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Edited by:
João Joanaz de Melo, Antje Disterheft,
Sandra Caeiro, Rui F. Santos and Tomás B. Ramos



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Proceedings of the
22nd International Sustainable Development
Research Society Conference

ISDRS 2016

*Rethinking Sustainability Models and
Practices: Challenges for the New and Old
World Contexts*

Volume 3 of 3

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Proceedings organization

The ISDRS 2016 Proceedings are divided into three volumes, organized according to the Conference theme special tracks and the core ISDRS themes and tracks. Papers associated to posters are presented at the end of each theme chapter. At the end of each volume there is a complete authors' index.

Volume 1:

General conference information

Special tracks for the 22nd ISDRS Conference:

Track A. Adaptive Sustainability Policies and Models in Changing Contexts

Track B. Oceans and Marine Sustainability: Innovation and Management

Track C. Sustainability Knowledge Sharing: From Individuals to Countries

Track D. African Perspectives on the Old and New World Challenges for Sustainable Development

Theme 1. Sustainable Development Science

Track 1a. Sustainable Development Science: Fundamental Concepts

Track 1b. Sustainability Assessment and Indicators

Track 1c. Role of Academia

Theme 2. Ecosystem Pressures and Limits

Track 2a. Biodiversity and Ecosystem Challenges

Track 2b. Food Security and Sustainable Agriculture

Track 2c. Resource Exhaustion

Theme 3. Climate Change and Energy

Track 3a. Climate Change: Predicting Impacts and Adaptation Strategies

Track 3b. Mitigating Climate Change: Renewable Energy and Energy Efficiency

Volume 2:

Theme 4. Sustainable Land Use and Sustainable Cities

Track 4a. Sustainable Land Use Policy/Planning to Manage Land Competition

Track 4b. Sustainable Cities and Regions

Theme 5. Corporate Sustainability and Innovation

Track 5a. Corporate Sustainability Management

Track 5c. Sustainability Transitions, Innovation Systems and Social Inclusion

Track 5d. Design for Sustainability

Track 5e. Circular Economy and Industrial Ecology

Track 5f. Sustainable Supply Chains and International Trade

Volume 3:

Theme 6. Society and Sustainability

Track 6a/6b. Global Equity, Justice and Global Governance

Track 6c. Social Sustainability: Impacts, Threats and Opportunities

Track 6d. Lifestyles and Consumer Behavior

Theme 7. Institutions and Governance Structures for SD

Track 7a. Local and Regional Governance

Track 7c. Advocacy and Public Participation

Track 7d. Rethinking the Fundamentals of Economic Systems

Track 7e. Legal Aspects of Sustainability

Table of contents of volume 3

(A) abstract only

(FP) full paper

Proceedings organization	3
Table of contents of volume 3	4
Theme 6. Society and Sustainability.....	8
Track 6ab7b. Global Equity, Justice and Global Governance	9
(A) Integrated research approaches to ensure healthy lives by controlling dengue disease: experiences in achieving sustainable development goals in Malaysia	10
(FP) Inequity and development in geospatial preparedness	12
(A) Towards Linking the Concepts of Ecosystem Services and Environmental Justice: A Hungarian Case Study	25
(A) The ethics of place in shale gas mining in South Africa	26
(A) The SDGs: Comprehensive Progress? An Assessment	27
(A) The elephant in the room: veganism as the low hanging fruit of sustainable development	28
(A) Do urban water development initiatives engage participants in the development of their capabilities? Reflections from India	29
(FP) A Legal Common Home for Humankind.....	30
(A) Political institutions and environmental public spending in 17 OECD countries: central versus local governance	45
(A) Energy Use Equity: analysis from smart meters, surveys and energy simulations	46
Track 6c. Social Sustainability: Impacts, Threats and Opportunities	47
(A) Health and dengue fever: a discussion about environment and media	48
(A) Challenges in social sustainable development learning from community-based conservation and reuse practices in the Tianzifang historic neighborhood	49
(FP) An investigation of the utilization of residential land in aged society	50
(A) Varieties of sustainability: A Brazilian case study	60
(A) Long-term population dynamics after evacuation from nuclear accident and tsunami disaster considering willingness to return of the residents	61
(A) Language as an inventory system for intangible cultural heritage	62
(FP) Women Social Entrepreneurship: A Step Towards Social Sustainability	63
(FP) Family Planning and Environmental Sustainability: Assessing the Science	73
(A) Social sustainability and water management in BRICS countries: opportunities for cooperation on impact assessments and risk management	80
(FP) Quality of life in a beyond growth economy.....	81
(FP) Co-processing of hazardous waste in a cement industry in Brazil: the perception of workers regarding environmental, economic, social and health issues	94
(A) Water issues in the food and energy frontiers	108
Track 6d. Lifestyles and Consumer Behavior	109
(A) Individual strategies to restore subjective wellbeing under the circumstances of constrained consumption	110
(A) Targeting households – Future policies to cap consumption demand	111
(A) Impact of different lifestyles on electricity consumption in Japan in 2030	112
(A) Energy saving behaviours: assessing the individual's motivation forces	113
(FP) Investigating long-term lifestyles changes in France: a statistical and modelling approach	114
(A) What is to be sustained? Exploring public discourses of sustainability in advanced and emerging economies	130

(FP) Coming out of the niche? Social banking in Germany: an empirical analysis of consumer characteristics and market size	131
(A) A conceptual systems thinking and life cycle analysis of the sharing economy	151
(FP) Environmentally sustainable consumption practice and the missing non-human living element	152
(A) Measuring Sustainable Consumer Behaviour of Residents in Abu Dhabi	166
(A) Citizen-driven sustainability initiatives and sustainability transitions	167
(FP) Negotiating Personal and Collective Futures across Diverse Social Contexts	168
(A) The Rio de Janeiro's Paradox: A comparison between the determinants of subjective well-being of three distinct neighborhoods	181
(A) Changing consumption through self-efficacy and community	182
(A) The role of trust and uncertainty in the start-up phase of local renewable energy initiatives: A mixed method analysis	183
Theme 6 posters	184
(A) Cultural Values and Trust in Agents and Technology in the Anticipation of Change to a Dynamic Prices Grid	185
(A) Extravagant Consumption and its Implications for Sustainability: The Case of the Ultra High Net Worth Emirati	186
(A) Perceptions of Relying Upon Smart Meters Within a Digitalized Grid With Dynamic Prices and of Using Technology in Managing Consumption of Electricity at Home: The Role Of Trust	187
(A) Predicting behaviour - energy efficiency types in organizational settings	188
(A) Sustainability of the Energy System: Transition through Stakeholder Activation	189
(FP) The importance of reducing food waste in restaurants for the minimization of environmental impacts	190
(A) The potential of Social network media in Sustainable marketing policy and the role of Electronic Word of Mouth (EWOM)	199
Theme 7. Institutions and Governance Structures for SD	200
Track 7a. Local and Regional Governance	201
(A) Discretion, Accountability and China's Local Governance Capacity: Evidence from its practice in addressing local debt crisis	202
(A) Capital Building through Collaboration aiming Sustainable Communities	203
(A) Development, Tax Regulation and Welfare: Examining the European Union Approaches	204
(A) The weight of words in a sustainability transformation	205
(A) Catalysing participatory governance in Portugal: visions, practices and political recommendations of bottom-up initiatives to foster social transformation	206
(A) Toward Better Case Studies: Understanding what ecourbanism means for urban governance	207
(A) A German Example: the 'ESSEntial' motivations and arguments for the 2017 European Green Capital award	208
(A) Powerful sustainable development master-signifiers in urban planning discourses	209
(A) Eco-districts as an example of transformative change? An investigation of energy use in Parc Marianne, Montpellier (France) and Olympic Village, Vancouver (Canada)	210
(FP) Notes from the watershed: What community stories can tell us about sustainable water management practices.	211
(A) Supporting EIA for a regional road project by HIA and stakeholder engagement	223
(A) Adopting a place-based approach: incorporating community interest into the multi-level governance of inland waterways	224
(A) Agrarian Cooperatives as Sustainable Governance Structures in the Region of Algarve, Portugal	225
(A) The governance capacity of Indonesia's public standard (the ISPO) for sustainable palm oil production	226

(A) The well-being of future generations (Wales) Act and higher education	227
(FP) Certification and farmer organization in the Indonesian coffee sector: benefits from a smallholder point-of-view.....	228
(A) Management of protected areas in Romania – from governing to governance	243
(FP) The role of the Polish public statistics in the monitoring process of sustainable development	244
(A) The new waste economy: a comparison between two urban solid waste management systems inside favelas of Rio de Janeiro, Brazil.	253
Track 7c. Advocacy and Public Participation	254
(FP) Coding sustainable development: contributions from the social representations theory	255
(FP) Kowork: Socially Engaged Codesign Project	266
(A) Co-production of knowledge for social participation and advocacy: cross-fertilizing perspectives of territorial intelligence and spatial justice	280
(FP) One, two, three, many! or...? Mapping of the controversy over the Swedish West Coast shrimp.....	281
(FP) Creative Practices Around the Production of Cork.....	302
(FP) Mainstreaming Sustainability in the Housing Sector: a New Approach to an established process.....	316
(A) The influence of public participation on industrial wastewater management in Thailand	329
(A) Revolution from the inside. How Grassroots Political Party Activism Changed Scottish Government Energy Policy	330
(A) Identifying stakeholders in a structured way - A basis for developing sustainable energy business models for cities	331
(FP) Towards Citizen Empowerment in Czechia: An Interurban Comparison of Grassroots Mobilizations in Post-democratic times	332
(A) The Regional Hydrographical Councils as consultative bodies of the water administration in Portugal . But who is being consulted by whom?	346
(A) Stakeholders, Processes and Power – setting assessment space for knowledge brokerage	347
(FP) Erosion Perceptions, Beliefs and the Sustainability of coastal areas: an individual or collective endeavour?	348
Track 7d. Rethinking the Fundamentals of Economic Systems	366
(A) Reflections on changing Humans-Nature-Wellbeing relationships and its implications for Economics and Development	367
(A) A Macro Model of Sustainability	368
(A) Environmental taxes, energy dependence and the current account	369
(A) Business Agglomeration and Special Districts	370
(FP) Frameworks for Policy-Making in a Sustainable New World.....	371
(A) Industrial Policies and Sustainability in Southeast Asia: The Case of the Philippines	376
(A) The sustainability of economic globalization: Cultural perspectives and the ‘social robustness criterion’	377
(A) Examining the effect of market power on sustainability: adding another market failure to the sustainability discourse	378
(A) Resource productivity in the European economic sectors	379
Track 7e. Legal Aspects of Sustainability	380
(FP) Good Corporate Governance (GCG) on Infrastructure Development for Environmental Sustainability: Indonesia Perspective From Corporate Law and Environmental Law	381
(FP) A Comparison of International Nitrogen Oxide Emission Regulation for the Energy Sector	394
(FP) Sustainable Development and Institutions: the case of property rights.....	407
(A) Reinventing agriculture in Brazil: Legal mechanisms to promote sustainability	417

(A) The implementation of 'Ecosystem Services' within the law: a multilevel governance challenge on the example of invasive alien species related EU-legislation in Austria and Romania	418
(A) Conflicting interests and practical solutions: nature conservation and climate change laws on the example of Vienna/Austria	419
Theme 7 posters	420
(FP) Construction and demolition waste: the steps for a sustainable management in a municipality of western of São Paulo State – Brazil	421
(A) Development of value-added products from biomass	431
Authors' Index	433
Sponsors and supporters	445

Theme 6. Society and Sustainability

Track 6ab7b. Global Equity, Justice and Global Governance

Track 6c. Social Sustainability: Impacts, Threats and Opportunities

Track 6d. Lifestyles and Consumer Behavior

Track 6ab7b. Global Equity, Justice and Global Governance

Session 6ab7b-01

Session 6ab7b-07

Integrated research approaches to ensure healthy lives by controlling dengue disease: experiences in achieving sustainable development goals in Malaysia

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Abstract

Nowadays, dengue is a serious mosquito borne disease that caused major problem on public health commonly in tropical and sub-tropical human populations including Malaysia. Higher mortality and morbidity caused by dengue are frequently due to the lack of specific treatment, lack of knowledge about dengue vector, minimal awareness among communities, control and surveillance of dengue were currently not effectively governed, less emphasis on law and policy as well as the absence of an effective vaccine or method for the main causes of failure in combating dengue. Therefore, to control this epidemic, integrated research approaches are needed to make sure the right methods, safe products of prevention, good services of health management, and good governance on policy and community participation as well as in achieving sustainable development goals. Approaches to integrated research framework are adopted from previous research by inclusion of some new disciplines with integrated education to form smart strategies to prevent and control dengue in Malaysia. These frameworks are considered the principle towards environmental protection and balanced socio-economic development. The approaches are ecosystems approaches to health, or eco-health, adaptive management and decision making process. It may seem too complex, but each approach has its strengths for dengue elimination to ensure healthy lives and promote well-being for all. Eco-health framework that links health with sustainable development has been widely used with vast experience in dealing with complex health issues. Adaptive management is considered as continuous process strategies that involved participation from experts on dengue, communities and health services to ensure the effectiveness of the technical solutions, strong informative knowledge on dengue and also forming good ethical individual attitude to achieve sustainable human well being. Decision making process is developed to connect eco-health framework and adaptive management to determine good governance in policy and regulatory issues by taking the community's views in decision making on dengue prevention. Closer collaboration between these three networking approaches can open huge opportunity to improve ecosystem services, socio-cultural empowerment, health awareness

and to foster economic growth without or less impact on human and the environment. Hence, it is necessary to look at the real situation of dengue cases in Malaysia by giving option to all parties involved to choose the best way to ensure healthy lives and promote well-being for all without dengue. Innovation methods on dengue prevention product and services should be continued to prevent the disease from continuing to spread. Informative knowledge and proper documentation data on dengue is essential for future research. The integration of these three frameworks and all relevant experts is hoped to provide greater understanding on approaches to ensure healthy lives and promote well-being for all and to provide new dimensions in dengue management as well as, good governance and community rights on decision making towards dengue prevention are parts of effective solutions in dengue control in order efforts to help the nation achieve its SDGs.

Keywords: integrated research approaches, eco-health, adaptive management, decision making process, sustainable development goals

Inequity and development in geospatial preparedness

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Abstract

Depending on the complexity of a disaster and the capacities of the local response, national and international organizations and multidisciplinary response teams might be involved in the response. Coordination and information sharing becomes paramount. Geographic Information Systems (GIS) are among the tools used to improve the coordination and facilitate the decision-making process through all phases of disaster management, especially during the disaster response. The use of GIS is based on geospatial preparedness: reliable up-to-date geodata, tools, and people with the knowledge to use those tools. The level of geospatial preparedness varies greatly, however, and in some cases does not exist. In developed countries geodata is abundant and there are means to use it. In least-developed countries the lack of geospatial preparedness, particularly geospatial pre-disaster information, hinders disaster response coordination. Based on the body of literature, other authoritative reports covering areas not studied by the academic world and the study of repositories and databases, this paper provides examples that illustrate the geospatial preparedness inequity issue and explores the tools that emergency responders use to overcome the problem. International institutions (UN) supported by Non-Governmental Organizations (NGOs), volunteers, and technical communities provide ad-hoc infrastructure to use GIS and create datasets in the aftermath of a disaster. Nevertheless, long-term solutions are necessary. Based on the theoretical concept of disaster management and development as a learning circle, the main contribution of the present work is to propose a new model to mitigate geospatial preparedness inequity. Our approach is based on the engagement of organizations working on development projects in disaster-prone areas to enhance geospatial preparedness. It is necessary to develop a public participatory GIS methodology for the engagement of development organizations and the local community to provide that information. Based on participatory methods this bottom-up approach allows community empowerment while conveying relevant pre-disaster datasets readily available to the humanitarian aid community. Nevertheless, there are challenges to overcome: development organizations, especially smaller players, might face a lack of technical and human resources to implement this approach. Finally, the perception of reliability by the emergency responders of the datasets provided through participatory approaches is also a question to be considered.

Keywords: geospatial preparedness, GIS, development, inequity, disaster management

1. Introduction

Communities are exposed to hazardous situations. These hazards may be natural (i.e. earthquakes, hurricanes, tsunamis, sea level rise, tornadoes, drought, landslides, and avalanches) or induced by human processes (i.e. environmental degradation and technological hazards). Hazardous situations occur with different consequences. There are different levels of vulnerability, preparedness, and response. In the aftermath of a disaster, situation, needs and response capabilities are assessed. Depending on the complexity of the disaster and local capacities, international and multidisciplinary response teams might be involved. Coordination and information sharing become paramount to implement an adequate response.

Geographic Information Systems (GIS) are among the tools used to improve coordination and to facilitate the decision-making process through all phases of disaster management. GIS provide the spatial dimension mainly as a cartographic tool for information sharing, resource allocation, planning and logistics. But it is also used for crisis simulation, environmental planning, hazard management, vulnerability assessment, risk reduction, map population densities and

displacements, and investigation of infectious disease outbreaks (Kaiser, Spiegel, Henderson, & Gerber, 2003) (Shorbi & Wan Hussin, 2015).

There are, however, requirements that must be pre-fulfilled to undertake these tasks. These are referred to as *Geospatial Preparedness*. This concept is described by the United States (US) Department of Homeland Security (DHS) as: "... the level of overall capability and capacity necessary to enable all levels of the Department to use geospatial data, geographic information systems software and hardware, and geospatial applications to perform essential functions such as prevention, detection, planning, mitigation, response, and recovery in order to minimize loss of life and property..." (page 3, DHS, 2004).

The implementation of geospatial technologies for disaster management requires political support and regulations to create institutions with tools and trained people to gather and use geodata. The level of geospatial preparedness differs across the world; it is significant in many countries while inexistent in others. This inequity hinders the coordination of disaster management. The lack of information, more particularly the lack of geospatial pre-disaster information, delays the coordination of disaster response. The goal of this paper is to illustrate through examples the geospatial preparedness inequity issue, and to consider how it is being addressed. Ultimately, the main objective is to introduce a new model to improve geospatial preparedness based on the work of development organizations in synergy with international institutions. It is out of the scope to provide a comprehensive inventory of geospatial preparedness, or to establish causal relationships between development and the use of technology.

2. Methods

The research is based on a literature review and the study of open databases. Researchers agree on the difficulties to perform a comprehensive literature review on GIS application to disaster management since in this multidisciplinary environment GIS is just one tool amongst others. Moreover, when considering the application by international institutions, much of the knowledge is not accessible or does not meet scientific standards (Verjee, 2007). This research is based mainly on the analysis of peer-reviewed journals and conference proceedings, in addition to other authoritative reports and online information for topics not considered by formal research. This paper might be considered a preliminary work that should lead further research using a multi-method strategy (qualitative and quantitative methods sequentially to "triangulate" the findings and develop the analysis) (Denscombe, 2014).

The first part of the paper explores the use of GIS for disaster, followed by comparative examples of geospatial preparedness to illustrate the inequity issue. It closes with a reflection on the mechanisms in place to close this gap and the introduction of a new model.

3. Results and discussion

3.1 Use of GIS in Disaster Management

Disaster management is approached as a cycle divided into phases as illustrated in Figure 1. GIS are coordination tools used throughout the cycle. Academia, institutions, NGOs, and software providers have different, but complementary, opinions about GIS capabilities. A holistic approach is needed to cover this topic: local governance considered in conjunction with international institutions and interaction between institutions, strategy with in-field operations, "basic" applications with spatial analysis.

Geography is a complex reality full of synergies between space, ecosystem, society, culture and economy. The use of GIS evolved to provide this geographical perspective to disaster management. The examples provided by the Joint Board of Geospatial Information Societies shows its flexibility, integration and economic impact (JBGIS, 2010). Applications, initially limited to technological solutions, become holistic and participative. Overviews on this application from the late 1990s (Cova, 1999) (Kaiser et al., 2003) as well as current publications (Kawasaki, Berman, &

Guan, 2013) recognize GIS as a fundamental tool to deal with hazards. It is used at different levels of complexity including a wide range of analysis and modelling capabilities. In humanitarian work GIS' main use is as a cartographic tool for situational awareness and information sharing. Optimization methods, problem solving, and decision support tools (e.g. route and resource allocation) are of especial interest for in-field operations. Additionally, modelling capabilities are used during rescue operations and for prevention and early warning (Shorbi & Wan Hussin, 2015). Other "trendy" topics in developed countries are: 3D mapping, cloud computing, and web-based GIS (Kawasaki et al., 2013).



Figure 1. Disaster management cycle.

Nevertheless, the advantages of using GIS for disaster management depend on the level of geospatial preparedness. In countries with adequate disaster mitigation strategies there are databases with reliable up-to-date information readily available to organize the response, there are tools to use and share that information and knowledgeable people to use those tools. Availability of reliable spatial data is especially important, including geodata related to the area of study, the community in that area, and the hazards to which they are exposed. In this regard, well-populated geospatial databases and spatial data infrastructures (SDI) are considered an essential precondition for the use of GIS (Köhler, Müller, Sanders, & Wächter, 2006). In the aftermath of a disaster, the International Association of Emergency Managers (IAEM-ETC, 2013) considers necessary datasets including but not limited to: topography, streets/roads, communications and logistics, administrative boundaries, critical infrastructures, utility lines, health care facilities, socio-demographics (population distribution and population centres), institutions; impact-area modelling; damage and needs assessments: disaster boundaries, etc.

3.2. Geospatial preparedness inequity

The fact that investment in geospatial preparedness improves information management during disaster response is commonly accepted by the humanitarian community. Geospatial preparedness, however, is not homogeneous across the world. A country comparison reveals an inequity issue. There are countries where geospatial preparedness is a "political" objective. These countries have institutional structures, tools, knowledgeable users, and an active private sector. As a result, geodata is abundant. On the contrary, in many places the geographical component of the information is not considered, data are not georeferenced and GIS are almost unknown. This inequity jeopardizes disaster response in those places lacking geospatial preparedness. The following paragraphs illustrate this gap.

US geospatial preparedness is described in the DHS Geospatial Concept of Operations

(GeoCONOPS). GeoCONOPS, included in the National Incident Management System, is an overview of different actors, tools, and best practices. It coordinates the use of GIS in disaster management and harmonizes political decisions for geospatial preparedness. Many US institutions are involved in geospatial preparedness. There are massive amounts of information originating in public and private institutions. Any institution using GIS creates and maintains geodata available in case of emergency (e.g. Federal Emergency Management Agency, US Geological Survey, Geospatial Multi-Agency Coordination, National Oceanic and Atmospheric Administration, National Aeronautics and Space Administration, US Army Corps of Engineers, US Forest Service, Environmental Protection Agency, and Department of Transportation). The list could be endless due to the ubiquity of GIS in the US. Usually, the information is accessible through web-based tools (e.g. DHS OneView and Portal for ArcGIS, Geospatial Platform database; *Gold* assembled by the National Geospatial-Intelligence Agency, Geospatial Portal, and CorpsMap Viewer). There are also GIS-based modelling (e.g. LandScan USA, Interagency Modelling and Atmospheric Assessment Center HAZUS, and Flood Inundation Mapper) and coordination tools (e.g. DHS Common Operating Picture: strategic situational awareness application through a web-accessible interface, and DHS Next-Generation Incident Command System) (DHS, 2014).

In the US there are multiple organizations, databases and strategic tools for coordination, decision making and information sharing. There are also tools for modelling and other analysis. There is continuous development to improve the information and to improve the tools to use it. In addition, there are new approaches involving public participation through volunteered information and free open data. Taking this level of geospatial preparedness as benchmark we would like to compare the situation in different parts of the world. This is not a comprehensive inventory but just examples to reveal different levels, as shown in Table 1.

Table 1. Levels of geospatial preparedness.

Geospatial Preparedness	Benchmark	Advanced implementation	Initial stages	Basic level
Institutions	Abundant	Abundant	Few	None
Tools	Abundant	Abundant	Few	None
Skilled staff	Abundant	Abundant	Relatively scarce	Scarce or none
Geodata	Abundant & available	Relatively abundant & available	Restricted to most populated areas	Non-existent, not accessible, outdated and/or not reliable.
Overall Coordination	Master plan for geospatial technologies in disaster management	Different projects applied to disaster management without clear overall coordination	Coordination is not essential since there are only a few institutions	Not applicable
Private Sector	Very Active & in close interaction with the institutions	Active and with some level of interaction with the institutions.	Collaboration with the institutions to meet the situation.	Multinationals linked to natural resources (restricted access). Universities/NGOs

Japan is at an advanced level of geospatial preparedness. While

the US pioneered the use of GIS for emergency response in the late 1980s, Japan followed in the 1990s. Japan Bosai Platform gathers “know-how” applicable to disaster management. It provides many examples of applications for different types of disaster. It is interesting to see the public-private partnerships in many projects (e.g. Kukusai Kogyo, Panasonic System Networks, Asia Air Survey Co). This symbiotic relationship is at the core of geospatial preparedness in most countries developed on a capital-based model. Other examples of countries at this level of geospatial preparedness are Canada and most European Union (EU) members. There is an enormous amount of geodata in the Canadian Geospatial Data Infrastructure. In addition, Canada’s Multi-Agency Situational Awareness System is a common operational picture and communication tool that exemplifies the level of geospatial preparedness of the country that first developed GIS

in the 1960s. Another example is the Canadian Disaster Database, which has a geospatial mapping component. EU project INSPIRE aims to facilitate sharing (availability and interoperability) of environmental spatial information through a geoportal. The availability of open geodata is used by companies like IDGIS developing open source software (e.g. Geoide Viewer: a GIS web-based tool for regional disaster management). In the UK there is a 2005 *Cabinet office Guide in GIS applications in Integrated Emergency Management* (MacFarlane, 2005) identifying available data (many INSPIRE datasets from Ordnance Survey Digital Map Products). In addition, around the EU there are countless geospatial preparedness initiatives at country level (e.g. Germany VorsorgePlan Schadstoffunfallbekämpfung maps the entire coast as part of a Contingency Planning System and Sensitivity Mapping).

Public and private institutions in these countries have many projects to gather and share information, and as a result reliable geodata is abundant. These institutions have the personnel and tools to use this information. There is not, however, a tool to coordinate these initiatives, such as GeoCONOPS in the US.

In other Asian and American countries geospatial preparedness initiatives are in their initial stages. The amount of information is not as profuse (most regions are mapped but the scale is not always adequate, there is insufficient level of detail, and many thematic areas are not covered). Some countries have developed GIS-based tools for disaster management including numerous examples of common operational picture (e.g. Peru – SIGRID, Chile – SIIE, Argentina - “Sistema Crisis”, Colombia – NGRD, Brazil - INDE & S2ID). These tools show different levels of integration with the national disaster management structures.

In many countries geographic information is not considered in the national incident plans. Geospatial datasets are not available. In some cases, it is not even possible to georeference a postal address (e.g. Sudan). Some international private companies may have datasets usually related to natural resources, but the access to this information is restricted.

Finally, it is difficult to evaluate the level of geospatial preparedness in some places. Data are not open to public use due to security concerns (e.g. Venezuela) or are just not available. Regardless of the available academic research, it is difficult to picture geospatial preparedness in places like China due to governmental structures and language barriers that hamper the investigation.

There are extreme differences between the expansion of GIS-based tools in low and high-income countries (Opadeyi, 2009). Even if it is not possible to geographically distribute the levels of geospatial preparedness indicated in Table 1, it could be generalized that the implementation is advanced in most western countries and some in Asia. It is just beginning in many countries in Latin America and some in Asia, while a basic level is the standard for Africa and some countries in South-East Asia and Latin America.

Geospatial preparedness inequity is especially problematic for least-developed countries and small islands. There is an acute need for information to coordinate the international support to disaster response. The analysis of the use of GIS during the 2010 Haiti earthquake carried out by Zook, Graham et al. observes *“Particularly challenging to relief efforts was the fact that comprehensive databases of assets, infrastructure, population, and location were minimal[...] Even some of the most fundamental informational needs, like detailed roadmaps and locations of critical assets, were not available”* (Zook, Graham, Shelton, & Gorman, 2010 p. 14).

Geodata is the most significant and costly part of GIS. Lack of pre-disaster data in least-developed countries is an issue (Wang et al., 2012). As we should see in the following point, where the level of income does not allow complex response structures, the attention is given to low-cost and free remote sensing alternatives and the expansion of open-source GIS. Nevertheless, these resources cannot replace sound geospatial preparedness. The matter is especially important since the purpose of the international humanitarian community should not be to replace the national response capacities, but to complement, support, nurture, and build those capacities (Ville de Goyet, 2008).

3.3. Addressing the inequity problem

Geospatial preparedness inequity has critical consequences during the emergency response. In those cases in which local authorities cannot cope with the consequences of a disaster, international humanitarian aid supports local capabilities and tries to cover information management needs. Disaster response teams arriving on the scene include units to create GIS infrastructure. Various organizations (i.e. UN institutions, private sector, NGOs, and volunteers) work together to create datasets “on the spot”. It takes precious time to make this information available to the decision-makers coordinating the response. Some of the data are disaster-related, but there is also the need for pre-disaster information (to be used as a base-line for recovery or because it remains relevant).

3.3.1. Institutional International Support: United Nations

When the international community intervenes, the United Nations Office for the Coordination of Humanitarian Affairs (UNOCHA) provides coordination, information management and financing through the *cluster approach*. During the initial stages of the emergency response the intervention is led by UN Disaster Assessment and Coordination (UNDAC) Teams. Within the UNDAC team there is a specific Information Management section that, among other tasks, deals with the use of GIS usually with partner organizations (i.e. MapAction). The initial assessment carried out by the UNDAC team is limited by time and resources. Subsequently, secondary data analysis, particularly “pre-crisis” secondary information, plays a crucial role (MapAction, 2011) (UNOCHA, 2013).

The need for reliable geodata has been acknowledged by the international institutions, particularly by the UN (Peduzzi & Herold, 2005) (Longhorn, 2012). The need to improve geospatial preparedness was initially considered by the UN General Assembly Resolution 59/212 (UN, 2005). It was further developed by the Inter-Agency Standing Committee 77th Working Group Meeting Information Management and Preparedness (7-9 July 2010). According to the UN Committee of experts on Global Geospatial Information Management the UN is developing the UNMap: a collection of geo-databases to be used as core mapping layers (international and administrative boundaries, coastlines, drainage, water bodies, roads, railways, airports, populated places, and urban areas). Also, the International Steering Committee for Global Mapping aims to compile fundamental digital geospatial information (transportation, boundaries, drainage, population centres, elevation, vegetation, land cover and land use). There are other UN projects: Inter-Agency Standing Committee Common Operational Datasets (CODs) and Fundamental Operational Datasets (FODs) can be downloaded from the Humanitarian Response repository. CODs (generic) and FODs (cluster specific) have mandatory data characteristics and comply with the “Dublin Core” minimum metadata standards (UNOCHA, 2009). UNOCHA Humanitarian Data Exchange consists of a *Repository* where raw data can be uploaded and made openly available. Other UN institutions providing GIS-based products during emergencies are: Second Administrative Level Boundaries project, the UN World Food Program as part of the Logistics Cluster and the UN High Commissioner for Refugees Field Information and Coordination Support Section.

These examples show a complex structure striving to achieve global coverage involving many organizations with overlapping tasks and interoperability issues. The results of these projects are uneven. Further research would be necessary to establish the level of geospatial preparedness achieved.

In countries without proper geospatial preparedness, international support is essential for the coordination of the response during the initial stages of a disaster. It is arguable, however, whether this “reactive” support is as adequate as promoting locally geospatial preparedness would be. Building local capabilities could have long lasting benefits for the community facilitating the task of the international community when that support is needed.

3.3.2. Non-institutional International Support: NGOs, Volunteers, and Private Sector

Least-developed countries lack institutions to provide the services needed by the society. NGOs become the centre of civil society, turning into service providers and reliable partners for governments and international institutions (i.e. UN clusters) (Lewis & Kanji, 2009).

Some NGOs are global players having GIS structures to respond to their particular needs, while others are exclusively focused on geospatial services. For example, the International

Committee of the Red Cross had a GIS unit since 2006 with a centralized web-enabled database that synchronizes with local data storages. *Médecins Sans Frontières* is establishing a framework for application based around “Map Centre” server with data accessible in a webserver. The system is being set up by CartONG, which is a GIS specialized NGO (Laborderie, Lessard-Fontaine, & Soupart, 2014).

The work of NGOs and UN institutions is supported by the volunteers and technical communities (V&TCs). The on-line community responds to disasters in different ways. One of the fastest developing methods is to use geospatial technologies; V&TCs provide GIS support in partnership with formal socio-technological networks, data providers, and software vendors. This support is becoming essential to address geospatial preparedness inequity. We are indeed facing a data overload (Carpenter & Snell, 2013).

Volunteers are coordinated by organizations like the Urban and Regional Information Systems Association program GISCORPS. The projects undertaken cover a wide range of disaster response activities: mapping as baseline data for humanitarian response, development of post-disaster web maps, damage proxy maps, geo-referencing, and organizing access databases. Volunteers are also field deployed upon request. There are many other organizations covering different areas of work: the Humanitarian OpenStreetMap Team provides geographic base data with their crowdsourced free and open world map; International Network of Crisis Mappers provides mobile and web-based applications, participatory and crowdsourced maps, aerial and satellite imagery, geospatial platforms, advanced visualization and live simulation; MicroMappers uses volunteers to pre-process disaster data. These and many other organizations are part of the Digital Humanitarian Network (DHNetwork), which is a “network-of-networks” creating a consortium of V&TCs that provides an interface with formal humanitarian organizations. The Standby Task Force established by DHNetwork covers: rapid geolocation of event-data and infrastructure data, creation of live crisis maps, data development, GIS and big data analysis, and satellite imagery tagging and tracing.

Another method to close the geospatial preparedness inequity gap turns to volunteered geographic information (VGI). The concept, coined by Goodchild (2007) covers a wide array of actions that could be interesting for countries with lower economic capacity. Institutional data (usually remote sensing) is complemented by data provided by the affected community giving rise to the concepts “people as sensors” and “collaborative damage mapping”. Nevertheless, these concept have limitations due to the lack of well populated SDI with quality data (Maiyo, Kerle, & Köbben, 2010), technological knowledge, and restricted internet access. As a result, VGI is mainly considered in developed countries that already have a good level of geospatial preparedness.

The possibilities opened by V&TCs and VGI have also been acknowledged by the institutions. Several initiatives are supporting and funnelling the results of this work. Information (mainly remote sensing) is made freely available to volunteers (e.g. Imagery to the Crowd of the U.S. Department of State Humanitarian Information Unit) and there are initiatives based on the information obtained from this community (e.g. MapGive by USAID, disaster.data.gov, OpenFEMA, and NGA GeoQ by the USA government, UNOCHA initiative The Humanitarian Data Exchange and the open source platform City72 Toolkit).

The private sector also supports humanitarian aid missions. Software and RS providers team up with institutions and V&TCs to provide geospatial services. We could take as examples Esri’s Disaster Response Program and Google Crisis Map open source tool from the Google.org Crisis Response team.

The 2010 Haiti earthquake was an inflection point regarding the use of V&TCs in disaster management. For the first time, V&TCs and to some extent VGI, played a fundamental role in the response. Their efforts were the basis for making information available within days of the disaster (Zook et al., 2010) (Harvard Humanitarian Initiative, 2011). This change is studied by Kawasaki et al (2013) who consider the use of crowd-sourced mapping for the coordination of emergency response. The collaboration of V&TCs changed the structure of the information management teams and the datasets available. The process culminating in the 2010 response was based on technological developments (web-mapping, geodata browsing, web-based data exchange

and development, mash-up live editing on the web) and the willingness to open data access from public and private sectors. The result of the study is a positive view of crowd-sourced information for response coordination. The prerequisite is the integration of this source of information in the disaster response plan. It can be concluded that the use of V&TCs and VGI is valuable in conjunction with a good level of geospatial preparedness.

Private sector NGOs and V&TCs are an *ad-hoc* answer to the lack of pre-processed geographical information. These sources of information and know-how seek to bridge the gap in geospatial preparedness. Their work has become necessary, but is not sufficient to do so.

3.3.3. A new approach: Development organizations

Post-disaster international support can only partially address geospatial preparedness inequity, making a new approach necessary.

The study of development and disaster management as part of a unique learning cycle, as shown in Figure 2, has been considered by several authors (Weichselgartner, 2002). Disaster management and development projects are part of this learning process to improve human wellbeing in changing environmental and socio-economic conditions (Desai & Potter, 2002). Cost-effective solutions can be developed through a common approach and common tools (San Martin, 2014). Development projects and disaster management share a geography. A holistic and dynamic approach is required to produce information from the community related to this geography. The different actors and factors have to be studied considering space, time, interactions, and feedback-loops (Weichselgartner, 2002).



Figure 2. Development and disaster-management learning cycle.

NGOs implement development projects to cover the needs that official institutions cannot satisfy. These *development organizations* often work in disaster prone areas having low level of geospatial preparedness. The value of GIS for planning, monitoring, and evaluation of development projects is widely acknowledged. Development organizations use GIS to base the decision-making process on sound information management, integrating the geographical component in topics such as sustainability, climate change (Stocker, Burke, Kennedy, & Wood, 2012) or linked to traditional cultures. Geospatial technology is also associated to land management, vulnerability assessments, and integration of disaster risk reduction strategies into development planning (Guha-Sapir, Rodriguez-Llanes, & Jakubicka, 2011).

The *disaster-development learning cycle* concept allows a synergic approach to GIS use to improve geospatial preparedness. The information standards and formats used for development projects and humanitarian aid are different but in many cases cover similar topics. It would be

necessary to compare the pre-disaster information needs of the disaster response managers with the capabilities of the development organizations to find the common points. As a result, development organizations in partnership with local communities could provide useful pre-disaster information, thereby reducing geospatial preparedness inequity.

Community implementation contemplates the inclusion of socio-economic factors in the information management system, while the development of technological skills empowers the community and provides ownership of the project. In addition, participatory approaches address other needs highlighted by the Sendai Framework for Disaster Risk Reduction considering the integration of traditional and local knowledge and the collaboration among people at the local level (UNISDR, 2015).

Public Participatory GIS (PPGIS) (Bunch, Kumaran, & Joseph, 2012) and Community mapping are relevant forms of VGI within this framework. PPGIS in development projects is usually associated with land-planning and resources management. It has also been linked to vulnerability mapping and used as a tool to introduce disaster risk reduction strategies in the community (UNCTAD, 2012). These applications bring together socioeconomic development and community empowerment. In parallel, they could become instruments to reduce geospatial inequity. These models could be complemented with the support of the V&TCs for data pre-processing.

Nevertheless, there are technological issues related to these applications. Even if free and low-cost techniques are available, know-how is needed to build up the capabilities of NGOs and communities. Limitations are not only technological but socio-economic, and institutional factors also play an important role in the creation of barriers (Badurek, 2009). There are also ethical issues related to the ownership of the project. The main limitations, however, could be the perception of quality and reliability of the information provided to the disaster response managers (Devillers & De Freitas, 2013).

4. Conclusions

The geographic component should be integrated in the decision-making process for disaster management. GIS are a powerful tool to facilitate this integration, especially during emergency response. Implementing a disaster response GIS requires geospatial preparedness: institutions, trained personnel, computing capacity, coordination, and reliable geodata. In addition to lack of skilled staff, the main challenges when building a GIS are lack of data, or data not freely available, and lack of standards and coordination between institutions.

The comparison of geospatial preparedness levels reveals an inequity issue. The difference amongst countries is enormous. In some, government supported institutions and an active private sector are coordinated to generate skilled staff, tools, and reliable geodata. This coordination makes it possible to turn a group of technical solutions into a holistic approach to disaster management. In other countries geospatial preparedness is deficient or does not exist. This issue is especially problematic for least-developed countries, where there is a more acute need for information to coordinate the international support.

The humanitarian aid community works to lessen the consequences of this inequity. International institutions (i.e. UN) and NGOs have acknowledged the need for geospatial preparedness. Main actors in international disaster response have developed the structure and knowledge to handle geodata. International support and public-private sector partnerships are providing vital solutions to coordinate disaster response in places with a deficient geospatial preparedness. Institutions are facilitating the work of V&TCs in providing open data and using the outcomes. International institutions, NGOs, the private sector, and V&TCs are the *ad-hoc* answer to the lack of pre-disaster information. In some cases, there is even a data overload. It is interesting to consider this apparent contradiction. The "mass-production" of data in the aftermath of a disaster does not compensate for the lack of pre-disaster data. On the other hand, the escalation of geodata production stresses the importance of data quality and reliability. These reactive sources of information and know-how

have become necessary but are not sufficient to replace geospatial preparedness.

The question is whether there are other ways to reduce the gap in geospatial preparedness. Considering development and disaster management as a learning cycle, the work of development organizations can be guided in that direction. Inequity can be contested from the bottom-up. Local communities can improve geospatial preparedness to facilitate the coordination of international humanitarian aid. Usually, NGOs implement development projects in disaster prone areas. These organizations use, or could use, GIS-based tools to plan, monitor, and evaluate project implementation. The information standards and formats used are different, but in many cases cover similar topics. This approach allows empowering the community while bringing long lasting benefits to the development and humanitarian organizations and the communities at the centre of their work.

The use of GIS exploring the synergies between development and disaster management is actually focused on applying disaster risk reduction strategies to development. A new approach should be at the centre of research to contemplate development as a tool to improve geospatial preparedness. It would be necessary to determine the information needs of the humanitarian community and implement qualitative and quantitative methods to establish the datasets and formats required. Since data input (acquisition and pre-processing) is expensive and time consuming, it is necessary to develop a PPGIS methodology for the engagement of development organizations and the local community to provide that information. In addition, V&TCs can support data pre-processing as they do in the aftermath of a disaster. The current trend in open data availability should both facilitate the task and be the reference for the results. These datasets should not be adequate only for the humanitarian community, but also for the tasks implemented by the development organizations. In addition, the implementation of the data gathering methodology should be in line with the budget and capabilities of these organizations. The concept can only be feasible if they obtain a benefit without an added burden.

There are limiting factors to this approach. The lack of technological capacity and data availability limits the use of GIS-based tools by the development community, especially among smaller organizations, even though some projects (e.g. MapAction RAMP) are trying to solve this issue. In addition, how to engage V&TCs without the pressure of a recent disaster should be considered. Finally, and more importantly, there is a conceptual limitation imposed by the lack of “credibility” of the information provided. It is necessary to establish the perception of reliability of the information obtained by NGOs through participatory approaches, and discover how to improve it.

References

- Badurek, C. a. (2009). Identifying barriers to GIS-based land management in Guatemala. *Development in Practice*, 19(2), 248–258. doi:10.1080/09614520802689543
- Bunch, M., Kumaran, T., & Joseph, R. (2012). Using Geographic Information Systems (GIS) For Spatial Planning and Environmental Management in India: Critical Considerations. *International Journal of Applied Science and Technology*, 2(2), 40–54. Retrieved from http://www.ijastnet.com/journals/Vol_2_No_2_February_2012/5.pdf
- Carpenter, J., & Snell, J. (2013). Future trends in geospatial information management: the five to ten year vision. *Ordnance Survey*. Ordnance Survey at the request of the Secretariat for the UN Committee of Experts on Global Geospatial Information Management. Retrieved from <http://ggim.un.org/docs/Future-trends.pdf>
- Cova, T. (1999). GIS in emergency management. In P. A. Longley, M. F. Goodchild, D. J. Maguire, & D. W. Rhind (Eds.), *Geographical Information Systems: Principles, Techniques, Management and Applications* (2nd ed., pp. 845–858). Abridged.
- Denscombe, M. (2014). *The good research guide for small-scale social research projects*. *Psychological Science* (5th ed.). Berkshire, UK: Open University Press McGraw-Hill

Education.

- Desai, V., & Potter, R. (2002). Learning and planning in disaster management. In V. Desai & R. Potter (Eds.), *Companion to Development Studies* (1st ed., pp. 176–204). London: Arnold.
- Devillers, R., & De Freitas, D. M. (2013). The use of GIS and geospatial technologies in support of coastal zones management - results of an international survey. In R. Devillers, C. Lee, R. Canessa, & A. Sherin (Eds.), *CoastGIS. The 11th international symposium for GIS and computer cartography for coastal zone management* (pp. 100–103). Victoria, British Columbia, Canada.
- DHS. (2004). *Geospatial Management Office Management Directive System. MD Number: 4030*. Retrieved from https://www.dhs.gov/xlibrary/assets/foia/mgmt_directive_4030_geospatial_management_offic_e.pdf
- DHS. (2014). Homeland Security Geospatial Concept of Operations (GeoCONOPS). Version 6. Department of Homeland Security. Retrieved from <https://publicintelligence.net/dhs-geoconops-v4/>
- Goodchild, M. F. (2007). Citizens as sensors: the world of volunteered geography. *GeoJournal*, 1–15. Retrieved from <http://link.springer.com/article/10.1007/s10708-007-9111-y>
- Guha-Sapir, D., Rodriguez-Llanes, J. M., & Jakubicka, T. (2011). Using disaster footprints, population databases and GIS to overcome persistent problems for human impact assessment in flood events. *Natural Hazards*, 58(3), 845–852. doi:10.1007/s11069-011-9775-y
- Harvard Humanitarian Initiative. (2011). *Disaster Relief 2.0: The future of information sharing in humanitarian emergencies. UN Foundation & Vodafone Foundation Technology Partnership*. Washington, D.C. and Berkshire, UK. Retrieved from <http://www.unfoundation.org/assets/pdf/disaster-relief-20-the.pdf>
- IAEM-ETC. (2013). *Recommended Technological Capabilities for Emergency Coordination and Operations Centers. A Resource Developed by the International Association of Emergency Managers - Emerging Technology Caucus*. Retrieved from http://www.sm4em.org/wp-content/uploads/2013/11/IAEM-ETC_Tech_Recs_for_ECCs_v1.pdf
- JBGIS. (2010). *Geoinformation for Disaster and Risk Management. Examples and Best Practices*. Joint Board of Geospatial Information Societies (JBGIS). Retrieved from http://www.fig.net/jbgis/publications/jbgis_booklet_2010.pdf
- Kaiser, R., Spiegel, P. B., Henderson, A. K., & Gerber, M. L. (2003). The Application of Geographic Information Systems and Global Positioning Systems in Humanitarian Emergencies: Lessons Learned, Programme Implications and Future Research. *Disasters*, 27(2), 127–140. doi:10.1111/1467-7717.00224
- Kawasaki, A., Berman, M. L., & Guan, W. (2013). The growing role of web-based geospatial technology in disaster response and support. *Disasters*, 37, 201–221. doi:10.1111/j.1467-7717.2012.01302.x
- Köhler, P., Müller, M., Sanders, M., & Wächter, J. (2006). Data management and GIS in the Center for Disaster Management and Risk Reduction Technology (CEDIM): from integrated spatial data to the mapping of risk. *Natural Hazards and Earth System Science*, 6(4), 621–628. doi:10.5194/nhess-6-621-2006
- Laborderie, S. de, Lessard-Fontaine, A., & Soupart, M. (2014). *Development of the Geographic Information System in MSF-CH*. Retrieved from http://cartong.org/sites/cartong/files/OCG-GIS-strategy2014-15_lightV.pdf
- Lewis, D., & Kanji, N. (2009). *Non-Governmental Organizations and Development*. (T. Binns, Ed.) *Molecular Biology and Evolution* (1st ed.). London & New York: Routledge.

- Longhorn, R. (2012). *GIS for the United Nations and the International Community Conference (UNITAR - UNOSAT). International community conference*. Geneva.
- MacFarlane, R. (2005). *A Guide to GIS Applications in Integrated Emergency Management. Emergency Planning College, Cabinet Office*.
- Maiyo, L., Kerle, N., & Köbben, B. (2010). Collaborative post-disaster damage mapping via Geo Web Services. In M. Konecny, S. Zlatanova, & T. L. Bandrova (Eds.), *Geographic Information and Cartography for Risk and Disaster Management - Toward Better Solutions (Lecture Notes in Geoinformation and Cartography)* (1st ed., pp. 221–231). Berlin: SpringerVerlag. Retrieved from http://link.springer.com/chapter/10.1007/978-3-642-03442-8_15
- MapAction. (2011). *Field Guide to Humanitarian Mapping* (2nd ed.). Little Missenden, UK: MapAction. Retrieved from www.mapaction.org
- Opadeyi, J. (2009). *Research on the Application of Geographic Information Systems for Disaster Early Warning Systems. Enhancing the Effectiveness of Information and Communication Technology Applications and Tools for Disaster Management in the Caribbean*. Retrieved from <http://www.lirds.org/OCCASIONALPUBLICATIONS>
- Peduzzi, P., & Herold, H. D. C. (2005). Mapping Disastrous Natural Hazards Using Global Datasets. *Natural Hazards*, 35(2), 265–289. doi:10.1007/s11069-004-5703-8
- San Martin, R. (2014). *Information Management in Disaster and Development: Geographic Information Systems* (No. 125). CEsa. Lisbon. Retrieved from <http://www.repository.utl.pt/bitstream/10400.5/7044/1/CEsa-WP125.pdf>
- Shorbi, M., & Wan Hussin, W. M. A. (2015). The use of Spatial Data in Disaster Management. *TI Journals World Applied Programming*, 5(4), 73–78. Retrieved from <http://www.waprogramming.com/download.php?download=5453b010c70131.46829808.pdf>
- Stocker, L., Burke, G., Kennedy, D., & Wood, D. (2012). Sustainability and climate adaptation: Using Google Earth to engage stakeholders. *Ecological Economics*, 80, 15–24. doi:10.1016/j.ecolecon.2012.04.024
- UN. International cooperation on humanitarian assistance in the field of natural disasters, from relief to development (2005). Retrieved from https://www.iom.int/jahia/webdav/shared/shared/mainsite/policy_and_research/un/59/A_RES_59_212_en.pdf
- UNCTAD. (2012). *Geospatial Science and Technology for Development. With a focus on urban development, land administration and disaster risk management* (No. 6). New York and Geneva. Retrieved from http://unctad.org/en/PublicationsLibrary/dtlstict2012d3_en.pdf
- UNISDR. (2015). Sendai Framework for Disaster Risk Reduction 2015-2030 (Third United Nations World Conference on Disaster Risk Reduction). Sendai, Japan: UN General Assembly. Retrieved from http://www.wcdrr.org/uploads/Sendai_Framework_for_Disaster_Risk_Reduction_2015-2030.pdf
- UNOCHA. (2009). *Common Operational Datasets for the Management of Humanitarian Information in Asia and the Pacific*, v1.0. Bangkok, Thailand: UNOCHA Regional Office for Asia and the Pacific. Retrieved from http://www.pacificdisaster.net/pdnadmin/data/original/AsiaPac_OCHA_CommonOperationalD atasets_v1.pdf
- UNOCHA. (2013). *United Nations Disaster Assessment and Coordination UNDAC Field Handbook* (6th edition.). Geneva: Office for the Coordination of Humanitarian Affairs (OCHA).
- Verjee, F. (2007). *An assessment of the utility of GIS-based analysis to support the coordination of humanitarian assistance. Zhurnal Eksperimental'noi i Teoreticheskoi Fiziki*. George Washington University. Retrieved from

<http://pqdtopen.proquest.com/pqdtopen/doc/304869817.html?FMT=AI>

- Ville de Goyet, C. (2008). Information Gaps in Relief, Recovery, and Reconstruction in the Aftermath of Natural Disasters. In S. Amin & M. Goldstein (Eds.), *Data against Natural Disasters. Establishing effective systems for relief, recovery and reconstruction*. (1st ed., pp. 23–58). Washington, DC: The World Bank.
- Wang, J., Pierce, M. E., Ma, Y., Fox, G. C., Donnellan, A., Parker, J. W., & Glasscoe, M. (2012). Using Service - Based Geographical Information System to Support Earthquake Research and Disaster Response. *Computing in Science and Engineering*, 14(5), 21–30. doi:10.1109/MCSE.2012.61
- Weichselgartner, J. (2002). About the capacity to be wounded: the need to link disaster mitigation and sustainable development. *Extreme Naturereignisse–Folgen, Vorsorge, Werkzeuge*, 150–158. Retrieved from <http://www.dkkv.org>
- Zook, M., Graham, M., Shelton, T., & Gorman, S. (2010). Volunteered geographic information and crowdsourcing disaster relief: a case study of the Haitian earthquake. *World Medical & Health Policy*, 2, 7–33. doi:10.2202/1948-4682.1069

Towards Linking the Concepts of Ecosystem Services and Environmental Justice: A Hungarian Case Study

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Abstract

Linking the concepts of ecosystem services and environmental justice is a very recent academic phenomenon. Both concepts represent well-established research fields, but there is much less research on their linkages. The present ongoing research attempts to develop a framework to link the two concepts grounded in a Hungarian case study. The case study in Hungary is constructed around a waterfront development which may significantly alter the potential access to benefiting from different types of ecosystem services. The case site is located in a Southern city of Hungary, Szeged and the second biggest river of Hungary, Tisza which cuts through the city of Szeged. The river provides a lot of ecosystem services which a diverse groups of local inhabitants benefit from. However, a river wall construction is in progress as a waterfront development project what includes changes in the town- and riverscape creating new opportunities of access and eliminating some of the existing ones. The present research aims to explore and understand how the proposed project will alter access to freshwater ecosystem services the different local groups and individuals enjoy, need and what will be the ensuing implications from an environmental justice perspective. Theoretically the issue is approached as a need to link access to ecosystem services with environmental justice. Thus environmental justice interprets in this survey as the access to ecosystem services. Two main research questions was framed: (i) What kind of ecosystem services by River Tisza are known, used by and accessible to different social groups in Szeged? (ii) How the proposed waterfront development project will influence awareness, use, and access by different social groups? A qualitative research design was developed based on an ethnographic approach. In the first phase of field research, an ethnographic participatory observations were pursued by attending public events discussing the proposed development project and in the research site of the most visited parts of the riverbank. During the public fora the communication by decision-makers towards local inhabitants was observed and recoded. It has become clear that these events failed to incorporate meaningfully the diverse views and interests of different groups of stakeholders by design. In the ethnographic engagement with the users of the riverbank patterns of use were observed and recoded along with the social characteristics of user groups. It has become clear that currently a very diverse pool of local stakeholders benefit from the ecosystem services of the river and there was no unequal access observed. However, the present plans developed by the dominant local actors of urban development planning will most probably and significantly change the current situation of access and use. Thus it seems timely to carefully examine the plans from an environmental justice perspective and highlight the potential implications of changing access and use patterns for the diverse local social groups currently benefiting from multiple ecosystem services the River Tisza provides.

Keywords: Ecosystem Services, Environmental Justice, Urban Freshwater Ecosystem, Waterfront Development, Qualitative Research Methods

The ethics of place in shale gas mining in South Africa

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Abstract

Proposed shale gas exploration in South Africa's semi-arid region, the Karoo, has evoked a mixed response from stakeholders with some welcoming the anticipated socio-economic gains that development is expected to bring and others being fearful of the impact that this will have on the area's unique sense of place. Many tourists and residents of the Karoo are attracted to the area for its wide open spaces and nothingness and there is concern if exploration goes ahead the new road infrastructure, gas flares and truck traffic will destroy the solitude that people seek out. This paper describes and analyses the diverse "senses of place" that have emerged in the Karoo within the public domain in film, art and academic literature, questioning if a single, strong sense of place can be identified and preserved. It unpacks the ethical tension between an objective understanding of "sense of place" that is measured in landscape architecture and the more subjective, dynamic interpretations of senses of place that are explored by environmental philosophers. It makes a three-fold argument for a public participation process that is both tangible (using indicators), iterative (regularly revisited) and open to both local and international perspectives. It is proposed that only a process that allows for the multiplicity of voices and proposed concrete outcomes to be visited regularly will enable an ethically justifiable shared sense of place to develop here.

Keywords: Shale gas, Karoo, sense of place, public participation

ISDRC Abstract

The SDGs: Comprehensive Progress? An Assessment

Joachim Spangenberg

Abstract

Background context. This paper analyses the SDGs with a focus on goals and targets relevant for climate change, energy transition, poverty alleviation and reducing inequalities, sustainable production and consumption patterns. It does so by identifying relevant targets and assessing them regarding both their suitability for sustainable development (based on the initial definition by the Brundtland Commission), the indicators developed for implementing Agenda 21 as developed by UNCSD/UNDP/UNEP, and their opportunities for success as detectable from the overall SDG context. Justification of the research / research argument, aim. The SDGs have been widely praised for their ambition. However, while that is justified for many of the targets, less attention has been paid to the adequacy of the targets defining the means how the targets are to be reached, regarding agency and internal coherence. This paper contributes to filling that gap. Methods/approach. The targets set are first compared to the agency to implement them, as far as referred to in the SDGs, and a clear deficit is identified. A second step is analysing the deficits by using the DPSIR heuristic used by the European Environment Agency EEA and the EU Statistical Services EuroStat, looking at Driving Forces, Pressures, State, Impact and Response of sustainability challenges. Finally the trends in indicator development and the key gaps are analysed. Findings/results. The SDGs are found to be weak on agency, with limited obligations to governments and none to the business sector. They focus on State and Impact, neglecting the Pressures and supporting counterproductive Drivers. The negotiations on the indicators to monitor implementation show the same deficits than the SDGs themselves. Conclusions. In conclusion, the positive targets will either not be realised, or the means of implementation must be upgraded significantly. Unfortunately, current trends point to the first direction. This can be read as an indication that some of the parties involved plan to do not more than lip service to goals and indicators, and the processes around the indicator development indicate (sic!) that some are actively trying to undermine their effectiveness by making sufficient monitoring impossible.

Keywords: SDGs, agency, DPSIR, monitoring, indicators

The elephant in the room: veganism as the low hanging fruit of sustainable development

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Abstract

Sustainable development should be part of an integral ethical stance which is a consequent ethical perspective from the point of view of the victims. The saying goes: 'You can't have the cake and eat.' So in parallel with this: 'You can't save the planet and eat it.' We do not need more knowledge in order to make progress towards sustainable development. Unfortunately knowledge conferences contribute virtually nothing to sustainable development - the burden of proof is on those who do claim that sustainability conferences are helping to steer the world towards sustainable development. There is enough knowledge to know that we are living unsustainable a harming others with our consumerist lifestyle and economic system based on growth. Which nation in the world will be the first vegan nation? France was the first country to abolish slavery in 1792, which country will have the audacity to expand its moral circle to include non-human animals and future generations and it willing to act upon it? As Gandhi has famously said: Be the change you want to see in the world.

Keywords: Food ethics; veganism; factory farming; environmental ethics; animal ethics

Do urban water development initiatives engage participants in the development of their capabilities? Reflections from India

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Abstract

Urban water development interventions among the marginalised in countries in the Global South such as India seek to improve access to water and to engage in capacity-building work with their intended beneficiaries. This approach is viewed as more likely to lead to substantial improvements in the quality of life and opportunities to be accessed by program beneficiaries by addressing water development as a complex issue requiring attention to education, citizenship, political engagement, and economic empowerment, among a range of other areas. This shift is indicative of the ascension of interventions geared towards the development of capabilities for human flourishing rather than those based on the more traditional emphasis on equitable distribution of water resources. However, there is little empirical evidence about whether these programs currently seek to develop the capabilities of their intended beneficiaries either explicitly or implicitly. The aim of this paper is to provide insight into whether the guiding principles and practices of urban water development initiatives intentionally seek to engage participants with the aim of building their capabilities through a range of interviews with professional staff from three organisations, and community leaders in Mumbai and Delhi, India. This research highlights that capability development typically remains an implicit, rather than explicit, goal of urban water development programs. The result is interventions that privilege access to water over considerations of how such access might enable or hinder the development of broader capabilities for flourishing by the marginalised.

Keywords: urban water, development, capabilities, marginalised, India

A Legal Common Home for Humankind

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Abstract

It is now recognized under the current doctrine that international law is not yet equipped to handle the ecological goods that exist simultaneously in and outside of all States. The global commons have always been understood as geographical spaces that exist only outside the political borders of States (Magalhães, 2016c). The global, diffuse and intangible character of a vital good such as a stable climate, have served to transform this traditional approach into an ecological nonsense. A giant leap was taken towards the unravelling of the nebulous arguments composed of legally vague and undefined concepts disseminated in national and international legal texts. This leap was made possible because of our increasing understanding of the functioning of the Earth System, together with the possibility of measuring its state of functioning through the planetary boundaries framework. The definition of core drivers of the Earth System state and the “Safe Operating Space of Humankind”, may become a key factor to overcome the disconnection between the ecological reality and existing legal frameworks. The necessary management of the use of this remaining ecological “intangible space”, demand a new legal construction capable of capturing the benefits and damages generated at the scale of the Earth System. They are the well-known economic externalities, either positive (regulating ecosystem services) or negative (pollution). Any attempt to overcome this true legal Black Hole (Magalhães and Ferreira, 2016) demands a new pre-existing legal construction capable of capturing the benefits generated at the scale of the Earth System from a legal perspective. Kiss (1982) came very close to the essence of the issue when he asked: “How can a good that belongs to no one be subject to a legal regime?”. In other words, if our Common Home is a particular favourable state of the Earth System, how can we then protect and regulate its use in absence of any form of legal representation of this vital good within the context of human society? The concepts Common Heritage of Mankind and World Heritage possess greater potential for evolution towards instruments capable of protecting this vital global good. The World Heritage has already made the evolution from tangible cultural heritage towards intangible cultural heritage. Through the structure of biogeochemical concentrations that remained relatively stable over the last 11,700 years – the Holocene period – we propose the recognition of a well-defined state of the Earth System as a World Heritage and/or as Common Natural Intangible Heritage of Humankind.. This new legal object should be the *locus* on which to construct a system for the management of use of the Earth System. With the information about the core processes that regulate the stability and resilience of the Earth System is also possible to build a common standard pattern that represents the positive and negative flows of each country on the state of the Earth System. Only by placing the various benefits in a common metric unit compatible with its consumption, we can translate, in its full extent, the relations to be harmonized.

Keywords: Intangible Natural Heritage, Planetary Boundaries, Common Home of Humankind, Global Legal Framework, Managing the use of the Earth System

1. Introduction

The expression "no-man's-land" (*Terra nullius*) was originally used in the middle Ages to define unclaimed or unoccupied territories, usually situated between fiefdoms, and used as dumps for garbage and deposits. In situations of war, it also served to describe the spaces between trenches and without any control. Unoccupied geographical areas are subject to the concept of ownerless property, an open access regime (*Res nullius*).

Although it is a known space, it is a remnant space where is settling what is left and where no

authority is clear – it is like not existing. Everything that exists is defined around what is seized. On a global scale, is as if each State was an island where all that is beyond its limit belongs to everyone, but indeed, belongs to no one. This is also the principle underlying the assumption that everything that goes beyond our limits should be considered as "external" to us - an "externality" in the words of economists, and inexistence to jurists.

Pollution from an aircraft is an "externality" for the economy and when performed outside the airspace of States, it's a non-existence for jurists. It is based on this vision that one can define common areas of Humankind (*Res Communis Ominium*), in which the "common" is what is left over (open sea, seabed, Antarctica), the remains of what could not be seized. Pureza (1998) considers that "the *res communis* own regime as a traditional framework for common international spaces is a sequence rather than an antithesis of the national sovereignty principle". The common is not what by its nature is truly common but the remainder of the appropriation (Magalhães and Ferreira, 2016).

However, a new reality was revealed when we discovered that the gases and substances emitted into the atmosphere, not only did not disappear in space, but were also interchanged with the land and the oceans, nor what was released to the sea did not disappear into the ocean of infinity. Step by step, science was uncovering the upper level of integration of an Earth System with global, intangible and complex interconnections difficult to observe and define. However, if this is already a new reality accepted and recognized by science and clearly visible from space, it remains invisible to the law. Therefore, "global" is a new reality that is outside the legal frameworks built to date. As stated by Kiss (1982) on the definition of *res communis*: "Of course, one may question the exact meaning of this concept: is it a common sovereignty, a co-ownership, a condominium? We must recognize that this question has never been solved in a completely satisfactory manner - that is precisely one of the major arguments of the advocates of the conception *res nullius*."

Until now, the Earth System is still considered to be an unidentified legal object - an ULO (Melot and Péglise, 2008) and results in a large black hole through which positive and negative vital fluxes "disappear" as externalities.

It is this abstraction that considers as remaining and *Res nullius* everything that does not fit the concept of national sovereignty, which makes us into true free riders of the Earth System to which we belong and depend, opening the doors for a collective tragedy.

2. Methodology

2.1. Get it while you can

One should consider the recent period of relative climate stability corresponding to the Holocene (the last 11,700 years after the last ice age), which has been the basis for the development of human civilizations (the history of the human species corresponds to a period of about 200,000 years), as a particularly favourable state of the Earth System for our species and for others that share the same ecological conditions. Every time a State, a company or an individual contributes to a change of the biogeophysical conditions of this period of stability which benefited all Humankind, an "externality" is generated and it affects all other users of this favourable state as "less resource" (considering a stable state of the Earth System as a resource) will be available to all agents (Magalhães and Ferreira, 2016).

While it is true that it is materially or legally impossible to deny to any human being the free access to use of the Earth System, the enjoyment of truly common goods without any effective rules means that each individual is compelled to indefinitely increase his/her use of common resources associated with a particular state of the Earth System (e.g., the atmosphere with a particular concentration of constituent gases), because, if one does not do it, others will. All users have an incentive to increase their use without having any concern for the impact that their actions may have on others (and perhaps themselves) and a disincentive in promoting the maintenance and improvement of the common good.

This is the well-known Tragedy of the Commons model described by Hardin (1968) in which a free and unregulated use of a common resource based on a logic of first come/first served results in a, rational actor maximizing individual interest. This, places the common resource under such pressure that the resource becomes degraded and eventually exhausted as a result of overexploitation, and hence the “tragedy”. The dilemma is that if a user retracts his/her use and the others do not, the resource will run out in the same way and the user will have lost the short-term benefit that was obtained by others.

The model is now being reproduced on a global scale with the difference that the resource (a well-defined state of the Earth System) was until recently unknown and not definable. In this global-scale model, each State, following its own interest, will not be concerned in limiting its pollution or maintaining its own ecosystems for the purpose of contributing to a well-functioning Earth System in a stable and accommodating state, as the good is freely available to be exploited by all. As there is no legal status for the global good, everyone uses it as *res nullius*, considering it to provide an endless stream of benefits available to everyone where their use does not reduce the potential for use by others (contrary to what is true of the commons).

Incidentally, this unidentified legal object, has also been identified by economists in the Stern Report: “Climate change presents a unique challenge for economics: it is the greatest and widest-ranging market failure ever seen. The economic analysis must therefore be global, deal with long-term horizons, have the economics of risk and uncertainty at centre stage, and examine the possibility of major, non-marginal change” (Stern, 2006).

The failure to recognize the existence of the Earth System makes nations unable to cope with the challenges on a planetary scale. One consequence is that all the benefits from or damages to the Earth System are legally non-existent. Without the existence of this common good or the identification of what is the good that presents simultaneously beyond and within all States, but that are required to be maintained in good condition for the functioning of the Earth System as a whole, we will not be able to turn ourselves in stewards of our common home (Magalhães and Ferreira, 2016).

The work of Hardin (1968) generated pessimism around the “common”, turning common property management into a “failure”. The failure deepens when even those who genuinely care about the future sustainability and the common good come to the conclusion that the restriction of use or exploitation of the resource will lead to a comparative economic loss. This is an altruistic feeling that will lead to a self-elimination of the agents, resulting from a natural selection process. This logic is valid not only for the exploitation of the resource, but also applies to the benefits that can be realized in maintaining/improving the common good.

In the context of the Earth System one can designate the current situation as a dual tragedy:

- 1) On one hand, the classical tragedy of exploitation embodied in the destabilisation of the relatively stable Holocene state of the Earth System by unregulated resource exploitation and pollution.
- 2) On other hand, as no country will enjoy just for itself all the benefits provided from its own ecological/geophysical infrastructure in the Earth System, there are no advantages in promoting actions to maintain the Earth System in a stable state. As there is no incentive for individual initiatives to maintain or improve the common good in the context of competition and legal and economic shortcomings in managing a common resource, it is normal to allow the degradation of ecosystems to sell raw materials or to obtain other economic gains, since the vital benefits provided by these features of the Earth System are worth zero as they are still shared by all on a global scale (Magalhães and Ferreira, 2016).

The logic of the tragedy of the commons is doubly valid for the exhaustion of the resource and for the destruction of the “Earth System infrastructure” that can deliver benefits to all societies. The short-term logic will prevail unless structural measures that have the ability to change these initial conditions and generate new systemic, collaborative effects are implemented. The logic of the tragedy of the commons undoubtedly depends on a set of assumptions related to the motivation of

people operating under rules governing the use of the common and defining the very nature of the resource.

With the work of Ostrom (2010) and the recognition of the Nobel Prize awarded to her, the commons were no longer an impossibility. For Ostrom (2010), "the crucial factor will be a combination of structural features that lead many involved to trust each other, and are willing to take joint action that adds value to their own short-term costs because both see a long-term benefit for themselves and others, believing that most others will comply". This building of trust and reciprocity, as she claims, requires structural features. We argue that the first structural feature in organizing the collective use of a common resource is to define the resource to be managed, and to recognise that it has to exist.

Ostrom (2010) also acknowledged that "it is obviously much easier to build solutions to collective action problems related to small-scale resources than for those related to a global common good." Despite the magnitude of the challenge, there is no other feasible alternative.

2.2. The Common Home of Humanity as a Home that needs to be built

With the exponential development of Earth System science over the last 25 years, and evolutions in the observation of the Earth from out of space, the incredibly complex Earth System that we inhabit transformed into a reality that we can start to understand and watch in real time as external spectators. As we joined information obtained from space with information collected at the lowest level of the system, for example with the aid of climate palaeontology, it became possible to reconstruct the history of the atmosphere and the entire Earth System. Over the course of history of our planet, many different chemical structures and compositions of the atmosphere and oceans originated into different energetic and thermodynamic balances, which in their turn would define different states of the Earth System. Access to this information allowed us to understand the real unique situation that has characterized the period of climatic stability of the last 11.700 years - the geological period of the Holocene (Figure 1).

"It is now recognized under the current doctrine that international law is not yet equipped to handle the ecological goods that exist simultaneously in and outside of all states. There exists a structural flaw in the theoretical approach towards the global "whole". The starting point on how reality has been framed is not what by its nature and characteristics is truly common but the remaining part of the appropriation. The current perspective is that the "Global Commons" are merely those parts that remain after territorial divisions made under the authority of sovereign nations, and not the goods, which by their very functional nature are truly common. Within this dominant perspective, the Global Commons were always (and continue to be) understood only as geographical spaces that exist only outside the political borders of States. This fundamental theoretical flaw extends its influence over the trans-temporal dimension of successive human generations. Humanity, including its future generations, although being repeatedly referred to as international conventions has not been attributed a proper legal status that guides towards efficient protection." (Magalhães, 2016c).

The global, diffuse and intangible character of a vital good such as a stable climate, which upon disturbance provokes effects that last over the time of several generations, transformed the traditional approach to the Global Commons into an authentic ecological non-sense. The dysfunctionality of existing legal instruments has not only been detected already for quite some time, as it has also been already been the object of various attempts to create concepts, which in absence of scientific information capable to delimit and define the good in question, were forced to remain open and indeterminate, thereby rapidly rendering them unusable without real legal consequences in terms of rights and duties. But as knowledge of the Earth System grew, and measurement of its functional state characteristics became possible with the aid of the planetary boundaries framework (Figure 2), a gigantic step was taken towards deciphering this legal void composed of vague concepts scattered in national and international legal texts.

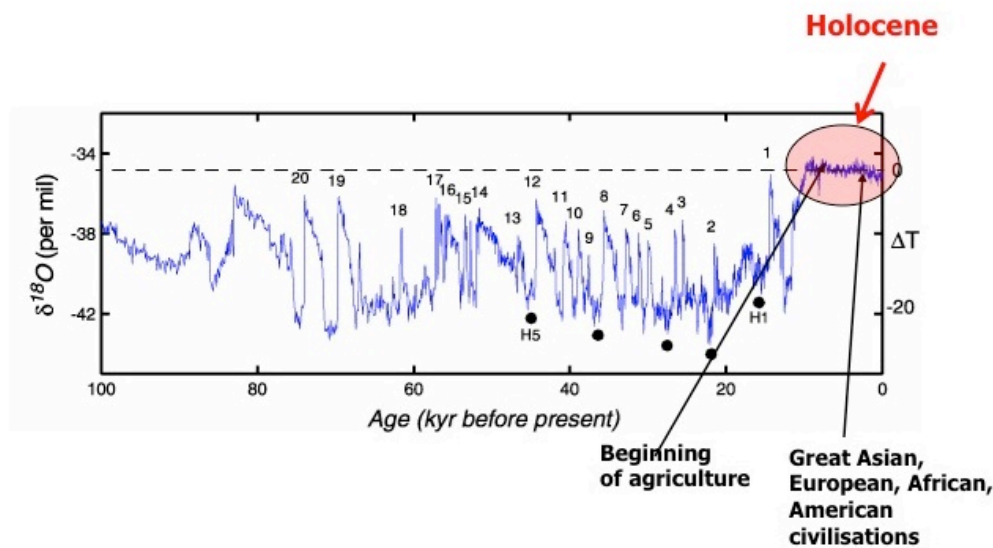


Figure 1. Record of $\delta^{18}\text{O}$ per mil (scale on left) from the Greenland Ice Sheet Project (GRIP) ice core, a proxy for atmospheric temperature over Greenland (approximate temperature range on $^{\circ}\text{C}$ relative to Holocene average is given on the right, showing the relatively stable Holocene climate during the past ca. 10,000 years and Dansgaard-Oeschger events (numbered) during the preceding colder glacial climate (Ganopolski and Rahmstorf, 2001). Note the relative stability of temperature for the last 11,700 years (the Holocene) compared to the earlier ice age period.

Expressions in International Law such as the Common Concern of Humankind, Common Interest of Humankind, Life-Support System, Intergenerational Equity, Ecological Integrity or Sustainable Development, do now possess a pattern of indicators that may be used to decipher and translate these open indeterminate concepts, creating the possibility to delimit new legal definitions. The definition of core drivers of the Earth System state and a “Safe Operating Space of Humankind” as formulated by scientists, may become a key factor to overcome the disconnection between the ecological reality and existing legal frameworks.

The discovery and definition of the “Safe Operating Space of Humankind” as a bio-geophysical space relative to concentrations of atmospheric and oceanic elements, and therefore as a qualitative and non-geographic space, requires a reorientation of what until today has been denominated the “Common Home of Humanity”. This intangible space of bio-geophysical conditions that allow and support the development of human societies does not refer to the physical planet and the geographic or political space constituted by the sum of the different areas under the jurisdiction of States and remaining areas.

For example, it means that in geopolitical terms, an acidified, dead ocean may continue to be an object of legal division into sovereign spaces, but it can no longer act as a support for marine life and humanity as a whole. Along the same line of thought, a planet that finds itself in an undesirable state, no longer capable in tending to the ecological needs of the human species, cannot be considered our Common Home. The conditions of habitability that exist simultaneously in-and outside all sovereign space, offer the basis for the concept of the Common Home. “In this sense, the Common Home of Humanity should not be understood as a planet with 510 million square kilometres, but should rather be represented by a favourable well-defined state of the Earth System taking reference to the geological period of the Holocene (Magalhães, 2016a).

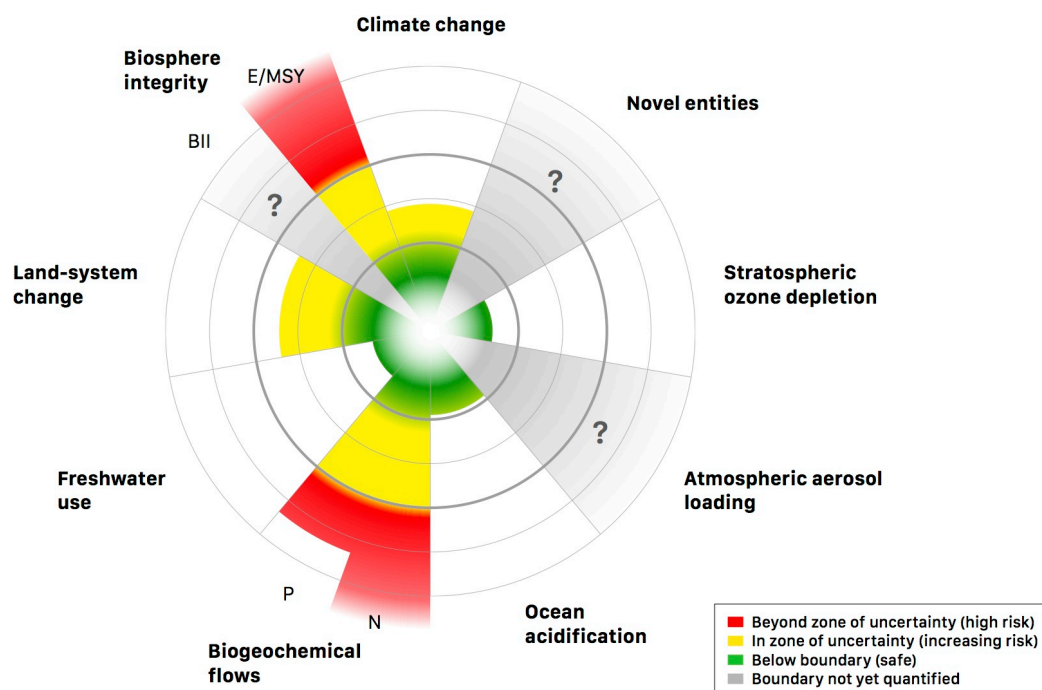
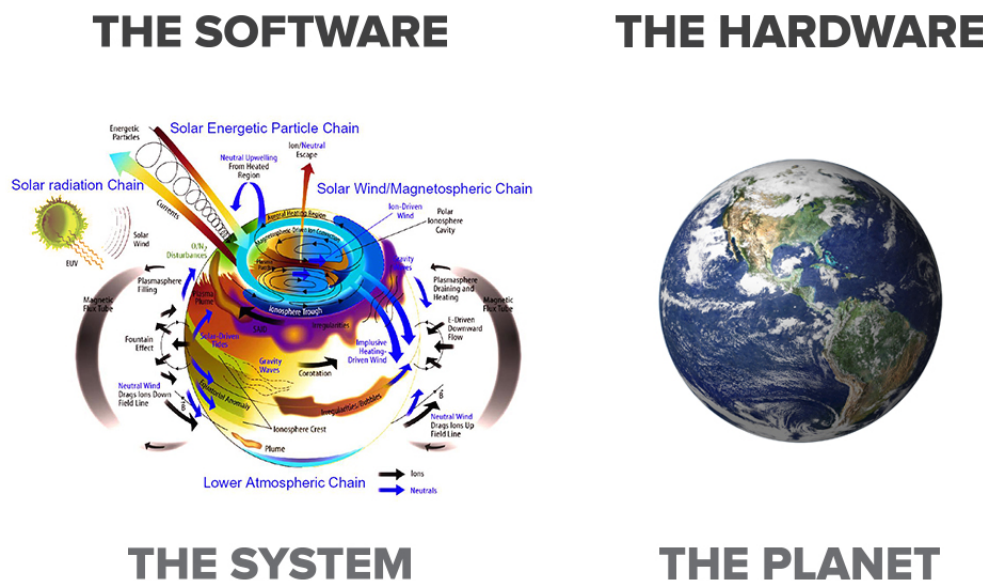


Figure 2. The current status of the control variables for seven of the nine planetary boundaries. Green zone is the safe operating space (below the boundary), yellow represents the zone of uncertainty (increasing risk), and red is the high-risk zone. The planetary boundary itself lies at the inner heavy circle. The control variables have been normalized for the zone of uncertainty (between the two heavy circles); the centre of the figure therefore does not represent values of 0 for the control variables. The control variable shown for climate change is atmospheric CO₂ concentration. Processes for which global-level boundaries cannot yet be quantified are represented by grey wedges; these are atmospheric aerosol loading, novel entities and the functional role of biosphere integrity. Source: Rockström et al., 2009; Steffen et al., 2015.

This functional and qualitative dimension of the Earth System may be determinant for the foundation upon which to construct the Common Home referred to by Pope Francis in his encyclical "*Laudato Si'*", and which according to his understanding "has not yet been constructed". So the '*Cura Della Casa Comune*' will consist of maintaining the structure and functioning of the Earth System – of the climate, the biosphere and the great bio-geochemical cycles that connect them - which determine the favourable conditions for the human family and all species that share with us the same ecological needs. The recognition that the concept of the Common Home of Humankind refers to the conditions for human life on the planet, represented by a specific favourable state of the Earth System, implies a parallel evolution of existing social and legal constructs. In fact, the affirmation of Pope Francis that our Common Home has not yet been built, can have only one meaning: although the physical house exists (the Planet Earth), a global human organization that allows living in it without its destruction, does not.

3. Results and discussion

The construction of the Common Home of Humankind, is a social construct, and as such is above all a legal construction (Magalhães, 2016a). So, regardless of the symbolic materialization of this Common Home in an existing building, the first objective of the Common Home of Humankind as social global coalition, apart from being a theoretical legal construction, should be the centre place for the development of a process to introduce this construct into international society. To take care of the Home, implies creating the preceding structural conditions for global collective action.



Link: http://www.nasa.gov/mission_pages/sunearth/multimedia/itm-processes.html (edited image) | http://farm6.staticflickr.com/5147/5679642871_9d3a2b6072_z.jpg (edited image)

Figure 3. The hardware/software relation and the Earth System/planet relation (Magalhães, 2016a).

Simone Borg in a Seminar organized by IUCN - Academy of Environmental Law, under a presentation with a title “Climate Change as a Common Concern of Humankind” (Borg, 2007), posted two fundamental questions:

- 1) Is it necessary to identify the legal status of climate?
- 2) Will we gain anything from doing so?

The Resolution UNGA 43/53 (1988), as Borg (2007) recognizes “identifies the legal status of a “intangible” common resource (Climate) that spans the global commons (...) and also across areas subject to national jurisdiction. It is the absence of a theory capable of representing the intangibility of nature and recognize legally a good that exists both inside and outside of all States, that we can summarize our inability to accurately portray the reality around us. “The problem arises because this new space has a new character, not geographical and territorial distinguishable, and therefore completely distinct from all other spaces previously discovered, even when compared to Space exploration, where the existence of intangible natural resources is already recognized today. Unlike these, its existence is not external to the planet, on the contrary, this intangible space is part of the Earth System, and is present inside and outside of all sovereignty” (Magalhães, 2016b), creating, as Borg (2007) explains, an “Inextricable link between the activities of States within national territory and its effects on climate (...) an unprecedented situation in International Law”. Defining the outlines of a new Legal Status is conditioned by the possibility to know what is to be protected, in other words, by the ability to define and delimit the quid to be put under the scope (protection) of Law.

The autonomy of environment as a legal good, with a value per se, was one of the major conceptual evolutions in the path of the legal protection of "environment" as a value that deserves legal protection. Despite several national and international legal systems adopted this recognition, during this looking-for period of the environmental good, there was no scientific knowledge available that would enable us to understand the facts, the quid, with which jurists were faced. This lack of knowledge and the impossibility to define the environmental good within existing paradigms, made these new questions as impertinent. "The subversive impulse of environmental law", was how Canotilho (2009) named this structural incompatibility. According to

Magalhães (2016a), the subversion of Law by the environment is based on three fundamental scale preconditions:

- a) The global scale of the good intended to be captured under the scope of law, and the impossibility to establish any kind of material or abstract legal division of the "environmental good" (Geographic scale);
- b) The cumulative and intergenerational character of the damages and benefits caused on this "environmental good" (Timescale);
- c) The restrictive and limiting approach of environmental law towards an economic system that was conceived to grow unlimitedly on a planet with limited resources (Economic/ecological scale).

The search to define the global at a local scale quickly would become inoperative. In the National Environmental Performance Report on Planetary Boundaries of the Swedish Environmental Protection Agency (Nykvist et al., 2013) it is stated that: "Sweden is exposed to environmental impacts from other countries which affect Sweden's ability to achieve these environmental quality objectives. At the same time, Swedish consumption and production have an impact on environmental performance in other countries". International Organizations such as the EU do recognize this global dependency: "Even though we have never used our natural resources with so much efficiency as we do at present, we are still degrading our essential resources, [...] in Europe as well as in the rest of the world, and in the environmental field, borders do not exist" (European Environment Agency, 2015).

The most adequate concept to describe the characteristics of the Earth System from a legal perspective, is the Common Concern of Humankind (CCH). According to Shelton (2009), "The environment is not an abstraction but represents a living space, the quality of life and the very health of human beings, including generations unborn". The concept introduces two fundamental innovations into International Law: the first relates to the fact that this concept does not make any reference to States; the second being the absence of any reference to a geographically delimited area, even though it is associated to other concepts such as the Global Commons areas, or High Seas, Antarctica, Seabed, Outer Space, where the Common Heritage of Mankind is applied. "Common concerns are different because they are not spatial, belonging to a specific area, but can occur within or outside sovereign territory" (Oldfield and Steffen, 2004).

The non-territorial and intangible character of the climate and the function of maintaining a stable climate, meets this vision of a functional space. So the "Living Space" as intangible and non-territorial space of the "Common Concern of Humankind", will coincide with this well-defined state of the Holocene, denominated by the scientific community as the "Safe Operating Space of Humankind" (Magalhães, 2016a).

We should emphasize that the "Living space" referred by Shelton, is not just the Climate System, but the whole life support system, of which the Climate System is just one part. To clarify these concepts, we recur to Oldfield and Steffen (2004): "The term climate system is also used in connection with global change, and is encompassed within the Earth System. Climate usually refers to the aggregation of all components of weather – precipitation, temperature, cloudiness, for example – averaged over a long period of time, usually decades, centuries, or longer. The processes which contribute to climate comprise the climate system, and they are closely connected to biogeochemical cycles"(...).

The use of the common resource, called here as the "favourable state of the Earth System", is extensive temporally and its effects are intergenerational. It is also through this resource that relationships are established between successive generations, past, present and unborn. Theory has defined property not only by the individual's relationship with the inherent characteristics of the object, but also to include the underlying relationship between the owner and all other individuals. According to Hang (2003), the most relevant is the relationship between individuals: "Property rights are a relationship between individuals in relation to a resource, not a relationship between an individual and the resource". Once the use of this limited resource is not exclusive to any "user" and any user can't exclude access to any other, in global terms we are facing a situation of

common ownership extended to the scale of all Humankind (*Res communes Ominium*). From the moment it is discovered that a resource considered inexhaustible, after all is exhaustible, internal relations are equally reconfigured among all users of that resource (Magalhães, 2016b). For Schmid (1995), "Property rights represent a set of ordered relationships among people which define their opportunities, their exposure to the acts of others, their privileges and their responsibilities for resource utilization" When the resource in question is a certain favourable state of the Earth System that everyone depends on, all users share the consequences of others acts.

To that extent, the legal recognition of a Favourable State of the Earth System, as a Common Heritage of Mankind, should primarily result in a regulatory instrument of relationships between individuals, States or communities. The legal absence of the good also corresponds to a social failure, to the *res nullius*, i.e. the absence of rules between individuals or States on the use of the good. "How can we admit that a good that belongs to no one may be governed by a specific law?" (Kiss, 1982). The perceived relevance of the underlying relations of ownership will be the most decisive factor in justifying the need to recognize legally the existence of the Earth System, and to give it a patrimonial dimension.

As a result, preservation of the new legal good should arise from a collective action internally organized between the users, rather than by a legal obligation. Thereby, the new heritage shall be the mediator of a dialectical relationship developed on a global scale between social internal relations and the object (Earth System) (Magalhães, 2016b). To that extent, Planetary Boundaries should not be perceived as a new prohibition but as the limits that underlie and justify our self-organization. We can even say that the ultimate goal of acknowledging this Common Natural Intangible Heritage of Humankind is the construction of a globally organized society around a common heritage, an intangible locus, on which Humankind organizes itself. "Peace is not the absence of violence but the presence of justice" (Moltmann and Boff, 2015).

This implies a structural intervention in the framework basics of the sovereignty international system, which allows the benefits achieved in the state of the Earth System that currently economically disappear into a "black legal hole" start to have economic visibility through an accounting system and compensation for the "stewardship of the Earth System". For this structural change to become possible, it is necessary that these global benefits made by to the "common resource" which is the Earth System in a favourable state are caught in a global legal instrument (Figure 4).

When we structure the global and inter-subjective relations, based on the relationships established through the use of a common good to which is assigned a value per se, we are simultaneously building the structural conditions referred by Ostrom (2010) to ensure its maintenance and allowing the construction of a larger global justice.

If no existence is possible in pure disorder, the survival of the human species as a whole depends on its ability to self-organize. So, it is at the level of consequences for subjective relationships in the internal organization between users of the common resource that lays the greatest justification for the legal consecration of a well-defined state of the Earth System.

EARTH SYSTEM

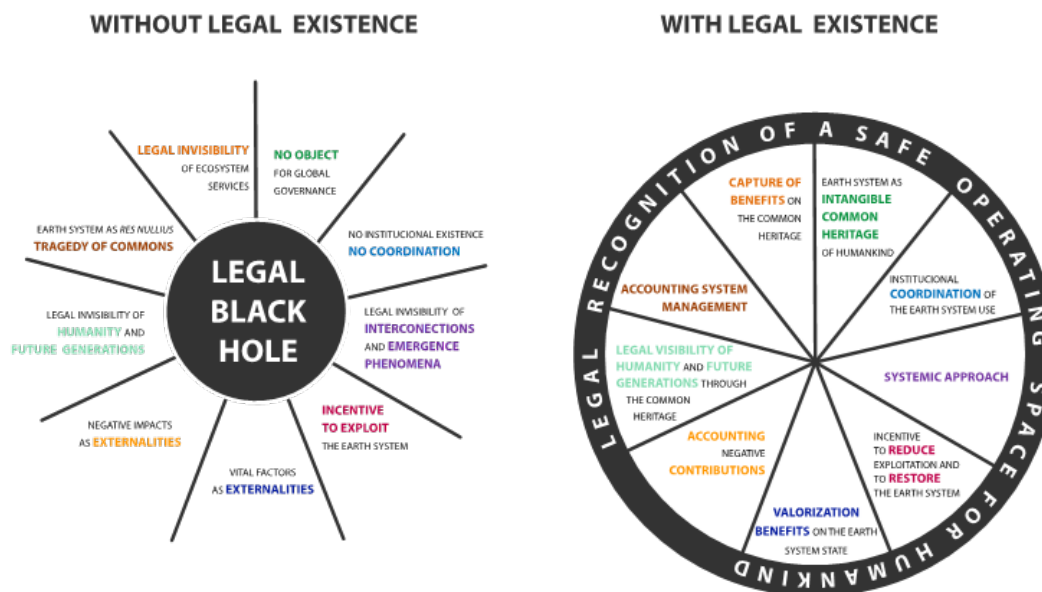


Figure 4. A comparison of the existing and proposed Earth System management regimes (Magalhães e Ferreira, 2016)

The process that gave origin to the period of the Holocene, unique in terms of climatic stability in the history of the Earth, was a phenomenon of spontaneous Emergence from the combination of certain elements and their proportions, and which in their reciprocal interactions formed a pattern, giving rise to a combined organizational "order". This natural process should be embraced by humanity as one of the greatest gifts it received from nature, as it were exactly these conditions that allowed for the development of human civilizations. In this sense we can argue that the state of the Earth System corresponding to the geological period of the Holocene, carries the meaning of a heritage as something we need to conserve in everyone's interest. It enables the recognition of a new value to be legally protected as an international autonomous legal good. "Heritage is one idea. Is a philosophical idea, a legal concept, as is something that we need to conserve." (Sobrinho, 2012).

"The evolution of a living space "concern", towards a Common Intangible Natural Heritage of Humankind as an authentic autonomous legal good, seems a crucial conceptual advance for the organization of the human relations which are now broadened to global scale. With the scientific "Safe Operating Space", the legal concept of the living space could have a value that can be measured. The legal concept of Heritage can be the *locus* for that vital good, one intangible space in which the living space represented by the Safe Operating Space can base its existence, and the support for a global organization" (Magalhães, 2016a).

Arvid Pardo's vision (Pardo, 1976) that gave origin to the concept of CHM involved the perception of the "ocean environment as an integrated fluid ecological system" and the concern "that continued, unmanaged use of the world's oceans would become a serious threat to international peace and security from the environmental impact of new technologies, the militarization of the seafloor and expanding state claims to jurisdiction over large parts of the oceans".

To realise these objectives through the legal regime of the Common Heritage of Mankind, involves

distinguishing the system concept and its *intrinsic intangible quality* from the territorial and geographical approach of already existing legal concepts. But as Taylor and Stroud (2012) states “Arvid Pardo (and others), who considered CHM regime flexible enough to adapt to the emerging challenges, the discovery of news resources and values, such as scientific research”.

Departing from this approach, unrealised due to theoretical and practical impossibilities at the time, we will try to conform the initial intentions of the CHM to the current criteria for the intrinsic unit of the Earth System.

It is therefore crucial to understand in detail the differences between the concept of CHM and the CCH derived from it. Based on the proposal of Murillo (2008), we will compare them with recent knowledge regarding the "Safe Operating Space for Humankind" and how they may be re-framed as to correspond to recent scientific evolutions (Table 1).

Table 1. Differences between Common Heritage of Mankind (CHM) and Common Concern of Humankind (CCH) (Magalhães, 2016a)

TERRITORIAL SCOPE	CHM	Areas beyond national jurisdiction and its resources
	CCH	A wider scope – It is applied in the Intangible higher level, both beyond national jurisdiction but also within the jurisdiction of States.
SUBJECT SCOPE	CHM	The main focus is related to the geographical areas beyond national jurisdiction and its resources.
	CCH	<p>Focused in functional intangible spaces that are a “concern” to humanity as whole. At present the matters are Climate Change, species in danger and conservation of Biodiversity.</p> <p>The intrinsic intangible ecological quality does not exist autonomously on the geographical space. Therefore, the CCH continues without a clear and precise definition, liable to be generating rights and duties.</p>
DISTRIBUTIVE SCOPE	CHM	Equitable sharing of benefits
	CCH	Equitable sharing of burdens- cooperation and problem solving.

From the analysis of different perspectives of the approach that considers the Earth System as a unique systemic whole with intrinsic limits regarding its state, we are able to identify the following advantages and disadvantages presented in Table 2.

In summary, one can say that while one has a *Locus* and does not possess an appropriate territorial scope, the other has the appropriate territorial scope but does not have a *Locus*. In regard to the Distributive scope, the sum of both may reveal to adequately address the characteristics of globally shared damages and benefits at the level of the Earth System.

In this sense, the combination of some of the characteristics of both concepts may bring the necessary advances in law and international relations with the objective to construct an institutional

architecture more adapted to the environmental living space in response to a collective concern of humanity.

Table 2. Comparative analysis of Common Heritage of Mankind (CHM) and Common Concern of Humankind (CCH) (Magalhães, 2016a)

TERRITORIAL SCOPE	The CCH offers a more adequate response to the characteristic of the Earth System on existing both in and outside of sovereignties. But it has the disadvantage of not having a <i>locus</i> as the CHM, so it cannot be attached to a space on which an organization can be build.
SUBJECT SCOPE	The CHM carries the advantage of being able to delimit the area or resource in question, while the CCH has a problem with the intangibility of the object.
DISTRIBUTIVE SCOPE	From the perspective of the Earth System, both damages and benefits, caused and produced upon the Earth System as a whole, are shared.

4. Conclusions

From the initial intentions and derived concepts that evolved from the Common Heritage of Mankind (CHM) concept will result a new legal object based on the fundamental separation between the *res incorporales* relative to the intangible dimension, qualitative and functional of the Earth System (higher level of integration), and the *res corporales* referring to the territorial space, (land, oceans and areal space, i.e. the lower level of integration) in which these functions and qualities develop.

In this sense we advance a proposal for an evolution with the combined elements for an axiological interpretation of CHM applied to the Earth System:

- The biogeophysical structure of the Holocene period is part of the international common heritage (patrimony) and therefore belongs to all humanity in common. This means it cannot be owned, enclosed or disposed of (i.e., appropriated) by any State/s or entity. As a commons it can be used, under the rules of a specific law.
- The use of the common heritage framework shall be carried out in accordance with a system of co-operative management, for the benefit of all humanity (or common good). This has been interpreted as creating a type of trust relationship with States acting as trustees for the benefit of all humanity (i.e. for the common good, not for the exclusive benefit of States/private entities) including future generations, taking into account the particular needs and interests of developing States (intra-generational equity);
- There exists a permanent sharing of damage and benefits realized over the state of the Earth System. It will be necessary to construct an accounting system in order to account for the contributions of each State towards the desired state of the Earth System, and next develop an equitable system of derived compensations for the different uses of the CHM;

- A global entity should be created with exclusive functions in coordination of compensations and the development of projects for the maintenance of this Common Heritage of Mankind.

The features for a possible evolution of a Common Heritage of Mankind / Common Concern of Mankind towards a Common Intangible Natural Heritage of Humankind are summarised in Table 3.

Table 3. Features for a possible evolution of Common Heritage of Mankind / Common Concern of Mankind (CHM/CCH) to a Common Intangible Natural Heritage of Humankind) (Magalhães, 2016a)

TERRITORIAL SCOPE	Scope	The Earth System as a Whole – Applied both beyond and within the jurisdiction of States.
	Form of Representation	The higher level of Earth System integration. The Intangible Nature. The well-defined status of the Earth System corresponding to the geological age of the Holocene.
SUBJECT SCOPE	Scope	Representation of a functional “living space” for the Humanity as whole, in a trans-temporal dimension. The “Safe Operating Space of Humankind”.
	Form of Representation	Planetary Boundaries Framework
DISTRIBUTIVE SCOPE	Scope	Equitable sharing of benefits and burdens through a system of compensations - ECOBALANCE .
	Form of Representation	An aggregated metric with the ability to represent the positive and negative impacts realized upon the Earth System.

References

- Boff, L. and Moltmann, J., 2015. Hay esperanza para la creación amenazada?, Editorial Sal Terrae.
- Borg, S., 2007. Climate Change as a Common Concern of Humankind, Twenty years later... From UNGA to UNSC. IUCN Academy of Environmental Law “Towards an Integrated Climate Change and Energy Policy in the European Union”, University of Malta.
- Canotilho, J.J.G., 2009. Sobre o Condomínio da Terra. Earth Condominium Publications, Porto.
- European Environment Agency, 2015. SOER 2015 — The European environment — state and outlook 2015. A comprehensive assessment of the European environment's state, trends and prospects, in a global context. Copenhagen.
- Ganopolski, A., Rahmstorf, S., 2001. Rapid Changes of Glacial Climate Simulated in a Coupled Climate Model. *Nature*, 409, 153–158.
- Hang, P., 2003. Essays in game theory and natural resource management. PhD thesis, Tilburg University.
- Hardin, G., 1968. The tragedy of the commons. *Science*, 162 (3859), 1243-1248.

- Kiss, A., 1982. La notion de Patrimoine Commun de L'Humanité. Académie de Droit International, Recueil de Cours, Vol.175, Tomoll.
- Magalhães, P., 2016a. A New Object of Law: Attempt for a Legal Construction, in Magalhães, P. Steffen, W. Bosselmann, K. Aragão, A., Soromenho-Marques, V. (Eds.), SOS Treaty, The Safe Operating Space Treaty- A New Approach to Managing Our Use of the Earth System, Cambridge Scholars Publishing, Newcastle upon Tyne (*in press*)
- Magalhães, P., 2016b. Earth Condominium: A Legal Model for the Anthropocene, in Magalhães, P. Steffen, W. Bosselmann, K. Aragão, A., Soromenho-Marques, V. (Eds.), SOS Treaty, The Safe Operating Space Treaty- A New Approach to Managing Our Use of the Earth System, Cambridge Scholars Publishing, Newcastle upon Tyne (*in press*)
- Magalhães, P., 2016c. Safe Operating Space of Humankind Treaty (SOS Treaty): A Proposal, in Magalhães, P. Steffen, W. Bosselmann, K. Aragão, A., Soromenho-Marques, V. (Eds.), SOS Treaty, The Safe Operating Space Treaty- A New Approach to Managing Our Use of the Earth System, Cambridge Scholars Publishing, Newcastle upon Tyne (*in press*)
- Magalhães, P., Ferreira, F. 2016. Global Free Riders, in Magalhães, P. Steffen, W. Bosselmann, K. Aragão, A., Soromenho-Marques, V. (Eds.), SOS Treaty, The Safe Operating Space Treaty- A New Approach to Managing Our Use of the Earth System, Cambridge Scholars Publishing, Newcastle upon Tyne (*in press*)
- Melot, R., Péglise, J., 2008. Prendre la mesure du droit: enjeux de l'observation statistique pour la sociologie juridique. Revue Droit et Société, 60/70, 331-346.
- Murillo, J.C., 2008. Common Concern of Humankind and its Implications in International Environmental Law, Macquarie Journal of International and Comparative Environmental Law, 5(2), 133.
- Nykvist, B., Persson, Å., Moberg, F., Persson, L., Cornell, S., Rockström, J., 2013. National Environmental Performance on Planetary Boundaries - A study for the Swedish Environmental Protection Agency, Report 6576, Swedish Environmental Protection Agency, Stockholm.
- Oldfield, F., Steffen, W., 2004. The Earth System, in Steffen W., Sanderson, A., Tyson, P.D., (Eds.), Global Change and the Earth System: A Planet Under Pressure, Springer-Verlag, New York.
- Ostrom, E., 2010. A Multi-Scale Approach to Coping with Climate Change and Other Collective Action Problems. Solutions, 1(2), 27-36.
- Pardo, A., 1976. The Common heritage. Selected papers on oceans and world order, 1967-1974. Occasional Papers, n° 3, Malta.O.I.
- Pureza, J. M., 1998. O património comum da humanidade: rumo a um Direito Internacional da solidariedade?, Edições Afrontamento, Porto.
- Rockström, J., Steffen, W., Noone, K., Persson, Å., Chapin, III, F. S., Lambin, E., Lenton, T. M., Scheffer, M., Folke, C., Schellnhuber, H., Nykvist, B., De Wit, C. A. ., Hughes, T., van der Leeuw, S., Rodhe, H., Sörlin, S., Snyder, P. K., Costanza, R., Svedin, U., Falkenmark, M., Karlberg, L., Corell, R. W., Fabry, V. J., Hansen, J., Walker, B., Liverman, D., Richardson, K., Crutzen, P., Foley, J., 2009. Planetary boundaries: exploring the safe operating space for humanity. Ecology and Society 14(2): 32.
- Schmid, A., 1995. The environment and property rights issues, in Bromley, D.W. (Ed.), The Handbook of Environmental Economics, Blackwell Publishers Inc..
- Shelton, D., 2009. Common Concern of Humanity. Iustum Aequum Salutar, 1, 33-40.
- Sobrinho, J. M., 2012. Património é uma ideia (...) Património é algo que é necessário conservar no interesse de todos. Jornal Quercus, 50 (Jan-Fev), 4-5.
- Steffen, W., Richardson, K., Rockström, J., Cornell, S.E., Fetzer, I., Bennett, E.M., Biggs, R., 2015.

Sustainability. Planetary boundaries: guiding human development on a changing planet. *Science* , 347(6223).

Stern, N. 2006. *The economics of climate change – The Stern Review*, Cambridge University Press, Cambridge.

Taylor, P., Stroud, L.. 2012. *Common Heritage of Mankind, A Bibliography of Legal Writing*. Fondation de Malte, Malta.

Political institutions and environmental public spending in 17 OECD countries: central versus local governance

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Abstract

This paper appeals to political economy to disentangle the impact of fractionalization and political constituencies over the level of environmental expenditures at both, central and local levels in the time period 1995-2012. Using data from 17 OECD countries, I provide strong evidences of the role of the number of parties and the district size on the level of public expenditures. In particular they influence are reversed whether I consider local or central level of expenditures.

Energy Use Equity: analysis from smart meters, surveys and energy simulations

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Abstract

The Sustainable Development Goals have as 1st goal to end poverty in all its forms and in the 7th goal to ensure access to affordable, reliable, sustainable and modern energy for all. Among other objectives, these goals set the background for analysis of energy equity issues and fuel poverty eradication. Fuel poverty occurs when households are unable to afford adequate energy services in the home at reasonable cost. The combination of low incomes; low performance dwellings with defective insulation (i.e., windows, walls), high energy costs are enablers of fuel poverty. The knowledge on fuel poverty in UK and Ireland is well established, with a strong focus on heating demand and on the impacts of fuel poverty on health. Despite a growing body of literature covers several European countries and acknowledge by several authors as a particular problem for southern European member states, single evaluation of EU countries has recurrently dismissed Portugal. Despite being a warm country with mild winters, several facts point Portugal as severely endangered by fuel poverty issues. This paper contributes to this topic evaluating Évora as case , using a different perspective and datasets, deriving fuel equity issues from electricity consumption. We couple electricity smart meters' registries (average 2011-2014 of 265 meters) with socio economic data, buildings structure characteristics and equipment ownership and use collected from door-to-door surveys (within the EU project InSMART) to evaluate fuel poverty and fuel "obesity". The approach is anchored on the use of daily electricity consumption data evaluated by a cluster analysis to distinguish groups of consumers. Our results unfold that one of the ten electricity consumption clusters defined is under fuel poverty (21% of the sample) presenting the lowest electricity consumption levels (under 5kWh/day). The socio economic data from the survey (e.g. low incomes, occupants older than 65 years, houses built 1946 and 1990 with no insulation, low levels of ownership and use of heating equipment) combined with the annual consumption profile portray the lack of fulfillment of thermal comfort levels inside households both in summer and winter. On the opposite, two other clusters reach very high levels of daily consumption (40kWh/day) showing fuel "obesity" patterns, which are also backed up by their socio economic profiles and equipment use. This knowledge is further combined with energy needs estimated from dedicated energy simulations of the clusters buildings typologies by using DesignBuilder and EnergyPlus. This allows confirming if the levels of indoor thermal comfort for both heating and cooling are being effectively delivered. We conclude that energy equity issues regarding electricity consumption arise among households of the same city, explained by the socio economic details and indoor thermal comfort levels. Smart meters show to be powerful tools on supporting the assessment of equity on energy use that could serve to define tailor made targeted policy measures and incentives.

Keywords: Fuel Poverty, Smart Meters, Surveys, Thermal Comfort, Évora

Track 6c. Social Sustainability: Impacts, Threats and Opportunities

Session 6c-03

Session 6c-04

Session 6c-09

Health and dengue fever: a discussion about environment and media

Ana Paula Machado Velho, Tiago Franklin R. Lucena, Lucas Machado Flores, Wesley Bichoff, Diana Domingues

Abstract

As a developing country, Brazil is facing several environmental problems. Probably, the most important one is the fight against dengue fever. This study tried to comprehend if media is being effective to mobilize the citizens of Maringá-Paraná-Brazil about the need of taking care of the environment to avoid the procreation of the transmitter mosquito and, thus, contribute to dengue prevention. This paper investigated how media focuses the relations between man/nature and man/environment to engage the community to interrupt the mosquito infestation. An analysis was performed taking the content of 141 texts selected from a very popular regional newspaper (O Diário) of Maringá during four months in 2014. The main voice of the survey sample was public health authorities. Their discourses were organized in brief notes, which were not being highlighted in important areas of the newspaper pages. Due to the constant increase of dengue in the region there must be more aggressive strategies to mobilize citizens about the prevention of dengue pointing the importance of environmental issues. One of them is developing researches about communication strategies which could be disseminated through media to stimulate people to change their habits and contribute to a collective environmental change.

Keywords: social development; neglected diseases; *Aedes aegypti*; communication; urban environment

Challenges in social sustainable development learning from community-based conservation and reuse practices in the Tianzifang historic neighborhood

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Abstract

Social sustainable development comprises a process of multiple implementations engaged in by multi-social groups taking multi-dimensional actions. These groups are pursuing the goals of long-term, sustainable human well-being, social justice and needs, continuity and diversity of culture, and the alleviation of poverty. However, achieving social sustainability in urban regeneration is the greatest challenge faced by most cities worldwide. Over the past three decades of inner-city regeneration in China, it has mainly been subject to either large-scale tabula-rasa redevelopment or frozen preservation, or protection and renewal through the process of gentrification. Advocated by the central government, these practices are implemented through a top-down approach that favors economic growth and enhances competence in the global cities network. While these major implementations of regeneration cause social inequity, the interruption of long-standing community networks, and loss of cultural identity, a number of innovative grass-roots practices in urban conservation and regeneration increasingly create new possibilities to achieve social sustainability. Therefore, it is worthwhile examining the new paradigms of urban conservation practices to understand both the opportunities and the merits and limitations they bring in creating social sustainable development. This research examines the typical case of Tianzifang in Shanghai in terms of the conservation and reuse practices in its historic neighborhood. The empirical study is conducted through interviews, questionnaire surveys, site mapping, and observation. The investigation focuses not only on the current conditions and outcomes of the practices, but also traces back to their emergence in order to learn from the processes involved. The literature review focuses on the concepts of social sustainability, urban conservation and regeneration, and related case studies. Government documents and regulations, media reports and news, and research articles and theses about Tianzifang are reviewed to ensure an overall understanding of the case. The conservation and reuse of Tianzifang is an innovative bottom-up practice led by its original inhabitants, shop owners, and enterprises; it extends beyond the current framework and mechanisms of conservation. The community-based, market-driven, and culture-catalyzed practices are its significant features. This research discusses and debates three crucial aspects of the case related to social sustainability: (1) the preservation of historic and cultural heritage; (2) the development of the creative industry in the neighborhood and its influence on the city's economic restructuring; and (3) the change in the community network and its impact on social justice in the conservation of the historic neighborhood. The practices used in Tianzifang may provide its counterparts with new insights and possibilities for achieving social sustainability. However, this research also emphasizes the underlying multi-faceted problems derived from this pilot situation that threaten the validity and sustainability of its merits in social sustainable development. These major challenges, which are due to its legitimation, cannot be systematically integrated into the agenda of the city's administration, urban planning, and conservation framework. Thus, the multiple actors and actions must reconcile with each other in order to achieve the goal of social sustainability.

Keywords: social sustainable development; community-based; conservation and reuse practices; historic neighborhood; Shanghai

An investigation of the utilization of residential land in aged society

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Abstract

At present, an increasing number of countries are stepping into aged society, among which Japan is one of the most serious countries. And the decrease of population reduces the utilization of urban lands and infrastructures, which obviously result into a series of social problems. This study focuses on Yahatahigashi-ku of Kitakyushu city in Fukuoka prefecture. It is one of the cities that had grown by supporting the iron and coal industry, which was once the centre of the economic development of Japan. However, after the 1960s, as the secondary industry in Japan was deteriorating, Yahata city was also deteriorating together with its facilities and urban lands use. At the same time, it stepped into aging society with fewer children. As a result, it faced serious problems, the decreasing population and increasing vacant dwellings and open spaces. The situation even becomes more serious in recent years. The residential land is a land contained in urban lands, and it is generally zoned or designated for dwelling purposes and designed to accommodate housing facilities in which people can live, as opposed to industrial and commercial areas. Residential land use is very important to a citizen's quality of life. Residence provides shelter, fulfilling basic human needs, and privacy. So the standard of residence experienced by citizens will have a significant impact on overall health, especial for the aged people. Elderly people's wisdom and resilience for survival are decreasing seriously because of their body function. Oppositely, they will more rely on their living environments. So the quality of the residence is particularly important to them. And the quality of housing is influenced by structure, age, habitability, general liveability and so on. This paper shows the current situation of aging population of Yahatahigashi-ku from several aspects at the beginning. And it also analyzes the utilization of its residential land by GIS (Geographic Information System) which can collect related data in different field base on the digital map. It covers construction age, construction type, and structure. Besides, this paper gives some practical information and data through field research. With the combination of two aspects, this paper shows the current situation of residential land in a district which is stepping into an aged society and the serious living condition for aged people. With this result, it makes contribution on urban regeneration for aging society that also appropriate for cities around world.

Keywords: aged society, residential land, construction, GIS, Yahatahigashi-ku

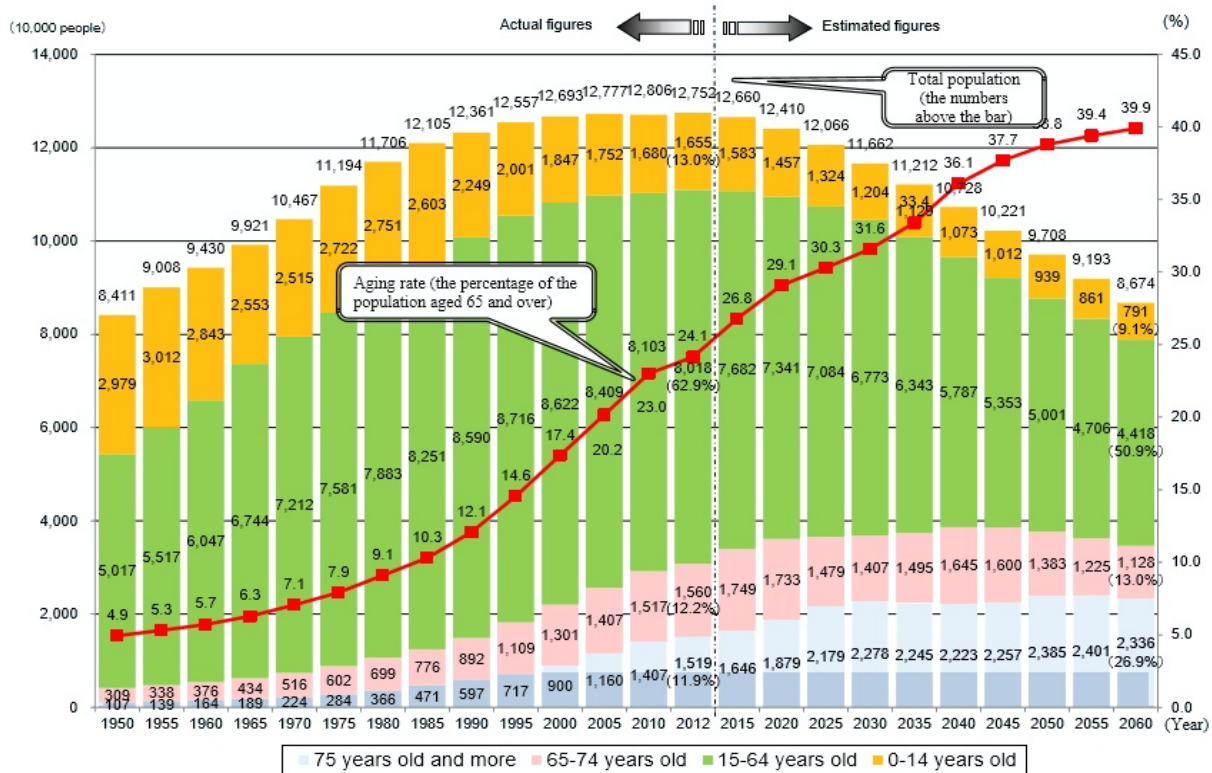
1. Introduction

1.1. Background

Nowadays, countries around the world are facing a common topic: the aging of the population. An aging society is a society which has a more than 7% of the general population older than 65 years old, which is accepted by international countries (United Nations, Department of Economic and Social Affairs, 1956). Since the 20th century, with the advances in technology and improvement of living conditions, life expectancy has a great change. By 2015, the average life has extended by nearly 23 years than that by 1950, reaching to 68 years old. And it is expected to extend by 7 years in 2050 (United Nations World Population Prospects: 2015 revision, 2015).

When it comes to population structure, because of the rapid growth of aged people in the 21st century, the population of 65 years old and above has increased from about 600 million in 2015 to nearly 1.5 billion in 2050. Forecasts released by the United Nations in 2015, the old-aged dependency ratio of the world will rise from 13% in 2015 to 16% in 2050, and 26% in 2050 (United Nations World Population Prospects: 2015 revision, 2015).

Around the world, Japan is one of the worst countries about the population aging problem. Now Japan has stepped into aged society, the status of the population of Japan can be summarized as "super-aged". Japan is a country of longevity. The results of the statistical average life expectancy in 2014 respectively are 80.5 of man, and 86.83 of woman (Annual Health, Labour and Welfare Report, 2015). At the same time, Japan is also facing with "low birth rate", that young people under the age of 15 is decreasing. As the Figure 1 shows, the beginning of population decline happened in 2005 after World War II. Compared with 2005, till 2012, the population totally had decreased by about 250,000. By 2015, the population over the age of 65 has reached to 26%, and it is still on the rise. The "production population"(general from 15 to 64 years old in this study) is considered as the pillar of economic society. Now the population structure has a big change. Experts predict that by 2050, the elderly population aged over 65 will rise to 38.8%. There will be a strong tendency that the dependency population will take a large portion of the total population. It's obvious that Japan shows a negative trend in population growth. According to the forecast, by 2050, the population of Japan will decrease to 97000000 (Cabinet Office, Government of Japan, 2012). Thus, the aging of the population in Japan is very serious.



Source: Up to 2010 Ministry of Internal Affairs and Communications "Population Census", 2012 "Population Estimates", after 2015 National Institute of Population and Social Security "Populations for Japan (January 2012) 2011 to 2060" based on the estimated figure with Medium-Fertility and Medium-Mortality Assumption

Figure 1. Trends in Aging and Estimations for the Future

1.2. Social problem

In the past decades, with the evolution of society and development of the country, many communities are scattered in every city of Japan along with the urbanization. However, time

going on, when faced with the aging population problem, the national infrastructure didn't keep up with such kind situation. The old city pattern can no longer meet the need of society. In nowadays, there are still many old buildings and facilities in this area. It results into a series of social problems. Many dwellings are deteriorating and their owners are getting older. Comparing with young people, the aged people's body functions drop, faced with unexpected situations. They lack the capacity to cope. The living environment is more important to them.

There was a great East Japan earthquake which happened on March 11, 2011. Coupled with subsequent tsunami and nuclear power disasters, it has become the largest catastrophe in Japan since World War II. The magnitude 9.0 earthquake hit the dominantly rural Tohoku district. In some of the devastated areas, one in three people was older than 65 years old. As in most natural disasters, the oldest people were the hardest hit. Older adults with functional disabilities had difficulties escaping the tsunami that killed more than 90% of the 15,000+ people who lost their lives in the earthquake. Surviving older adults were vulnerable to cold temperatures, influenza, relocation, and mental and physical stress. Many struggled without access to medications and treatments needed to control their chronic conditions, which could result in premature deaths. Persons aged than 65 account for more than 90% of the growing number of such "earthquake-related deaths" (NHK, 2011). Two months after the earthquake, the nuclear power disaster is far from ending, and 9,500 people are still missing. This historic catastrophe occurred in an earthquake-prone super-aged society. Its profound implications go far beyond its immediate impact on the most vulnerable. It shows negative aspects of the Japanese aged society. The aged people's local living conditions should be reconsidered, and proposed corresponding solutions.

2. Methods

2.1. Research site

In Japan, the aging problem is common in various districts. As mentioned in the beginning of this paper, the average aged population of Japan is 26% in 2015, but in Yahatahigashi-ku and Moji-ku, which are located in Kitakyushu city in Fukuoka, are more than 32%. In this paper, the Yahatahigashi-ku area is taken as a research site. In the past few decades, Yahatahigashi-ku was regarded as a major area of industrial production, which had experienced a period of prosperity. The local population had a great growth for a long time. After the 1960s, with the industry innovation and population aging, local residents began to decrease, and the population of elderly people increased. The current situation of aged population of Yahatahigashi-ku is showed as below. The demographic data are made by the government and presented on the official website called as "City of Kitakyushu"

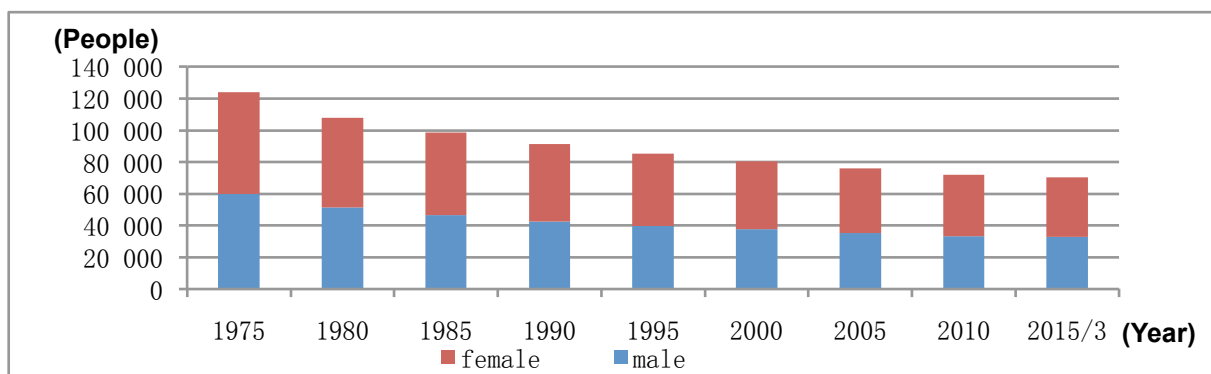


Figure 2. The total population of Yahatahigashi-ku (1975-2015)

Figure 2 shows the population changes by every five years from 1975 to 2015. The total numbers of the population have decreased since 1975. By 2015, the total population of this area has decreased to 70210, nearly only 58% that in 1975's. In Figure 3, it shows the tendency of the population of 65 years old and over since 1990. It is obvious that aged population is growing, in spite of the decrease of total population. By 2015, the elderly people's number has reached to 23614. It means there is one old person in three persons.

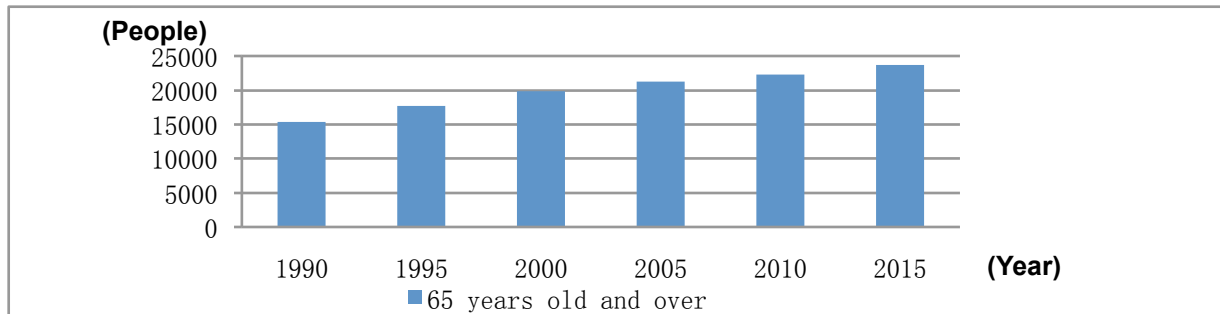


Figure 3. The population of 65 years old and above of Yahatahigashi-ku (1990-2015)

Figure 4 shows the number of the population older than 65 in each area of Yahatahigashi-ku. Most of the areas are over 200. And compared with the sloping area, the number of aged people in the flat area is generally larger. And in Figure 5, in all of the living area, the ratio of the population older than 65 are higher than 7%, which has already reached the standard of aging society. Actually, most of them are higher than 30%, and some areas even reach to 50%. Aging society is a very serious problem in this ward.

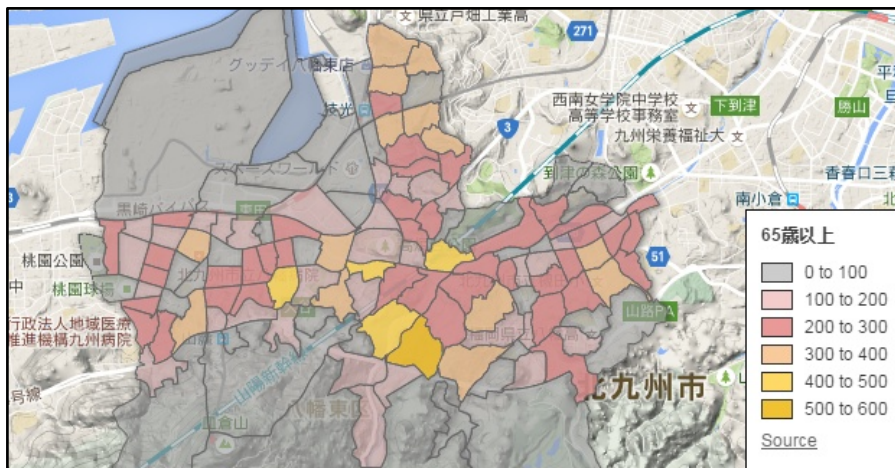


Figure 4. The population of 65 years old and above in each area of Yahatahigashi-ku (2015)

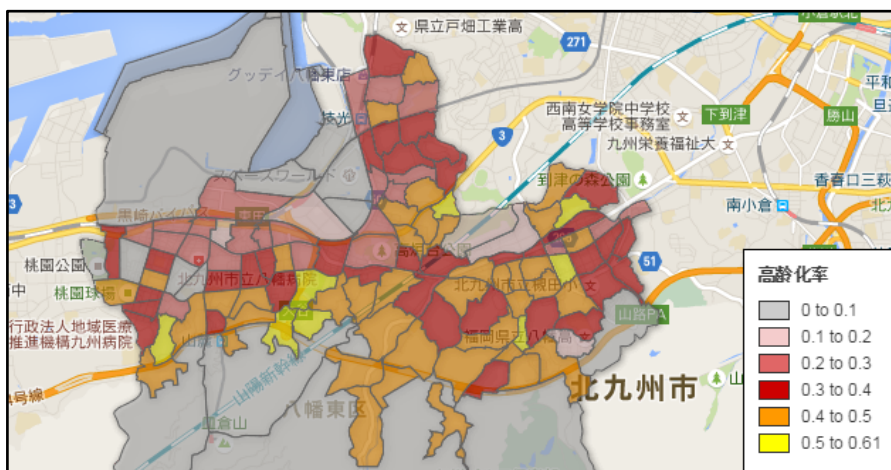


Figure 5. The population of 65 years old and above of total in each area of Yahatahigashi-ku (2015)

Figure 6 shows the population density of each area. We can find out that the density in steep sloping areas is lower than the flat areas. That is because most of the dwellings in the steep slope areas are isolated houses. Recently, apartments are built closed to the station. But combined with Figure 5, the ratio of people older than 65 is high in the steep sloping areas. After industry innovation the flat areas were reused as residential land. Many young people moved into the flat areas. But the elderly people are still living in the steep sloping areas with their old houses.



Figure 6. The population density in each area of Yahatahigashi-ku (2015)

2.2. Research object

Figure 7 shows the research area of Yahatahigashi-ku. In order to make research more clear and simple, it is divided into 14 districts. Each district is made up of several small towns, which are called as "machi" in Japan. In this paper, it mainly focuses on the "No.9" district, which is called as "Sanno-Hinode" district. It consists of 12 towns (Edamitsu hon-machi, Sanno 1 chome, Sanno 2 chome, Sanno 3 chome, Sanno 4 chome, Suwa 1 chome, Suwa 2 chome, Fujimi-machi, Shirakawa-machi, Hinode 1 chome, Hinode 2 chome and Hinode 3 chome). This district developed at the end of the Edo period. In 1992, the steel company was established in Shirakawa-machi. It became the centre of this area. Since that time, the development of this district accelerated. The construction of house spread to the steep sloping areas before the land readjustment project was implemented. Now this district faced with its negative consequences. Both the ratio and population older than 65 years old are at a relatively high level in Sanno-Hinode district, compared with other districts in Yahatahigashi-ku.

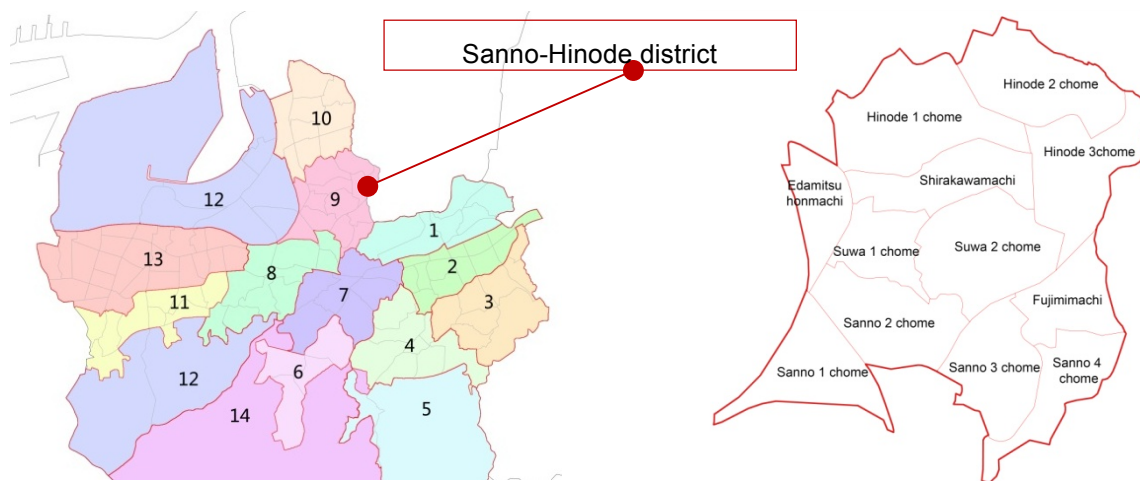


Figure 7. The research area of Yahatahigashi-ku

2.3. Research methods

This study shows the present situation of residential lands and living conditions for elderly people in this district. It is made up of two steps. Firstly, using GIS to analyze the map data to show the land use of this district. Secondly, it examines the current status based on the field work.

2.3.1. Data analysis with GIS

GIS can help to store, manipulate, and analyze physical, social, and economic data of an area. By using GIS software, it will be more efficient and exact in collecting the local land information.

In this paper, local map data are taken to analyze, and the data source of GIS was made in 2010. The content includes four parts: residential land, vacant dwelling, construction age, and residences structure.

2.3.2. Field research

The data source of GIS was made in 2010. Some buildings may have changed. Besides the preliminary software analysis, taking a field work to check the current situation is needed. According to the 12 towns, the original analysis data are printed by 12 sheets. Then go to each town, and check each residence on the sheet. If there is any conflict or inconsistency between the data of GIS and the actual situation, take a mark on the sheet and modify in the digital data. After the field work, finally it comes out a greater accuracy and practical analysis results.

3. Results

3.1. Land use of Sanno-Hinode area

In this district, which includes private houses and apartment buildings, the residential density is very high. Figure 8 shows the residential lands in Sanno-Hinode area. Both of blue areas and green areas are residential lands. The green areas indicate the apartment and the blue areas indicate the private houses. It is obvious that most of the residential lands are occupied by the private houses, some of which are combined with stores, offices, and ministries. There are even some obvious vacant dwellings.

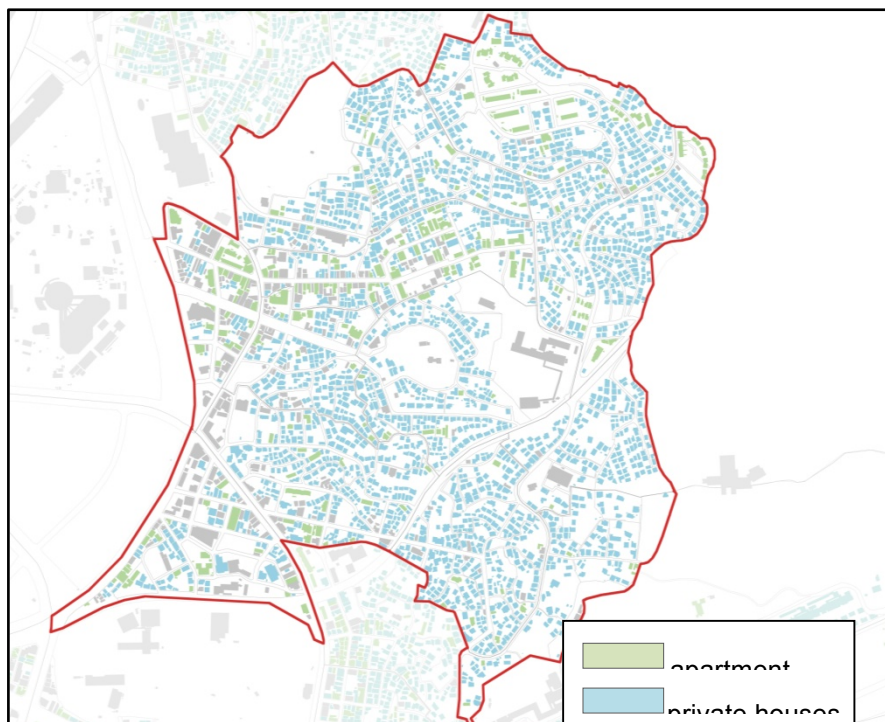


Figure 8. The residential land in Sanno-Hinode district

Figure 9 shows the vacant dwellings in this district. There are many vacant dwelling exist. According to research, the percentage of vacant dwelling reaches to 7%.

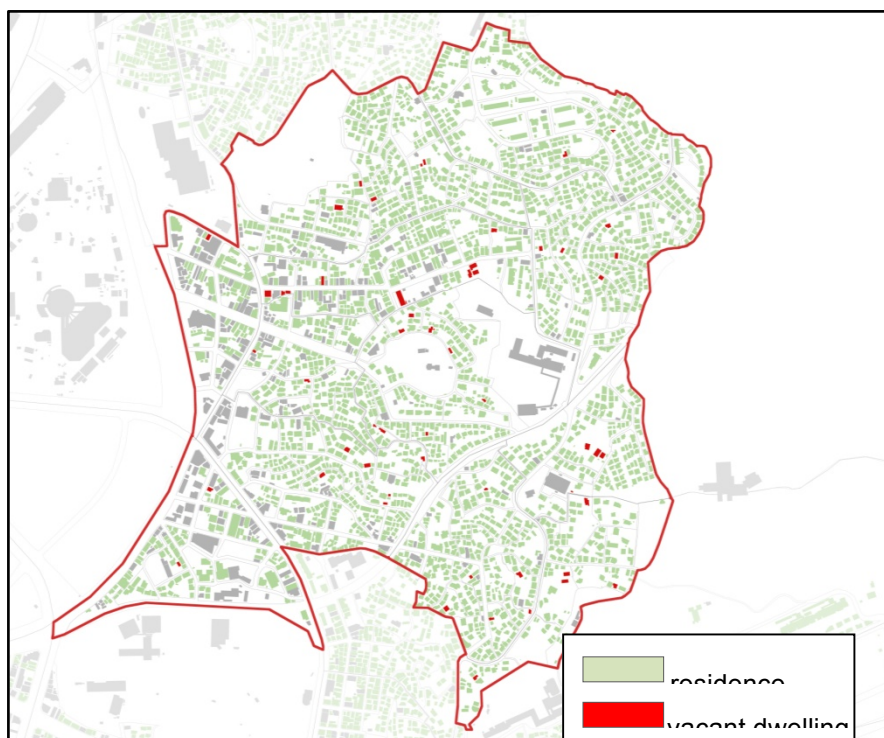


Figure 9. The vacant dwelling in Sanno-Hinode district

3.2. Construction age and type of residences

Table 1. The number of residences in each town of Sanno-Hinode district by four construction ages

Town Year	Edami tshon machi	Sanno 1 chome	Sanno 2 chome	Sanno 3 chome	Sanno 4 chome	Suwa 1 chome	Suwa 2 chome	Fujimi machi	Shira kawa machi	Hinode 1 chome	Hinode 2 chome	Hinode 3 chome
- 1950	3	2	63	100	19	46	80	23	26	71	51	128
1951- 1965	24	41	95	70	28	56	58	25	69	112	68	54
1966- 1985	12	25	71	61	43	20	44	78	48	67	76	64
1986- 2015	19	32	50	59	32	31	40	20	51	62	57	66

Table.1 shows the number of residences in different decades in each town of Sanno-Hinode district. And Figure 10 shows the construction age of residences in Sanno-Hinode area. Through the analysis and data statistics, the total amount of residences in this area is about 2440, among which the number of residences that are older than 30 years is 1921, nearly 79% of all, and the number of residences that are old than 50 years is 1312, nearly 54% of all, and there are even 25% of them over 65 years. In Yahatahigashi-ku, many residences were built during the period of industry. At that time, the quality of buildings are not well, so the strength of the residences becomes very low now. On the other hand, many Japanese traditional houses are made by wood, which are different from reinforced concrete structure. Since the useful life of the traditional wooden houses is not so long, after a few decades, the building began to grow old. The structure is not strong enough and can't support a reliable environment for living.

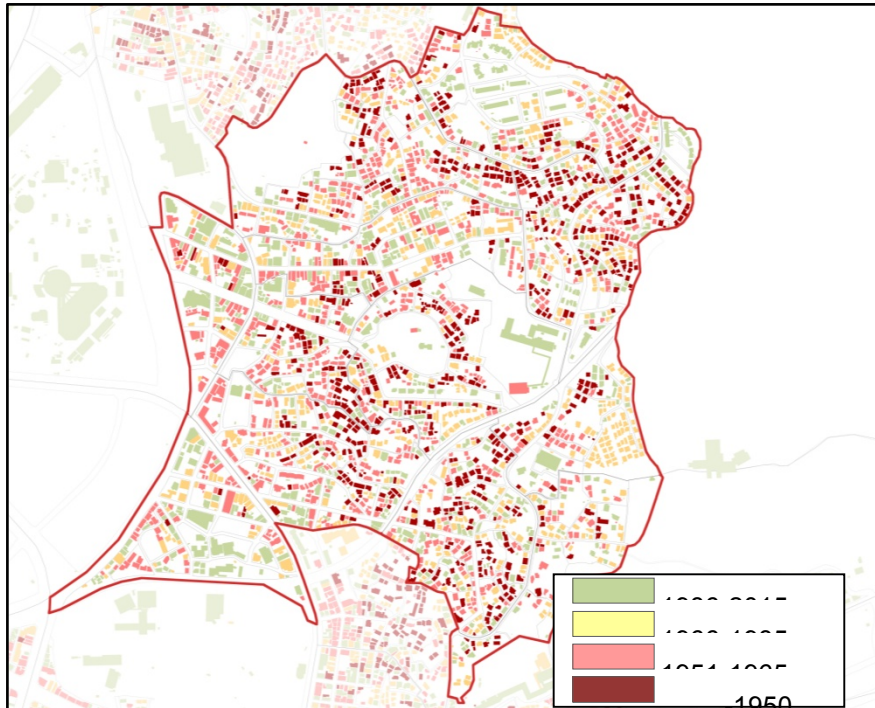


Figure 10. Construction age of residences in Sanno-Hinode district

Figure 11 shows the distribution of robust and non-robust structure residences. Non-robust structure residence indicates that the main structure is wooden, including wooden structure with cement rendering and timber flamed structure with clay finishing. And robust structure residence indicates the building which is built with reinforced concrete construction (Ministry of Land, Infrastructure, Transport and Tourism, 2015). In this district, only nearly 7% of them are robust structure, and most of them are apartments. By combining with the Figure 4, Figure 5 and Figure 10, it is obvious that construction safety issue is very serious, and the local elderly people live in such kind environment is difficult.

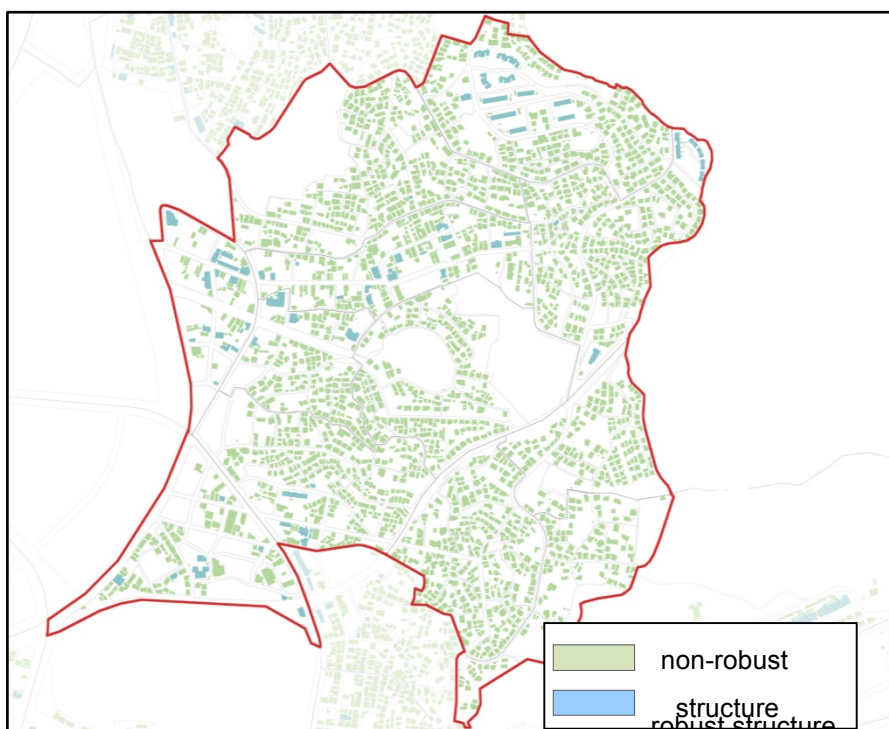


Figure 11. The structure of residences in Sanno-Hinode district

3.3. Potential risk

In addition to, by field research, a phenomenon was found in many areas that a group of old dwellings were built closed to each other. The space between them is narrow, and most of the dwellings were wooden structure. There is a high potential risk in these areas. Once the fire or earthquake happens, these buildings will be destroyed easily, and the surrounding area will be affected. The current situation of this phenomenon is showed in Figure 12.



Figure 12. The present situation of Sanno-Hinode district

4. Discussion

In this paper, according to the results based on software analysis and field work, it comes out some existing serious problems in Sanno-Hinode district with the situation of aged society. Firstly, the problem of population aging in Yahatahigashi-ku is really grim. The ratio of people older than 65 is much higher than the average of the country or world. The imbalance of population structure is serious. Secondly, there are a large number of residences in this district, but 79% of them are more than 30 years old. Most of them exceeded their useful age. Besides, there are many vacant dwellings and open space existing in this district. In the early time, the roads between houses which were built before the land readjustment project the land was developed for houses before the land readjustment project took place are narrow, so it is not possible to rebuild houses with the current standard. These dwellings are very old. They are unfit for human habitation. The original owners abandoned them. In the aspect of residences' structure, most of the residences are non-robust structure, and most of them are built with wooden. To be different with the stone masonry building of Europe, the useful life of the traditional wooden dwellings of Japan is about 30 years. After 30 years, wooden dwellings and the residence environment begin to decrepit. In the past decades, the quality of building material couldn't reach the level for the life cycle. Dwellings built in that period have a shorter life age. The structure is old and not strong enough. There will be a security risk to the people who live in such kinds of house. In addition, many houses are built in the steep sloping areas, and the space around them is narrow. Some of them are next to each other. It brings potential safety hazard for daily life. Japan is a one of the world's most earthquake-prone countries, thus the stability of the construction is especially important. The situation happened in Yahatahigashi-ku is a general social phenomenon in the other wards of Kitakyushu researched (Koki Totake., 2015). Many researchers had expressed their methods in different aspects, such as trying to introduce the share-ride taxi system into Yahatahigashi-ku to solve the public transport problem for elderly people by using GIS (Hiroatsu Fukuda et al., 2015).

5. Conclusions

Japan is enjoying the highest life expectancy around the world. Despite this seemingly rosy picture, Japan faces major challenges stemming from the situation of population aging and population decreasing, and the problem of population aging is still worsening. In Japan, the tendency of the population and urban infrastructure changes are supposed to continue in the near future. More population will be declined in the next few decades. Japan precedes other countries in experiencing a "super-aged" society not only in rural but also in urban communities. Yahatahigashi-ku, which is located in Kitakyushu, and now is suffering from a series of public crisis. In this area, buildings those built in the early time are getting old, and more and more vacant houses appear. How to deal with these houses is an important topic at present. One the other hand, the living environment in this district is not well. It is obvious that the life in this district will become difficult, especially for the aged people. Effective measures should be taken to provide a comfortable living condition for elderly people. Introducing GIS is crucial to achieving the goal of urban reduction. It shows a great capacity to evaluate public facilities, landform, residential environment, and transportation. A GIS enhances the efficiency of site analysis. Thus, GIS provides planners a more comprehensive understanding of the site upon which they are working.

At present, Japan has the highest proportion of the aged people in the world, but more and more countries around the world will experience the same phenomenon in the future. Taking a district of Japan as a research, it can find out the actual situation happened in aged society. That would be contributing to those countries and regions which have a tendency to suffer such kind of problems. Japan's experience could provide lessons from which other countries might learn. Recognizing population aging as a critical societal issue for the past two decades, Japan has implemented a number of policies. But it is still faced with many problems. Such social experiments could inform other countries.

References

- United Nations, Department of Economic and Social Affairs., 1956, The aging of populations and its economic and social implications, HB 1531 .U54, New York, pp.7-8
- United Nations, Department of Economic and Social Affairs, Population Division., 2015, United Nations World Population Prospects: 2015 revision, New York, pp.27-45
- Ministry of Health, Labour and Welfare, <http://www.mhlw.go.jp/toukei/saikin/hw/life/life14/dl/life14-04.pdf> (accessed 2015)
- Cabinet Office, Government of Japan, Annual Report on the Aging society (summary), <http://www8.cao.go.jp/kourei/english/annualreport/2015> (accessed 2015)
- NHK., 2011, 524 deaths at 241 hospitals in Miyagi, Fukushima, and Iwate prefectures.
- City of Kitakyushu, <http://www.city.kitakyushu.lg.jp> (accessed 2015)
- Ministry of Land, Infrastructure, Transport and Tourism., 2005, Construction Statistics Guidebook, http://www.mlit.go.jp/toukeijouhou/chojou/csg/csg_f.htm (accessed 2015)
- Koki Totake., 2015, A study on the analysis method of decline region of Kitakyushu in population onus society using GIS, Japan.
- Hiroatsu Fukuda., Yupeng Wang., Kiyoshi Shinriki., 2011, Case Study on Information Evaluation by GIS for Aging Society Urban Planning: GIS Application on Urban Planning, Proceedings of the International Conference on Information Management and Evaluation, pp.441-442

Varieties of sustainability: A Brazilian case study

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Abstract

In seeking to understand the sustainability opportunities and constraints as they pertain to specific countries, this paper adopts a 'varieties of capitalism' (VoC) perspective. This theoretical framing originates in the French 'regulation' school and has been widely applied in studies seeking to explain qualitative differences in capital-labour-state relations and wider institutional frameworks as they originate and persist in different countries around the world. To date, however and with some notable exceptions, the perspective has not been greatly applied to research into issues of sustainability. Taking the empirical example of sugarcane ethanol production in Brazil, and using a range of secondary sources including business media, industry lobby organisations, corporate websites and government data publications, this paper presents the argument that the apparent sustainability advantages that should apply in this case have been substantially eroded by the specific character of macro-economic policy, political preferences and corruption in the country. In this account, the sugarcane ethanol industry is presented as suffering 'collateral damage' and in danger of failing outright, not because of weaknesses in the sustainability case for the sector but because of policies and other actions primarily directed at other sectors – notably but not exclusively the petroleum sector. The paper therefore seeks to speak to the core themes of the conference by exploring sustainability threats and opportunities for an emerging and fast changing economy and society (Brazil). However, contrary to the main theme of the conference, which is a focus on current sustainability strategies, policies, practices and approaches and the need to rethink their roles and applicability in different socio-cultural and economic contexts, this paper seeks to identify how sustainability can be 'sabotaged' by economic and other policies. In terms of academic research, the paper concludes that comparative theorisation and analysis of sustainability could helpfully be grounded in the VoC approach. The paper concludes from a policy perspective that while innovation for sustainability must perforce include a technological and often regulatory element, it is vital that each application is grounded in a robust understanding of the wider political and socio-economic setting that will vary on a wide basis from one country to the next.

Keywords: Varieties of capitalism; sugarcane ethanol; Brazil; petroleum policy; unintended outcomes.

Long-term population dynamics after evacuation from nuclear accident and tsunami disaster considering willingness to return of the residents

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Abstract

After the tsunami disaster and accident in Fukushima-daiichi nuclear power plants in 11th March, 2011, at Fukushima prefecture, Japan, many people in the region has been forced to evacuate from the area. Since then, as decontamination around the power plants and construction work for recovery from the tsunami have been proceeding, the people who evacuated have started returning to their hometown recently. However, it will take years to complete decontamination of radiation pollution and reconstruction of all buildings and infrastructure. According to questionnaire survey to the citizens conducted by the local governments in the area, around half of the people are reluctant to come back to their hometown even if decontamination activity is completed. Furthermore, recovery of highly polluted area is still considered quite difficult. For the future of those municipalities, the number and demographic structure (age and gender composition) of the returning people have significant long-term impacts. The problems are not only the population size, but to the economy and social and welfare services. This is a serious issue on sustainability of those communities. However, that problem, which will become tangible ten to twenty years later, has not been discussed explicitly in the plans of recovery from the disaster of the central and local governments. Against the background, we aimed at beginning the debate of the issue by showing future transition of demography and economy in the area. In order to simulate the population and economic activity, we developed a population dynamics model coupled with a simplified economic model. Using government statistics of current (evacuating) population, opinion survey of the evacuating people by the local governments, their age and gender composition, future birth and death rate, and assumption of future industrial structure, the model simulates long-term population and economic prospects of the area. Several scenarios were developed by considering gap between the presented intention and actual behaviour of the people, and economic growth rate of surrounding area. The result suggests, if the people behave as they answer to the surveys (the people younger than age of 50 are especially reluctant to return, compared with elder people), after a few decades, the cities and towns may face a rapid decline of population after extremely "aged" demographic structure. Their economic activity level may become less than one fourth of the pre-disaster level as they lose labourers. The result also showed some hints at where to approach in order to maintain the demography and economy. For instance, creating opportunity of employment and environment for children (including school and nursery services) will be particularly effective. The quantitative simulation provides basic insights for those municipalities trying to re-construct their communities and formulate long-term development plans, and showed an aspect of long-term impacts of nuclear accident to the communities..

Keywords: Disaster management, Nuclear accident, Regional economics, Community sustainability, Population projection

Language as an inventory system for intangible cultural heritage

Olga Bialostocka

Abstract

As a vehicle of oral traditions and cultural expressions, language has been made visible in the UNESCO list of intangible cultural heritage alongside social practices, rituals, indigenous knowledge or festive events that serve to bestow identity to people. Inherited from past generations, some traditional practices and rites are still observed, though usually in a slightly modified manner; and as such they constitute and are protected as the living heritage. The continual practice of these traditions often naturally necessitates alterations in their outer form in response to the changing environment and the contemporary socioeconomic context. Accordingly, inscription of intangible cultural heritage on an inventory in view of conserving it runs a risk of essentialising culture. Safeguarded in this form, living heritage becomes 'fixed in time' and any kind of change in its form starts being perceived as a treat to its authenticity. Meanwhile, cultural heritage loses its cultural value the moment it is deprived of its meaning. The form of cultural expressions modifies with time, yet without meaning heritage becomes worthless. As a commodity with no meaning, it loses its cultural value; in result, its economic potential also decreases. In the long term this process affects the identity of the people to whom the living heritage belongs, which may have further implications on the sociocultural sustainability of their community. This theoretical paper looks at language as a vehicle of culture that gives meaning to people's experiences. Through it and in it, reality is created and named. Therefore, language can be considered an inventory system for the living heritage, for the latter is primarily contained in the linguistic interactions of the people to whom it belongs. The paper advocated for a greater protection and promotion of vernacular languages that convey the meaning of people's living heritage while remaining a tool that adapts the form to changing environments. To safeguard the cultural practices without losing their meaning and to ensure sustainability of the sociocultural development of the peoples still observing these traditions, the language that created them needs to be preserved in the first place. The paper is constructed within Bourdieu's theory of practice which sees social practices as products of the relation between a particular field (that represents social spaces) and a habitus (defined as a set of dispositions that structure human actions in unconscious ways). In line with this theory, language is perceived as a socio-historical phenomenon, where every linguistic interaction reflects and reproduces social structures in which the language has been formed and is currently used. The theory further asserts that the habitus is a product of history, constantly being created through experience. On that ground dehistoricisation of social practices can be challenged in favor of a non-essentialist view of culture.

Women Social Entrepreneurship: A Step Towards Social Sustainability

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Abstract

Greece has been going through one of the most severe economic crises in its history, with significant impacts on, among others, women's unemployment, inequalities and poverty. Thus, what seems to be needed is a sustainable creation and distribution of wealth based on the development of those activities that can best respond to women's needs; i.e. social entrepreneurial activities. Social enterprises offer a way for women to share in the country's growth and provide solutions to its entrenched social problems. They are regarded as a significant means through which social consequences of the crisis can be mitigated, sustainable employment can be created, and eventually the economic and social fabric can be reshaped. Women are generally more altruistic and socially minded than men, and this characteristic motivates them to manage a social enterprise than a pure for-profit form. However, female social entrepreneurship faces challenges which are likely to impact on women's business start-up decisions and operation. The aim of this study is to explore the characteristics of female social entrepreneurs in Greece, their motivation and the challenges they face. Using a qualitative approach, this study draws on data from interviews with 12 women social entrepreneurs. Women viewed the crisis and its impacts as an opportunity and were involved in social entrepreneurial activity. Their main motivation was the offer to the community, combined with their need for employment and independence. According to the results, women social entrepreneurs believe that the intended purpose is still far away. Additionally, women social enterprises deal with many challenges that make difficult not only the fulfillment of their social mission but also their own survival; the vague legal framework, the increased taxation, the uninformed public authorities, the lack of the locals' confidence and funding are many of them. In order to address the barriers and challenges that female entrepreneurs face, it is crucial to formulate strategies through institutional and legal, and financial support. Supporting women social entrepreneurs, productivity and growth will be enhanced, and the gender-based inequalities and social pressures that restrain female employment and entrepreneurship will be reduced.

Keywords: Social Enterprise, Women, Sustainability, Greece

1. Introduction

In recent years, there has been a genuine interest in social entrepreneurship and its contribution to sustainable development. Literature has revealed a lot of different meanings and forms of social entrepreneurship underlying its unclear boundaries (Dacin et al., 2010).

According to a recent definition of the European Commission, a social enterprise is "an operator in the social economy whose main objective is to have a social impact rather than make a profit for their owners or shareholders. It operates by providing goods and services for the market in an entrepreneurial and innovative fashion and uses its profits primarily to achieve social objectives. It is managed in an open and responsible manner and, in particular, involves employees, consumers and stakeholders affected by its commercial activities" (Communication from the Commission, 2011).

In Europe, social enterprises adopt a social economy approach (Galera and Borzaga, 2009; Nasioulas, 2012). They follow a cooperative or an association legal structure (Kerlin, 2013) to create social value and benefit the community using assets and wealth. Social enterprises have a statutory purpose of social benefit; they present priority of people over capital; they employ a democratic and participatory system of decision-making process not based on capital ownership; they enjoy a high degree of autonomy and solidarity; their profits are limited distributed with a high percentage of them to be invested in the creation of new jobs (Nasioulas, 2012).

Clearly, based on entrepreneurship strategies, social enterprises are organizations that aim for a “double bottom line”; they attempt to primarily meet social objectives and then economic ones (Goldenberg et al., 2009; Witkamp et al., 2011). They are member-controlled and people-centred, and their purpose is to maintain and strengthen social cohesion within a particular community or society (Oatley, 1999).

In Greece, social entrepreneurship has been institutionally recognized by Law 4019/2011 on “Social Economy and Social Entrepreneurship”. The aforementioned law was the first legislative act that introduced the concept of Social Economy and created a new form of cooperative, the “Social Cooperative Enterprise” (SCE). According to the article 2 §1: “The Social Cooperative Enterprise is established as an entity of Social Economy. It is a civil cooperative with a social purpose possessing entrepreneurial capacity by law. The Social Cooperative Enterprise members can be either individuals or juridical entities. Its members participate with one vote regardless of the cooperative shares they possess” (Nasioulas, 2012: 165).

The market of Greek social cooperative enterprises is newer, less mature and less dominated by competitive pressures than the market of business entrepreneurship. Three categories of SCEs are divided (Nasioulas, 2012):

a) Social Cooperative Enterprises of Integration: They focus on the integration of vulnerable groups (e.g. disabled, addicted, imprisoned/released, unemployed over 50 years of age, long-term unemployed, single-parents, abused women, illiterate, immigrants) into the economic and social life, and have at least 40% employees which belong to those groups. It is worth mentioning that in Greece, another type of social integration cooperative enterprises was firstly introduced by Law 2716/1999. More specifically, Limited Liability Social Cooperatives (LLSCs) have been created targeting individuals with psycho-social disabilities, aiming at economic and social integration through a productive and commercial activity. However, LLSCs are based on a multi-stakeholder strategy; a partnership between individuals of the target group, psychiatric hospital workers and community institutions.

b) Social Cooperative Enterprises of Care: They focus on the production of goods and provision of services of social-care character towards certain population groups, such as the elderly, infants, children, disabled and chronically ill.

c) Social Cooperative Enterprises of Collective and Productive Purpose: They focus on the production and provision of products and services respectively (culture, environment, ecology, education, social benefit services, local products, traditional activities and crafts etc.).

Starting a social enterprise is accompanied by all challenges which an entrepreneur has to face, including lack of access to funding, and absence of networks and role models. However, creating a social enterprise may be more difficult than creating a traditional business, because of the skills needed to start up and manage an enterprise which is trying to fulfill social and profit oriented objectives (OECD/European Union, 2013). Sharir and Lerner (2006) identified eight variables that could contribute to the success of a social enterprise. Out of these eight variables, five are related to the qualities of the entrepreneur, i.e. the entrepreneur’s social network, commitment, previous work experience, ability to integrate the vision and establish strategic alliances. In addition, Shaw and Carter (2007) indicate that a social entrepreneur is characterized by dynamism, ambition and passion, while Peredo and McLean (2006) believe that a social entrepreneur should be risky, innovative and proactive.

Research literature describes social entrepreneurs as extraordinary individuals and highlights the significance of their commitment and dedication to social purposes. For social entrepreneurs

it is more important to create “social value” compared to business entrepreneurs who focus on “economic value” (Trivedi and Stokols, 2011). Social entrepreneurs are regarded as “different breed of people” (Weerawardena and Mort, 2006); people who are primarily forced by a particular social mission and are trying to balance moral imperatives and profit motives (Drayton, 2002; Peredo and McLean, 2006).

According to the definitions of Dees (1998) and Nicholls (2006), social entrepreneurs play a significant role as agents of change in the social field; they create both social and economic value, exploit new business opportunities using limited resources and they are involved in a process of continuous innovation and learning. Generally, social entrepreneurs are people who rely on new ideas for addressing serious social problems and persistently trying to carry out their mission and widely spread their ideas (Bornstein, 2004; Vega and Kidwell, 2007).

Especially for women, social enterprises offer a way to share in the country’s growth and provide innovative, sustainable solutions to its entrenched social problems. Women are, generally speaking, more altruistic and socially minded than men; they also give more importance to benevolence and universalism values, and not to power, stimulation, hedonism, achievement and self-direction values (Schwartz and Rubel-Lifschitz, 2009); therefore women are more likely to manage a social enterprise than a pure for-profit form.

Women are more likely to choose a niche market and found or manage a social enterprise, adopting a more defensive strategy and a collective management, while they place lower emphasis on “competitive aggressiveness” compared to business entrepreneurs (SELUSI, 2011). Furthermore, women social entrepreneurs, compared to men, seem to have lower expectations, less confidence about their entrepreneurial skills and reluctance to take business risks and engage in competitive environments. According to Estrin et al. (2014), women’s personal traits and preferences for risk and innovation determine the size and the performance of the social enterprise they run, and subsequently determine the salary they can pay themselves.

Although most studies have investigated social enterprises’ characteristics and social entrepreneurs’ profile, their motivation, obstacles, strategic methods and role in development (e.g. Farmer et al., 2008; Haugh, 2005), there is little consideration to woman social entrepreneur (Teasdale et al., 2011). To the best of our knowledge, there have not been so far any studies exploring woman social entrepreneur in Greece; thus our study can be considered as a first overview of the woman social enterprises’ issue.

Given the paucity of research on female social enterprises, this study takes a qualitative approach. The aim of this study is to explore the characteristics of female social entrepreneurs in Greece, their motivation and the challenges they face. Within this approach, we may create a more complete view of woman social entrepreneurs and develop greater insight into the running of female social entrepreneurship and its sustainability.

2. Methods

In this study, a qualitative research method was applied to explore the characteristics of female social entrepreneurs, their motivation, and the opportunities and obstacles that particularly affect them in Greece. The interviews provide the researcher the flexibility to explore respondents’ thoughts, feelings and perspectives, offering a more complete picture of what is happening and why.

The data was collected between 29/09/2015 and 28/02/2016 through personal structured interviews with 12 women social entrepreneurs.

Data collection should meet the following criteria: 1) The sample includes women who have found and/or lead a social enterprise, 2) Social enterprises operate at least one year and meet the literature specified criteria, 3) Social enterprises include different focuses, 4) Social enterprises cover at least one of the total 13 Regions of Greece, taking into account that our research is a first approach.

The sample of women social enterprises was based on the list of the Greek Ministry of Labour. The interview participants were initially contacted by telephone being invited to take part in the research. In addition, the study's aims and objectives were explained, and confidentiality of the given information was assured. Finally, we interviewed 12 women social entrepreneurs, covering 10 of 13 Greek Regions (2 women represented in two cases the same Region, respectively). Various dates and times were offered in order to be accessible to the participants. The 12 telephone or skype interviews lasted approximately 45 minutes on average.

The interview included predetermined protocol questions. The questions included topics, such as profile and career background of women social entrepreneurs, motivation, factors affecting the enterprise's operation, and processes of social enterprise's evaluation.

After the interviews, detailed notes were written up and after compiling the notes, the interviews were coded using standard qualitative coding methods.

3. Results

3.1 Demographic characteristics and work experience

The demographic characteristics and work experience of women social entrepreneurs were described in the first stage of analysis. Of the 12 women interviewed, 5 were aged between 30-39 years, 5 were between 40-49 years and 2 were aged over 50 years. All participants were highly educated. Eight women had attended university, 3 had attended postgraduate studies, while one had attended college. Only one participant had a previous work experience within the social economy sector, while the prior experience of the rest of 11 women interviewed was not within that setting. However, those women reported that they have an experience on management issues or the subject their social enterprise employs.

3.2 Motivation and opportunities

Women of this study were involved in social entrepreneurship because of their need to enter the labor market. Unemployment and instability in their previous workplace were a key motivation for them. All female survey interviewees started up their enterprise under the uncertain situation of the market environment. The crisis was regarded as an opportunity for employment or improved working conditions. Another motivating factor was women's desire to help society.

[...] I mainly saw it as a great opportunity to change job (interviewee 10).

Social economy is an issue of philosophy, not of business. I think that all problems have been emerged over the past five years due to individuality; this mindset must change; we cannot move on our own, we have to go along with the others [...]. That's why I was involved in social entrepreneurship; I have seen it as a great opportunity to change the world (interviewee 3).

[...] What no one can teach you is to love your fellow man. I think we should move forward from "I to We" (interviewee 5).

All social enterprises were established to meet the increased needs of society and solve serious social problems. However, to obtain information and knowledge required to recognize opportunities, and identify and assess local social needs, women suggested networking, which was seen as a key priority and a main strategy for all women interviewed.

Eight of 12 women gave emphasis to social responsibility. Social entrepreneurs should be active citizens with a strong sense of social responsibility and be aware of local conditions helping them to identify the local social needs that have not being met. The term "empathy" has been particularly mentioned by the interviewees. As mentioned:

What distinguishes a social entrepreneur from a business one is what we call emotional intelligence and empathy (interviewee 9).

Social entrepreneurship was considered as an answer to the crisis, as a step to sustainable

development. However, women interviewed have not shown significant outcomes. As some entrepreneurs noted, it is rather important to provide salaries to their employees. On the other hand, regarding social impacts, women believe that they have achieved remarkable objectives. The evaluation of the social enterprise's social impact is mainly based on the local community response and support, and the new jobs have been created. It is worth mentioning that only 2 of 12 women social entrepreneurs has already some knowledge about the process of monitoring and evaluating the social impact of their enterprise. However, most women considered that they have not yet achieved their objectives to a desired extent. A social entrepreneur noted:

If there was a rating scale of 100, I would say that we have achieved our goal at a rate of 10 (interviewee 3).

Following the philosophy of the social economy sector, social enterprises can promote the common good, highlighting principles, such as solidarity and cooperation. Social entrepreneurs understand the necessity of being inclusive to generate a sense of value-added participation among collaborators and give importance to be a part of something that is "ours", not "mine" or "theirs".

One reason I have not put down is because I take courage from the other social entrepreneurs. Our contacts have brought us closer, we realized that working together makes us able to achieve (interviewee 10).

I have been always directed towards people around me. I have always been involved in volunteering and cooperation with local authorities. Social Economy gave me the opportunity to make my offer more organized, with better results (interviewee 2).

[...] It is our common goal to carry the message of solidarity and teamwork (interviewee 2).

Women reported that their involvement in social entrepreneurship makes them feeling independent, creative and more social, and satisfaction may be generated by these feelings.

Satisfaction of doing something that makes sense, something [...] through which help other people being happy, solve social issues [...] (interviewee 9).

[...]. Helping others is my motivation and the best reward. This feeling is unique (interviewee 5).

Social mission oriented activities and their effects make women social entrepreneurs getting great satisfaction which in turn gives them strength and courage. Moreover, according to the sample, persistence and patience are the key elements that should characterize any social entrepreneur.

[...] You have to be strong because many times you will fall down and should get up again, as profits will take a long time coming (interviewee 9).

Summarizing, the motivation of social entrepreneurs cannot be only explained by economic theories and includes the following bases: the desire to help society, a need of employment, a non-monetary focus, achievement orientation and closeness to the social problem at hand.

Furthermore, many women did not consider that there is any difference between male and female social entrepreneurs; character, abilities and skills may assist individuals on the road to success. However, women considered that women social entrepreneurs have advantages over men. Women are considered more emotional and communicative compared to men, features that facilitate negotiation and cooperation. However, one woman entrepreneur stated that gender is the only important characteristic of social entrepreneurship. Social entrepreneurship gender gap is not as high as with traditional commercial entrepreneurship; women are greatly fulfilling social objectives.

Woman has family responsibilities and wants to go back to work; social entrepreneurship gives her schedule flexibility [...]. You are not going on your own in social entrepreneurship. A woman is more likely to cooperate compared to a man who wants to be a leader (interviewee 9).

3.3 Obstacles

Poor access to finance was considered as a major obstacle for Greek social enterprises. When the respondents were asked about financing, only 3 of 12 women reported that they have received funding. As mentioned, unemployment is a key motivating factor for women to start a social enterprise. Thus, despite the fact that social enterprises have not exclusively addressed by profit, they are neither outside of the market nor outside of the public system of resource allocation; thus funding is necessary.

One of the reasons women social entrepreneurs have limited opportunities in accessing credit is the limited awareness of people of the philosophy of social economy and social entrepreneurship.

We faced many problems when we had been engaged with Municipalities and we were trying to present our vision. We were regarded as NGOs. Social entrepreneurship is not well understood because people don't understand how you can develop cooperation [...] (interviewee 1).

Social entrepreneurship in Greece faces many difficulties. People do not know how to cooperate, they are opportunists, they seize every opportunity to improve things for themselves (interviewee 9).

According to interviewees, women social entrepreneurs face stereotyped beliefs that determine their role as an entrepreneur and their chances on the market. Traditional financial institutions generally refuse to lend social enterprises because they do not meet their established criteria and are not seen as offering sufficient guarantees.

Women social entrepreneurs face prejudice and discrimination against them [...] (interviewee 6).

There are many people that face women cautiously. In general, people consider that women have poor money management practices and are no trustworthy to lenders (interviewee 9).

Furthermore, a major obstacle for female social entrepreneurs was the vague legal framework, which is ignored by institutions, such as ministry, local authorities and tax agency. Greek bureaucracy also complicates the situation.

In Greece, social entrepreneurship is in infancy. Social entrepreneurs, irrespective of the gender, need to spend much more time to be informed, solve problems and develop social oriented activities. This situation is becoming more difficult due to the state's insufficient information. The socioeconomic circumstances and the state structures create additional difficulties in the daily life of women and the balance between family and work.

Tax was considered as another difficult issue for female Greek social entrepreneurs, as startups receive no fiscal support. By the government support, women social entrepreneurs believe that they could be more competitive and innovative, achieving their goals faster.

Clearly, in Greece female social enterprises face many challenges, such as the legal framework, ignorance of institutions, high taxes, lack of public confidence and access to finance. These problems make difficult not only the fulfillment of the enterprises' mission but also their survival. It is worth mentioning that women social enterprises have not shown significant profits. Most of them are hardly sustainable.

4. Discussion

The aim of this research was to explore the characteristics of female social entrepreneurs in Greece, their motivation and the challenges they face.

The findings showed that Greek women social entrepreneurs are middle aged with a high educational level and experience on management issues or the subject their social enterprise employs; a result similar to the findings of Shaw and Carter (2007). In many European countries social entrepreneurs are younger, possibly due to a higher risk propensity, except the UK, where young social entrepreneurs were found at low levels (Humbert, 2012). As Humbert (2012: 5) says: "it is important to consider the effect of age as there may also be potential links with the type of social enterprise being set up: younger social entrepreneurs may work on transformational actions while older social entrepreneurs may tend to focus more on charitable organizations". Regarding

educational level, this is not surprising as it has been revealed that social entrepreneurs have a higher level of education than for-the-profit ones.

Of specific interest in this research was an attempt to understand of what drives women social entrepreneurs' work. Hechavarria et al. (2012) have recently suggested that entrepreneurial outcomes are firstly driven by an individual's motivation to start a business. It is the motivation that leads the entrepreneur to act and pursue opportunities.

Generally, women social entrepreneurs are driven both by economic and non-economic forces. Profitable growth, personal satisfaction, help others and flexibility motivate women to be involved in social entrepreneurship; motivating factors that are also found in business entrepreneurs (DeMartino and Barbato, 2003; Fischer et al., 1993; Orhan and Scott, 2001). It is worth mentioning that the need of making money is most likely to be found in business entrepreneurs (Hessels et al., 2008); however, in this study this need can be also regarded as a basic driver of social entrepreneurship.

Furthermore, women's desire to help society is a motivating factor. Humbert (2012) identified a tendency of women social entrepreneurs to get involved with their community. Urbano et al. (2014) found that altruistic attitudes and being a member of a social organization were the most relevant socio-cultural factors of female social entrepreneurship. Women's work done in the community is considered as an extension of their private responsibilities to family (Neysmith and Reitsma-Street, 2000).

Women stated that their involvement in social entrepreneurship makes them feeling independent, creative and more social, and satisfaction may be generated by these feelings. According to Estrin et al. (2014), job satisfaction may be an important factor affecting women's involvement in social entrepreneurship. They suggest that female social entrepreneurs are more satisfied with their job than their male counterparts, and this job satisfaction is independent of the salary generated through the social business.

Social enterprises can promote the common good, highlighting social responsibility, solidarity and cooperation. Neysmith and Reitsma-Street (2000) emphasize that what we call "the participatory component" should not be underplayed. Social entrepreneurs understand the necessity of creating a value-added participation among collaborators and pay attention to be a part of something that is yours.

In addition, 11 women do not consider that there is any difference between male and female social entrepreneurs. They believe that individual's character, abilities and skills can greatly lead to success. Entrepreneurial success is not limited to one specific personality trait or motivation (Chu, 2000). However, women consider that women social entrepreneurs have advantages over men. They are more emotional and communicative, features that facilitate the process of negotiation and cooperation.

However, female social entrepreneurship faces challenges which are likely to impact on women's business decisions and operation. A major challenge that social entrepreneurs face is access to financing. Generally, poor access to finance is considered as a major obstacle for social enterprises (Dees 1998; Kingston and Bolton 2004; Social Enterprise UK, 2013). Despite the fact that government plays a significant role in social entrepreneurship and capital requirements (Bull 2008; Haugh and Kitson 2007), Greek social enterprises have poor involvement in funding programs; a result similar to the findings of Farmer et al. (2008).

Women social entrepreneurs' limited opportunities in accessing credit are due to the limited awareness of people. In general, society is not aware of the philosophy of social economy and social entrepreneurship, and people are unable to understand the dual social and economic focus of social enterprises, their role and significance. Creating a social enterprise may be more difficult than creating a traditional business not only because of the skills needed, but also because of the greater difficulty in accessing capital and funds which can arise from the limited understanding of social enterprises and the social value generated by them.

Furthermore, women interviewees reported that they face stereotyped beliefs which determine their entrepreneurial role and their chances on the market. Traditional financial institutions refuse to lend women social entrepreneurs, mainly because they are not considered as offering sufficient guarantees.

An obstacle for female social entrepreneurs is also the vague legal framework, which is ignored by institutions; an appropriate national legal framework could bring clarity to social enterprises' definition, mission and activities.

Finally, tax is another major issue for female Greek social entrepreneurs; startups receive no fiscal support. In Greece, social enterprises are highly taxed, which in the long run can hinder sustainability. Considering how profits are distributed in a social enterprise, it is understood that this measure is an obstacle for the development of a social enterprise. In other countries, there is a reduced VAT rate and a tax exemption up to certain limits for integration enterprises (OECD/European Union, 2013).

5. Conclusions

The ability of Greece to grow depends, among others, on the understanding of social entrepreneurship and the promotion of its development. Under the crisis conditions, social entrepreneurship has emerged as a key role model and a significant means through which social consequences of the crisis can be mitigated, sustainable employment can be created, and eventually the economic and social fabric can be reshaped.

Women viewed the crisis and its impacts as an opportunity to be involved in social entrepreneurial activities. Their main motivation was the offer to the community, combined with their need for employment. However, although female social enterprises are able to strengthen the economy and social cohesion, they face major obstacles. Female social enterprises deal with many challenges that make difficult not only the fulfillment of their social mission but also their own survival.

In order to address the challenges that female social entrepreneurs face, it is crucial to formulate strategies through institutional, legal and financial support. Supporting women social entrepreneurs, productivity and growth will be enhanced, and the gender-based inequalities and social pressures that restrain female employment and entrepreneurship will be reduced. Furthermore, social entrepreneurs must seek new financial partners.

Our study may be considered as a first overview of the female social enterprises using qualitative research method. Due to the small size of the sample, our findings may not be generalizable. They do, however, provide some hypotheses which can be tested by future research on a larger scale. Furthermore, our study is limited in the specific area of female social enterprises sector. Future research could be also directed towards female profit enterprises, getting further conclusions derived from the studies results' comparison.

Finally, some implications of this study may interest policy makers. Understanding the main challenges and obstacles relating to the female social enterprises is an important step towards promoting enterprises' performance and women's quality of working life, and hence contribute to sustainable development.

References

- Bornstein, D., 2004. How to change the world: Social entrepreneurs and the power of new ideas, updated edition. Oxford University Press, New York.
- Bull, M., 2008. Challenging tensions: Critical, theoretical and empirical perspectives on social enterprise. *International Journal of Entrepreneurial Behavior & Research*, 14(5), 268-275.
- Chu, P., 2000. The characteristics of Chinese female entrepreneurs: Motivation and personality. *Journal of Enterprising Culture*, 8(1), 67-84.
- Communication from the Commission to the European Parliament, the Council, the European

- Economic and Social Committee and the Committee of the Regions, 2011. Social business initiative creating a favourable climate for social enterprises, key stakeholders in the social economy and innovation, Brussels, 25.10.2011 COM(2011) 682 final.
- Dacin, P.A., Dacin, M.T., Matear, M., 2010. Social entrepreneurship: Why we don't need a new theory and how we move forward from here. *Academy of Management Perspectives*, 24(3), 37-57.
- Dees, J.G., 1998. Enterprising nonprofits. *Harvard Business Review*, 1(1), 55-67.
- DeMartino, R., Barbato, R., 2003. Differences between women and men MBA entrepreneurs: Exploring family flexibility and wealth creation as career motivators. *Journal of Business Venturing*, 18(6), 815-832.
- Drayton, W. 2002. The citizen sector: Becoming as competitive and entrepreneurial as business. *California Management Journal*, 12(1), 29-43.
- Estrin, S., Stephan, U., Vujčić, S., 2014. Do women earn less even as social entrepreneurs? CEP Discussion Paper No1313. Centre for Economic Performance, London School of Economics and Political Science, London.
- Farmer, J., Steinerowski, A., Jack, S., 2008. Starting social enterprises in remote and rural Scotland: Best or worst of circumstances? *International Journal of Entrepreneurship and Small Business*, 6(3), 450-464.
- Fischer, E.M., Reuber, A.R., Dyke, L.S., 1993. A theoretical overview of the extension of research on sex, gender and entrepreneurship. *Journal of Business Venturing*, 8(2), 151-168.
- Galera, G., Borzaga, C., 2009. Social enterprise: An international overview of its conceptual evolution and legal implementation. *Social Enterprise Journal*, 5(3), 210-228.
- Goldenberg, J., Han, S., Lehmann, D.R., Hong, J.W., 2009. The role of hubs in the adoption processes. *Journal of Marketing*, 73(2), 1-13.
- Haugh, H., 2005. The role of social enterprise in regional development. *International Journal of Entrepreneurship and Small Business*, 2(4), 346-357.
- Haugh, H., Kitson, M., 2007. The third way and the third sector: New labour's economic policy and the social economy. *Cambridge Journal of Economics*, 31(6), 973-994.
- Hechavarria, D., Renko, M., Matthews, C., 2012. The nascent entrepreneurship hub: Goals, entrepreneurial self-efficacy and start-up outcomes. *Small Business Economics*, 39(3), 685-701.
- Hessels, J., van Gelderen, M., Thurik, R., 2008. Entrepreneurial aspirations, motivations, and their drivers. *Small Business Economics*, 31(3), 323-339.
- Humbert, A.L., 2012. Women as social entrepreneurs. Working Paper 72, Third Sector Research Centre.
- Kerlin, J.A., 2013. Defining social enterprise across different contexts: A conceptual framework based on institutional factors. *Nonprofit and Voluntary Sector Quarterly*, 42(1), 84-108.
- Kingston, J., Bolton, M., 2004. New approaches to funding not-for-profit organizations. *International Journal of Nonprofit and Voluntary Sector Marketing*, 9(2), 112-121.
- Nasioulas, I., 2012. Social cooperatives in Greece: Introducing new forms of social economy and entrepreneurship. *International Review of Social Research*, 2(2), 151-171.
- Neysmith, S., Reitsma-Street, M., 2000. Valuing unpaid work in the third sector: The case of community resource centres. *Canadian Public Policy - Analyse de Politiques*, 26(3), 331-346.
- Nicholls, A., 2006. Social Entrepreneurship, in: Carter, S., Jones-Evans, D. (Eds.), *Enterprise and Small Business: Principles, Practice and Policy*. FT Prentice Hall, Harlow, pp. 220 – 242.
- Oatley, K., 1999. Why fiction may be twice as true as fact: Fiction as cognitive and emotional simulation. *Review of General Psychology*, 3(2), 101-117.

- OECD/European Union, 2013. Policy brief on social entrepreneurs. Entrepreneurial activities in Europe, Publications Office of the European Union, Luxembourg.
- Orhan, M., Scott, D., 2001. Why women enter into entrepreneurship: An explanatory model. *Women in Management Review*, 16(5), 232-247.
- Peredo, A.M., McLean, M., 2006. Social entrepreneurship: A critical review of the concept. *Journal of World Business*, 41(1), 56-65.
- Schwartz, S.H., Rubel-Lifschitz, T., 2009. Cross-national variation in the size of sex differences in values: Effects of gender equality. *Journal of Personality and Social Psychology*, 97(1), 171-185.
- SELUSI, 2011. Social entrepreneurs as lead users for service innovation. http://cordis.europa.eu/result/rcn/146138_en.html (accessed 10.01.2016).
- Sharir, M., Lerner, M., 2006. Gauging the success of social ventures initiated by individual social entrepreneurs. *Journal of World Business*, 41(1), 6-20.
- Shaw, E., Carter, S., 2007. Social Entrepreneurship: Theoretical antecedents and empirical analysis of entrepreneurial processes and outcomes. *Journal of Small Business and Enterprise Development*, 14(3), 418-434.
- Social Enterprise UK, 2013. The People's Business. http://www.socialenterprise.org.uk/uploads/files/2013/07/the_peoples_business.pdf (accessed 10.01.2016).
- Teasdale, S., McKay, S., Phillimore, J., Teasdale, N., 2011. Exploring gender and social entrepreneurship: Women's leadership, employment and participation in the third sector and social enterprises. *Voluntary Sector Review*, 2(1), 57-76.
- Trivedi, C., Stokols, D., 2011. Social enterprises and corporate enterprises: Fundamental differences and defining features. *Journal of Entrepreneurship*, 20(1), 1-32.
- Urbano, P.D., Ferri, J.E., Noguera i Noguera, M., 2014. Female social entrepreneurship and socio-cultural context: An international analysis. *Revista de Estudios Empresariales*, 2, 26-40.
- Vega, G., Kidwell, R.E., 2007. Toward a typology of new venture creators: Similarities and contrasts between business and social entrepreneurs. *New England Journal of Entrepreneurship*, 10(2), 15-28.
- Weerawardena, J., Mort, G.S., 2006. Investigating social entrepreneurship: A multidimensional model. *Journal of World Business*, 41(1), 21-35.
- Witkamp, M., Raven, R., Royakkers, L., 2011. Strategic niche management of social innovations: The case of social entrepreneurship. *Technology Analysis & Strategic Management*, 23(6), 667-681.

Family Planning and Environmental Sustainability: Assessing the Science

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Abstract

The authors engaged researchers around the world to assist in evaluating articles published in peer-reviewed academic journals since 2005 to assess scientific evidence supporting or undermining the hypothesis that wider use of family planning will contribute to environmental sustainability. In all, some 939 articles were selected based on such search criteria as family planning, human population, gender, women and major environmental topics. We find that the hypothesis frequently supported in published research but rarely explored directly and hence neither established nor refuted. Constructing a conceptual framework that disaggregates steps along two key pathways by which family planning might influence the environment, one demographic and the other relating to the empowerment of women, proves more fruitful. A diversity of researchers — female and male, from developing and developed countries — report evidence supporting the conceptual framework. A small body of modestly undermining literature was found and was prioritized for assessment.

Keywords: environment, sustainability, reproductive, gender, population

1. Introduction

For decades the idea that wider use of voluntary family planning contributes to a healthier, more supportive and more sustainable natural environment has been argued by some scholars and activists. Advocates of wider access to family planning and related reproductive health services have often joined them. In recent years, however, the argument has been rarely heard or noticed. To many, including in the world of research, the linkage seems scientifically complicated or culturally loaded to enough audiences—especially to women and people in and from developing countries—to discourage its use. Moreover, the scientific evidence base for the family planning-environmental linkage has never been firmly established in peer-reviewed research, the gold standard for scientific acceptance of a hypothesis—and hence for eventual public recognition.

If a comprehensive search and participatory assessment of peer-reviewed literature could establish that 1) a robust scientific case does exist for family planning's contribution to environmental sustainability, and 2) researchers who are women and/or from developing countries are among those supporting this hypothesis, the conversation on these connections might be enriched. The family planning and environmental advocacy communities might be more likely to use, and more effective in using, the argument that environmental sustainability and sustainable development would benefit from wider availability and use of family planning.

This is the concept behind the Worldwatch Institute's Family Planning and Environmental Sustainability Assessment (FPESA) project. Funded by the United Nations Foundation, Turner Foundation, and Wallace Global Fund, work on the project has been ongoing since early 2014. We work to prove or disprove two hypotheses: 1) Peer-reviewed scientific research published in the past 10 years supports the thesis that greater use of family planning, in developed as well as developing countries, contributes to environmental sustainability through two main pathways: the empowerment of women and the slowing of population growth. 2) This scientific literature is not restricted to that published in developed countries by developed-country researchers, or only of interest in these regions, but rather has been produced in the last decade by a diversity of

researchers of both sexes from developing as well as developed countries and is of widespread global interest.

The Worldwatch Institute is an independent environmental research organization whose mission is to use research, data analysis and compelling communication to promote an environmentally sustainable world that meets human needs. Within this mission, the Institute's board and staff see themselves not as environmental advocates but as a think tank working to contribute to sustainability through solution-oriented strategies assessed objectively for their value and technical and political feasibility. The Institute takes no official positions related to the topics of the present research. It has, however, published work by individual researchers promoting the wider use of family planning and the slowing of population growth, including by co-author and FPESA project director Robert Engelman, who authored the book *More: Population, Nature, and What Women Want* (Engelman, 2008). The FPESA was nonetheless conceived as an effort to assess as objectively as possible scientific evidence either supporting or undermining the hypothesis that family planning is good for environmental sustainability.

The family planning and environmental sustainability linkages are not simple, but they do exist as a complex array of many cross-sectoral independent factors and dynamics. We recognized it was unlikely we would identify many studies testing causal relationships directly from family planning to environmental sustainability. We thus developed a conceptual framework that hypothesized two main pathways, each containing several steps, through which a causal relationship might operate. We then worked to identify papers that shed light on at least one relationship within this framework. One pathway was demographic (use of family planning lowers fertility and thus slows population growth), and the other considered family planning as a potential influence on the empowerment of women, which then itself might contribute significantly to environmental sustainability.

2. Methods

Of equal importance to the hypothesis was our methodological approach. We sought to design one that was participatory and inclusive of a diversity of researchers in multiple fields, of both genders, and from developing as well as developed countries. While beginning a search for appropriate scientific studies, we also began a process of advertising through our own research networks and through others such groups as the Population-Environment Research Network for researchers willing to help us evaluate published papers relating to our hypothesis. In order to focus on research that could be considered reasonably current and accessible to the largest possible audiences, we elected to restrict our purview to papers published in English in peer-reviewed academic journals in 2005 and later. We elected not to consider papers that lacked a web-based abstract easy to hyperlink—a decision that unfortunately led to a selection bias against developing-country journals and authors, whose work is somewhat less readily placed on the Web. In practice we rejected no more than four or five otherwise-qualifying papers for this reason, so we believe the selection bias was minimal.

We also sought to initiate a partnership between the Worldwatch Institute and a comparable independent research organization based in a developing country. Several organizations were identified and approached, and two expressed interest and subsequently joined Worldwatch in joint fundraising proposals. The partnerships foundered when these proposals were unsuccessful and existing funding proved insufficient to support the efforts of the two organizations. We adjusted to this setback by focusing our international collaboration instead on a small network of international research assessors, who represented all three major regions of the developing world — Africa, Asia and Latin America — as well as Europe and the United States. Ultimately, 15 of the 28 network FPESA assessors selected became active in the assessment process. To encourage assessments after an initial unsatisfactory rate of return, we paid modest honoraria — U. S. \$100 — for each formal assessment of candidate research articles we sent to this network.

Assessors were asked to fill out a standard survey form and to include an essay of at least 250 words on the strengths and weaknesses of each article in supporting or undermining the FPESA conceptual framework. This framework, which hypothesized both demographic and women's empowerment pathways leading from family planning to environmental sustainability, was the

touchstone document foundation for the assessment work. We asked all assessors to base their evaluations on individual or connected components of the framework. Due to the logistical effort required to absorb and process the collaborative assessments only a few of the most promising papers identified were sent for assessment by the full network. Others were sent to individual assessors selected for their demonstrated expertise. Having been funded to continue the project in 2016, we may alter this process for further assessments after reporting on our results to date based on work in 2014 and 2015.

To identify suitable papers for assessment project staff utilized our own knowledge of research on family planning, population and the environment; interviews with experts and colleagues in these fields; and finally two computerized web-based databases that collectively scan tens of millions of journal articles: Google Scholar and Web of Knowledge. Search terms included family planning, reproductive health, women's empowerment, human fertility and human population on one side; and a range of such environmental terms as climate change, biodiversity, deforestation, fisheries, food security, land degradation, water, freshwater, oceans, marine, natural resources management and resource scarcity on the other. Papers needed to include terms from both sides to qualify for assessments.

These database searches and our own identifications of appropriate articles (some missed by the databases) yielded a sample of nearly 1,000 papers. We pared down this total to 939 papers by eliminating obvious selection errors (e.g., languages other than English, application of search terms to animals rather than humans, lack of peer review). At least two members of the project team scored each paper, based on its title and abstract and to the extent possible available full papers, on a score of 1 (irrelevant to our primary hypothesis) to 5 (clearly relevant), with 3 a neutral or uncertain rating of relevance and 2 and 4 intermediate (likely to be irrelevant or relevant, respectively). The project director (Engelman) took account of team members' scores and his own reading of abstracts and papers to establish a final assessment score for each paper.

We rated 414 papers among our group of 939 qualifying papers as of certain or probable relevance, i.e., value in supporting or undermining elements of our conceptual framework. Random searches within our selection for cited articles that also sounded potentially relevant suggest to us that we may have identified approximately half of the qualifying articles relevant to our conceptual framework. (That is, we have found about half of such cited articles in our selection, with the remaining half not found.) We believe our sample broadly represents a large slice of a diverse international body of scientific literature probing links of environmental science and policy on the one hand with demography, gender, family planning and reproductive health on the other.

To make our methodology as objective as possible we applied quantitative scores to the assessment of papers through several means. We assigned binary values to the presence of original data and specific mention of family planning. Our survey forms required our network assessors to apply numerical scaled grading to such characteristics as reproducibility of results, absence of ideology, and strength of relevance (positive or negative) to our conceptual framework. Worldwatch project staff took these collaborative assessments into account when assigning overall scores to papers, and two project consultants also contributed overall assessment scores, with particular attention to papers' overall strength, relevance and accessibility to non-technical audiences.

Where the value of article text and evidence offered some room for uncertainty in assessments, we slightly favored papers that were open-access (hence more accessible to wider audiences), or included authors who are women or from developing countries, and or in journals based in developing countries. As this process makes clear, however, it must be said that despite a wealth of data to assist us, especially in ranking articles for closer examination, the assessment process was fundamentally qualitative. The project director, first author of this abstract, took final responsibility for deciding which papers to weight most heavily and to summarize through annotations in our work. In mid-2016 the Worldwatch Institute published a final report including findings and annotations of selected papers of high relevance.

3. Results

We found considerable evidence supporting our first hypothesis—and little undermining and none refuting it. But we could not directly confirm it, in that we found no substantial body of scientific literature, data or evidence that would convince neutral observers, let alone skeptics, that wider use of family planning would significantly advance environmental sustainability. We did, however, identify considerable empirical and other evidence for a series of relevant findings that are supportive of our primary hypothesis. And we feel our secondary hypothesis—diverse interest in the family planning-environment linkage—was confirmed. Of 464 authors of top-ranked papers (those we prioritized for assessment and annotation) whose sex could be verified, for example, 133 were women. While quantifying a comparable distinction between author's origins in either developed or developing countries was beyond our capabilities, our impression is that a similar but probably somewhat smaller proportion of these authors are either working in or at least were born in developing countries.

Many environmental papers from our search briefly referred to population growth as being significant in its environmental impacts, yet failed to present further evidence for the assertion or mention attention to family planning or other factors influencing population change as viable solutions in achieving environmental sustainability. This was a disconnect acknowledged by many of the experts interviewed for this project.

Some experts we interviewed suggested that the lack of data and evidence could be associated with a sense of the obviousness of our hypothesis on the part of many researchers. How could wider use of family planning fail to reduce fertility beyond what it would otherwise be, all else equal? And how could lower fertility fail to slow population growth and through this reduce human pressure on the environment? But our search was for positive empirical evidence, not arguments based on logic or an accumulation of published studies and commentaries from the past.

What we found among the selected relevant papers was a fair amount empirical evidence, along with some assertion and opinion, supporting the hypothesis illustrated in our conceptual framework. Examples include papers that demonstrating that slowing population growth could slow or delay the increase of freshwater scarcity in some countries and that parliaments with higher proportions of women members are more likely to ratify environmental conventions and protocols. Many such papers were compelling. But it was not possible for us to judge the research as collectively convincing, even given the obvious inherent challenges of demonstrating a hypothesis linking social and physical science and exploring the dynamism of human interactions with the biophysical world. At the least we found effectively no empirical evidence that refuted our hypothesis or significantly undermined the components of the conceptual framework.

4. Discussion

Among the articles we found most important for demonstrating key components and links in our conceptual framework, several are worth mentioning here.

Several papers provided fresh evidence that the use of contraception directly (albeit not linearly) reduces fertility. Among the most compelling were Casterline and El-Zeini, 2014, Sedgh et al., 2014, and Finer and Zolna, 2016.

While 25 top-ranked articles drew a line directly from family planning to environmental benefits, only two of these presented evidence both for family planning's impact on population growth and the impact of slower growth on the environment. Exceptions were O'Neill et al., 2010, and O'Neill et al., 2012. These two papers probably came closest among all we examined to covering the full range of our conceptual framework's demographic pathway from family planning to environmental sustainability.

A third paper, by Headey and Jayne, 2014, found that while the ratio of arable land to people in Africa had little impact on fertility, low ratios correlated to low desired fertility and higher unmet need for family planning, suggesting that reducing unmet need in environmentally constrained areas might well lower fertility, slowing the development of such constraints. Several other

papers offered data supporting fairly specific quantitative assessments of the role of population growth in certain environmental problems, most frequently greenhouse-gas emissions implicated in human-caused climate change.

A paper by Khan and Nicell, 2014, demonstrated, counter intuitively, that increasing the use of oral contraceptives could reduce estrogen pollution in the environment over the long term. The authors calculated that this would occur through the combination of lower release levels of natural estrogens from pregnancy and births and the environmental “legacy effect”—smaller future generations releasing less estrogen than would have been the case had effective contraception not been used by current generations.

Papers by McKee et al. 2013, and Mora et al., 2013, made empirical cases for the importance of population growth as a critical factor in the loss of biodiversity.

Empirical studies by Liu and Chen, 2006, Pricope et al., 2013, and McDonald et al., 2011, lent support to the argument that demand growth through population change is a greater threat to freshwater supplies than is decrease in supply resulting from climate change. Similar studies found population growth trumping climate change in deforestation and land degradation. In all, 14 top-ranked papers concluded that population growth plays a measurably larger role than climate change in specific environmental problems or natural-resource imbalances.

A study by Carbajo et al. 2012, of the rise of dengue fever in Argentina attributed its spread more to increases in population density than to increases in temperature, a finding with possible relevance to Zika and other mosquito-borne diseases. We did not find articles making the reverse argument—that changes in climate are more important than growth in population—with respect to water supply, forests, changes in land, or infectious disease.

Papers by Agada and Igbokwe, 2014, and by Welderufael, 2014, were among several by African authors that identified correlations between household size and food insecurity in Africa. These were also among the nine articles by African authors, out of a total of 22, that called for expansion of family planning services to address food insecurity and environmentally degradation.

A “quasi-experimental” test in the Philippines by D’Agnes et al., 2010, of the concept of applying population, health and environment (PHE) in communities found that interventions integrating coastal-resource management with reproductive health (including family planning) had better impacts on both human and ecosystem health than either intervention applied alone. This was a rare empirical test of the PHE concept published in a peer-reviewed journal.

While we identified no papers connecting family planning to environmental sustainability through the pathway of gender equity and women’s empowerment, a few papers offered evidence for such a link. In the United States, McCright, 2010, found not just higher concern about climate change among women than men, but also “more scientifically accurate climate knowledge.” (Intriguingly, women nonetheless rated their own scientific understanding lower than men rated theirs.) Norgaard and York, 2005, found that parliaments with higher proportions of women members (a phenomenon logic suggests is more likely where women routinely can plan the timing of pregnancy using contraception) were more likely to ratify environmental agreements. Agarwal, 2009, found a similar correlation with women’ participation in community forest management groups in India and Nepal. Overall, a dozen of our 112 top-ranked papers (with a final score of 5) offered scattered evidence that 1) women tend to care more than men do about the environment and are more prone to want to take action on their concerns, and 2) that societies in which women are active in government or civil society tend to compare favorably environmentally with similar societies in which women are less active, all else equal. For the thesis that family planning facilitates environmental action by concerned and/or empowered women, one would need to apply a logical argument, as we found no literature specifically making this case.

We took extra care to identify and share among ourselves contrarian papers—i.e., those that would undermine our primary hypothesis. We worked to avoid selection bias by using neutral search terms in our search for literature. We found nine articles we identified as wholly or in part contrarian, including papers by Lee and Mason, 2010, and by Knight and Rosa, 2012, finding increases in per-capita consumption in association with fertility decline. Almost all other

contrarian articles were qualitative, relying on logic or previous literature or both to make a case that population or family planning is environmentally unimportant. (This was true as well for many papers asserting the opposite case.) Perhaps most notable—both in the media coverage it obtained and in some pointed rebuttals from other researchers—was a paper by Bradshaw and Brook, 2014, whose main message was captured by its provocative title: “Human Population Reduction Is Not a Quick Fix for an Environmental Problems.” It may be worth noting that our literature search did not identify any papers suggesting the contrary.

5. Conclusions

We were able to verify a broad and diverse interest, by authors of both genders and both sides of the development divide, in some of the connections illustrated in our conceptual framework. These connections were principally demographic: Authors from developing countries—especially those in Africa, including women authors—were frequently represented among those who asserted a strong role for the influence of population growth on food security, ecosystem health, the integrity of forests, and similar environmental or natural-resource issues. African authors were disproportionately represented among those who called for improved family planning services or expanded access to slow the growth of population and the degradation of the environment. Out of 22 papers making such a call in our top-ranked selection (111 papers total), 9 were by primarily African authors.

Nowhere in the research we have examined are there any findings that undermine the human-rights framework for addressing the linkage of family planning to environmental sustainability. Any linkages documented appear either clearly accepted that family planning and population policies must be based in the reproductive intentions of individuals and couples—or at least said nothing that would undermine such a basis.

The FPESA process has offered a rich exploration of a large and varied body of literature by authors from most regions of the world—except for Latin America and the Caribbean. (Authors from this region turned up only rarely in our literature search.) There is a depth of research, thinking and analysis on connections between family planning, population change, improvement in gender relations and the environment. Numerous papers yield potentially important findings for policymakers and those advocating the empowerment of women and the wider accessibility and use of voluntary family planning. Overall, however, it is clear that there is no significant body of empirical research testing the proposition that there are important environmental benefits to be expected from wider use of family planning worldwide. This points to an important research gap worth filling.

A number of experts we interviewed suggested that many researchers would like to explore these questions but that there is little interest or support from those who might fund their work. Such research, we were told, also tends to be difficult to shepherd through peer review to publication in journals. These assertions deserve further exploration. In some cases funding has been available for on-the-ground programs linking community-based efforts in both family planning and natural-resource conservation. Called Population, Health and Environment (PHE), this concept has generated its own literature, only a small proportion of which has been peer-reviewed and published in journals. There remains a major research gap on family planning’s influence on the environment, and our work suggests yet another question worth pursuing: why this is so.

References

- Agada, M. and Igbokwe, E., 2014. Food security and coping strategies among ethnic groups in North Central Nigeria, *Developing Country Studies*, volume 4, pages 31–44.
- Agarwal, B. Gender and forest conservation: the impact of women’s involvement. *Ecological Economics*, volume 68, pages 2785–99.
- Bradshaw, C., Brook, B., 2014. Human population reduction is not a quick fix for environmental problems. *Proceedings of the National Academy of Sciences of the United States of America*,

volume 111, pages 16610–15.

Carbajo, A. et al., 2012. Is temperature the main cause of Dengue rise in non-endemic countries? The case of Argentina. *International Journal of Health Economics*, volume 11, pages 1–11.

Casterline, J., El-Zeini, L., 2014. Unmet need and fertility decline: a comparative perspective on prospects in sub-Saharan Africa. *Studies in Family Planning*, volume 45, pages 227–45.

D'Agnes, L., et al., 2010. Integrated management of coastal resources and human health yields added value: a comparative study in Palawan (Philippines), *Environmental Conservation*, volume 37, pages 398–409,

Engelman, R., 2008, *More: population, nature, and what women want*. Island Press, Washington, D.C.

Finer, L., Zolna, M., 2016. Decline in unintended pregnancy in the United States, 2008-2011. *The New England Medical Journal*, volume 374, pages 843–52.

Headey D., Jayne T., 2014. Adaptation to land constraints: is Africa different? *Food Policy*, volume 48, pages 18–33.

Khan, U., Nicell, J., 2014. Contraceptive options and their associated estrogenic environmental loads: relationships and trade-offs. *PLoS ONE*, volume 9, page e92630.

Knight K., Rosa , E, 2012. Household dynamics and fuelwood consumption in developing countries: a cross-national analysis. *Population and Environment*, volume 33, pages 365-78.

Lee R., Mason A., 2010. *European Journal of Population*, volume 26, pages 159–82.

Liu Y., Chen Y., Impact of population growth and land use change in on water resources and ecosystems of the arid Tarim basin in western China. *International Journal of Sustainable Development & World Ecology*, volume 13, pages 295–305.

McCright, A., 2010, The Effects of gender on climate change knowledge and concern in the American public. *Population and Environment*, volume 32, pages 66–87,

McDonald, P. et al., 2011. Urban growth, climate change, and freshwater availability. *Proceedings of the National Academy of Sciences of the United States of America*, volume 108, pages 6312-17.

McKee, J., et al., 2013. Human population density and growth validated as extinction threats to mammal and bird species. *Human Ecology*, volume 41, pages 773–78.

Mora, C., et al., 2011. Global human footprint on the linkage between biodiversity and ecosystem functioning in reef fishes. *PLoS Biology*, volume 9, page e1000606.

Norgaard, K., York, R., 2005. Gender equality and state environmentalism. *Gender & Society*, volume 19, pages 506–22.

O'Neil, B., et al., 2010. Global demographic trends and future carbon emissions. *Proceedings of the National Academy of Sciences of the United States of America*, volume 107, pages 17521–26.

O'Neil, B., et al., 2012. Demographic change and carbon dioxide emissions. *The Lancet*, volume 380, pages 157–164.

Pricope, N., et al., 2013. The climate-population nexus in the East African Horn: Emerging degradation trends in rangeland and pastoral livelihood zones. *Global Environmental Change-Human and Policy Dimensions*, volume 23, pages 1525–41.

Sedgh, G., et al., 2014. Intended and unintended pregnancies worldwide in 2012 and recent trends. *Studies in Family Planning*, volume 45, pages 301–14.

Welderufael, M., 2014. Determinants of households vulnerability to food insecurity in Ethiopia: econometric analysis of rural and urban households, *Journal of Economics and Sustainable Development*, volume 5, pages 70–79.

Social sustainability and water management in BRICS countries: opportunities for cooperation on impact assessments and risk management

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Abstract

This paper's background context was marked by the BRICS agreement to establish the New Development Bank in 2014 and by the global agreement in 2015 to establish the United Nations 2030 Agenda and Sustainable Development Goals (SDG), which offered a framework for sustainable development projects, including for those financed by the New Development Bank. The recent inauguration of new multilateral banks and sources of funding for sustainable development justifies research on the differences between the predominant development risk cultures of financial institutions headquartered in BRICS countries and in Washington, DC. Mwase and Yang (2012) argued that BRICS philosophies for development financing differ from those of traditional donors, most members of the OECD Development Assistance Committee (DAC), in that they reject any form of policy conditionality, allegedly pay less attention to social and environmental safeguards and have a view of credit risk that focuses on micro-sustainability of debt rather than macro-economic and long-term factors. The aim of this paper is to shed light on the development cultures and philosophies that are likely to shape the water management policies of BRICS financial institutions and, based on this analysis, to suggest opportunities for financial and technical cooperation on social sustainability methodologies for water intensive projects. According to an annual survey carried out by the World Economic Forum (2016), water crises have been perceived for the last five years to be among the top three greatest risks in terms of impact, out of 29 global risks. Moreover, the top risk in 2016, failure of climate-change mitigation, is highly interconnected with water risks and can exacerbate them significantly. This paper is also stimulated by the recognition that the 2018 World Water Forum, in Brasilia, represents a window of opportunity to promote the expansion of BRICS cooperation. An anthropological approach to commodity chains (Appadurai, 1986) and water (Orlove & Caton, 2010) was adopted, and combined with an interdisciplinary approach to risk cultures (Douglas & Wildawsky, 1982; Beck 1992; Power, Ashby & Palermo, 2013). Combining these approaches leads to a focus on the distribution of technical, cosmological and evaluative knowledge about risks in transnational networks of relationships linking water producers, distributors and consumers. Several methods were employed to produce data on water risks that affect social development. Ethnographic context was clarified by carrying out participant observation and taking field notes while working with multi-sector partnerships in Brazil and China, involving public sector and United Nations bureaucracies, companies and non-governmental organisations. In addition, information extracted from on-line water management databases and from a preliminary review of literature was cross examined with semi-structured interviews with water sector professionals based in Brazil, China and India. The results of this research project indicate that a social risk management decision support system capable of combining tools and indicators employed for Integrated Water Resources Management, Enterprise Risk Management and monitoring Sustainable Development Goals can help to improve the quality of assessments in the water sector and potentially the productivity of partnerships and enterprises.

Quality of life in a beyond growth economy

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Abstract

We might have entered the era of a beyond growth economy. We do not know whether a beyond growth economy will mean green growth, slow growth, beyond growth, no growth or contracting economy, but the world is less likely to stay on the same fast growth track in the future. There is a lot of discussion on social sustainability and factors influencing quality of life. However, there seems to be lack of multidisciplinary perspectives in the academic discourse how these issues are expected to develop in a beyond growth context. The aim of this paper is twofold: 1) to provide a critical overview of major streams addressing the challenge of reducing economic growth, respecting ecological limits and enhancing quality of life altogether; and 2) to synthesize the main features of a beyond growth economy (structure of the economy, balance of work and free time etc.) including the transition path to beyond growth. The research is based on a systematic literature review, a sketch of 'beyond growth economy' is offered, acknowledging the fact that it is still an ongoing developing concept. Deduced from growth-critical scientific streams, it is struggling with internal contradictions and debates. The question presents itself whether or not we will still be able to live a full and satisfied life in the future if growth is not a viable alternative. Criticism of the growth paradigm is getting common, while positive messages and normative instructions are rare. This work intends to provide an overview of how high level of subjective wellbeing might be achieved in a beyond growth economy. Based on a systematic review of the academic literature, six different streams have been detected and analyzed: degrowth, steady state economics, prosperity without growth, voluntary simplicity, sustainable happiness and green growth. The streams overviewed agree about the possibility of enhancing subjective wellbeing without growth or at least in a way not conflicting planetary boundaries (green growth). The streams also agree that such an economy is economically feasible. It will increase rather than decrease the number of jobs, although may decrease economic efficiency and the amount of potential goods consumed. We might need to do with less, but be able to enjoy it more. The streams strongly disagree about the way how this paradigm change can be carried out (bottom-up and voluntary transition based on deliberation, policy-driven transition fostered by enlightened governments or crises driven change). Certain approaches hit fundamental values of individualism while other streams insist to these fundamental values even when they risk to lose credibility.

Keywords: quality of life, subjective well-being, social sustainability, beyond growth economy.

1. Introduction

The economic crises hitting the world in 2008 may be impermanent, but it hit fundamental values and undermined trust in the economy and institutions. Climate crisis seem to be less prompt but also raise the need to rethink production and consumption patterns. The world will quite unlikely be the same again. Most politicians and mainstream economists are busy in putting back the world to the same track we had been on before the economic crises. Others argue that we should urge rather than set back the paradigm shift to be bred by recent economic anomalies, which cannot be explained on the basis of prevailing paradigms of competition and growth. According to Kuhn, strategies which look beyond the prevailing approach and functional framework of the system in question, are appropriate to manage systemic crises (see its theoretical origins in science as paradigm shift, Kuhn 1962). Economic crisis creates material problems, but the prevalence of materialistic answers definitely make solutions imperfect or impossible (Inglehart and

Klingemann, 2000, Easterlin 1973). New theories are needed, but there has been no sufficient time for inventing fresh conceptual models with appropriate answers to the new situation.

No matter whether beyond growth economy means de-growth (Latouche 2009), steady-state zero-growth (Daly, 1997) or even slow growth economy, all these concepts share the common feature of painting a world fundamentally different from the one we are acquainted to, we are accommodated to and we insist during the last 50 years. All the un-orthodox streams that welcome rather than regret a permanent economic slowdown will be comprised here by the umbrella term “beyond growth”.

The paper overviews research streams along three topics: by their position about the desirable level of (1) economic activity, (2) ecological footprint and (3) subjective well-being. Clear distinction between ecological footprint and economic activity will bring the concept of eco-efficiency into the debate as well as critics of the dominant paradigm regarding what should or should not grow: the economy, the ecological footprint or both (cf., van den Bergh, 2011). We should be able to drive the necessary change rather than be driven by the change. Diverse positions on whether policy, grassroot organizations or scientists should act as change agents will also be reflected as well as the inherent value conflicts of the research streams.

After the systematic reviews, a sketch of ‘beyond growth economy’ will be offered, acknowledging the fact that it is still an ongoing developing concept. Deduced from growth-critical scientific streams, it is struggling with internal contradictions and debates. The question presents itself whether or not we will still be able to live a full and satisfied life in the future if growth is not a viable alternative. Criticism of the growth paradigm is getting common, while positive messages and normative instructions are rare. Can such an economy provide sufficient number of jobs, make the work meaningful and contribute to personal development? Can subjective wellbeing be sustained or even enhanced in a beyond growth economy? Can we gain public acceptance for a policy acting on behalf of a beyond growth economy? The paper offers a survey of comprehensive vision of future life provided by various beyond growth approaches. Finally challenging issues, unanswered questions, value conflicts and research gaps will be revealed.

In brief, the objectives of this paper are twofold:

- to provide a critical overview of major streams addressing the challenge of reducing economic growth, respecting ecological limits and enhancing subjective wellbeing altogether; and
- to synthesize the main features of a beyond growth economy (structure of the economy, balance of work and free time etc.) including the transition path to beyond growth.

In Section 2 the methodology of the systematic literature review is presented. Section 3 delivers a short review of the six major streams deduced from the literature review (degrowth, steady-state economics, prosperity without growth, voluntary simplicity, sustainable happiness and green growth). Based on the revealed positions of streams, Section 4 provides a synthesis of life in a beyond growth economy, while Section 5 provides conclusions and further insights.

2. Method

‘Beyond growth economy’ falls at the point of intersection of three concepts studying : (1) the ideal size of the economy; (2) the ecological limits to growth; and (3) human wellbeing including subjective factors as life satisfaction and happiness.

We formulated a three cloud model describing the above mentioned three concepts (Fig. 1). Cloud I contains ‘growth related terms’ common to beyond growth academic literature (beyond growth, degrowth, zero growth, slow growth, steady state, green growth). They feature limits to economic growth in monetary terms (symbol of ‘\$’). Cloud II contains terms referring to the environmental limits to growth (planetary boundary, ecological constraint, biocapacity, carrying capacity, overshoot). Limits on this area are usually featured by non-monetary, natural units (CO₂ absorption capacity, ecological footprint etc.). (we use ‘[]’ as symbol of boundaries.) Cloud III deals with subjective, psychological wellbeing factors that seem strategic in elaborating widely

accepted sustainability visions (subjective wellbeing, subjective welfare, happiness, quality of life, life satisfaction). (We use the smiley symbol '☺' here)

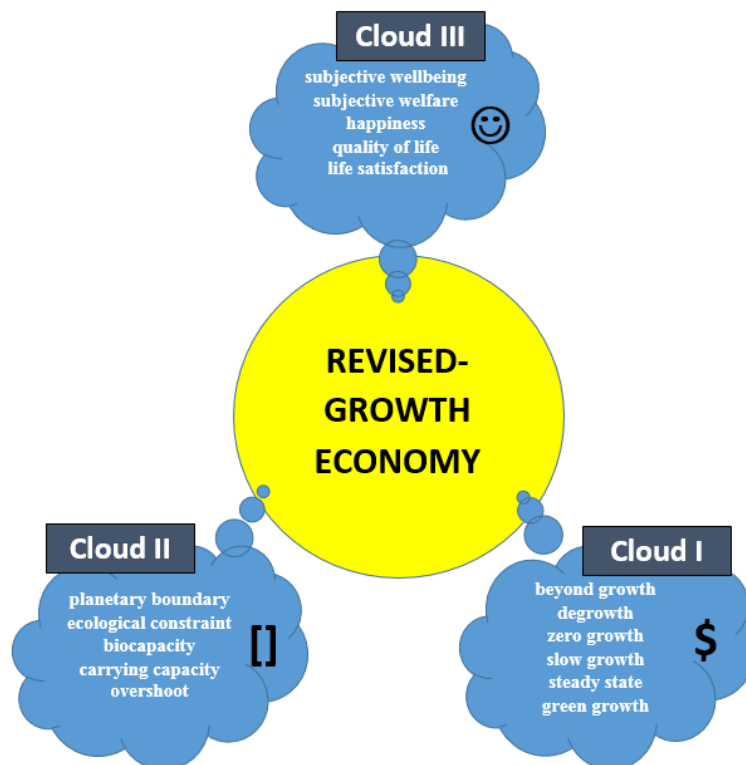


Figure 3. Clouds for systematic search of scientific literature to reveal streams towards a beyond growth economy.

Our literature review is based on finding the intercepting areas of the three concepts in a way that follows the rules of a systematic literature review.

A systematic review of the literature (Fink, 1998, Tranfield et al., 2003 and Klewitz and Hansen, 2014) differs from conventional or narrative reviews in that it aims to 'synthesize research in a systematic, transparent and reproducible manner' (Tranfield et al., 2003). It consists of a descriptive, bibliographical analysis as well as a thematic analysis of the field. To ensure the representation of the subjective issues of Cloud III, Cloud I (growth) and Cloud II (limits) were merged during the search process. Target publications needed to match at least one keyword per the remaining two clouds. In line with the objectives of this paper, the review does not aim to cover all records dealing with growth/limits or subjective wellbeing in general, only the intersection of the three clouds.

To be able to manage the amount of records found and still maintaining quality, focus was put on peer-reviewed, academic papers in English language. Concerning the timeframe of the review, we did not make any restrictions, as some streams have very early roots (e.g. voluntary simplicity or degrowth).

The review covered the most important scientific databases (EBSCO, Emerald, ScienceDirect, Scopus, SpringerLink and Web of Science) that were appropriate to the interdisciplinary research field of this review. Different databases applied different search syntax so search terms and search strings had to be adjusted accordingly. Based on the search terms a preliminary list of 819 publications emerged. This number is large, as some of the search terms are common, and they are likely to occur somewhere in the full text of the records; but was sharply reduced by a title, abstract and keyword analysis. Following an in-depth analysis 54 records were remained in the sample. Additionally, 19 other publications found elsewhere and considered as important contributions to the field of research were manually added to the list by narrative inclusion. To

improve the reliability of the analysis, three researchers (the co-authors of this paper) were involved in the research process.

The results of the systematic review are presented and discussed in Sections 3 and 4.

3. Results – streams towards a beyond growth economy

Six major streams were detected during the systematic analysis with many sub-variants not to be discussed separately. We constructed a graphical tool named 'onion model' (Fig. 2) in order to structure them and highlight their similarities and dissimilarities. While all streams has something to say to our main concern regarding the economy, the environmental limits and human well-being, slight differences between emphases are clearly perceivable. Thus, three axes were chosen which define sixths of a plane. Each axis corresponds one of our main concerns: one for the size of the economy (\$), one for the environmental limits ([]), and one for subjective wellbeing related issues during future implementation (☺). Fig. 2 was designed that all sixth represents a different preference order of the above three considerations (peeling direction). Central position means that an approach is more general trying to balance between the viewpoints; external position indicates that an approach is more specific having its favorite viewpoint.

Of course all streams agree that the notion of growth must be revised relating either to the size of the economy in monetary term (\$) or to its absolute scale in a natural term ([]) while the psychological consequences (☺) still have great significance. However most of these theoretical positions seem differ in ranking those considerations. For example while for steady-state economists the most important point may be the objective carrying capacity of the Earth, they still are interested to the general performance of the economy (measured by the monetary term of GDP) and subjective well-being. But they only have the hope (and a promise) that their desired system will sustain the usual level of well-being: in case it is not, being within the environmental limits to growth still has the highest priority (cf. Daly, 1997). Voluntary simplicity is quite to the contrary: for followers of the movement the most important is to regain or achieve a high level of well-being by escaping from market transactions, during which – often incidentally – considerable environmental gains may also be reaped (Kocsis, 2002). Following the logic above, other positions on Fig. 2 are easy to interpret. In the next six subsections we offer short descriptions of all detected streams towards a beyond growth economy.

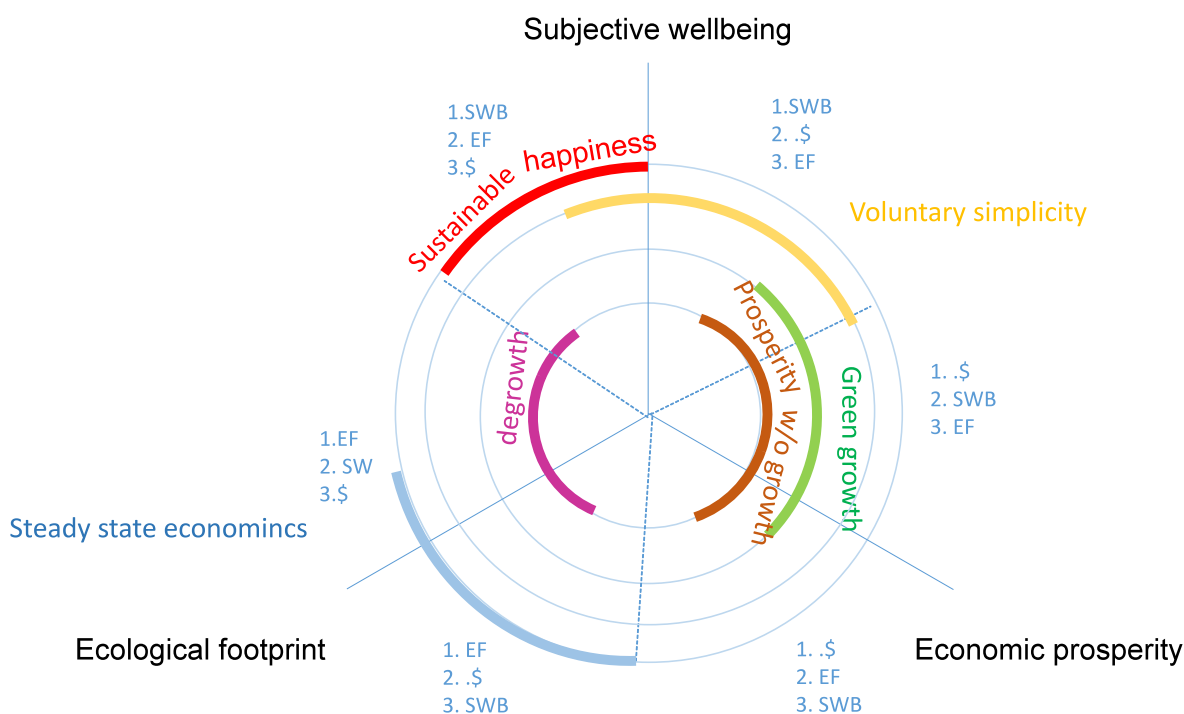


Figure 4. Onion model of beyond growth streams. Peeling direction indicates order of preferences.

3.1. De-growth

Degrowth is one major and widely spread framework criticizing the growth-centered economy. The term 'décroissance' in French was introduced by the Romanian economist Nicholas Georgescu-Roegen in his essays on an attempt to link entropy, ecology and economy (Georgescu-Roegen 1971 and 1994). However, in Georgescu-Roegen's perspective the term means rather declining, not exactly what we understand by degrowth today.

The origins of the degrowth concept can also be found in the report of the Club of Rome.

Although the term is used from the 1970s, Whitehead (2013) calls the attention that it was not used as a normative or activist slogan until the 2000s. Even today, it is very difficult to provide a unanimously accepted definition for the term, as there are very different related connotations in different countries and languages (Latouche, 2009).

The concept of degrowth is based on two major principles (Latouche, 2009). First is that economy shall not go beyond the carrying capacity of the Earth. Second is that economic activity should focus on increasing human wellbeing and happiness and not on the increase of wealth for its own sake.

On one hand, as direct effects, this means lower production levels and wages, thus also less consumption. But on the other hand it also leads to higher levels of wellbeing because of having less work-related stress and also more free time for relaxing and for social activities with family and friends (Latouche, 2009, van der Bergh, 2011) so ultimately better quality of life both at the individual and the community level promoting intragenerational and intergenerational justice (Muraca, 2012).

Keeping the size of the economy within the ecological constraints of the biosphere contributes also to the improvement of subjective wellbeing, Schneider et al (2011) defines sustainable degrowth as an equitable downscaling of production and consumption increasing human well-being in a way that ecological conditions are also enhanced.

Degrowth offers reduced working hours to maintain high or full employment. Benefits of reduced working hours (van der Bergh, 2011): (1) reducing working hours is a very exact and easily interpretable aim, (2) there are certain direct welfare benefits (such as more free time and more relaxed lifestyles etc.) associated with working less beyond a sufficiently high, especially in richer countries and (3) decreasing working time will reduce consumption both at the supply (production capacity) and the demand (purchasing power) side.

Degrowth aims to move towards full employment (Kallis et al., 2012). Furthermore, beyond reduced working hours, work-sharing, enhanced social security and even basic income are aimed by the degrowth concept (Schneider et al, 2011). Beyond the output, the activity of working can bring satisfaction in itself as well. Nørgård (2013) claims that the working process can also be a motive for working, independently whether it is paid or non-paid (cf. Kallis, 2013, Nierling, 2012).

In a degrowth economy there are also many ways to make profits without extensive material production or consumption, such as in sectors like recreational services, entertainment (sports, movies, opera) internet services etc. (Murphy, 2013). Enterprises for serving new demands may emerge also in the following fields (for example Schneider et al, 2011): eco-villages and cohousing, cooperative production and consumption, various systems of sharing, and community issued currencies. Douthwaite (2012) proposes issuing non-debt money or regional currencies that would also mean different company strategies for selling conventional products (e.g. energy delivered at a certain time in future). Some authors (Loehr, 2012, Kallis et al., 2012) suggest zero interest rates (or similarly, extra costs on capital).

The degrowth concept proposes a voluntary, bottom-up transition. Martinez-Alier (2012) conceptualize transition as 'activist-led', supported by the academic study of economic, social and environmental science and using their results in a novel and creative way.

However, some aspects would definitely need policy support, this may make a change between economic recession (or depression) and degrowth (Schneider et al., 2011). In some fields, like the reduction of average working hours there has not too much achieved yet in the policy field (van der Bergh, 2011). However, the zero interest rate (suggested for example by Loehr, 2012) has been at least approached by the policy makers of many leading economies, like the United States or the EU as an attempt to overcome the financial crisis.

Latouche (2010) urges for the elimination of the negative externalities of growth by offering a program consisting 8 Rs: Revalue, Reconceptualize, Restructure, Relocate, Redistribute, Reduce, Reuse and Recycle. The core idea here is to realize them on a voluntary basis, however, for comprehensive achievements policy support seems to be unavoidable. State intervention is needed also to create quality green jobs. Murphy (2013) states that market based transition is not sufficient is incapable to create green jobs and such claims are not supported by empirical evidence.

3.2. Steady state economics

Another concept criticizing the growth-based economy is the steady state economics. A steady state economy is related with neither growth nor recession. As Daly (1997) suggests it more specifically, it has a constant stock of capital and a constant population of people (thus constant stock of labor). Advocates of the steady state economics do not precisely specify the achievable size of the steady-state economy (Daly, 1997 and Craig, 2006), but it shall be within the physical limits of the Earth's ecosystem.

A steady state economy with relatively stable, maximum mildly fluctuating production and consumption can be considered as a viable alternative to growing economies (Czech and Daly, 2004). However, the authors argue that this is more likely to be achieved in case of large and wealthy economies (like the United States) as they have the economic power for a successful transition (and later on, they can assist in the transition process for other countries as well).

The steady state economy concept can be related to degrowth (Kerschner, 2010) as the latter can be a path of transition to the first (at a lower steady-state).

The steady state economics concept has very similar view on the link between economic growth and subjective wellbeing. Referring to Mill (1900), Czech and Daly (2004) state that a stable sized economy does not necessarily mean cultural stagnation; ethical and spiritual improvements deliver a positive contribution to subjective wellbeing. Craig (2006) cites empirical data on the remarkably small effect of money on people's satisfaction with life (supposed that they already get past the level of real or absolute deprivation).

In a steady-state economy the number and size of enterprises can stay stable, however the weight of different sectors might be very different (Czech and Daly, 2004). For example oil industry and heavy chemistry may be less important while renewable energy industry intends to offer more fields for entrepreneurs. (Signs of this can be perceived now, in 2015.) There is also need for a viable financial sector (private banks and cooperatives) but less need for certain financial products (derivatives etc.) so the size of the financial sector might also be smaller.

Daly (1987) warns about the ethicosocial limits to growth that questions the desirability of it including

- the costs imposed on future generations
- the costs imposed on sub-human species
- self-cancelling effects on welfare (Easterlin paradox)
- corrosive impacts on moral standards including glorification of self-interests

The latter two aspects relate to the negative impacts of growth on human wellbeing.

The steady state economics does not directly address how the transition should be managed, however Daly (1997) clearly highlights the role of governments in achieving a steady state economy. Czech and Daly (2004) claim that the most conducive form of government may be a

social democracy like in Sweden or in Switzerland. They also admit that a steady-state economy is mostly appropriate for large and wealthy states because of ethical and practical reasons.

3.3. Prosperity without growth

Another alternative concept to the growth-based economy is prosperity without growth. In his founding work, Jackson (2009) examines thoroughly the technological opportunities for climate stabilization by 2050 (at 450 ppm CO₂-level) in a framework of current economic growth rates. He concludes that there would be a need for a 10-fold faster improvement in eco-efficiency (carbon efficiency) than today (and 8-fold faster efficiency improvement even in a zero-growth economy). As this seems unrealistic, Kallis et al. (2012) argues that therefore only a combination of degrowth and efficiency improvements can be sufficient.

While Daly worried about the negative consequences of growth, Jackson put the emphasis on the positive social impacts of living in a world with no-growth prosperity. Jackson, T. defines the requirements of prosperity that go well beyond material sustenance. Prosperity has vital social and psychological requirements. An important component is to participate meaningfully in the life of society. Thus, this stream strongly focuses on wellbeing and social components that can be enhanced in a no growth economy.

Fritz and Koch (2014) operationalize prosperity in three dimensions: ecological sustainability, social inclusion, and the quality of life. In this view prosperity is not considered as an economic term and the data analysis of 38 advanced countries suggests that a relative high level of prosperity can be achieved with a relatively low level of income.

3.4. Voluntary simplicity

Voluntary simplicity is an ideological and practical stream (Gregg, 1936, Elgin–Mitchell, 1977, Elgin, 1993) for which the interest is still widespread and ongoing (Schreurs, 2010, Gambrel–Cafaro, 2010, Jackson, 2008, Gandolfi–Cherrier, 2008, Shi, 2007, de Graaf–Wann–Naylor, 2005, Etzioni, 2004, De Geus, 2003).

The concept of voluntary simplicity as well as the movement associated with it is considered to be an institutionalized form of resistance to consumer society (Schumacher, 1980, Shama and Wisenblit, 1984). The essence of voluntary simplicity is a way of life which is outwardly simple and inwardly rich (Elgin, 1993). It has its roots, among others, in the legendary frugality and self-reliance of the Puritans, Thoreau's naturalistic vision at Walden Pond (1854), Emerson's practical and spiritual espousal of simple living and high thinking as well as the teachings and social philosophy of spiritual leaders such as Jesus and Gandhi (Kocsis, 2002).

According to the scale people having a lifestyle of voluntary simplicity: make gifts instead of buying; ride a bicycle for exercise, recreation or transportation; recycle newspapers used at home; recycle glass jars and bottles used at home or take it to a bottle bank; recycle cans used at home; learn skills to increase self-reliance; intentionally eat meatless main meals; buy clothing at second-hand stores; buy major items of furniture or clothing at garage sales; make furniture or clothing for the family; exchange goods or services with others in lieu of payment with money; grow the vegetables the family consumes during the summer (Leonard-Barton 1981). Considering that these activities are voluntary one may have the established hypothesis that voluntary simplifiers may have strong restraining effect on a growth economy. Normatively, voluntary simplicity intends to provide guidance on how one should live in opposition to the criticized structures of economic growth (Alexander, 2013). Turning to the practical level of voluntary simplicity, there is a huge body of literature investigating lifestyle and ecological sustainability in the frame of voluntary simplicity (Alexander–Ussher, 2012, Schreurs–Martens–Kok, 2012, Merrick, 2012, Chhetri–Stimson–Western, 2009, Hamilton–Denniss, 2005, Huneke, 2005, Grigsby, 2004, Craig–Hill, 2002, Pierce, 2000).

In an economic aspect it is important that voluntary simplicity is not frugality (Lastovicka et al. 1999). Simple living is not necessarily cheaper, as home-made, aesthetically enduring products

usually cost more than mass-produced ones. However, as the rotation of enduring products in the economy is lower than mass-produced ones there still are a strong drive towards a beyond growth economy. Maslow's (1954) thesis is compatible with the suggestion that voluntary simplicity may appeal to people after their basic needs are well and securely satisfied. Thus consumerism, not consumption, is the target for voluntary simplicity (Etzioni, 2004, p. 416). But the question still remains here: how many people's basic comfort needs should have guaranteed by the Earth to globally start a lifestyle voluntary simple?

3.5. Sustainable happiness

Based on O'Brien's (2005) definition, sustainable happiness is the pursuit of happiness without exploiting other people, the environment, or future generations. The concept of sustainable happiness brings sustainability and happiness together and offers meaningful opportunities for increasing individual, community, and global well-being.

The concept of sustainable happiness builds significantly on the basis of positive psychology. Positive psychology (Seligman and Csíkszentmihályi, 2000 and Seligman, 2002, 2006) – as opposed to 'traditional', pathology-dominated psychological discipline – focuses on positive subjective experience, positive individual features, and positive institutions in order to improve quality of life and enhance happiness. Peterson et al. (2005) made a differentiation between 'full life' and 'empty life'. They found that "an orientation to pleasure is not as strong an individual predictor of life satisfaction as orientations to engagement or to meaning". Corral-Verdugo et al. (2011) surveyed the correlation between happiness and sustainable behavior, as an addition to the 'positive psychology of sustainability', considering both the positive predictors and the positive (mainly intrinsic) consequences of sustainable behavior. In their research frugality, equity, altruism and pro-ecological behavior resulted to be predictors of the construct called 'sustainable behavior', while 'sustainable behavior' was significantly associated with happiness as a possible positive intrinsic consequence.

In the sustainable happiness approach, happiness is defined by more factors, however economic growth does not seem to be among them. Lyubomirsky et al. (2005a) model the architecture of sustainable happiness influenced in 50% by genetics, in 10% by circumstances of the person – surprisingly, objective factors, such as marriage, age, sex, culture, income, and life events have minor effect on the level of well-being (Diener et al., 1999) – and in 40% by intentional activity. Kim et al. (2003) highlight that cultural factors such as individualism versus collectivism have a substantial role on happiness. In this sense changes in a person's activities seem to have much higher opportunities than changes e.g. economic circumstances. According to Boehm and Lyubomirsky (2009) such intentional activities may be committing acts of kindness, expressing gratitude or optimism, and savoring joyful life events may play a major role in increasing and maintaining subjective well-being.

3.6. Green growth

Differently from other concepts criticizing growth, the green growth framework proposes the integration of ecological aspects in the growth concept in order to cover the current deficiencies of the growth-based economy. In 2008, as the economic crisis was at its beginning, the New Economics Foundation suggested an ambitious vision called as the Green New Deal (2008).

As an ecological version the New Deal of the Roosevelt administration to the Great Depression in the 1930s, the Green New Deal suggests that the economic crisis at the same time offers an opportunity to build a new type of economy, where economic prosperity can be maintained and decoupled from environmental issues (Whitehead, 2013).

Bauhardt (2014) calls the attention for the role of the green parties, related think tanks (such as Heinrich Boell Foundation in Germany or the Green New Deal Group in Great Britain) and environmental NGOs in promoting green growth and especially the Green New Deal at the EU level.

The green growth or green economy initiatives are linked closely with the goals of Rio +20. They suggest that normative judgments are essential to provide social and political meaning to environmental limits (Meadowcroft, 2013) to increase the chances for a real solution. Indeed, even at the political level in the EU, US and China, the green growth concept seem to offer a win-win solution and thus gaining popularity. In this approach, the current triple crisis (financial crisis, climate change and the depletion of the global oil reserves) requires a different understanding of the growth concept, based on innovative, eco-efficient and environmentally friendly technologies. On the whole, supporters of the green growth concept claim that it is possible break the link between economic growth and the negative environmental impacts (Hayden, 2015).

However, as not properly addressed issue in the green growth concept (see for example Schneider et al., 2011), efficiency gains (achieved also from increased eco-efficiency) are generally reinvested elsewhere, resulting further growth and thus a rebound in resource use as well.

4. Discussion – how a beyond growth economy may look like

Based on the different streams overviewed, this section aims to provide a synthesis on the main features of a beyond growth economy. At the current status of the analysis, we provide a discussion of the overviewed streams in a table format by covering the following aspects:

- growth & SWB,
- values shared,
- labor, work,
- enterprises,
- community,
- policy approach, transition,
- limitations, questions left over.

Table 2. Overview of different streams towards a beyond growth economy.

	De-growth	Steady State Economics	Prosperity Without Growth	Voluntary Simplicity	Sustainable Happiness	Green Growth
Link between growth and SWB	<ul style="list-style-type: none"> • growth in itself does not increase SWB • equitable downscaling of production and consumption increases SWB • negative if ecological constraints are overshoot 	<ul style="list-style-type: none"> • there is an optimal size of the economy that maximizes SWB • for wealthy countries, equitable downscaling of production and consumption increases SWB 	<ul style="list-style-type: none"> • growth in itself does not increase SWB • increasing ecological efficiency is needed to maintain SWB 	<ul style="list-style-type: none"> • growth in itself does not increase SWB • personal growth is superior to economic growth and is the major factor of increasing SWB 	<ul style="list-style-type: none"> • may be positive in the short run • neutral on the long run • personal growth is more important than income growth at the individual level or economic growth the community level 	<ul style="list-style-type: none"> • positive if the impacts of economic growth kept within ecological limits • offers a 'win-win' solution from the growth-based perspective
Values shared	<ul style="list-style-type: none"> • the ultimate goal of economic activity is to increase human SWB • economy and human activity shall be kept within the ecological carrying capacity of the Earth 	<ul style="list-style-type: none"> • the ultimate goal of economic activity is to increase human SWB • a stable sized economy allows room for cultural and ethical development 	<ul style="list-style-type: none"> • prosperity includes ecological sustainability, social inclusion and quality of life • relatively moderate living standards are sufficient to achieve a decent minimum of prosperity and wellbeing 	<ul style="list-style-type: none"> • material simplicity, human scale, self-determination, ecological awareness and personal growth • resistance to consumer society (not to consumption) 	<ul style="list-style-type: none"> • 'full life' is an essential orientation to happiness • happiness without exploiting other people, the environment, or future generations • sustainable behavior (frugality, equity, altruism and pro-ecological behavior) is positively associated with happiness 	<ul style="list-style-type: none"> • the deficiencies of the growth based economy can be corrected • good ecological conditions are essential for a high level of SWB

5. Conclusions

This paper intended to provide an overview of how high level of subjective wellbeing might be achieved in a beyond growth economy. Based on a systematic review of the academic literature, six different streams have been detected and analyzed: degrowth, steady state economics, prosperity without growth, voluntary simplicity, sustainable happiness and green growth.

The streams overviewed agree about the possibility of enhancing subjective wellbeing without growth or at least in a way not conflicting planetary boundaries (green growth). The streams also agree that such an economy is economically feasible. It will increase rather than decrease the number of jobs, although may decrease economic efficiency and the amount of potential goods consumed. We might need to do with less, but be able to enjoy it more.

In a beyond growth economy work is much more than just a source of income. Employment enhances subjective wellbeing by offering a chance to carry out meaningful activities. Enterprises can be successful and profitable but strategies may need to be refocused (eco-innovations, repairing and maintaining of products instead of only production). New forms of economic activities (sharing based business models, community based agriculture) strengthen the fabric of local communities as well.

The streams strongly disagree about the way how this paradigm change can be carried out (bottom-up and voluntary transition based on deliberation, policy-driven transition fostered by enlightened governments or crises driven change). Certain approaches hit fundamental values of individualism while other streams insist to these fundamental values even when they risk to lose credibility.

There are plenty of limitations of the overviewed streams. First is the inertness of the society, consumers are locked in their unsustainable lifestyles. They might not be able or wish to change by themselves. Opinion polls reflect public opinions driven by media and politicians ('garbage in – garbage out'). Second, beyond growth might only be lucrative for wealthy countries and people, and that is not the case for the rest of the world. Last, but not least, lack of sufficient practical experience on sustainable lifestyles enhancing subjective wellbeing also hinders transition. However, it is also clear that if no policy driven or democratic response is given to this situation then crises driven response will occur.

The good news is that after the shock of such crises and the sudden decrease in our subjective wellbeing, a return to high level of subjective wellbeing is still possible at a lower level of economic activity. The challenge of an enlightened policy is to decrease the amplitude of that change and balance the impacts among different segments of the society.

References

- Alexander, S., Ussher, S. (2012). The Voluntary Simplicity Movement: A multi-national survey analysis in theoretical context, *Journal of Consumer Culture*, 12, 66–86.
- Alexander, S. (2013). Voluntary simplicity and the social reconstruction of law: degrowth from the grassroots up. *Environmental Values*, 22(2), 287-308.
- Bauhardt, C. (2014). Solutions to the crisis? The Green New Deal, Degrowth, and the Solidarity Economy: Alternatives to the capitalist growth economy from an ecofeminist economics perspective, *Ecological Economics*, Volume 102, June 2014, Pages 60-68
- Bilancini, E., Simone D'Alessandro (2012). Long-run welfare under externalities in consumption, leisure, and production: A case for happy degrowth vs. unhappy growth, *Ecological Economics*, 84, p.194-205.
- Boehm, J. K., Lyubomirsky, S. (2009). The promise of sustainable happiness. *Handbook of positive psychology*, 2, 667-677.
- Chhetri, P., Stimson, R., Western, J. (2009). Understanding the Downshifting Phenomenon: A Case of South East Queensland, Australia, *Australian Journal of Social Issues* 44, 4.
- Craig, L. M., Hill, C. (2002). 'Understanding Voluntary Simplifiers' *Psychology and Marketing*, 19,

2, p. 187–210.

Craig, P. L. (2006). How a Steady State Economy Can Change Our Lives. *Communities*, (133), 42-47.

Csikszentmihályi M. (1993). *The Evolving Self: A Psychology for the Third Millennium*, New York: Harper Collins.

Czech, B., Daly, H. E. (2004). The steady state economy-what it is, entails, and connotes. *Wildlife Society Bulletin*, 32(2), p. 598-605.

Daly; H. E. (1997). *Beyond growth: the economics of sustainable development*. Beacon, Boston, Massachusetts, USA.

Daly; H.E. (1987). The economic growth debate: What some economists have learned, but many have not. *Journal of Environmental Economics and Management*, 14: p.323-336.

De Geus, M. (2003). *The End of Over-Consumption: Towards a Lifestyle of Moderation and Self-Restraint*, Utrecht, International Books

de Graaf, J., Wann, D. Naylor, T. (2005). *Affluenza: The All-Consuming Epidemic*. 2nd ed. San Francisco: Berret-Koehler.

Diener, E., Suh, E. M., Lucas, R. E., & Smith, H. L. (1999). Subjective well-being: Three decades of progress. *Psychological Bulletin*, 125, 276-302.

Douthwaite, R., (2012). Degrowth and the supply of money in an energy-scarce world. *Ecological Economics* 84, p. 187–193.

Easterlin R.A. (1973). Does money buy happiness? *Public Interest* 30, p. 3–10.

Elgin, D. (1993). *Voluntary Simplicity: Toward a Way of Life That Is Outwardly Simple, Inwardly Rich*, Revised Edition, New York: Morrow (first published in 1981).

Elgin, D., Mitchell, A. (1977). Voluntary Simplicity (3), *The CoEvolution Quarterly*, Summer, 4–19.

Etzioni, A. (2004). The Post Affluent Society, *Review of Social Economy* 62 (3), p. 407–420.

Fink, A. (1998). *Conducting research literature reviews. From paper to the internet*. Sage Publications, London.

Fritz, M, Koch, M (2014). Potentials for prosperity without growth: Ecological sustainability, social inclusion and the quality of life in 38 countries, *Ecological Economics*, Volume 108, p.191-199.

Gambrel, J. C., Cafaro, P. (2010). The Virtue of Simplicity, *Journal of Agricultural and Environmental Ethics*, 23, p. 85–108.

Gandolfi, F., Cherrier, H. (Eds.) (2008). *Downshifting. A theoretical and practical approach to living a simple life*. Hyderabad: Icfai University Press.

Georgescu-Roegen, N. (1971). *The entropy law and the economic process*. Cambridge, MA, USA: Harvard University Press.

Georgescu-Roegen, N. (1994). “La décroissance”, Introduction and translation by Grinevald, Jacques, Rens, Ivo. *Sang de la terre*.

Georgescu-Roegen, N., (1977). The steady state and ecological salvation: a thermodynamic analysis. *BioScience* 27, 266–270.

Green New Deal Group (2008). *A Green New Deal. Joined-up policies to solve the triple crunch of the credit crisis, climate change and high oil prices*. The first report of the Green New Deal Group. July 2008. www.neweconomics.org/publications/greennewdeal. (accessed 07.07.2015).

Gregg, R. (1936). “Voluntary Simplicity,” *Visva-Bharati Quarterly*, August, reprinted in *The CoEvolution Quarterly*, 1977, Summer, 20–7.

Grigsby, M. (2004). *Buying Time and Getting By: The Voluntary Simplicity Movement*, State

University of New York Press, Albany.

Hamilton, C., Denniss, R. (2005). *Affluenza: When Too Much is Never Enough*, Allen & Unwin, Crows Nest, NSW.

Hayden, A. (2015). Bhutan: Blazing a Trail to a Postgrowth Future? Or Stepping on the Treadmill of Production? *The Journal of Environment & Development*.

Huneke, M. E. (2005). The Face of the Un-Consumer: An Empirical Examination of the Practice of Voluntary Simplicity in the United States, *Psychology & Marketing* 22 (7), p. 527–550.

Jackson, T., (2009). *Prosperity without Growth: Economics for a Finite Planet*. London, Earthscan.

Jackson, T. (2008). The Challenge of Sustainable Lifestyles, in. *State of the World 2008*, The Worldwatch Institute, p. 45–60.

Kallis, G. (2013). Societal metabolism, working hours and degrowth: a comment on Sorman and Giampietro, *Journal of Cleaner Production*, Volume 38, p. 94-98.

Kallis, G., Kerschner, C., Martinez-Alier, J. (2012). The economics of degrowth. *Ecological Economics*, 84, 172-180.

Kelsey, E., O'Brien, C. (2011). Sustainable happiness. *Green Teacher*, 93, 3-7.

Kerschner, C., (2010): Economic de-growth vs. steady-state economy. *Journal of Cleaner Production* 18, 544–551.

Kim Y., Kasser T., Lee H. (2003). Self-concept, aspirations, and well-being in South Korea and the United States. *Journal of Social Psychology*, 143, p.277–290.

Klewitz, J., Hansen, E. G. (2014). Sustainability-oriented innovation of SMEs: a systematic review. *Journal of Cleaner Production*, 65, p.57-75.

Kocsis, T. (2002). *Roots: Pleasure and Wealth in a Globalizing Consumer Society*; PhD Dissertation, Corvinus University of Budapest

Lastovicka, J. L., Lance A., Bettencourt, R., Hughner S., Kuntze R.J. (1999). Lifestyle of the Tight and Frugal: Theory and Measurement, *Journal of Consumer Research*, 26, 85–98.

Latouche, S. (2009). *Farewell to growth*. Hoboken, NJ, USA: Wiley.

Latouche, S. (2010). Degrowth. *Journal of cleaner production*, 18(6), 519-522.

Leonard-Barton, Dorothy (1981). Voluntary simplicity lifestyles and energy conservation, *Journal of Consumer Research*, vol. 8, 243–252.

Loehr, D. (2012). The euthanasia of the rentier – a way toward a steady-state economy? *Ecological Economics* 84, 232–239.

Lyubomirsky, S., King L.A., Diener E. (2005b), 'The benefits of frequent positive affect: Does happiness lead to success?', *Psychological Bulletin*, 131, 803–55.

Lyubomirsky, S., Sheldon, K. M., Schkade, D. (2005a). Pursuing happiness: the architecture of sustainable change. *Review of general psychology*, 9(2), 111.

Martínez-Alier, J. (2012). 'Environmental justice and economic degrowth: an alliance between two movements'. *Capitalism Nature Socialism* 23(1): 51–73.

Maslow, Abraham (1954). *Motivation and Personality*, London, New York: Harper and Row.

Meadowcroft, J. (2013). Reaching the limits? Developed country engagement with sustainable development in a challenging conjuncture. *Environment and Planning C: Government and Policy*, 31(6), 988-1002.

Merrick, H. (2012). Promoting sustainability and simple living online and off-line: An Australian case study, *First Monday* 17 (12).

- Mill, J. S. (1900). Revised edition. Principles of political economy, with some of their applications to social philosophy. Colonial Press, New York, New York, USA.
- Muraca, B. (2012). Towards a fair degrowth-society: Justice and the right to a 'good life' beyond growth, *Futures*, Volume 44, Issue 6, p. 535-545.
- Murphy, M. P. (2013). Translating degrowth into contemporary policy challenges: a symbiotic social transformation strategy. *Irish Journal Of Sociology*, 21(2), 76-89.
- Nierling, L. (2012). "This is a bit of the good life": Recognition of unpaid work from the perspective of degrowth, *Ecological Economics*, Volume 84, p. 240-246
- Nørgård, J. S. (2013). Happy degrowth through more amateur economy. *Journal of Cleaner Production*, 38, 61-70.
- O'Brien, C. (2005). Planning for sustainable happiness: Harmonizing our internal and external landscapes. In 2nd International Conference on Gross National Happiness, Antigonish, Canada. Retrieved from www.gpiatlantic.org/conference/papers/obrien.pdf. accessed 02.07.2015.
- O'Brien, C. (2008). Sustainable happiness: how happiness studies can contribute to a more sustainable future. *Canadian Psychology/Psychologie Canadienne*, 49(4), 289.
- Pierce, L. (2000). Choosing simplicity, real people finding peace and fulfillment in a complex world. Carmel, CA: Gallagher Press
- Schneider, F., Martinez-Alier, J., & Kallis, G. (2011). Sustainable Degrowth. *Journal Of Industrial Ecology*, 15(5), p. 654-656.
- Schreurs, J. (2010). Living with less: Prospects for sustainability. Maastricht: Schrijen-Lippertz
- Schreurs, J., Martens, P., Kok, G. (2012). Meet the Dutch downshifters: How people adjust consumption expenditures, experience downsizing and contribute to sustainability, *International Journal of Home Economics* 5 (2), p. 290–306.
- Schumacher, Ernst F. (1980). *Small is Beautiful*, London: Century Hutchinson Publishing Group
- Shama, A., Wisenblit, J. (1984). Values of voluntary simplicity: Lifestyle and motivation, *Psychological Reports*, vol. 55, pp. 231–240.
- Shi, D. (2007). *The Simple Life: Plain Living and High Thinking in American Culture*, Revised Edition, Athens, University of Georgia Press.
- Sorman, A.H., Giampietro, M., (2013). The energetic metabolism of societies and the degrowth paradigm: analyzing biophysical constraints and realities. *Journal of Cleaner Production* 38, 80-93.
- Thoreau, H. D. (1989). *Walden*. Princeton University Press (first published in 1854)
- Tranfield, D., Denyer, D., Smart, P. (2003). Towards a methodology for developing evidence-informed management knowledge by means of systematic review. *British Journal of Management*, 14(3), p. 207-222.
- van den Bergh, Jeroen C.J.M. (2011). Environment versus growth — A criticism of "degrowth" and a plea for "a-growth", *Ecological Economics*, Volume 70, Issue 5, p.881-890.
- Whitehead, M. (2013). Degrowth or regrowth?. *Environmental Values*, 22(2), 141-145.

Co-processing of hazardous waste in a cement industry in Brazil: the perception of workers regarding environmental, economic, social and health issues

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Abstract

The Brazilian cement industrial park consists of 85 units, where 36 of these are licensed for co-processing. In 2012, the co-processed waste accounted for the elimination of environmental liabilities of 1,320,000 tons. Of this amount, 38% were used as raw material substitutes, and the other 62% as alternative fuels. The thermal substitution rate in the current year due to the use of alternative fuels reached 9%. It is believed that the national co-processing capacity can reach 2.5 million tons/year. The co-processing practice has been growing, however, the uncertainties related to potential negative impacts on public health and environment represent one of the major concerns of the competent authorities and of the scientific community. This research aims to access the perception of workers of a cement industry on environmental, economic, social and health issues, related to practice of co-processing. The survey was implemented through a questionnaire to 50 workers of one cement industry. The questions cover a range of topics related to practice of co-processing such as: pollution, conditions and safety on work, environment, individual and collective health, employment opportunities, capacity building and training offered by the company, waste co-processing, public transparency and active participation of the population in decision-making. The questionnaire was delivered by hand after a pre-test on a sample and validation. Respondents were 50 employees representing about 20% of a medium size industry (about 400 workers). The selection criteria followed these mandatory requirements: working time must be equal or longer than two years, and must be resident in local communities or cities surrounding. The cement industry was chosen by accessibility and because covers also the task of co-processing. Regarding perceptions of evolution of air pollution, noise, safety and work conditions, job opportunities and the commitment of industry with environmental protection, the majority of workers revealed that there was an improvement in all aspects, although no changes were reported to the evolution of health perception. Workers have a good understanding about the co-processing practice, but families, neighbours and inhabitants have little knowledge about it. A neutral perception was found for the information that the industry provides to the public about the co-processing and an unfavourable perception was observed in relation to the active involvement of population in decision-making aspects. Employees felt that there were a favourable health care, safety and training offered by the industry and found a very favourable response for the perception of impacts on the environment, as well as most of the workers understood that such effects on the environment are very positive. Concerning the impacts in the health of communities around the factory, respondents mostly had a neutral perception because they didn't realize that the co-processing competes for this issue. For greater acceptance of public opinion regarding the co-processing is important to provide sufficient information about the practice and its implications through a clear and accessible language. This will allow ordinary citizens to have a more accurate view of all aspects involved, as well the advantages and disadvantages.

Keywords: Co-processing, hazardous waste, cement industry, Brazil, perception of workers, occupational health

1. Introduction

Nowadays, humanity faces a socio-environmental crisis coming from the civilization and development which have been built without concern to the prospect of a sustainable future. With the industrial era, the generated residues are increasingly complex and numerous, so that nature no longer has the ability to reabsorb them in their cycles. The management of such generated materials is one of the challenges to modern society, especially in developing countries. The implementation of a proper management in this field, in addition to provide the reduction of pollution, is able to promote the reduction of waste, reusing the materials labelled as useless. .

Co-processing is a concept of sustainable development based on the principles of industrial ecology, which focuses on the potential role of industry to mitigate the negative environmental issues throughout the product life cycle (Karstensen, 2009; Mutz et al, 2007). One of the main objectives of industrial ecology is to convert the waste of an industry in the raw material of another (OECD, 2000). In the cement sector, one can see a positive example of this vision: waste from other industrial branches are used as alternative fuels and raw materials for clinker manufacturing (UNEP, 2012). The industrial technique consists in the use of suitable materials and waste in manufacturing processes in order to recover energy and resources, thereby reducing the use of fuels and conventional raw materials due to the replacement (PNUMA, 2012). Giannopoulos et al. (2006) say that the co-processing in cement kilns is an effective technology for the elimination of hazardous industrial waste.

Due to socio-economic, environmental, and energetic issues, this industrial practice has been increasingly used. However, the uncertainties related to possible negative impacts on public health and environment, arising from the use of this manufacturing method, represent one of the concerns of the competent authorities, as well as the scientific community.

Faced with this scenario, this study aims to identify the environmental, economic, social and health issues perceptions of workers in a Brazilian cement industry that uses the co-processing.

2. Methods

This case study presents an exploratory nature, which used a mixed method research, in order to recognize an existing reality still little studied, bringing hypotheses of understanding about the respective theme (Carmo and Ferreira, 2008).

The documentary research was based on a review of literature on cement manufacturing process and the co-processing of industrial waste (hazardous and non-hazardous) in cement kilns. Bibliographic catalogues, books, magazine of scientific areas, master's theses, doctoral dissertations, academic papers and reports, constituted the used bibliographical sources (Sousa and Batista, 2011).

Several visits were accomplished to the cement plant in the study which had the purpose to elucidate, in practice: the cement manufacturing process, the management and operation of the use of alternative fuels, and also the opportunity to meet and discuss with technical experts in the industrial process.

A survey was conducted and the questionnaire instrument was chosen to collect the data. It was delivered by hand to 50 employees distributed by just about all sectors of industry, and satisfying the condition that some should be employees representing work activities linked directly to the co-processing. The process of selection of respondents satisfies also the following requirements: working time equal or longer than two years, and reside in communities or cities surrounding the cement plant.

Assuming that all information collection tools should be tested to find out how long it takes and also to eliminate questions that do not lead to relevant data, five workers from different sectors of the company were subjected to pre-test (pilot), in order to ascertain whether the questions were

understood without difficulty by respondents. Small adjustments were made to the final version, taking into account the comments made by pre-tested.

For no loss of information, the questionnaire was anonymous and not too long in order to make it more attractive to the respondents. It has an initial section devoted to the characterization of the participating worker, such as gender, age, education level, job title, industry, working time, occupational activities directly related to co-processing, smoking habits, alcohol consumption, regular use of medication, diseases and / or health affections.

The questionnaire consisted mostly of multiple-choice questions. The questions were made as simple as possible in order to facilitate the understanding of the respondents (NOAA, 2007). There were twenty-eight questions (the great majority closed, always including the option "do not know"), related to the following categories: pollution, health and safety conditions at work, environment, employment opportunities, training of workers, waste co-processing, public transparency and active participation of the population in decision-making. Although there is a predominance of multiple choice questions, the last section (VII) consists of an open question, that is discursive, optional, where the respondents could express themselves about any aspect related to the co-processing process which would understand be pertinent.

The questionnaires were applied in own factory during working hours, starting on a Monday (18 August 2014) and ending 10 days after, with a break on Saturdays and Sundays that interspersed the survey.

A Likert scale ranging from 1 to 5 was used to evaluate the degree of agreement with items corresponding to the underlying dimensions and where 1 corresponded to lowest intensity levels of agreement and 5 to the higher positive intensity levels.

Information gathered received statistical processing in Excel. Although this work had a sample of 50 workers, a normal distribution of the data was not obtained, as can be seen in figures (1-3), so it's not reliable the application of the calculation of averages and deviations to show the distribution of responses. It was necessary to resort to use of appropriate location measures of ordinal type including the median (central value, in non-parametric case), mode (answer most frequent), and replace the standard deviation by the quartal dispersion (Q75% - Q25%) (Hill and Hill, 2009).

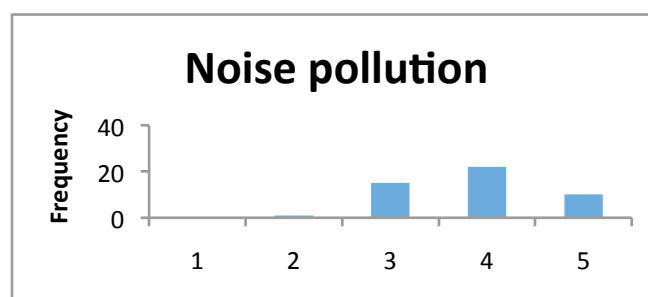


Figure 1. Results obtained regarding the perception of workers about the noise pollution.

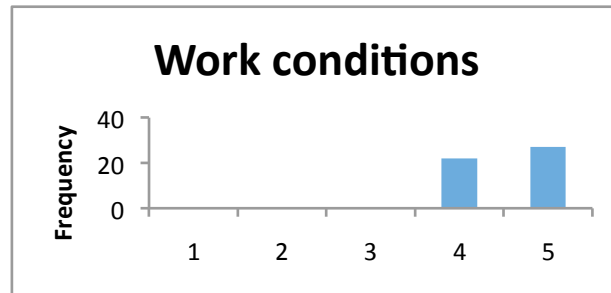


Figure 2. Results obtained regarding the work conditions.

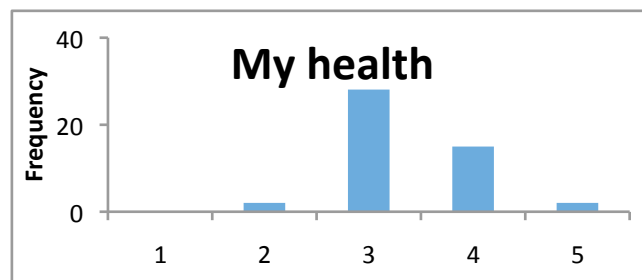


Figure 3. Results obtained regarding the health of Workers.

After to the appropriate adaptations in data processing, the responses were considered as favourable perceptions when the values were equal to or greater than 3.5; unfavourable when they were less than 2.5; and neutral to between 2.5 and 3.4 (Santos, 2011; Simon and Mosso, 2013).

3. Results and Discussion

In the survey participated employees of all sectors of cement plant, including all employees with work activities linked directly to the co-processing. Of the total respondents, at the time of the interview, sixteen of them (32%) were working or had worked in co-processing.

The average of working years of participants in the survey was 12.5 years, ranging working time of 2 to 44 years. Regarding to gender, male respondents (74%) was higher than women (26%), which reflects the predominance of male workers in the company. The age of the participants ranged between 21 to 64 years old. In relation to the level of education of participants, the high school had a predominant degree of education (56% of respondents), 22% of respondents had graduate degrees, 18% had university graduates and 4% had primary degrees (only 2 employees).

Concerning smoking habits and alcohol consumption, it was found a vast majority of non-smoking (76%), 14% former smokers and 10% smokers. 54% of the respondents said they have habits of drinking alcohol while 46% do not.

Regarding regular medication used by the participants, 34 workers (68%) said they do not consume and 32% reported they consume. Among the participants who revealed the use of medication, are indicate in descending order of frequency, the type used: antihypertensives, followed by statins (drugs for the treatment of dyslipidaemias), and thirdly the anovulatory.

Most participants (64%) provided negative responses when asked if they were suffering from any disease and/or pre-existing chronic health condition. Hypertension was most pointed pathology (14%), followed by dyslipidaemia (10%) and pathologies of the spinal column (6%). Other diseases highlighted (one case each) were bronchial asthma, elevated uric acid and coronary artery disease.

The applied questionnaire was divided into seven different sections:

3.1 First section of the questionnaire

In the first section of the questionnaire, participants answered questions (Table 1) related to air pollution, noise pollution, their own health and health of the co-workers, to conditions and job safety, job opportunities for new employees and for himself, and the commitment of the cement plant for the protection of the environment.

Table 1. Perception of participants about what is happening at the factory in recent years.

Questions	Median (*)	Mode	Quartal Dispersion
Air Pollution	4	4	1,5
Noise pollution (noise)	4	4	1
Health of participant	3	3	1
The health of co-workers	3	3	1
The working and safety conditions	5	5	1
Employment opportunities for new workers	4	4	0
The opportunities for growth in employment for the participant	4	4	1
The company's commitment to environmental protection	5	5	1
(*)Scale 1= Much worse 2= Worse 3= Without changes 4= improved 5= Much improved			

The feedback received from the 1st section of the questionnaire was mostly favourable, except for the perception related to health (own and co-workers) where it showed a neutral median, that is, respondents realized that there were no changes in their health nor in the health of co-workers. However, 22 of the participants (44%) did not answer or were not able to answer to this last question. Regarding the perception of own health, almost all respondents answered this question (94%).

Rocha et al. (2011) describe that during the burning of waste, the most volatile materials follow emission routes that are harmful to occupational health, and Milanez et al. (2009) point out that studies evaluating the impacts of cement production and co-processing on human health and the environment, show negative effects both in peripheral countries as in the central countries. In the analysis of risk to human health carried out in the Environmental Impact Study of SECIL-Outão (Portugal), it was held a multi-expositional study, according to the following elements:

sources and emission rates, contaminants of potential concern (COPCs) COPCs movements in the atmosphere, exposure routes, human populations potentially subjected to exposure and potential adverse health effects that may result from exposure. In that study, it was characterized the risk to human health, compared to exposure rates estimated with toxicity criteria, and concluded that it was not expected adverse health effects regarding cancerous affections nor to non-cancerous affections (SECIL, 2007). Also the Independent Scientific Commission of Environmental Control and Supervision of Co-Incineration - CCI (Portugal), recommends the co-processing in cement kilns, and justifies that this practice does not imply a predictable increase of emissions harmful to health when compared to the use of traditional fuels (ICC, 2000). Junior and Braga (2009) conducted interviews with thirteen workers in co-processing section of cement kilns (median time 4 years of work). Respondents reported clinical manifestations, mainly irritative on exhibition areas, such as skin, ocular and respiratory mucosa. Nausea, vomiting, headache, dizziness and asthenia were also listed. In contrast to results obtained by the authors cited, in this investigation, which included 50 employees (with a median of 9 years working time), no health impairment of this nature was evidenced. The same authors also describe reports of excessive use of analgesics for chronic headache account allegedly triggered by contact with waste. However, it was also not been mentioned by any of the interviewed of this study the use of the type analgesics or similar medications, as well as complaints related to the mentioned symptoms.

Also at the 1st section of the questionnaire, we highlight the opinions concerning the working and safety conditions as well as the company's commitment to environmental protection, in these two issues, medians and modes were 5, it is understood as greatly improved. Regarding the working and safety conditions, the perception of interviewed is contrary to the work developed by Milanez et al. (2009), which describes that research in Taiwan, UAE, Brazil and Tanzania show that many cement companies do not offer suitable conditions for the work to be done in healthfully . In another research, Milanez (2007), reveals that studies on occupational health demonstrate the precarious conditions in which the cement companies operate in developing countries. In those places workers perform their occupational activities without personal protective equipment and unsuitable environments, causing situations of great exposure to risk factors, that can become big health problems.

3.2 Second section of the questionnaire

In section II of the questionnaire, questions were performed (Table 2) regarding the understanding of the co-processing (by the respondent, their families, neighbours and inhabitants of their town), the information that the industry provides to the population about the practice, the care of industry investigated about health and occupational safety, the degree of participation of population in decision-making, and the training offered by the company to employees.

Table 2. Perception of participants about aspects related with co-processing - Section II.

Questions	Median (*)	Mode	Quartal Dispersion
Knowledge of respondent about co-processing	4	4	1
Knowledge of family members of respondent about the co-processing	2	2	2

Knowledge of the respondent's neighbours about the co-processing	2	2	1
The knowledge of people about the co-processing, in the city where the respondent resides	2	2	0
The information that the industry provides to the population related with co-processing	3	3	1,5
The industry care about the health and safety of its workers	5	5	1
The active participation of the neighbouring population to the factory, in the decisions and issues involving the co-processing	2	2	1
Capacity building (courses and training) offered by the company	4	5	1
(*)Scale 1=None 2=Little bit 3= Regular 4=Good 5= Great			

The median of responses obtained in the second section of the questionnaire were divided between unfavourable, neutral and favourable. Regarding the employees' knowledge about the co-processing process, showed a favourable result indicating a good knowledge about this subject. Also, other positive results were found in relation to training (preparation offered to employees through offered courses and training), and the industry care about the health and safety of the workers, with particular attention to the latter, which had as median and mode the value 5, that is, the respondent recognized that the care given by the cement factory for health and safety at work is great. However, with regard to training, Milanez et al. (2009) report that studies including Brazil, show inadequate training for workers. Also in this second section of the questionnaire, when workers were asked about the magnitude of the information that industry provides to the general public about the co-processing, evidenced a neutral result, i.e. regular. Unfavourable medians were attributed to issues related to the knowledge of the family, neighbours and inhabitants about the co-processing, and also the active involvement of the plant surrounding population in decision-making aspects related to the practice, although to this last question, there was a considerable number of answers like "do not know" / "not answered" (36%).

3.3 Third section of the questionnaire

In the third section of the questionnaire is intended to highlight the impression of workers as well as their perceptions about what is the opinion of general public, about the practice of co-processing (Table 3).

Table 3. Perception of participants about aspects related to the Co-processing - Session III.

Questions	Median (*)	Mode	Quartal Dispersion
The opinion of respondent regarding the practice of co-processing	5	5	1
The perception of respondent about the opinion of people in general about the practice of co-processing	3	4	2

(*)Scale 1=Disagree 2=Disagree in Part 3= Do not agree nor disagree 4=Agree in Part 5= Totally agree

It was found that workers have a favourable opinion about the co-processing, with the majority totally agree (mode responses with value 5). In this question, there still were 3 answers like "do not know", and only one respondent answered disagree in part. As for the question related with to the perception of respondents about the opinion of people in general about the practice of co-processing, it was realized a neutral response, i.e., the median was 3, that is an opinion do not disagreement or agreement, perhaps attributed due to lack of knowledge on the subject by the general population.

3.4 Fourth section of the questionnaire

In the last section (fourth) of the first part of the questionnaire, the aim was to identify the perception and understanding of workers about the possible impacts caused by co-processing in the environment and also in the health of people living around the factory (Table 4).

Table 4. Perception of participants about aspects related to the co-processing - Section IV.

Questions	Median (*)	Mode	Quartal Dispersion
Understanding of respondents regarding the impact (effects) caused to the environment by co-processing	5	5	1
Understanding of respondents regarding the impacts (effects) caused to the health of the communities around the factory by co-processing	3	3	1

(*)Scale 1= Very negative 2=Negative 3= Neutral 4= Positive 5=Very positive

The last section (fourth) of the first part of the questionnaire, showed a very positive response (median 5) concerning the perception of impacts of co-processing caused in environment, and most workers understood that such effects on the environment are very positive. Regarding perception of impacts on the health of communities around the factory, there was a neutral evidence (median 3). Most of respondents (mode 3) indicated that they didn't know that co-processing can interfere in the health communities. Santi and Filho (2004) mention that the population living in neighbouring areas of the cement plants as well as those who are located farther away, in the direction of the winds, are exposed to impact of several chemical pollutants generated from these plants and thus subject to risk disease. However, as already discussed, the Independent Scientific Commission of Environmental Control and Supervision of Co-Incineration - CCI and Environmental Impact Study of Outão in Portugal do not corroborate with this fact, nevertheless CCI recommends that should be an active epidemiologic surveillance to populations located around the cement plant, to ensure early detection of any health problem (CCI, 2000; SECIL, 2007).

3.5 Fifth section of the questionnaire

The fifth section of the questionnaire differs to the previous towards the survey structure, because it was used a scale of attitudes, where in such a way that the questioner could get not only the opinions of workers but also their attitudes. Table 5 presents the results obtained.

Table 5. Opinions and attitudes of respondents.

1) Question: Follow the security procedures of the company's work?					
What happens			What should happen		
Median (*)	Mode	Quartal D.	Median (*)	Mode	Quartal D.
5	5	0,75	5	5	0
2) Question: Perform medical examinations according health program of the company's employee?					
What happens			What should happen		
Median (*)	Mode	Quartal D.	Median (*)	Mode	Quartal D.
5	5	0	5	5	0
3) Question: Ask and interrupt a job when is not secure, and has the potential to cause an accident?					
What happens			What should happen		
Median (*)	Mode	Quartal D.	Median (*)	Mode	Quartal D.
5	5	0	5	5	0
4) Question: Ask and interrupt a job when has the potential to cause harm to my health?					
What happens			What should happen		
Median (*)	Mode	Quartal D.	Median (*)	Mode	Quartal D.
5	5	0	5	5	0
5) Question: Keep and attend the training and courses offered by the company for my technical improvement?					
What happens			What should happen		
Median (*)	Mode	Quartal D.	Median (*)	Mode	Quartal D.
5	5	0	5	5	0
6) Question: Demand for health care when I realize a health problem?					
What happens			What should happen		
Median (*)	Mode	Quartal D.	Median (*)	Mode	Quartal D.
5	5	1	5	5	0
7) Question: Demand for medical care even without having a health problem, but for a preventive consultation?					
What happens			What should happen		
Median (*)	Mode	Quartal D.	Median (*)	Mode	Quartal D.
4	3	1,75	5	5	0,75
(*)Escala 1=Never 2=Almost never 3= Sometimes 4=Almost always 5=Always					

So in this section, the first two questions addressed the issue of health and safety at work, which was intended to highlight the perceptions and attitudes of respondents related to compliance with the safety procedures and medical examinations of the worker's health program. The median

obtained for the issue of job security was very favourable, with the value of 5, that is, the majority of respondents understand how to comply with the relevant procedures related to this issue. To the question of medical examinations, the result was unanimous regarding the perception and attitude, that is, all answered that they should carry out medical examinations according the health program of the company's work as well as they do so. The third and fourth questions, which intended to clarify the autonomy and consciousness of the worker forward to working conditions with potential hazard, particularly to those with ability to affect their physical integrity and also to own sanity. The results for both questions were very similar, with very favourable medians "always" (mode 5) were both for the perceptions, and for what they practice in working routine. So most workers responded always stop an activity that has the potential to cause harm to himself. The fifth question performed permeates aspects related to compliance by the workers of the training program and training offered by the company, where the perceptions and attitudes were quite favourable mentioned by the respondents. The last two questions of this session addressed the issue related to health care. In question 6 is intended to understand the opinion and behaviour of the workers in presence of a health problem and the search for health care and treatment of alleged health problem. Most replied that always seek medical assistance in such cases, and all 50 respondents felt that this fact should always occur. In the seventh and final question in this section, where the survey aimed to demonstrate the concept and awareness of workers about the importance of prevention, ie, prevention as a tool to combat disease, was where we got a more heterogeneous profile of all this session. When asked the worker if he seeks medical attention without even exhibit a health problem or complaint, only for preventive review purposes (the attitude practiced by the respondent), the median (value 4) obtained was favourable, that is, despite not practicing always, almost always does. However, most have said had this behaviour only a few times (mode 3) and six respondents reported never seek medical assistance in these cases. On the other hand, when evaluating the opinion of the respondents on this theme there was obtained a median even more favourable (value 5), that is, indicating that respondents in these cases though in practice to seek medical assistance almost always understand a need to do this always. Finally, the questions asked in this session were answered by 100% of respondents without no blank question.

3.6 Sixth section of the questionnaire

In the sixth section, respondents could point out the options they understand to be correct, when asked the intentions the factory in study to practices the co-processing (Table 6).

Table 6. Opinion of participants about justification why the factory practices co-processing.

Options of answers	Number of answers obtained
Take profit	28
Promote sustainable development	37
Participate in the final destination of industrial waste	29
Contribute to environmental preservation	37
Fabricate cement a sustainable way	32
Save petroleum fuels	34
Saving raw materials for cement production	21
Becoming more competitive in the sales market	19
Comply with legislation	16
Don't know how to answer	1

The majority indicated two alternatives: to promote sustainable development and contribute to the preservation of the environment. Other fairly marked responses were, in descending order of choice: save petroleum fuels, cement manufacture in a sustainably way, participate in the final destination of industrial waste and profit. An important fact to note is that one of the alternatives to which the majority of respondents indicated refers to sustainable development, which leads to the conclusion that workers are aware of this concept. Only one participant chose the alternative that indicates not know how to answer it. Finally, still in this session, there was a space where the respondent could mention another factor that answer the question posed, no answer was given.

3.7 Seventh section of the questionnaire

The last section of the questionnaire consisted on a single question, open, optional, where the worker could write about aspects related to the co-processing in the company, which had not been addressed, to expose their opinion about it. Only three of the fifty respondents replied (Table 7).

Table 7. Answers given by respondents in Section VII of the Questionnaire.

1) "I believe that all materials that are no longer useful should receive appropriate treatment than burning"
2) "The co-processing is the safest way to waste disposal. Because there is total destruction. Every job has its risks, and the residue is no different. Insurance work is that done safely"
3) "We must have a strong work facing society in order to present, disseminate our existing controls and procedures for co-processing. Today we have almost nothing back for this purpose."

In the final part of the questionnaire, the answer number 1 ("I believe that all materials that are no longer useful should receive appropriate treatment than burning") It was given by a respondent with little working time (2 years; time elected as a minimum to participate in the survey), belonging to a sector not connected to the co-processing, and portrays the lack of knowledge about one of the pillars of this practice, that is, respect the hierarchy of sustainability in waste treatment. Only intended for co-processing those residues that can't be reused or recycled, still respecting constraints for up to a number of types of materials.

The second states obtained in this session ("*The co-processing is the safest way to waste disposal. Because there is total destruction. Every job has its risks, and the residue is no different. Insurance work is that done safely.*"). It shows a level of knowledge about the co-processing as well as the notion of insurance and safety work. In the co-processing, the waste suffer a thermal destruction in a safe and efficient way, from environmental and operational point of view. The ash from the combustion are totally incorporated in to the clinker, thus avoiding the need for disposal in landfills (Tocchetto, 2005). The co-processing is a sustainable and suitable alternative because it represents a safe integration of waste in the cement manufacturing process (ABCP 2014). Giannopoulos et al. (2006) state that the co-processing technique in cement kilns is an effective technology for the destruction of hazardous industrial waste. According Kihara (2011), the organic components contained in the waste is destroyed in a ratio of 99.99%. Already the inorganic part is incorporated in solid clinker structure. Leaching tests evidence the retention of trace elements in the crystal lattices of minerals that comprise the clinker from furnaces that use the co-processing (Maringolo, 2001). Malviya and Chaudhary (2006) identified the Portland cement as an ideal support for immobilization (due to high pH) for various toxic heavy metals by precipitation reaction, absorption and adsorption. On the other hand, the notion of work safe and safety perceived this second statement of the respective respondent confirms the commitment that the company has had in the sense of training of its workers.

The last comment obtained (“We must have a strong work facing society in order to present, disseminate our existing controls and procedures for co-processing. Today we have almost nothing back for this purpose.”) It reflects the perception of the respondent regarding the company's communication with stakeholders, that has not yet reached a satisfactory level in this way, a fact which is in line what was obtained in session II of the investigation, when asked respondents about their perceptions of the magnitude of the information that the industry provides to the public about the co-processing, the outcome was neutral, ie, regular (median 3).

4. Conclusions

The workers' perception of the cement plant was favourable in his majority when asked about air pollution, noise, conditions and work safety, job opportunities for themselves and for other workers, commitment of industry with environmental protection, that is, they opined that in recent years there was an improvement in all these aspects. Regarding health perception (their own and of other workers), respondents reported no changes.

Regarding employees' knowledge of co-processing process, this study showed a favourable result, indicating a good understanding of this subject. On contrary, respondents reported that their families, neighbours as well the inhabitants of the cities in which they reside, have little knowledge about the co-processing process.

We found a neutral perception (regular) of workers in relation to the magnitude of the information that the industry provides to the public about the co-processing.

An unfavourable perception was observed in relation to the active involvement of population surrounding the factory in decision-making aspects related to the co-processing, this is, they realized that there is little involvement of this public.

Favourable results were found in the issues related to the industry care about the health, safety and training (preparation through courses and training offered) to their employees.

It has been found that workers have a favourable opinion to the coprocessor, this is, they totally agree. However, regarding the perception of respondents about the opinion of people in general about this practice, it was obtained a neutral response (nor disagreement and also nor agreement); probably it can be attributed to the lack of knowledge on the subject by the general population.

It was found a very favourable response in relation to the perception of impacts caused to the environment by co-processing, as well as most of the workers understood that such effects on the environment are very positive. Regarding the impacts to the health of communities around the factory, there was a neutral evidence, that is, respondents indicated that they did not realize that the co-processing competes for this issue.

It was found that workers follow the work safety procedures, performing medical examinations according with medical control of occupational health program, they question and interrupt a particular work when realize it is not safe and has the potential to cause damage to health, attend training provided for technical and professional development, and look for medical care when perceive a health problem. However, despite being aware also of importance of a medical appointment for a preventive assessment, even without presenting a health problem, it was observed that in practice, the attitude toward this does not occur absolutely on all occasions, but often.

Mostly workers attributed the practice of co-processing to the following factors (in decreasing order): promoting sustainable development, contribute to the preservation of the environment, save petroleum fuels, manufacture cement sustainably, participate in the disposal of industrial waste, take profit, and save raw materials in cement production.

The industry generates impacts on the environment and natural resources. Thus, industrial

planning integrated with the environmental management is a necessity in order to mitigate the negative effects produced. Countries should invest in a cleaner production chain, narrowing the dialogue with communities and other stakeholders. Public participation should be included in the disclosure of information regarding the legislation, activities, policies and related programs. A suitable way to address environmental issues is to include citizen participation. People should have access to the information on the environment and activities which pose danger as also the opportunity to participate in decision-making.

Building a broad discussion, involving the participation of all stakeholders, can result in solutions that satisfy all parts. Dialogue is a key element in conflict resolution, an essential tool in decision-making, where it is necessary to try to understand the position, needs and interests of each one of the actors. It is through dialogue that individuals argue their reasons, making particular interests in publicly defensible values.

References

- Associação Brasileira de Cimento Portland (ABCP), 2014. Coprocessamento – Uma solução definitiva para o resíduo. O que é. Disponível em: <http://coprocessamento.org.br/pagina-exemplo> (accessed 10.02.2014).
- Carmo, H., Ferreira, M. M., 2008. Metodologia da Investigação – Guia para Auto-Aprendizagem, 2nd ed, cap 2, Universidade Aberta, Lisboa.
- Comissão Científica Independente de Controlo e Fiscalização Ambiental da Co-Incineração (CCI), 2000. Parecer Relativo ao Tratamento de Resíduos Industriais Perigosos. Portugal.
- Giannopoulos, D., Kolaitis, A., Togkalidou, A., Skevis, G., Fountini, M., 2006. Quantification of Emissions from the Co-incineration of Cutting Oil Emulsions in Cement Plants – Part I: NO_x, CO and VOC. In: Fuel, 86, pp 1144-1152.
- Hill, M. M., Hill, A., 2009. Investigação por questionário. 2^a edição. Edições Sílabo 377 pp.
- Júnior, A. G. P., Braga, A. M. C. B., 2009. Trabalho e saúde: a atividade da queima de resíduos tóxicos em fornos de cimenteiras de Cantagalo, Rio de Janeiro
- Karstensen, K. H., 2009. Guidelines for co-processing. Actas de la Conferencia Internacional de China sobre la Utilización de Materias Secundarias y Combustible en la Industria de Materiales de Construcción. Instituto de Información Técnica para la Industria de Materiales de Construcción de China, No.1, Guanzhuang Dongli, Distrito de Chaoyang, Beijing, China.
- Kihara, Y., 2011. Coprocessamento em Fornos de Cimento: Resíduos Urbanos. Apresentação ABCP.
- Maringolo, V., 2001. Clínquer Co-processado: Produto de Tecnologia Integrada para Sustentabilidade e Competitividade da Indústria de Cimento, Tese Doutorado em Mineralogia Aplicada, Universidade de São Paulo, USP
- Malviya, R. Chaudhary, R., 2006. Leaching behavior and immobilization of heavy metals in solidified/stabilized products. Journal of Hazardous Materials, v. 137, n. 1, p. 207-217.
- Milanez, B., 2007. Co-incineração de Resíduos Industriais em Fornos de Cimento: Problemas e Desafios. IX ENGEMA - Encontro Nacional Sobre Gestão Empresarial e Meio Ambiente, Curitiba.
- Milanez, B., Fernandes, L. O., Porto, M. F. S., 2009. A co-incineração de resíduos em fornos de cimento: riscos para a saúde e o meio ambiente.
- Mutz, D., Andres, C., Hengevoss, D., Morf, L., 2007. Co-Processing Waste Material in Energy-Intensive Industries (EII): A global study with focus on Europe. Universidad de Ciencias Aplicadas de Suiza Noroccidental
- Noaa Coastal Services Center, 2007. Introduction to Survey Design and Delivery - Social Science

Tools for Coastal Programs.

Organización para la Cooperación y el Desarrollo Económicos (OCDE), 2000. Strategic Waste Prevention, OECD Reference Manual.

Programa das Nações Unidas para o Meio Ambiente (PNUMA), 2012. Convenção da Basileia. Diretrizes Técnicas. Orientações Técnicas Sobre o Coprocessamento Ambientalmente Saudável de Resíduos Perigosos em Fornos de Cimento.

Rocha, S. D. F., Lins, V. F. C., Santo, B. C. E., 2011. Aspectos do coprocessamento de resíduos em fornos de clínquer. Eng Sanit Ambient, vol.16 n.1

Santi, A. M. M., Filho, O. S., 2004. Combustíveis e riscos ambientais na fabricação de cimento; casos na Região do Calcário ao Norte de Belo Horizonte e possíveis generalizações. II Encontro Nacional De Pós-Graduação E Pesquisa Em Ambiente E Sociedade – Anppas, Campinas.

Santos, A. B. M., 2011. O Turismo e a Percepção dos seus Impactes pela Comunidade Local – O Caso da Ilha do Sal, Cabo Verde. Dissertação de Mestrado em Cidadania Ambiental e Participação. Universidade Aberta, Lisboa.

SECIL, 2007 – Estudo de Impacto Ambiental da Co-incineração de Resíduos Industriais Perigosos na Fábrica Secil-Outão.

Simão, J., Mósso, A., 2013. Resident's perceptions towards tourism development: the case of Sal Island. International Journal of Development Issues. Vol. 12 No. 2, pp. 140-157.

Sousa, M. J., Baptista, C. S., 2011. Como fazer investigação, dissertações, teses e relatórios segundo Bolonha. Pactor - Edições de Ciências Sociais e Política e Contemporânea, Lisboa.

Tocchetto, M. R. L., 2005. Gerenciamento de Resíduos Sólidos Industriais. Departamento de Química – CCNE. Curso de Química Industrial. Universidade Federal de Santa Maria.

Water issues in the food and energy frontiers

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Abstract

Water's vitality for life and its array of environmental, social, cultural and economic processes has made it one of the most pressing environmental concerns of the 21st century. The Cerrado is the second largest biome in South America, after the Amazon, and half of its native vegetation has already been lost to activities such as sugarcane, soy, cotton and cattle farming, (agro)energy production and the built environment. The waters that rise in the area replenish three main aquifers, one of which is the world's second largest, and five of Brazil's eight largest river basins. In addition, the waters in the region generate more than half of the electricity in the country. As a result, it is imperative to identify and document the water conflicts in the area in order to promote a better understanding of what constitutes a sustainable future in the water, food and energy geographical and technological frontiers. This exploratory research aimed to identify existing and emerging water conflicts in the Cerrado biome of the Goiás state in central Brazil. This was done through a field visit in August 2015 when three regions in the west, southwest and northeast of the state were visited. More than 20 interviews were conducted with representatives from rural communities, NGOs, environmental authorities and the agribusiness sector. The qualitative analysis of the data collected underscored four main water conflicts: water and the agribusiness sector; energy generation and water distribution; water and rural livelihoods; and a lack of data and monitoring. Results indicate that the close link between water and agriculture translates to local and public concerns about the quality and quantity of water, especially in intensive activities such as biofuel, cotton and soy production. In addition, some areas of the state of Goiás present concerns about energy generation through large and small-scale hydroelectric plants and the socio-environmental impacts involved. Moreover, issues regarding water access and sanitation were identified in rural communities, which threatens human livelihoods. This research that presents a rich testimony of the challenges facing rural communities also identified a grave absence of publically available data and independent monitoring regarding water quality and quantity. This introduces a concerning level of uncertainty that points towards a clear need from researchers, environmental authorities and civil society to work collaboratively in such key areas of water utilisation, present and future conflict.

Keywords: water, energy, food, agro-hydro-business, cerrado

Track 6d. Lifestyles and Consumer Behavior

Session 6d-01

Session 6d-04

Session 6d-05

Session 6d-06

Individual strategies to restore subjective wellbeing under the circumstances of constrained consumption

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Abstract

The challenge of sustainable consumption lies in the most probable necessity of consumption reduction which is still an unpopular idea today. Situations of coercive consumption reduction indicate various individual reactions and severe impacts on subjective wellbeing. Key issue of the paper is how individuals create resilient adaptation strategies in order to keep or even enhance the current level of their subjective wellbeing, when facing the challenge of coercive consumption reduction. Our intention was to simulate a resource scarcity situation and the reaction of consumers to that situation. The authors will use the Q-methodology for profiling individual strategies which aim to restore subjective wellbeing. The research is based on the results of a previous research, conducted by the authors, which aimed to map the consequences of the 2008' economic crisis on consumption patterns and subjective wellbeing. Using the qualitative methodology of causal loop diagrams, focus group participants were asked to map the direct effects of the economic crisis of 2008 on their family or themselves, as well as their adaptive changes in their consumption patterns on those effects. We identified direct impacts of the crisis on the subjective wellbeing of participants, recognised constructive and destructive loops regarding the effects and reactions, and analysed the adaptive consumption strategies from the point of view of the ability to restore formal levels of subjective wellbeing. We found that people were quite innovative when they had to adapt to income reduction, while they easily got involved in destructive loops when they were subject to uncertainty and unemployment. Resilient individual strategies were identified mainly in the field of spending holiday and relaxation time, mobility and eating habits. The features of wellbeing-restoring strategies serve as input for the statements to be used in the Q-methodology. Participants will be asked to set up their priority order from the statements. Due to the patterns of Q-methodology, those priority orders can be categorised into different factors which describe well-being restoring strategies in a more illustrative way. The analysis of the results help understand the complex response of individuals on the effects of coercive consumption reduction. As resilient adaptation to change and the restoration/enhancement of subjective wellbeing are both crucial for sustainability, results are expected to provide new insights to the issue of sustainable consumption, especially regarding the challenge of consumption reduction. The authors will formulate policy implications for consumer policy about how to manage the challenges and critical issues of sustainable consumption.

Targeting households – Future policies to cap consumption demand

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Abstract

According to recent research, household resource consumption should be reduced over 60 % – 80 % in Western European countries by 2050. Although technological development, efficiency in resource use and recycling and immaterial services will contribute towards this same goal, the challenge is formidable, and it requires a transformation in the consumption patterns and habits of present day consumers. The transformation, however, should not rely on changing individual behaviour. Instead, systems and structures should be created to make it possible for individuals to lead lives that consume less than today. Currently many 'Old world' policies aim to adjust the production-consumption systems to be less wasteful of natural resources, but most of these policies focus on the supply side. More stringent policies targeting reductions in consumption demand should be established. Learning ways to cap this demand would enable us to block the rebound effects, which currently are undermining many efforts of saving resources. One way is to implement new kinds of policies that would set limits to household consumption through taxation, quotas, bonus systems or other alternatives. Such systems could ensure fair and equitable levels of consumption between and within nations. This presentation describes a set of potential, new, future policy measures that could be used to radically reduce household consumption of natural resources. Potential measures include, for example, the following: progressive tax, up to 70 %, on certain consumables like energy, electricity or parking spots. Bonuses for environmentally less-harmful behaviour combined with local trading scheme and local taxation system (e.g. households that do not own a car could pay their taxes with the bonuses gained from bicycling and using public transport). Quotas for consumption of energy, travel or emissions of CO₂ combined with a nation-wide trading system; and, reductions in weekly working hours and hence in earnings. The reviewed policies have been identified based on literature review and expert interviews. The feasibility, preferability and probability of these measures were assessed by a selected group of Finnish experts in economic, consumption and environmental policies. Fourteen experts were interviewed for this purpose. According to these experts many of the potential policies are feasible and preferable options for more stringent consumption policies to be implemented in the Finnish society, although their political acceptability may be low and technical implementation costs high. In general, the experts regarded highly the consumers' freedom of choice, hence economic instruments were regarded more preferable than strict regulatory limits. This presentation is part of a PhD research titled 'The images of the future of Finnish decision makers as enablers of sustainable development'. The selected consumption policies will be utilised in a Delphi process in which Finnish decision makers are asked to discuss, comment and develop the policies further.

Impact of different lifestyles on electricity consumption in Japan in 2030

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Abstract

Since FY2011, National Institute for Environmental Studies (NIES) has been conducting the “SusLife Project” to develop scenarios for people’s lifestyles in Japan in 2030 and to propose a range of policies for shifting to sustainable lifestyles and consumption. Most conventional studies which estimate environmental load generation and present roadmaps to a society with a low environmental load in the household sector do not focus on people’s lifestyles in detail. In response to this problem, the SusLife project was boldly established to study future lifestyle scenarios which do not focus on environmental issues. Up to now, (1) Four types of lifestyle risks (economic, health, change in lifestyle stage, communication/network) have been identified, and (2) the number of persons who face various types of risks and whose lifestyle will deteriorate is expected to increase in Japan in the future. (3) Persons with deteriorating lifestyles can be divided into two types- those who are not aware of the risks they face, and those who are aware of the risks they face but cannot avoid them. (4) On the other hand, if proper guidance can be provided to persons with deteriorating lifestyles, it may be possible for them to address the risks. In this research, differences in electricity consumption among household types and lifestyle types which were discussed in the SusLife project were analyzed. First, three types of reference household are set based on previous studies, along with a few characteristics for each reference household. Then approx. ten household types with different lifestyles are formulated. In next step, electrical devices found in each household and how they are used depending on household type are determined. Finally, electricity consumption of each household is estimated and differences between households are analyzed. From the analysis results, four main outcomes could be determined- (1) even in low income households with fewer devices compared to high income households, if the household is not environment-friendly conscious, electricity consumption was estimated to be high, and (2) even in high income households, if the household is environment-friendly conscious, electricity consumption was estimated to be comparatively low. (3) As for high income household with non-eco-friendly mind, it is not easy to change their behaviour to eco-friendly, so development of high energy efficiency devices is needed. On the other hand, (4) as for middle and low income household with non-eco-friendly mind, it is relatively easy to change their behaviour to eco-friendly, and appropriate information about a comfort and energy-saving lifestyle are needed.

Keywords: Lifestyle change, Electricity consumption, sustainable lifestyle

Energy saving behaviours: assessing the individual's motivation forces

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Abstract

International organizations and national governments seem to be committed to promoting environmental sustainability and fighting global warming. At the same time, energy efficiency has been considered critical for minimizing the costs of reducing greenhouse gases and the most effective tool to reduce energy sector carbon emissions. In this context, environmentally sustainable behaviours are increasingly seen as desirable and socially approved. Yet, effective knowledge about the way individuals are, or can be, successfully motivated to act accordingly is still scant. The goal of this research is to further enlighten what drives consumers to adopt environmentally friendly energy behaviours. More specifically, this research contributes to existing knowledge by relating positive and negative affect with consumers' energy saving behaviours. To the best of our knowledge, this is one of the first studies linking affect with energy saving behaviours by consumers. Affect is understood as a broad term concerning both moods and emotions (e.g., Lee et al., 2011). The dominant view looks at affect as having two dimensions: positive and negative affect (e.g., Watson et al., 1988). Hence, affect encompasses the negative or positive subjective experiences of individuals (cf. Moneta et al., 2012). Individuals scoring higher on positive affect tend to "approach their environment with more favourable expectations, and display a stronger willingness and enthusiasm to seek out and actively engage in various life events" (Kuyper et al., 2000: 480). Individuals with higher levels of negative affect tend to perceive the world surrounding them in a negative manner (Kuyper et al., 2000). Given that positive and negative affect influence the extent to which individuals are willing to engage in various life activities, it is likely that affect determines, in particular, the degree to which individuals follow an energy saving posture. Accordingly, we develop a model in which positive and negative affect are directly and indirectly related to the adoption of environmentally-friendly energy behaviours by consumers. Hence, the model specifies mechanisms for the transmission effects of affect to energy saving. In particular, the model considers that environmental concern and perceived energy saving self-efficacy partially mediate the influence of affect on energy saving behaviours. This model is tested with a sample of over a thousand Portuguese consumers, who answered a survey designed by the authors. The pre-tested questionnaire was developed upon previously validated scales. To assess the psychometric properties of the measurement scales, we conducted a confirmatory factor analysis, which provided evidence of scale reliability, convergent validity, and discriminant validity. Moreover, we relied on structural equation modelling to test the research hypotheses. The (preliminary) results indicate that the influence of positive and negative affect on energy saving behaviours is only partially mediated. These are novel results, helping to illuminate the complex question of what shapes environmentally-friendly energy behaviour. Managerial and academic implications are derived, noting limitations and offering suggestions for future research.

Keywords: Affect, Behaviour, Environmental concern, Energy saving, Survey

Investigating long-term lifestyles changes in France: a statistical and modelling approach

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Abstract

As lifestyles relate to our ways of “doing”, “having”, “using” and “displaying”, our behaviour and all of the related products, objects and infrastructures (Røpke, 2009), they are both a broad and complex object of thought and a key determinant of the sustainability of our societies. Conducted in a qualitative way, the analysis of future lifestyles offers great freedom to imagine dramatic changes of societies and to explore paradigm shifts. These changes could result from the widespread of various existing behaviours considered today as weak signals or from the emergence of social movements of great magnitude. Performing a quantitative analysis is less straightforward and could be conceptually questioned. Yet for the specific problem of sustainable lifestyles a quantitative approach can help ground the scenarios not only on technical solutions but also on elements of lifestyles change. What is missing is a quantitative method to define the possible long term impact of lifestyle change on mobility, housing and consumption patterns. In this paper we introduce a statistical model that we developed especially to address long-term lifestyles changes and their consequences on the consumption of goods and services and on the energy services demand in France. We make use of national mobility housing and consumption surveys to identify significant patterns. We propose a model of their diffusion in the long term according while also taking into account the demographic changes. Our contribution is organised as follows: we first describe the statistical model and the surveys; then an application to future societal trends is proposed in a prospective approach. A set of lifestyles anticipated for France in 2050 that explore various changes are considered. Finally we aim to discuss the contributions and limitations of the proposed quantitative model and how it can fit into futures thinking.

Keywords: lifestyles, consumption, energy consumption, foresight, transition

1. Introduction

Since the Rio Earth Summit in 1992 there has been an increased recognition of the role of societal changes in achieving a sustainable society. A typical quantitative technical and economic analysis will stress factors such as efficiency, carbon content of energy flows and costs or GDP; whereas a societal and lifestyle perspective will put the emphasis on the potential or barriers to a wider diffusion of sustainable practices in a society, and seek a stronger engagement of consumers or citizens to reduce the footprint of our lifestyles while avoid adverse rebound effects. Just as lifestyles relate to our ways of “doing”, “having”, “using” and “displaying”, our behaviour and all of the related products, objects and infrastructures (Røpke, 2009), they are the logical background of our ordinary energy uses and yet remain a broad and complex object of thought. As such understanding they role as a levy towards more sustainable society is essential. Furthermore, when looking forward by 2050 and beyond we are not irreversibly locked in an unchanging set of social patterns or lifestyle: the future decades could either be a movement towards a more energy intensive techno-society or a society with different degrees of sobriety. Conducted in a qualitative way, the analysis of future lifestyles thus offers great freedom to imagine dramatic changes of societies and to explore paradigm shifts. These changes could result from the widespread of

various existing behaviours considered today as marginal or emerge from original social movements of great magnitude.

Yet a scientific and systematic treatment of lifestyle remains an emerging research field that encompasses several disciplines and multiple concepts. Starting from the abundance of the literature on consumption, (Jackson, 2005) challenges the idea that consuming more always increases the welfare against the alternative understanding of consumption as a “social pathology”. Beyond a criticism of “utilitarianism” this work proposes grounds for a strong rehabilitation of a more complex understanding of the formation of needs than what is embedded in conventional consumers’ preferences. The SEI (Kate Scott, 2009) report adopts a more practical and tool box approach and proposes a transversal description of some key themes and methodologies used to investigate either sustainable alternative lifestyles or, with a more restrictive focus, sustainable consumption. The UNEP’s survey also provides evidence of differences and similarities in the declared priorities of young adults across the world. Though the sample might not be fully representative, this report gives multiple qualitative views on the aspirations associated to the notion of sustainable lifestyles (UNEP, 2011). Similarly the SPREAD project offers a comparable exercise centered on Europe (Kuittinen et al., 2012) where participants to several workshops imagined a sustainable lifestyle in Europe in 2050 with the target of 8000 kg as material footprint per year and per person. The challenge of supporting sustainable consumption practices is addressed in (Jaeger-Erben et al., 2015) through a review and typology of several practical examples and, in (Shao et al., 2016) with an attention on the availability of information on products attributes to consumers for a better informed purchase decision. In UK, the sustainable lifestyle approach of DEFRA (Eppel et al., 2013) provides a strong case of a government agency’s effort to understand and promote sustainable behaviours and lifestyles. The proposed segmentation in population groups reveals the differences in willingness to engage in more sustainable behaviours and shows for instance that the two extreme groups of “Positive Greens” and “Honestly Disengaged” have similar size. In France (Le Gallic et al., 2014) the iterative and participative process described in (Emelianoff et al., 2012) provides a comprehensive description of five possible future lifestyles defined within the PROMOV project.

This overview of the growing and diverse literature on sustainable lifestyles or sustainable behaviours illustrate that the challenge has been a better understanding of the process of behavior itself, its psychological (values, meaning) or societal (social pressure, collective practices) dimensions, and possible governance schemes. This is done through both conceptual frameworks and practical case studies. Quantitative scenarios of future lifestyle have received less attention mainly because a shared understanding of the boundaries and meanings of lifestyle does not exist. In this paper we propose a numerical model to project alternative social practices (mobility, housing and equipment levels) on the long term in France. It is intended as a dialog tool to bring assumptions formulated as lifestyle change in a form useable for techno-economic analysis and thus bridge the two approaches. A model cannot of course replace the cognitive, human and imaginative value of workshops such as the co-construction workshops cited above. Its interest should be seen as a complementary tool and one that can lightly explore alternative variants. We adopt a macroscopic perspective on social practices and quantify them using existing large scale statistical surveys. Compared to the literature on sustainable lifestyles our focus is put on the impact of changing lifestyles (more sustainable or not) on the demand for energy services. Longer term lifestyle transformation have explicitly been proposed in (Mont et al., 2014) for Europe based on visions drawn from expert groups and a specified sustainability target. Using the information contained in current surveys, our core assumption is that the distribution of practices among the population captures the heterogeneity of practices. The proposed quantitative scenarios are of course exploratory and should not be considered as an attempt to “predict” future lifestyles. Section 2 presents the methodology while section 3 provides some illustrative results on different dimensions.

2. Methodology

2.1. Surveys as a substrate for a quantitative approach of social practices

Our aim is to investigate the consequences of future lifestyles changes on the energy services demand in France, i.e. on the housing demand, on the demand for mobility and on the consumption of goods and services. In order to achieve this goal, we need a quantitative approach of lifestyles. This constitutes a delicate task given that they are related to both qualitative and quantitative dimensions and to both conceptual and practical dimensions. Lifestyles are multifaceted and are marked by our relationships to time, to space, to others, and to ourselves (Héraut, 2013). Nevertheless, they have a visible resultant in the individual and collective practices in a broad sense. It is through these practices that we intend to somewhat “capture” lifestyles traits and apprehend them through data from French national surveys. Most of the surveys are conducted periodically every five to ten years providing a valuable material for foresight.

Five national surveys were used in order to cover several dimensions of social practices: the population census, the Housing Survey, the National Transport and Travel Survey, the time-use survey and the household budget survey. A short description of their goal, their scope, the existing editions and the size of the samples is provided in Table 3. We used the latest available edition of each of these surveys (except for the population census) to establish a baseline on current practices.

Table 3. Short description of the five used national surveys.

Name	Time use survey	Housing Survey	National Transport and Travel Survey	Household budget survey	Population census
Purpose	To collect accurate information on the use by individuals of their time	To collect comprehensive and accurate data on the housing stock and the conditions of occupation by household	To improve the knowledge of mobility of the households living in France	To study the household expenditure and income at a microeconomic level	To know and follow the evolution of the population of France, in its geographic diversity and its evolution
Editions	1966-1967 1974-1975 1986-1987 1998-1999 2009-2010	1955, 1961, 1963, 1967, 1970, 1973, 1978, 1984, 1988, 1992, 1996, 2002 et 2006, 2013	1966-1967 1973-1974 1981-1982 1993-1994 2007-2008	1979, 1984, 1989, 1995, 2001, 2006, 2011	Since 1801 Every 5 to 9 years from 1801 to 1962 Harmonized data : 1968, 1975, 1982, 1990, 1999, 2006 to 2012
Edition used to establish a reference	2009-2010	2006 <i>(The latest edition is available since March 2016 and was not used for the first version of this paper)</i>	2007-2008	2011	2009

Main scope	The survey detail use of time of individuals from the description of two complete days by individual surveyed (use of notebooks)	Nationally, this is the major statistical source to describe the housing stock and the conditions of occupation by households of their primary residence. <i>Only ordinary dwelling is concerned.</i>	The survey investigates short and long distance mobility, the use of individual and collective means of transport.	The survey is providing detailed data on all kind of expenditure (including expenditure which are not goods and services; e.g. taxes) and income of individual and household surveyed. <i>(Only ordinary households)</i>	The census provides information on population and housing: gender, age and origin, marital status and place in the household, diploma and place of study, occupation, place of work and mode of transportation, previous residence, housing conditions, location.
Sample of the last edition	≈28 000 notebooks ≈18 000 individuals ≈12 000 households	≈43 000 households ≈43 000 dwelling ≈110 000 individuals	≈45 000 notebooks ≈19 000 individuals ≈19 000 households	≈41 000 individuals ≈16 000 households	All the population is concerned

Each survey includes several variables that provide directly two types of information: information on individual (or household) characteristics and information on their practices. For example, the National Transport and Travel Survey household contains a set of variables describing individual daily mobility (e.g. number of trips, distance, means of transport, aim) and a set of variables describing the individual (e.g. gender, age, situation) and his or her household (e.g. size, composition, age of the household reference person). A key step of our approach is to select a set of variables to build a representation of the people and their lifestyles. The Table 4 reports the types of variables that we used to address the different dimension of lifestyles and the questions addressed by each set of variable.

Table 4. Types of variables used to build a quantitative representation of “people and their lifestyles” and their availability in each survey. *Legend: “+++” means “comprehensive data is available”; “++” means “partial data”; “+” means “a few information”; an empty cell means “no information available”.*

Types of variables	Surveys				
	Time use survey	Housing Survey	National Transport and Travel Survey	Household budget survey	Population census
Who are they? age, gender, activity status	+++	+++	+++	+++	+++
With whom do they live? household size and composition, incomes	++	++	++	++	+++
Where do they live? type of urban space	+++	+++	+++	+++	+++
What do they do? frequency of different kind of activities and time spent	+++		+	+	
Where do they do it? location of activities (at home, at work, ...), to-face or virtual activity	+++		+++		

What do they have?	ownership of equipment, vehicles, furniture	++	+	+	+++	+
What do they consume?	volumes of each type of goods and services				+++	
How do they inhabit?	building type, dwelling size	+	+++	+	+	++
How do they move?	number of trips, distance and means of transport	+		+++	+	
How do they travel?	location, frequency, duration			++	+++	

By analyzing the surveys, we accede to the information which is contained in the correlation between variables. For example people aged 75 and older make an average of two times fewer trips per weekday than the rest of the population (see Figure 5). This reflects the process of biological and social ageing, i.e. it is more and more common for people beyond 75 years to experience physical discomfort to move/get around on one hand and to see their social networks decrease on the other hand. A different lifestyle characterized by an enhanced social participation or physical capability of this group with time, coupled with the change in population structure could then influence the total trip demand. Another example is given by the correlation between the size of household and the floor space per person in a dwelling (see Figure 6). This correlation reflects the process of space sharing which has a consequence on space needs. To give a concrete application of this process: if several types of rooms could be considered by most of people as a “need” in a dwelling (e.g. kitchen, bathroom, living-room), one of these type of room per household/dwelling is most of time considered as enough.

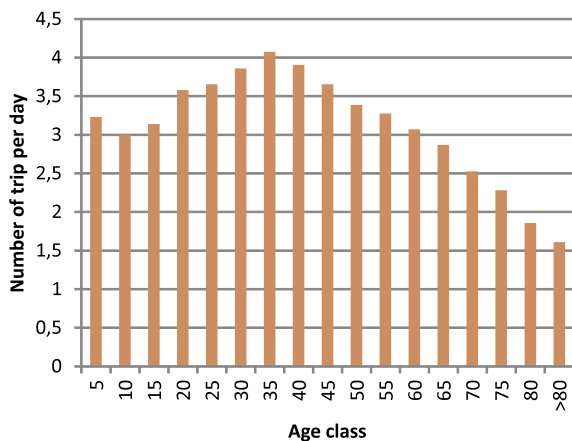


Figure 5. Number of trips per age. Data source: National Transport and Travel Survey 2007-2008.

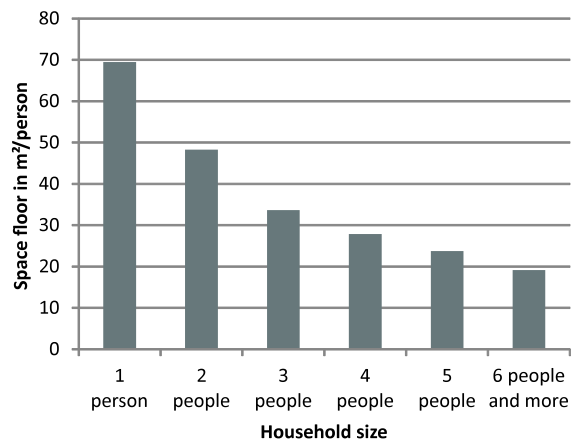


Figure 6. Floor space per person depending on household size. Data source: Housing survey 2006.

2.2. Principle of the modelling approach

A survey basically consists of a matrix in which each row represents an individual and each column represents a variable. Some of the variables might describe individual or household attributes (e.g. age, gender), while others describe practices (e.g. number of trip per day per purpose, time spent at home per day). In its generic form a cell of coordinates (i,j) contains the value or the modality of the variable j for individual i. Classification methods then allow for the identification of groups of individual according to the modalities of the variables used as basis for the segmentation. Finally we use the correlations between variables of the surveys as descriptor of social practices. These correlations are thus interpreted as the statistical manifestation of a combination of biological, psychological, cultural, juridical, geographical, demographical or

economic processes. They are formalized in correlation matrices whose form is illustrated in Figure 7.

	$z = z_1$...	$z = z_r$
$\begin{cases} x = x_1 \\ y = y_1 \end{cases}$	$\rho(z = z_1)_{x=x_1 \& y=y_1}$...	$\rho(z = z_r)_{x=x_1 \& y=y_1}$
...
$\begin{cases} x = x_m \\ y = y_n \end{cases}$	$\rho(z = z_1)_{x=x_m \& y=y_n}$...	$\rho(z = z_r)_{x=x_m \& y=y_n}$

Figure 7. Form of a correlation matrix. The response variable z is categorical and has r modalities. x and y are the explanatory variables which have respectively m and n modalities.

In this example, one categorical variable – called z and which have k modalities – is analyzed in relation to two explanatory variables – called x and y and which have respectively m and n modalities. Each row represents an unique combination of modalities of x and y , in a group and each column represents one modality of the variable z . The cells contain a value ρ that is the frequency of a modality for one couple of values (x,y) . If z is a categorical variable, the cells contain the percentage for each modality; if z is numerical, the cells contain a statistical measure (e.g. mean, percentage of cases between two values). The distribution consistency is checked (Equation (1)) for any couple $i, j \in \{m, n\}$.

$$(1)$$

The statistical approach we propose uses dynamic population and practice matrixes as markers of lifestyles. Its practical starting point is a basic matrix containing a future population pyramid (which is extracted from demographic projections), i.e. only two variables are described: age and gender (an indication of the region could be added). The other variables are added one by one thanks to the correlation matrices. The Figure 8 illustrates the principle of adding a variable to the population matrix. In this case, adding a variable to this matrix increases the number of rows by a factor r (r is the number of modalities of the added variable, z). The population matrix (a) has two variables (x and y). Analyzing the correlations between z (as response variable) and (x,y) (as explanatory variables) provides the correlation matrix (b). These two matrices are combined to create the population matrix (c) which disaggregates each row of (a) in k rows (for the k modalities of z) using the frequencies of the matrix (b). This elementary operation is included in a sequential process starting from the basic population matrix (population pyramid) and leading to a more comprehensive population matrix including several variables describing the future population and its lifestyles.

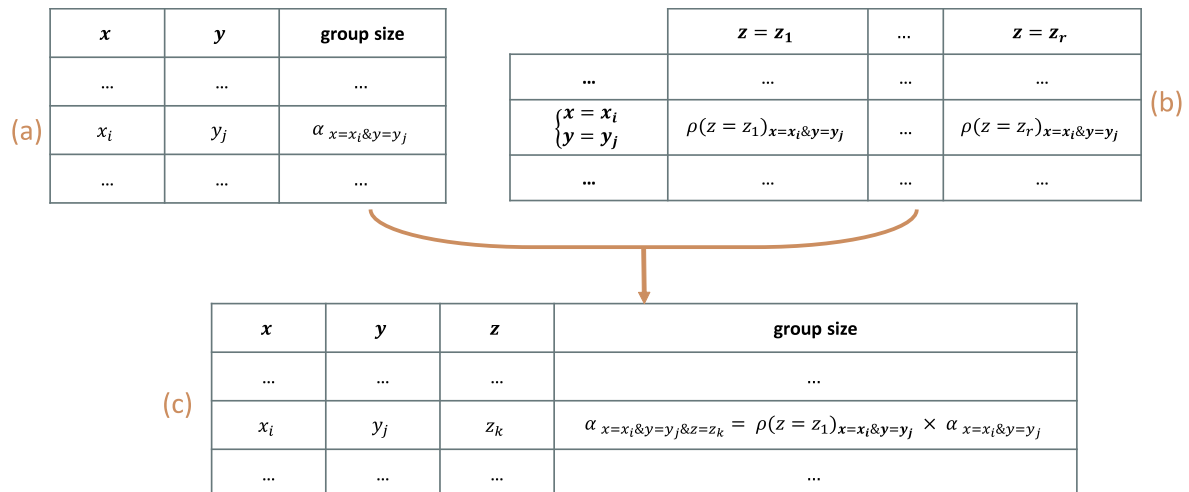


Figure 8 : Example of adding a variable to the statistical model.

Among the available methods to report the correlation between variables, we used decision trees. Firstly this method allows dealing easily with a mix of numerical and categorical covariates. Secondly the implemented process provides a great flexibility, especially in the selection of variables that are taken into account. Decision trees use numerical categorization to build descriptors or predictors from a data source and are commonly used in data mining. In our case, they are used to group individuals with relatively homogeneous practices or situations with regard to a given variable. The practices or situations of each group are then characterized by standard statistical analyses (e.g. mean, distribution). This method - providing clarity and flexibility - also allows us to control the size of the formed groups to ensure their statistical significance. We use the RPART routines (as "Recursive PARTitioning") available in R to build the decision trees (Breiman & al., 1984) and (Therneau and Atkinson, 2015).

The Figure 9 is showing an example of classification tree and its associated correlation matrix. In this example, the response variable is the space floor per person. The explanatory variables are the age of the household reference person (5-years classes), the household size (6 classes: 1 person, 2 people, 3 people, 4 people, 5 people, 6 or more), the location of the dwelling (4 classes: rural area, urban area of less than 100 000 inhabitants, urban area of more than 100 000 inhabitants, urban area of Paris) and the building type (2 class: apartment or flat). In this example, we have limited the recursive partitioning to 8 parts. The most explanatory variable is the household size. The sample is split into 2 groups: single-person-household and the others. Each group is then further split in subgroups using the most relevant criteria. Figure 9 also reports the mean and standard deviation of floor space per individual of each group.

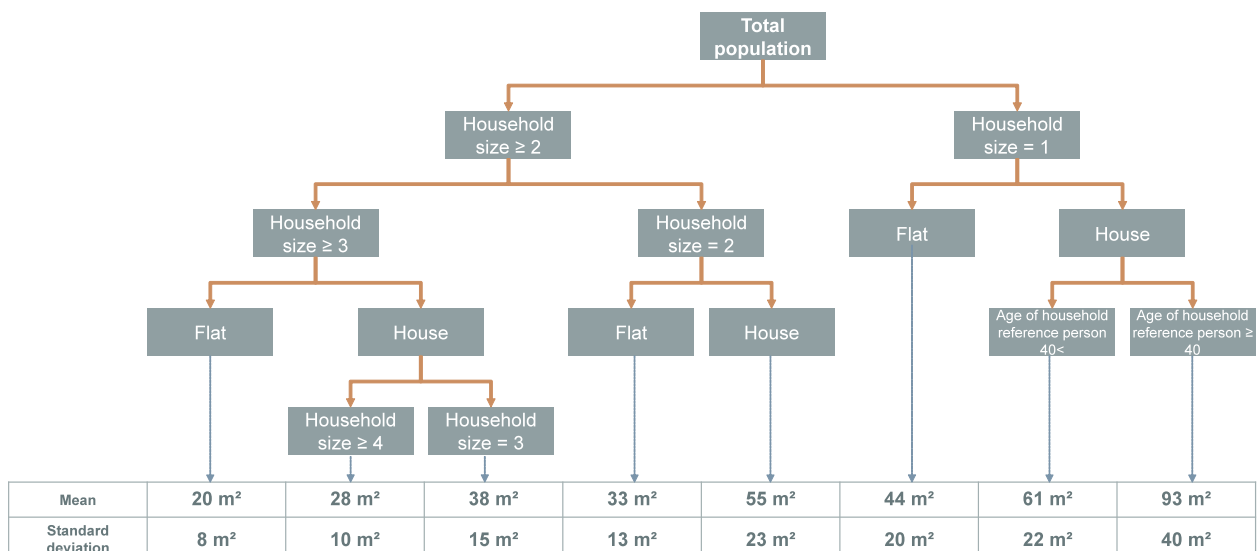


Figure 9. Regression tree related to the space floor per person and its associated matrix. Data source: Housing survey 2006 for France.

2.3. Representing prospective changes in lifestyles indicators

We turn now to the critical question of the dynamics of our lifestyle indicators. Over several decades different social mechanisms can indeed lead to changes over time in the pattern of aggregated practices in a society (here at national level). Firstly we can mention demographic changes and the reconfiguration of the population structure. If it can be argued that there are as many original lifestyles as there are individuals, we can also identify some age based groups with relatively homogenous practices. Changes in the relative sizes of these different groups – all things equal otherwise – would also change the aggregate collection of lifestyles. Population pyramid and revenue distribution are some examples of such structural elements that will evolve in the future and potentially modify the dependent practices. Secondly we can mention some more progressive social changes such as changing in perception of societal priorities (awareness for the environment during the last decades), or new social trends such as remote activity (teleworking, teleshopping, teleconferencing) or the development of a leisure economy. Thirdly some changes are essentially disruptive and can be perceived as radical changes with fast rates of adoption. They can be triggered by unexpected economic crisis reducing brutally the wealth to share in a society, or can originate from a massive spread of new forms of social practices enabled by wider access to new social networking capabilities (car ownership, internet). In our approach they are treated as scenarios. The main principle is to convert narrative assumptions of change into quantitative practice changes in frequency in one or some of the correlation matrices. The Figure 10 depicts this simulation process where some changes are introduced through the replacement of reference matrices by modified matrices.

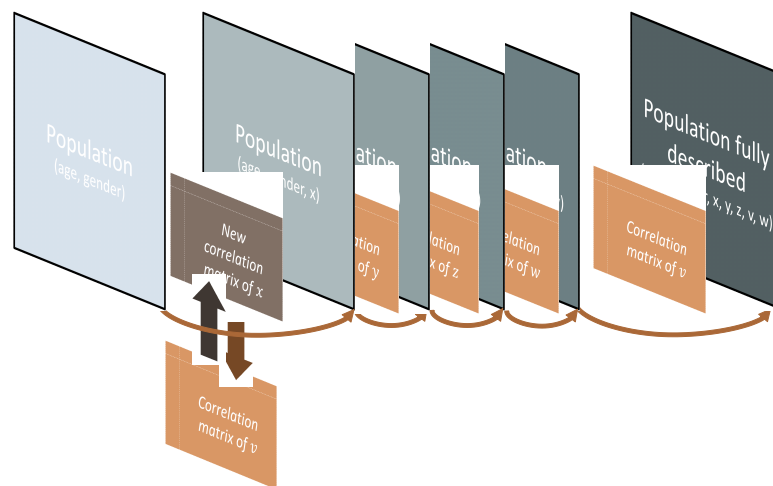


Figure 10. Illustration of the process of changing matrices. In this generic case, the correlation matrix of x is changed.

3. Results

Using the methodology presented above we tested the influence of lifestyle changes on housing demand, mobility needs and demand for selected goods in France. Our scope is 2050 and includes people living in Metropolitan France and belonging to a household¹, representing about 92% of the whole population living in the French Republic. The housing demand is expressed in terms of number and type of dwellings, and the surface area which are the key determinants of the energy demand both at the household and country level (Maresca & Dujin, 2014). The short distance passenger mobility is assessed through the number of trips made per year, the purposes of these trips, and the corresponding total distance. This structures the social network and the

¹ *i.e.* excluding for example people living in caserns or in retirement home.

relation to space. The demand for selected goods concerns private cars, household appliances, digital equipment, computer equipment and audiovisual products.

3.1. Scenarios description

We highlight here four types of characteristic factors to concretely illustrate the proposed statistical model. The first one is the evolution in the household composition resulting from different cohabitation practices and more generally from changes in the relationship to others and to oneself. The second one is the changes in the location of the dwelling resulting from the societal appeal to metropolitan, urban or rural lifestyles. The different options include rural areas, urban areas of less than 100 000 inhabitants, urban areas of more than 100 000 inhabitants, and the urban area of Paris. The third one deals with the structural determinants of time use: sharing between work, leisure, sociability and other activities. The fourth one addresses the relationship to the space and sharing between real and virtual activities and also the part of each activity which is carried out at home or outside. These key dimensions are combined in three lifestyle scenarios exhibiting contrasting hypotheses of change (Table 5). They are inspired from a set of five lifestyles anticipated for France in 2050 and defined by (Emelianoff et al., 2012):

- The first scenario is a *business as usual* scenario. The household size continues to decrease as a result of the ageing population. The preference for houses continues to feed the urban sprawl. The main structure of time use is similar to the current one, *i.e.* especially work or study structure the organization of the week for most people.
- The second scenario called “individual and virtual society” consider a more individualistic and performance oriented society. The will of performance and personal development drives most people to live alone, without constraints of others. To access to the most sought leisure and services, they live in large cities in small apartments. More and more activities are carried out virtually: work, social relations, shopping... Individuals pay great attention to their home where they spend a lot of time.
- The third scenario called “social link society” is radically different. Social ties are placed in the heart of the society and its organization. It results in widespread forms of group housing. The relationship to time also changes and productive work gradually loses its structural role towards social tasks and civic activities.

Beside the three scenarios, the current situation is depicted as a reference. Demographic changes in volume and structure for the three scenarios is based on the central projection of the National Institute of Statistics and Economic Studies for 2050 (“Insee projection”). In this scenario the population size is increasing by 16% relatively to 2010 one and reaches 70.3 billion in our scope. In addition, the population ageing changes the age structure of the population between the current situation and the three scenarios.

Table 5 : Summary of the hypotheses distinguishing the three scenarios

	Business as usual	Individual and virtual society	Social link society
Demography	INSEE projection	INSEE projection	INSEE projection
	Central hypotheses	Central hypotheses	Central hypotheses
Household composition, relation to others	Current practices	More individual society	More collective society
		Individual households are the norm.	Extended households and families are the norm
Location of the dwelling	Current practices	Very strong attraction for metropolitan area to the detriment of rural areas in particular	Attraction for urban area and densification

Time use	Current practices	Current practices	3 work days instead of 5, but 2 days devoted to social tasks and civic activities More emphasis on sociability activities
Location of activities, relationship to space	Current practices	Most of the time at home The share of virtual activities increases	Current practices

3.2. Housing demand

The household is the driver for the housing demand in our modelling approach. Its composition (size, number of adults and children, age and situation of its members) will influence its aspiration in terms of location, type of dwelling and surface area. The current links between these variables are considered through their current correlations. The size and composition of the housing stock resulting from the simulation of the three scenarios varies significantly (see **Figure 11**). Firstly, the cohabitation practices have a great influence on the number of dwellings needed. The dynamics of the size of household is given in (Table 6).

Table 6: Dynamics of size of households for the three scenarios. B = business as usual; I = individual and virtual society; S = social link society.

Scenario	2010			Dynamic: average annual rate			2030			2050		
	B	I	S	B	I	S	B	I	S	B	I	S
1 person	14%			0,00%	2,7%	-0,4%	14%	27%	13%	14%	40%	12%
2	28%			0,00%	0,3%	-0,7%	28%	30%	25%	28%	31%	21%
3	19%			0,00%	-0,6%	-0,1%	19%	17%	19%	19%	15%	18%
4	22%			0,00%	-2,5%	-0,8%	22%	15%	19%	22%	8%	16%
5	11%			0,00%	-2,5%	0,2%	11%	8%	12%	11%	4%	12%
6 and more	6%			0,00%	-2,7%	3,2%	6%	4%	14%	6%	2%	21%

The preference for living alone in the “individual and virtual society” thus results in a need for about 42% more dwellings than in the “business as usual” scenario where the demographic effect conducted to an increase of 18% compared to the current situation. The will for more collective housing practices in the “social link society” involves that the size of the housing stock remains stable. However, changes in its composition would result in needs for housing construction or conversion. In this scenario, the main demand would concern the large apartments in urban area would be whereas the “individual and virtual society” scenario would strongly increase the demand for small apartments in big cities.

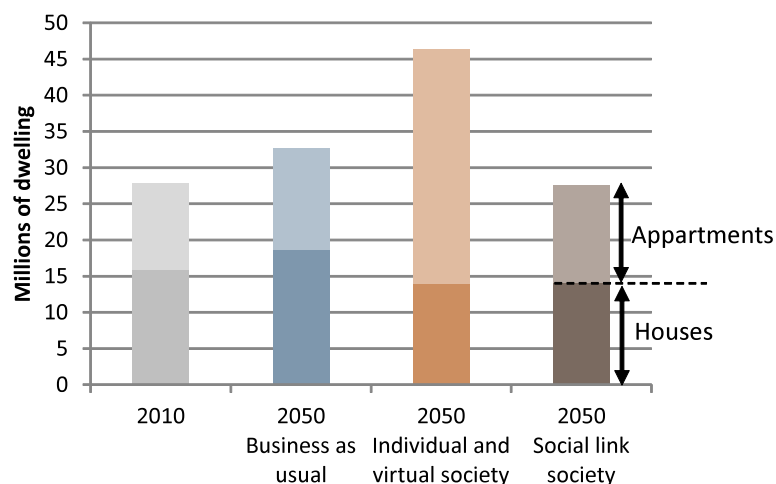


Figure 11 : Size and composition of the housing stock for the current situation and the three scenarios. The lowest (and dark) part of the bars is for houses, the upper (and clear) part is for apartments.

In terms of surface, two effects influence the results (see **Figure 12**). On one hand, the share of space is accentuated in the “social link society” scenario contributing to a decrease of 8% of the mean surface area per person. Conversely, in the “individual and virtual society” scenario, the share of space is reduced contributing to the increase of 27% of the mean surface area per person. On the other hand, the preference for urban or metropolitan area in these two scenarios contributes to reduce the demand for surface area per person. This simulation thus reflects the highest pressure on space and on the housing market in dense areas. A small increase of the surface area per person is also visible in the business as usual scenario resulting from the single demographic effect (population ageing).

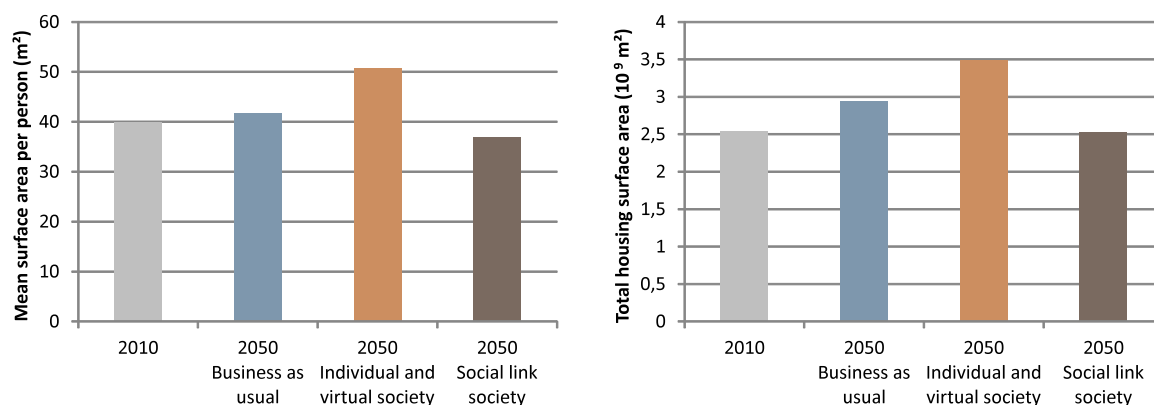


Figure 12 : Mean surface area per person and total housing area for the current situation and the three scenarios.

The use of these three scenarios demonstrates the influence of lifestyles changes on the housing demand. These aggregated results may be useful for understanding their influence on the construction sector, on the urban dynamic or on the energy demand - which depends on the total surface area to be heated. More detailed results are available, for example an assessment of the housing demand per size of dwelling. But especially, depending on the goals in which the model is used, it would be interesting to explore more comprehensive scenarios, taking into account other type of lifestyle changes.

3.3. Demand for specific goods

We now consider the impact of our consumption of goods and services for cars, household appliances, digital equipment, computer equipment and audiovisual products. Whereas many other factors could be introduced for clarity we focus here on couple of them:

- The composition of households which reflects the effect of sharing goods at the household level – note that some other hypotheses could be defined to simulate the effects of sharing at a district, apartment building or community level.
- The location of the dwelling which is a key determinant of the need for car to move around. The changes in age structure of the population could be mentioned as a third impact visible when the current situation and the business as usual scenario are compared.

The lifestyle assumption has a significant effect on the size of the car stock (see Figure 13). The increase of 24% of the car stock in business as usual scenario compared to the current situation show that the effect of changes in age structure of the population is not negligible (compared to the increase of 16% of the population size). Comparatively the “social link society” scenario combines the effects of car sharing at the household level and of a more urban society resulting in an increase of only 4% compared to 2010. The dynamics of location is given in (Table 7). Finally in the “individual and virtual society” scenario, the downsizing effect of location of household is largely compensated by the reduction of car sharing at household level due to the substantial increase of the number of households and a more individualistic approach.

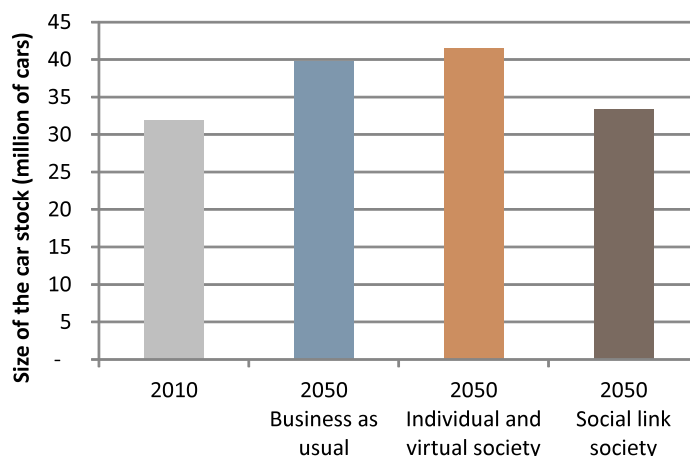


Figure 13 : Size of the car stocks for current situation and the three scenarios.

Table 7: Dynamics of location of the households for the three scenarios. B = business as usual; I = individual and virtual society; S = social link society. Expressed in percentage of households in each area.

Scenario	2010			Dynamic: average annual rate			2030			2050		
	B	I	S	B	I	S	B	I	S	B	I	S
Rural area	23%			0%	-2,3%	-0,3%	23%	16%	22%	23%	9%	20%
Urban area of less than 100 000 inhabitants	30%			0%	-0,9%	-0,5%	30%	26%	28%	30%	21%	25%
Urban area of more than 100 000 inhabitants	30%			0%	1,0%	0,7%	30%	38%	35%	30%	45%	39%
Urban area of Paris	16%			0%	1,1%	0,0%	16%	21%	16%	16%	25%	16%

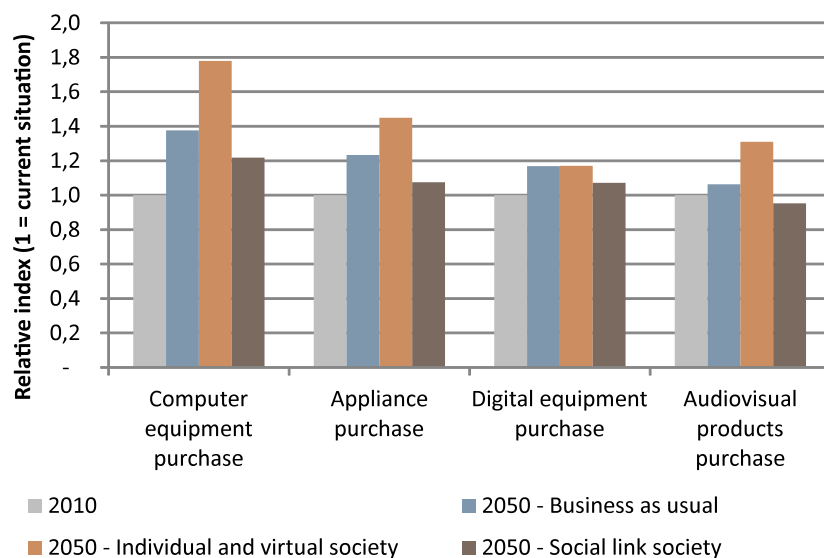


Figure 14 : Consumption of four types of durable goods in the current situation and the three scenarios (using relative quantitative index)

The other durable goods analyzed are also well anchored in our current society. While disruptive technological innovations could make them obsolete they have deeply integrated our practices and activities (leisure, productive work and domestic work). Figure 10 shows that for these goods and independently of the scenario, a significant reduction below today's levels is not at reach without targeting our practices. Here, the household composition and the associated sharing at household level are the main explanatory effect. The simulated scenarios do not outline a path towards a straightforward material sobriety but without efforts to better understand lifestyle related drivers (and their differences depending on the types of goods) we can miss 10% to 20% of reduction relatively to a "Business as usual" case. These differentiated outcomes illustrate the usefulness of a model to quantitatively challenge how far our initial narratives go. More complex scenarios, including changes in relationship to space (e.g. extent of the area where is organized the everyday life) or property (an increase of the sharing practices at community or building level and not only at household level) for instance could then be envisioned as extension to the present scenario set.

3.4. Needs for short distance mobility

Trips are not performed for themselves but to reach a desired location where an activity of interest is performed. In this section, we now discuss the social practices in terms of short distance mobility (and associated purposes) and as lifestyle markers for our scenarios. This relates to the dimension "ways of doing". Besides the household composition and the location of the dwelling the additional explanatory force highlighted here is the use of time (see also Table 5).

The "social link society" scenario tests such a structural change inspired by one of the five scenarios described by (Emelianoff et al, 2012). In this society, time spent on productive work decreases by 40% for workers, representing three days a week. This has two consequences: the number of unemployed is reduced and most people spend two days in social tasks and civic activities. It also involves a reduction of the number of commuting for work, which are replaced by travels for the new practiced activities.

Furthermore information and communications technologies change our relationship to space, leading to new arbitrages between real and virtual activities (work, leisure, learning, shopping). In "individual and virtual society" this share is largely moved towards more virtual activities. The withdrawal leads most people to prefer spending more time at home. The equivalent of 40% of full-time workers work from home, pupils and students spend 40% percent at school, two-thirds of purchases are made online, an increasing part of the sociability and leisure activities are carried out from home...

The simulated impacts of these assumptions at a macroscopic level are illustrated in (Figure 15 and Figure 16). A first result is that compared to the 16% increase of population, the evolution of the number of travels (+3%) and of the total distance (+2%) are low, highlighting the effect of population ageing on the reduction of the intensity of practice in a “Business as usual” case. Here again altering this lower intensity of practice with further assumptions on good health and “socially reconnected aging” could be a potentially disruptive change. While this topic is beyond the scope of this paper, (Moiescu, 2014) and (Lumme-Sandt, 2011) illustrate this better ageing potentially disruptive evolution of old age lifestyle. The second main effect is that the virtualization of the society results in a drastic reduction of the short distance mobility (-41% by number of travels). In this scenario, our hypothesis does not consider any rebound effect linked to a resource given that the virtualization is the result of a will to stay at home. Here a parallel with the private car stock indicates that while owning a car remains a strong individualistic aspiration, the higher virtualization decouples this aspiration and a regular use. In this “private car for exceptional trips” world, the material and energy footprint of transportation could be less correlated. Thirdly and conversely, the release of time for workers in the “social link society” scenario causes some kind of rebound effect resulting in a higher number of travels per year (+7% compared to the current situation). However, these activities are closer to home, limiting the influence of this increasing on distance travelled. In addition the distance travelled is slightly reduced due to the more urban society.

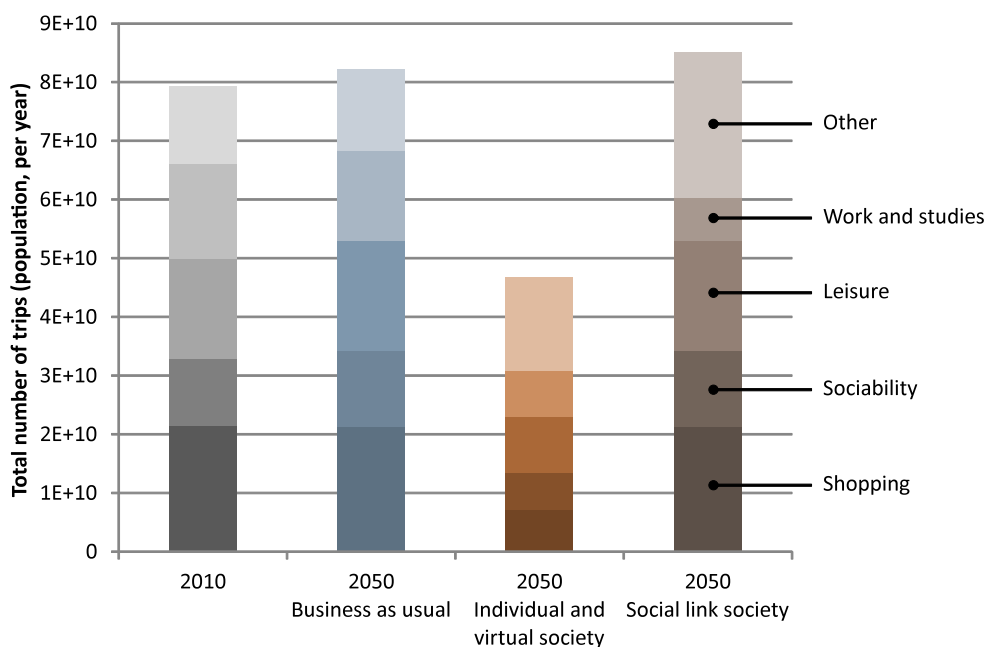


Figure 15: Total number of travels of the population per year in the current situation and the three scenarios.

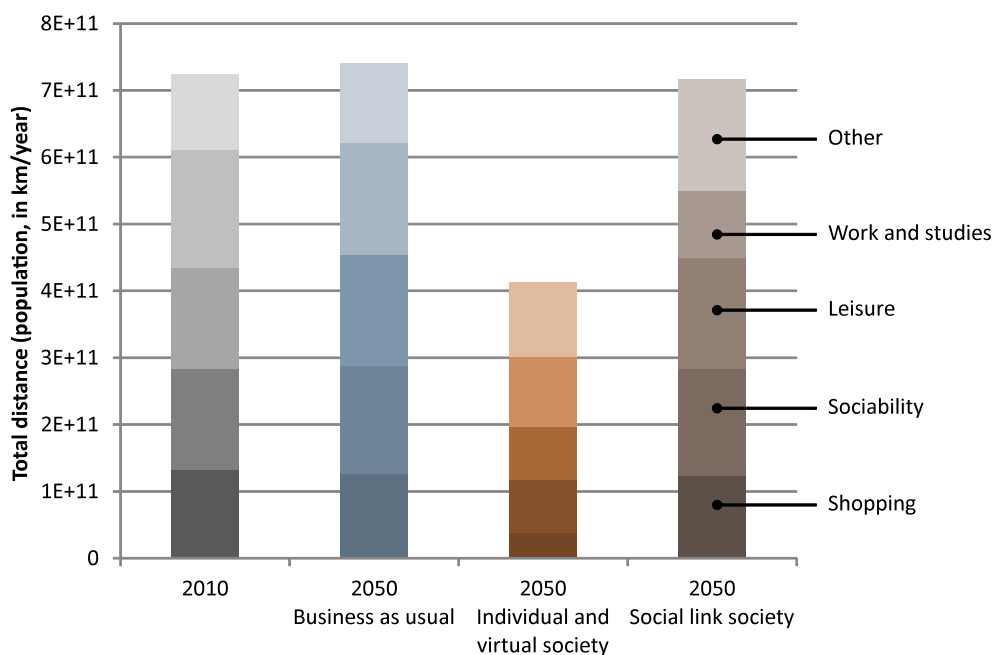


Figure 16: Total distance travelled per year by the population in the current situation and the three scenarios.

4. Conclusive discussion

Lifestyles are a central yet complex dimension of the assessment of the different open options for our societies both in terms of desirability and sustainability. This work proposed a numerical model to project alternative social practices (mobility, housing and equipment levels) and to quantify some of their implications on the long term in France. The modelling approach is based on the use of official surveys as basic material and it aims at defining a consistent explanatory environment to question the broad idea of lifestyle change. It should again be stressed that its underlying paradigm is one of an exploratory tool and not a prediction.

From this rationale a statistical model was described and results for a set of contrasted future lifestyle scenarios were discussed. The simulations took into account the diversity of population, and demonstrated that the correlation between characteristics and practices can bring a renewed understanding to the macroscopic implications of alternative lifestyles change narratives. Such changes are not initially intended and formulated as either sustainable or unsustainable.

Nevertheless the rate of adoption of radical lifestyles or the rate of reconfiguration of our social practices (and meta-structures such as cities and institutions) might remain slow. The evaluation process and the large number of potential proposals might also appear counter-productive in terms of normative policy choices. On these two aspects a robust insight could be that despite the inherent difficulties ignoring the effect of lifestyle is also a first order approximation that can lead to half-blind estimates of perceived “needs”: on one hand regarding the rationale of the Business as usual cases that are used as reference for mitigation, and on the other in the existence of opportunities for less costly mitigation options.

References

- Breiman, L., Friedman, J., Olshen R., Stone, C., 1984. Classification and regression trees, Wadsworth & Brooks.
- Emelianoff, C., Mor, E., Dobre, M., Cordellier, M., Barbier, C., Blanc, N., Sander, A., Castelain Meunier, C., Joliton, D., Leroy, N., Pourouchottamin P., Radanne, P., 2012. Modes de vie et empreinte carbone. Les Cahiers du CLIP, n°21, 132 pp.

- Eppel, S., Sharp, V., Davies, L., 2013. A review of Defra's approach to building an evidence base for influencing sustainable behaviour. *Resour. Conserv. Recycl.*, SI: Resourceful Behaviours 79, pp. 30 – 42.
- Hérault, B., 2013, Tendances et mutations sociales en France à l'horizon 2025 - Rapports aux autres, au temps et à l'espace, support de formation, 33 pp.
- Insee. Enquête « Budget de famille » 2011.
- Insee. Enquête « Emploi du temps et décisions dans les couples » 2009-2010.
- Insee. Enquête « Enquête nationale transports et déplacements » 2007-2008.
- Insee. Enquête logement 2006.
- Insee. Recensement de la population 2009.
- Jackson, T., 2005. Live Better by Consuming Less?: Is There a “Double Dividend” in Sustainable Consumption? *J. Ind. Ecol.* 9, pp. 19 – 36.
- Jaeger-Erben, M., Rückert-John, J., Schäfer, M., 2015. Sustainable consumption through social innovation: a typology of innovations for sustainable consumption practices. *J. Clean. Prod.* 108, Part A, pp. 784 – 798.
- Kate Scott, 2009. Literature Review on Sustainable Lifestyles and Recommendations for Further Research.
- Kuittinen, O., Mokka, R., Neuvonen, A., Orjasniemi, M., Ritola, M., Wikholm, M., 2012. iFuture - The Diversity of Sustainable Lifestyles. Rapport D7.3 People's forum workshop summaries. SPREAD project - Sustainable Lifestyles, 60 pp.
- Le Gallic, T., Assoumou, E., Maïzi, N., Strosser, P., 2015. Les exercices de prospective énergétique à l'épreuve des mutations des modes de vie. *VertigO - la revue électronique en sciences de l'environnement*.
- Lumme-Sandt, K., 2011. Images of ageing in a 50+ magazine. *J. Aging Stud.* 25, 45–51.
- Maresca, B., Dujin, A., 2014. La transition énergétique à l'épreuve du mode de vie. *Flux* N° 96, pp. 10 – 23.
- Moiescu, P.C., 2014. The Social Integration of Elders Through Free-time Activities. *Procedia - Soc. Behav. Sci.*, 5th World Conference on Educational Sciences 116, pp. 4159–4163.
- Mont, O., Neuvonen, A., Lähteenoja, S., 2014. Sustainable lifestyles 2050: stakeholder visions, emerging practices and future research. *J. Clean. Prod.*, Special Volume: Sustainable Production, Consumption and Livelihoods: Global and Regional Research Perspectives 63, pp. 24 – 32.
- Røpke, I., 2009. The role of consumption in global warming - an ecological economic perspective. *Anthology on Global warming*, Routledge, p.11.
- Shao, J., Taisch, M., Mier, M.O., 2016. Influencing factors to facilitate sustainable consumption: from the experts' viewpoints. in *Journal of Cleaner Production*, accepted.
- Therneau, M., Atkinson, E., 2015. An introduction to recursive partitioning using the RPART routines. Mayo Foundation. 52 pp.
- UNEP, 2011. Visions for change: Recommendations for Effective Policies on Sustainable Lifestyles Based on the Global Survey on Sustainable Lifestyles (GSSL).

What is to be sustained? Exploring public discourses of sustainability in advanced and emerging economies

Kristina Diprose, Canny Liu, Katie Mcquaid, Gill Valentine, Robert Vanderbeck, Lily Chen, and Mei Zhang

Abstract

The post-war period in the Global North was characterised by rapid economic growth and technological development, accompanied by considerable social change in terms of consumer culture and individualisation (Beck 1992, Fukuyama 1995, Putnam 2000). In this period, the so-called 'baby-boomer' generation accumulated unprecedented property and wealth, and developed resource-intensive ways of living (Mulgan 2006, Willets 2010). Contemporary financial and ecological crises suggest that current younger and future generations - despite perhaps anticipating similar entitlements - will not be able to consume in the same way. The effects of past generations' unsustainable consumption are felt not only across time, but across the globe by poorer communities on the frontline of climate change. Meanwhile, the development objectives of emerging economies seek to eradicate poverty and provide lifestyles equivalent to those in the North, even as Northern countries call for reductions in consumption at home and abroad. This international struggle for intergenerational justice raises questions about whether past, present and future generations of consumers in the North owe a debt to the past, present and future generations in the South. INTERSECTION addresses this important question through cross-national, multi-method research ongoing in mid-sized cities in three contrasting national contexts: China, Uganda and the UK. The project employs public discourse analysis, survey data, theatre and interviews to look at different generations' consumption aspirations and their understanding of responsibility for environmental problems. In this work, we are particularly concerned with thinking comparatively about sustainability in advanced and emerging economies, and de-centering debates about intergenerational justice, which has overwhelmingly been researched from the Anglophone perspective. In this paper we will compare and contrast public discourses on sustainability in each country, reporting on the findings of a discourse analysis of national newspaper texts in 2015. Our analysis will explore how the different socio-cultural and economic contexts influence understandings of sustainability as a personal, social and environmental practice (Mulligan 2015), including beliefs about what it is important to sustain for future generations as a matter of justice.

Keywords: generations, sustainability, China, Uganda, UK

Coming out of the niche? Social banking in Germany: an empirical analysis of consumer characteristics and market size

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Abstract

The social banking market constitutes a small but rapidly growing submarket of the global banking sector. Information on the number of potential social banking customers and on how to identify them is essential for social banks to grow and to promote sustainable consumption in the banking sector. In scientific research, social banking is considered an underdeveloped field, still lacking empirical analyses regarding the market size and specific consumer behaviour. This study addresses the research gap by generating insights into the German social banking market. Previous research on socially responsible investors serves as a basis for developing hypotheses. Based on an online survey using an adaptive conjoint analysis, a large dataset covering 3.537 respondents was compiled. Sample 1 comprises 2.896 respondents including customers of three major social banks in Germany (EthikBank, GLS Bank and Triodos Bank Germany). Sample 2 covers the remaining 641 respondents who represent the German adult population and exclusively buy from conventional banks. Logistic regression modelling reveals that social banking customers differ significantly from their conventional counterparts regarding 16 socio-demographic, behavioural and psychographic factors. In comparison to conventional banking customers, social banking customers tend to be younger, higher educated, located in larger places of residence and, in contrast to existing research, rather male than female. Moreover, social banking customers practice sustainable buying behaviour in everyday life more strongly and have weaker preferences for financial, but stronger preferences for social return than conventional banking customers. The results further indicate a considerable untapped growth potential for social banks by uncovering a market size of around 17 % of the German adult population. Finally, suggestions for marketing strategies and future research are given.

Keywords: adaptive conjoint analysis, consumer characteristics, market size, social banking, sustainable consumption

1. Introduction

Social banking, also often referred to as ethical banking, is still a relatively recent phenomenon. In Europe, for example, it has been present for no more than about 40 years (Benedikter, 2011; Weber, 2013). Since the outbreak of the latest financial crisis in 2007, public interest in social banking has been rapidly increasing due to a growing need for ethics in finance (Benedikter, 2011; Boatright, 2014; Weber and Remer, 2011). According to the triple-bottom-line principle, social banking refers to a bank's equal consideration of profit, the environment and people when judging investment and lending opportunities, unlike the traditional focus on profit alone (Benedikter, 2011). By investing in social banking products, consumers therefore gain a blended value return, which is a combination of financial and social return (Emerson, 2003).

The social banking market constitutes a small but rapidly growing submarket of the global banking sector. The average total assets of social banks worldwide amounted to merely 0.2 % of the average total assets of conventional financial institutions in 2012. However, social banks were growing more strongly than conventional banks with an average annual growth rate in net income of around 16 % between 2007 and 2012 (Weber, 2013). In Germany, social banking has also

heavily strengthened its position during the last years, yet it still is a niche market. The number of German social banking customers amounted to roughly 0.3 % of the German adult population in 2011.²

A manager's knowledge about the market size defined as the number of potential buyers of certain products provides a crucial basis for strategic planning and decision making (Kotler et al., 2007). An emerging market such as the German social banking market usually embraces substantial growth reserves (Becker, 2012). Thus, social banks in Germany would benefit particularly from information on the market size. According to Kotler et al. (2007), potential buyers of social banking products can be roughly described as all those conventional banking customers sharing a particular need for social banking products. Considering the largely conventional banking market, it appears beneficial to examine the characteristic differences between social and conventional banking customers. A resulting social banking customer profile can then be used by marketers to identify potential social banking customers among the conventional customer base. The underlying assumption here is that a person fitting to that profile is regarded as having a particular need for social banking products.

Information on the number of potential buyers of social banking products and on how to identify those consumers is essential for social banks to grow and to promote sustainable consumption in the banking market. However, social banking is considered an underdeveloped field of scientific research, still lacking major empirical findings regarding the market size and specific consumer behaviour. In fact, no study estimating the size of the social banking market could be found. Moreover, research on sustainable consumer behaviour in the banking sector has mainly focused on socially responsible investors and, thus, failed to incorporate the social banking perspective so far. This study addresses the research gap by generating first insights into the German social banking market. Consequently, the research questions are 'What is the size of the social banking market in Germany?' and 'What characteristics are suitable to differentiate between social and conventional banking customers in Germany?'

To address both questions, a large-scale, quantitative study was conducted based on an adaptive conjoint analysis to effectively measure consumer preferences. A special focus was set on preferences, since they provide a fundamental basis for explaining consumer choices for multi-attributed product alternatives such as financial products (Rao, 2014). For the purpose of data analysis, binary logistic regression was applied due to its strong ability to analyse group differences and predict group affiliation based on multiple variables from various scale levels (Backhaus et al., 2016). The paper provides empirical indication that customers of social banks differ significantly from customers of conventional banks regarding 16 out of 18 examined characteristics. Findings on the market size further reveal considerable untapped growth potential for social banks. In contrast to a 0.3 % share of current customers, the market size equals around 17 % of the German adult population in 2011.

Prompted by the paucity of research on social banking customers, the following section presents an overview of the extant literature on socially responsible investors as basis for developing the hypotheses of this paper (section 2). Section 3 describes the methodology and samples used to address the research questions. The results of the empirical analysis are presented and discussed in section 4. Finally, section 5 draws conclusions as well as implications for sustainability marketing practice and future research based on the findings of this paper.

2. Literature review and hypotheses development

2.1 Preliminary considerations

² The number of customers of the three largest social banks in Germany (GLS Bank, UmweltBank and EthikBank) equaled 175,210 at the end of the first half of 2010 (Handelsblatt, 2010) and the number of German citizens aged 16 years and above amounted to 69,015,000 in 2011 (Axel Springer and Bauer Media, 2011).

Consumer characteristics chosen within this study are intended to not only represent potential differentiators between social and conventional banking customers, but also to be of practical relevance for marketers. Referring to standard marketing literature (see, e.g., Kotler et al., 2007; Meffert et al., 2012), it is highly useful to address customers based on a mixture of socio-demographic, behavioural and psychographic characteristics. Socio-demographic criteria are helpful to approach customers easily, whereas the other two types of criteria show a higher relevance for the purchase behaviour (Meffert et al., 2012). Likewise, previous research on profiling sustainable consumers has increasingly highlighted the importance of examining not only socio-demographic, but also behavioural and psychographic aspects (Diamantopoulos et al., 2003; Nilsson, 2009; Straughan and Roberts, 1999). To avoid a prediction of market size based on an oversimplified consumer profile, a mixture of different types of consumer characteristics seems appropriate. In the following, literature on socially responsible investors (SR investors) is reviewed. Socially responsible investment or investing (SRI) covers investment decisions which integrate social, environmental or corporate governance criteria into an otherwise financially driven investment process (Sandberg et al., 2009). Obviously, SRI and social banking are linked, since both concepts deal with ethics in finance. In contrast to social banking, the prior aim of SRI is, however, to guarantee attractive financial returns by investing in funds that also consider socially responsible aspects (Weber et al., 2011). Thus, only few SRI funds meet the holistic ethical needs of social banks (Weber, 2011). SR investors are therefore not necessarily customers of social banks. Nevertheless, research results on SR investors deliver first concrete insights into ethical or sustainable consumer behaviour³ in the banking industry. Similar to this paper, studies on SR investors are often based on a comparison with conventional investors (see, e.g., Junkus and Berry, 2010; McLachlan and Gardner, 2004; Rosen et al., 1991). Therefore, they provide a suitable basis for developing hypotheses which address the second research question. Additionally, findings from the more general literature stream on sustainable consumer behaviour were integrated.

2.2 Socio-demographic characteristics

Several researchers concluded that the typical SR investor is female (see, e.g., Junkus and Berry, 2010; Nilsson, 2009; Schueth, 2003), younger and higher educated (see, e.g., Bauer and Smeets, 2015; Junkus and Berry, 2010; Tippet and Leung, 2001). Only few deviating research results exist, for instance stating that SR investors are rather male (Haigh, 2008) or middle-aged (Escrig-Olmedo et al., 2013; Lewis and Mackenzie, 2000). These findings are in line with most of the research on sustainable consumer behaviour. According to that, sustainable consumption is predominately exercised by higher educated women (see, e.g., Brécard et al., 2009; Diamantopoulos et al., 2003; Koos, 2011). Regarding age, some studies agree with the conclusion of being younger (Brécard et al., 2009; Diamantopoulos et al., 2003), whereas other studies highlight a middle-aged consumer profile based on an inverse U-shaped age effect (Koos, 2011). The hypotheses regarding gender, age and educational achievement follow the overall picture of previous research.

Hypothesis 1a: The share of women is higher among social banking customers than among conventional banking customers.

Hypothesis 1b: Social banking customers are younger than conventional banking customers.

Hypothesis 1c: Social banking customers are higher educated than conventional banking customers.

With regard to income, research results on SRI behaviour are highly ambiguous. Findings ranged from no influence on SRI behaviour (McLachlan and Gardner, 2004; Nilsson, 2009) to typically lower (Rosen et al., 1991), moderate (Lewis and Mackenzie, 2000) and higher levels of income (Escrig-Olmedo et al., 2013) of SR investors. It is important to note that Rosen et al. (1991)

³ In line with a shared meaning in consumer research, the terms 'ethical' and 'sustainable' are used interchangeably below.

compared SR investors with conventional investors who earned over-average income. As measured by the population, the income of SR investors was therefore rather equal. Research on sustainable consumers frequently examined income as potential determinant of sustainable consumption. Several studies indicate a positive relationship between income and sustainable consumption (Brécard et al., 2009; Koos, 2011), whereas there is also evidence for an inverse U-shaped income effect (Torgler and Garcia-Valiñas, 2007). Based on the more comprehensive and consistent research findings on sustainable consumers a positive influence of income is assumed.

Hypothesis 1d: Social banking customers earn higher levels of income than conventional banking customers.

In contrast to the above mentioned determinants, which experienced relatively wide attention in SRI research, the influence of urbanity was hardly investigated. Nilsson (2009) concluded that investors living in urban areas do not invest differently in SRI funds than investors living in rural areas. More general research, however, revealed that sustainable consumers rather live in urban than in rural areas (Brécard et al., 2009). Torgler and Garcia-Valiñas (2007) identified an inverse U-shaped effect between size of place of residence and sustainable consumer behaviour. Due to a lack of research on SR investors, the major finding from research on sustainable consumers serves as basis for the following hypothesis.

Hypothesis 1e: Social banking customers rather live in urban areas than conventional banking customers.

2.3 Behavioural and psychographic characteristics

From a behavioural perspective, SR investors usually choose a more sustainable way of life compared to conventional investors (Lewis, 2001; Lewis and Mackenzie, 2000; Rosen et al., 1991). A sustainable lifestyle comprises sustainable buying behaviour which is often practiced by consumers with regard to more than one aspect of consumption. Thus, it can be assumed that social banking customers differ from conventional banking customers regarding their general sustainable buying patterns such as purchases of organic or fair trade products in everyday life.

Hypothesis 2a: Social banking customers practice sustainable buying behaviour more strongly than conventional banking customers.

Furthermore, psychographic factors were intensely examined by researchers such as the underlying motives of SR investors (see, e.g., Beal et al., 2005; Dorfleitner and Utz, 2014; Mackenzie and Lewis, 1999). On the one hand, studies highlight the importance of high financial return for SR investors (see, e.g., Dorfleitner and Utz, 2014; Koellner et al., 2005; Nilsson, 2009). Thus, lower perceived future returns can lead to a decrease in demand for SRI (Nilsson, 2009). On the other hand, researchers figured out that SR investors are also driven by ethical concerns along with the willingness to sacrifice financial for social return (see, e.g., Hofmann et al., 2008; Lewis and Mackenzie, 2000; Pasewark and Riley, 2010). As the concept of social banking is even more strictly grounded on ethical values than the concept of SRI (Weber, 2011), it can be assumed that this willingness is even stronger among social banking customers. Besides, the offer of social return describes the unique selling proposition of social banks and their main point of differentiation compared to conventional banks. As consumer preferences are often found to be particularly purchase relevant (see, e.g., Kotler et al., 2007; Meffert et al., 2012; Rao, 2014), they build the core of this examination. Thus, preferences for social and financial return are assumed to be key differentiators between social banking customers and their conventional counterparts.

Hypothesis 2b: Social banking customers have stronger preferences for social return than conventional banking customers.

Hypothesis 2c: Social banking customers have weaker preferences for financial return than conventional banking customers.

The framework of hypotheses was extended by further variables to explore their influence as distinguishing features. Eight aspects regarding the consumers' perceived importances for bank specific features were chosen by means of company- and market-specific information. The

attributes mainly refer to general differences between social and conventional banks in Germany. For instance, German social banks offer comparatively few products, branches and cashpoints and rely strongly on online banking services. The underlying assumption is that a conventional banking customer, apart from social and financial return, might cherish specific social banking features or might be willing to sacrifice specific conventional banking features to become a customer of a social bank. In summary, ‘comprehensive online and mobile banking services’, ‘competency and fairness in consulting’ and ‘social commitment’ were chosen as rather social banking related features. A ‘wide range of products’, ‘consulting also in the evening and on weekends’, ‘easy access to branches’, ‘free access to many cashpoints’ and ‘public image’ were chosen as rather conventional banking related features. Figure 1 depicts the entire conceptual framework for differentiating social from conventional banking customers.

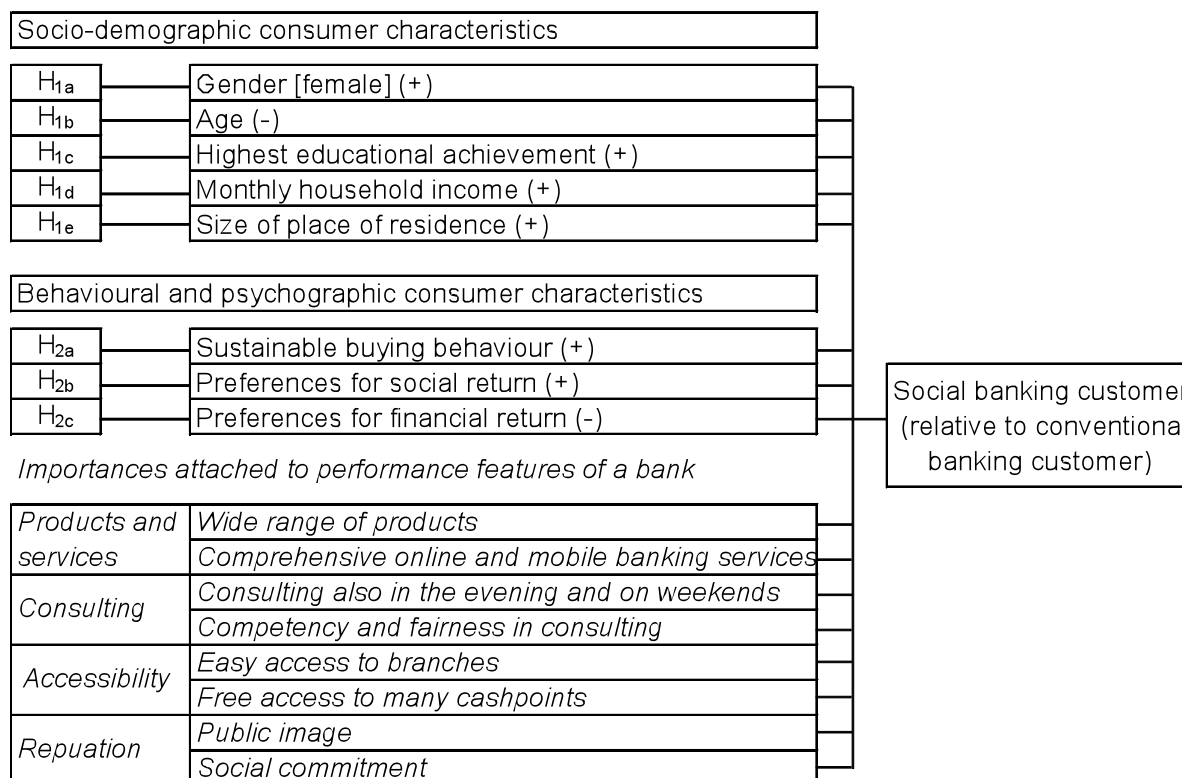


Figure 1. Conceptual framework for differentiating social from conventional banking customers

3. Methods

3.1 Adaptive conjoint analysis

3.1.1 Preliminary considerations

Conjoint analysis represents a bundle of multivariate methods well suited to estimate the structure of an individual’s preferences for various levels of attributes of choice alternatives (Rao, 2014). The consumer theory of Lancaster (1966) provides the theoretical framework of conjoint analysis in marketing research by claiming that consumer preferences are not directed to the goods themselves, but to their attributes. The basic idea behind traditional conjoint analysis is to decompose a consumer’s overall preference judgments for multi-attributed product profiles into separate attribute-specific utility values or rather partworth functions (Green and Rao, 1971). Adaptive conjoint analysis (ACA) expands the traditional decompositional approach by a preceding compositional task within the questionnaire to estimate partworth functions more accurately in terms of each respondent’s true underlying preferences (Johnson, 1987; Rao, 2014). Conjoint analysis has already been used in the conventional banking context, e.g. to measure credit card preferences (Kara et al., 1994), service quality preferences (Oppewal and Vriens, 2000) or retail channel preferences (Laukkanen, 2007), but not yet in the context of social banking.

3.1.2 Survey design

A computerized ACA was designed by using the ACA package of Sawtooth Software, a supplier of standard survey software for conjoint analysis. The ACA questionnaire was built upon an instant access savings account, a common financial product of the social and conventional banking market in Germany. With regard to hypotheses H_{2b} and H_{2c}, consumer-relevant attributes needed to reflect a trade-off between social and financial return. Thus, they were chosen by means of company-specific information from corporate websites such as product portrayals and mission statements, as well as scientific evidence on the differences between social and conventional banks (San-Jose et al., 2011). The interest rate constitutes a critical product feature which is directly linked to a consumer's financial return. Three more attributes were selected to account for social return: social-ecological placement of assets, information transparency and participation. Besides a social-ecological placement of assets and information transparency as key distinguishing features, social banks also support active participation of stakeholders in decision making (San-Jose et al., 2011). Thus, preferences for financial return are expressed by the preference for the interest rate, and preferences for social return are expressed by the preferences for a social-ecological placement of assets, information transparency and participation. Care was taken that all attribute levels were feasible from a company's point of view and easy to communicate to the respondents. A final constellation of product attributes and attribute levels is displayed in table 1.

Table 1. Attributes and attribute levels of the ACA survey

Attribute	Attribute levels
Interest rate	0.50 %
	1.50 %
	2.00 %
	2.25 %
	2.50 %
	3.00 %
Social-ecological placement of assets	None (conventional)
	Only instant access savings account
	Entire bank
Information transparency	None
	By sector
	Full
Participation	No
	Yes

3.1.4 Sample characteristics

On the basis of two samples, a total of 3.537 usable online questionnaires were completed during the survey period in October 2011. Sample 1 comprises 2.896 respondents who are customers of three major social banks in Germany (EthikBank, GLS Bank and Triodos Bank Germany) and at least 16 years of age. As social banking customers, they may also be customers of conventional banks. The sample was drawn and provided by the respective social banks. Sample 2 covers the remaining 641 respondents who are German citizens aged 16 years and above and have accounts exclusively at conventional banks. Thus, sample 1 represents social and sample 2 conventional banking customers in Germany aged 16 years and above. The ACA revealed 45.981 evaluations resulting from 13 paired comparisons graded by each of the 3.537 respondents.

Respondents of sample 2 were recruited via an online panel of a market research company (puls Marktforschung GmbH). It was intended to draw a sample representative of the German adult population to allow for population-based implications regarding the market size. To verify population representativeness, chi-square tests were used to test the distribution of sample 2 for homogeneity with the one of the German population as reported by Axel Springer and Bauer Media (2011) regarding specific characteristics such as gender, age, size of place of

residence and highest educational achievement (see Heinzle and Wüstenhagen, 2012, for a similar approach). As presented in table 2, no statistically significant differences were found between sample 2 and the German population with regard to the chosen criteria. Table 2 gives a thorough overview of the input factors (observed and expected marginal distribution of sample 2) and the output factors (chi-square-value, degrees of freedom and p-value) of all chi-square tests. Apart from the ACA, all calculations of this study were carried out by using the statistical software packages R and IBM SPSS Statistics.

Table 2. Comparison of sample 2 with the German population

Characteristics	German population ^a	Sample 2		Chi-square test			
	%	%	n	n	χ^2	df	p-value
	100	100	641	641			
<i>Gender</i>							
Female	51.2	49.9	320	328	0.209	1	0.647
Male	48.8	50.1	321	313			
<i>Age</i>							
Under 20 years old	5.6	3.7	24	36	3.261	5	0.660
20 to 29 years old	14.3	14.7	94	92			
30 to 39 years old	14.3	14.4	92	92			
40 to 49 years old	19.6	19.8	127	126			
50 to 59 years old	16.5	15.3	98	106			
60 years and older	29.8	32.1	206	191			
<i>Highest educational achievement</i>							
No school qualification or still at school	3.1	2.2	14	20	10.635	5	0.059
Secondary modern school qualification	42.2	34.3	220	271			
Secondary school certificate	28.8	32.8	210	185			
University entrance qualification	12.2	13.9	89	78			
University degree	12.6	15.4	99	81			
Doctorate ^b	1.1	1.4	9	7			
<i>Size of place of residence</i>							
Below 20,000 inhabitants	41.4	38.2	245	265	1.991	3	0.574
20,000 to 100,000 inhabitants	27.3	29.8	191	175			
100,000 to 500,000 inhabitants	15.0	14.4	92	96			
More than 500,000 inhabitants	16.2	17.6	113	104			

^a Figures of Axel Springer and Bauer Media (2011)

^b Category added based on a figure of the Federal Statistical Office (2011)

3.2 Binary logistic regression

3.2.1 Preliminary considerations

Binary logistic regression investigates two predefined groups towards significant differentiators and enables the classification of new elements into those groups. On the basis of one or more independent variables, probabilities of group affiliation are determined. This classification function can be used to forecast buying behaviour and therefore enables the estimation of market size. A main advantage of logistic regression over discriminant analysis, which is often used alternatively, is its robustness. Without hurting any distribution assumptions, logistic regression allows for incorporating a mixture of independent variables of metric as well as non metric scale levels

(Backhaus et al., 2016).

3.2.2 Procedure

In this study, two predefined groups were examined: social banking customers (sample 1) and conventional banking customers (sample 2). Both categories of the dependent variable can therefore be described as 'purchase of social banking products' versus 'exclusive purchase of conventional banking products'. Independent variables were determined on the basis of conceptual considerations, as described in section 2. In addition to preference data from the ACA, the questionnaire sought information on socio-demographic and further behavioural and psychographic characteristics of the respondents. From that, 18 metric and non-metric variables were selected in line with the conceptual framework. As customary, ordinal variables based on Likert scales were interpreted as metrically scaled and each of the remaining non-metric variables was transformed into one or several binary variables. Appendix A provides the descriptive statistics of all independent variables for both samples.

Since independent variables of any regression analysis should be largely free of multicollinearity, a test was conducted by measuring the variance inflation factor (VIF) based on linear regression (Backhaus et al., 2016). Considering that perfect multicollinearity exists among the measured preferences by nature, one of the four variables had to be separated from the subsequent logistic regression model. The influence of one excluded variable can be explained by the influence of the remaining three variables though. Hence, multicollinearity was tested by comparing four different linear regression models which varied in their constellation of preference variables. The test indicated that the combination of the three preferences for social return (social-ecological placement of assets, information transparency and participation) yielded the best results in terms of low multicollinearity (VIF of 2 at the maximum) and therefore appeared to be the most suitable basis for logistic regression.

As expected, the test further revealed increased multicollinearity among the three variables describing sustainable buying behaviour: 'purchase of natural and organic products', 'purchase of fair trade products' and 'consideration of eco-labels when purchasing groceries'. Based on a factor analysis by means of principal axis factoring these variables were condensed to one variable called 'sustainable buying behaviour' by weighting and averaging the items according to the factor loadings. The factor matrix along with its quality criteria is presented in table 3. A repetition of the test of multicollinearity with the final variable set showed that it was no longer affected by multicollinearity.

Table 3. Factor matrix of variables concerning sustainable buying behaviour

Variables	Factor ^a
Purchase of natural and organic products	0.900
Purchase of fair trade products	0.762
Consideration of eco-labels when purchasing groceries	0.907
Kaiser-Meyer-Olkin measure of sampling adequacy	0.727
Bartlett's test of sphericity (approx. χ^2)	6506.71 (df = 3, p-value = 0.000)

^a Extraction method: principal axis factoring

After having specified the variables, sample 1 and 2 were each halved by drawing two random samples. One half of each sample was used as training sample for estimating the parameters of the logistic regression model. The remaining halves were withheld as control samples to subsequently classify their respondents by means of the regression model calculated first (Morrison, 1969). Consequently, both sub-samples of sample 2 need to be population representative as well. As presented in appendices B and C, no statistically significant differences were found between them and the German population.

4. Results and discussion

4.1 Differences between social and conventional banking customers

Table 4 displays the estimated binary logistic regression model, especially regression coefficients (B) and odds ratios (Exp(B)) of all independent variables. Here, an odds ratio defines the factor by which the odds of purchasing social banking products change for a one-unit increase in the independent variable. To make regression parameters more comparable, all metric variables were standardized by setting means to 0 and standard deviations to 1 before using them in the logistic regression. Odds ratios were thus calculated for a one standard deviation unit change in the metric variables. For a dummy variable, the odds ratio is interpreted as the ratio of odds for one dummy variable category to the odds of the reference category (Pampel, 2000). According to table 4, social banking customers differ significantly from their conventional counterparts with regard to 16 out of 18 independent variables. The regression model reveals a high goodness of fit expressed by the p-value of the likelihood ratio test and the pseudo R² statistic Nagelkerke.

Table 4. Binary logistic regression model for the differentiation between social and conventional banking customers

Independent variables	Regression parameter ^b (n = 3,537)				P-value ^d	Hypothesis
	B	S.E.	Exp(B)	% Δ ^c		
Socio-demographic consumer characteristics						
<i>Gender</i>						
Female ^a						H _{1a} not supported
Male	1.101	0.272	3.006	201	0.000 ***	
<i>Age</i>						
Under 20 years old	0.843	0.983	2.322	132	0.391	H _{1b} supported
20 to 29 years old	1.484	0.446	4.409	341	0.001 ***	
30 to 39 years old	1.854	0.430	6.388	539	0.000 ***	
40 to 49 years old	1.908	0.393	6.738	574	0.000 ***	
50 to 59 years old	1.676	0.414	5.345	435	0.000 ***	
60 years and older ^a						
<i>Highest educational achievement</i>						
No school qualification or still at school	2.043	1.262	7.711		0.105	H _{1c} supported
Secondary modern school qualification ^a						
Secondary school certificate	1.066	0.403	2.903	190	0.008 **	
University entrance qualification	1.913	0.452	6.775	577	0.000 ***	
University degree	3.024	0.412	20.576	1958	0.000 ***	
Doctorate	3.702	0.751	40.514	3951	0.000 ***	
<i>Monthly household income</i>						
Below 1,000 €					0.619	H _{1d} not supported
1,000 to 2,000 €	0.557	0.517	1.746	75	0.281	
2,000 to 3,000 €	0.501	0.517	1.650	65	0.333	
3,000 to 4,000 €	0.439	0.540	1.551	55	0.417	
4,000 to 5,000 €	0.344	0.629	1.410	41	0.585	
More than 5,000 €	1.280	0.800	3.598	260	0.109	
not specified	1.004	0.607	2.729	173	0.098 +	
<i>Size of place of residence</i>						
Below 20,000 inhabitants	-0.798	0.335	0.450	-55	0.017 *	H _{1e} supported
20,000 to 100,000 inhabitants	-0.803	0.360	0.448	-55	0.026 *	
100,000 to 500,000 inhabitants	0.011	0.395	1.011	1	0.977	
More than 500,000 inhabitants ^a						
Behavioural and psychographic consumer characteristics						
Sustainable buying behaviour	1.287	0.154	3.623	262	0.000 ***	H _{2a} supported
<i>Preferences</i>						
Ethical placement of assets	1.122	0.165	3.070	207	0.000 ***	H _{2b} supported (H _{2c})
Information transparency	0.542	0.130	1.720	72	0.000 ***	
Participation	0.360	0.130	1.433	43	0.006 **	
<i>Importances attached to performance features of a bank</i>						
Wide range of products	-0.465	0.151	0.628	-37	0.002 **	
Comprehensive online and mobile banking services	0.306	0.142	1.358	36	0.031 *	
Consulting also in the evening and on weekends	-0.465	0.139	0.628	-37	0.001 ***	
Competency and fairness in consulting	0.410	0.137	1.507	51	0.003 **	
Easy access to branches	-0.745	0.169	0.475	-53	0.000 ***	
Free access to many cashpoints	-0.054	0.153	0.948	-5	0.725	
Public image	-0.373	0.158	0.689	-31	0.018 *	
Social commitment	0.883	0.146	2.417	142	0.000 ***	
Constant	-0.741	0.639	0.477	-52.339	0.246	
Likelihood ratio test χ^2	1,206.153				(df = 32, p-value = 0,000)	
Nagelkerke R ²	0.808					

^a Reference category

^b Differentiators between the categories of the dependent grouping variable 'purchase of social banking products' (coded as 1, n = 2,896) and 'exclusive purchase of conventional banking products' (coded as 0, n = 641) were identified. B is the regression

^c Percent change in the odds of purchasing social banking products, % Δ = (Exp(B) - 1)*100

^d Based on the Wald test; + p ≤ 0.10, * p ≤ 0.05, ** p ≤ 0.01, *** p ≤ 0.001

Regarding socio-demographic characteristics, results show that gender, age, highest educational achievement and size of place of residence are significant differentiators. For gender, the odds ratio of 3.01 indicates that the odds of purchasing social banking products are 3.01 times or 201 % larger for men than for women. Contrary to a majority of research findings on SR investors (see, e.g., Junkus and Berry, 2010; Nilsson, 2009) and sustainable consumers (see, e.g., Diamantopoulos et al., 2003; Koos, 2011), our study indicates that social banking customers are rather male than female. Hypothesis H_{1a} was therefore not supported. A possible explanation for this could be derived from the diffusion of innovation theory (Rogers, 1962). According to that, social banking might be still in its early stages of the diffusion process with rather male than female adopters. Some research findings support the idea that men are more likely to be the innovators or early adopters of innovations in the banking sector (Laukkanen and Pasanen, 2008; Yiu et al., 2007). Women, whose adoption of innovation can underlie more strongly social influences (Mazman et al., 2009), might increasingly follow in the course of the diffusion process.

With regard to age, the odds are larger for all persons aged between 20 and 59 years compared to persons aged 60 years and older. No difference was evidenced for persons who are between 16 and 20 years of age. The middle age groups of 30 to 39 years and 40 to 49 years show the highest odds ratios, more specifically the odds are roughly 6 to 7 times larger for persons of those age groups than for persons aged 60 years and older. Thus, the effect that social banking customers tend to be younger than their conventional counterparts is especially strong in the middle age groups, similar to research findings on SR investors (Lewis and Mackenzie, 2000) and sustainable consumers (Koos, 2011). For highest educational achievement, the odds ratios indicate that the higher the educational achievement the greater the odds. Especially for university and doctorate graduates, the odds are around 20 and 40 times larger than for persons with a secondary modern school qualification. This result corresponds to a large body of previous literature (see, e.g., Brécard et al., 2009; Junkus and Berry, 2010) which predominantly proves a strong positive influence of educational achievement on sustainable consumer behaviour. Thus, younger and middle-aged persons with higher levels of education might have greater up-to-date knowledge and awareness regarding societal issues such as sustainability problems. Hypotheses H_{1b} and H_{1c} are therefore supported.

Monthly household income does not differentiate significantly between social and conventional banking customers, so hypothesis H_{1d} was rejected. Correspondingly, research on SR investors has been rather contradicting regarding income (see, e.g., Lewis and Mackenzie, 2000; Nilsson, 2009). Some studies on sustainable consumers also indicate that income might be a poor indicator (Brécard et al., 2009; Roberts, 1996). For some branches such as food and clothing, a consumer's income might positively influence the magnitude of sustainable consumption, because products are often more expensive than their conventional equivalents (Brécard et al., 2009). Except for possible fees, financial investments offered by social banks are by nature not more expensive than conventional investments. A possible income effect could be related to the expected return of investment, as savings accounts at social banks usually offer lower interest rates than comparable accounts at conventional banks. However, no concrete evidence in literature was found on the influence of a person's level of income on the willingness to sacrifice interest.

With regard to size of place of residence, the odds are 0.45 times or 55 % smaller for persons living in places with less than 100,000 inhabitants compared to persons living in places with more than 500,000 inhabitants. No significant differences were found for persons living in places with 100,000 to 500,000 inhabitants. Similarly to research on sustainable consumers (Brécard et al., 2009), social banking customers seem to live in urban rather than in rural areas. An explanation may be that people from urban areas are rather open-minded to new ideas such as social banking. Thus, the study finds support for hypothesis H_{1e}.

Concerning the metrically scaled behavioural and psychographic measures, sustainable buying behaviour and the preferences for social and financial return were found to be significant differentiators. For sustainable buying behaviour, the odds ratio of 3.62 shows that a standard deviation unit increase in sustainable buying behaviour increases the odds of purchasing social banking products by a multiple of 3.62 or 262 %. The variable constitutes the strongest positive

differentiator among the all metric variables. Hypothesis H_{2a} was therefore supported. The finding reveals a strong link between general sustainable buying patterns and the purchase of social banking products. Assuming more general sustainable beliefs behind the general sustainable buying patterns, this result reveals parallels with Stern et al.'s schematic model causal model of environmental concern (1995) saying for instance that more general beliefs are the antecedents of more specific attitudes and behaviours.

With reference to the preferences, all three variables reflecting social return positively affect the odds of purchasing social banking products, so that hypothesis H_{2b} was supported. For a standard deviation unit increase, preference for participation increases the odds by 43 % and preference for information transparency increases the odds by 72 %. With an odds ratio of 3.07, the preference for a social-ecological placement of assets increases the odds by 207 % and therefore constitutes the strongest positive differentiator among the preference variables, and the second strongest positive differentiator among all metric variables. Similarly, Escrig-Olmedo et al. (2013) identified the placement of assets and information transparency as key differentiators between social and conventional banks. These findings automatically indicate that the preference for the interest rate has a significant negative effect on the odds. Hence, hypothesis H_{2c} was supported. As assumed on the basis of SRI literature (see, e.g., Nilsson, 2009; Pasewark and Riley, 2010), social banking customers reveal stronger preferences for social return and weaker preferences for financial return. The key difference is relative importance perceived by consumers regarding a social-ecological placement of assets. All in all, six out of the eight proposed hypotheses were supported. By this, the research question 'What characteristics are suitable to differentiate between social and conventional banking customers in Germany?' was answered.

4.2 Size of the German social banking market

Based on the comparative analysis of social and conventional banking customers, knowledge about the size of the German social banking market was generated. Estimated probabilities of group affiliation of all respondents served as a basis to identify potential buyers of social banking products. The commonly applied cut-off value (p^*) of 0.5 (Backhaus et al., 2016) was chosen to assign each respondent to one of the two groups of the dependent variable ($p^* > 0.5 =$ 'purchase of social banking products', $p^* \leq 0.5 =$ 'exclusive purchase of conventional banking products'). The confusion matrix of table 5 demonstrates the predicted classification and misclassification of social and conventional banking customers separated into training and control sample.

The overall percentage of correct predictions was high for the training (95.2 %) and the control sample (93.8 %).⁴ Besides the already presented goodness of fit measures, those high classification rates once again indicate a strong predictive power of the logistic regression model. For both samples, sensitivity was greater than specificity, which means that conventional banking customers were misclassified more strongly than social banking customers. In other words, the share of conventional banking customers showing characteristics of social banking customers is greater than the share of social banking customers showing characteristics of conventional banking customers. For reasons of greater objectivity, the size of the German social banking market was solely derived from the control sample. Regarding the control sample, 96.3 % of social banking customers were classified correctly, whereas only 82.6 % of conventional banking customers were classified correctly. In other words, 17.4 % of potential buyers of social banking products were identified among the conventional banking customers based on their personal characteristic values. The size of the German social banking market therefore amounts to around 17 % of the German adult population. In contrast to the 0.3 % share of current customers, the study reveals a huge unused growth potential for social banks in Germany. Moreover, considering the misclassification rate of a logistic regression model as an estimate for market size appears to be a novel approach. Consequently, the research question 'What is the size of the social banking market in Germany?' was answered.

⁴ It should be noted that both classification rates successfully exceeded the maximum random distribution probability of 81.9 %.

Table 5. Confusion matrix of the binary logistic regression model ($p^* = 0.5$)

Observation		Prediction							
		Training sample				Control sample			
		Type of banking customer			% correct	Type of banking customer			% correct
		Conventional	Social	Sum		Conventional	Social	Sum	
Type of banking customer	Conventional	266	54	320	83.1 ^a	265	56	321	82.6 ^a
	Social	31	1417	1448	97.9 ^b	53	1395	1448	96.3 ^b
% overall correct (classification rate)		95.2				93.8			

^a Specificity, i.e. the proportion of correct predicted conventional banking customers

^b Sensitivity, i.e. the proportion of correct predicted social banking customers

5. Conclusions

By means of a large-scale quantitative analysis, this paper advances the understanding of consumer behaviour in the emerging field of social banking. The purpose of this empirical, population-representative study was to explore the differences between social and conventional banking customers and to estimate the size of the social banking market in Germany. Logistic regression modelling revealed several significant socio-demographic, behavioural and psychographic differentiators. In comparison to conventional banking customers, social banking customers tend to be younger, higher educated, located in larger places of residence and, in contrast to existing research, rather male than female. In particular, persons between 30 and 50 years of age holding a university degree or doctorate show a comparatively strong affiliation with the group of social banking customers. However, the income level was not found to be a significant differentiator. From a social class perspective, social banking customers may not earn higher levels of income, but have higher levels of education than their conventional counterparts. Thus, becoming a social banking customer rather seems to be a matter of education than a matter of income. Furthermore, the fact that social banking customers practice sustainable buying behaviour in everyday life more strongly demonstrates another key differentiator. Resulting from an adaptive conjoint analysis, social banking customers showed stronger preferences for social return, i.e. for a social-ecological placement of assets, information transparency and participation, and weaker preferences for financial return. Similar to the sustainable buying behaviour, the preference for a social-ecological placement of assets has a strong distinctiveness. When weighting the different attributes of an investment alternative, social banking customers are mainly interested in how ethically their money is invested in. Results from analysing the additional exploratory variables show that 'social commitment', 'competency and fairness in consulting' as well as 'comprehensive online and mobile banking services' are more relevant, whereas an 'easy access to branches', a 'wide range of products', 'consulting also in the evening and on weekends' and the 'public image' of a bank are less relevant for social banking customers, as initially expected. Only the importance of a 'free access to many cashpoints' was not found to be significant differentiator, which means that this criterion is equally relevant for social and conventional banking customers. Furthermore, this paper presents the first scientific study providing an estimate of the size of the social banking market. The examination indicates a considerable untapped growth potential for social banks by uncovering a market size of around 17 % of the German adult population in 2011.

The findings of this study reveal first practical implications for marketers of social banks. In fact, knowledge about the number and characteristic profile of potential social banking customers improves a social bank's ability to identify them among the population by means of marketing. First, targeting activities of marketers should consider a mixture of highly influential consumer characteristics such as age, educational level, general sustainable buying patterns and the preference for social-ecological investments. Second, marketing cooperations between social banks and suppliers from more established sustainable markets such as the food market are recommended to generate synergy effects by addressing a mutual customer base. Third, strong preferences for social return prove that social banks should continuously develop their core

business comprising a transparent and participative social-ecological investing and lending policy. Besides certain product attributes, specific service features such as a competent and fair consulting should be pursued.

However, this research is not free of limitations, which should be addressed by future research. First, data collection of this cross-sectional study took place at the end of 2011. As consumption patterns change over time, the market size might not reflect recent changes in the economic conditions. Considering the current low-interest phase in Europe, the market size of social banking could now be different due to changes in consumer preferences as a reaction to lower interest rates. Future research studies should therefore employ longitudinal research designs to better account for possible time effects. Second, limitations result from the main assumption that the market size estimate depends on the selected consumer characteristics. There might be further relevant aspects influencing the market size. As demand forecasts in economics often incorporate macroeconomic figures such as economic growth or company-specific aspects such as advertisement, future research could consider the interplay of those variables. Third, the underlying rationale of identifying potential social banking customers based on the actual customer profile neglects the fact that there might be potential buyers who are different from the status quo. Thus, future research should explore this aspect, for instance by developing market segments. Fourth, measuring preferences brings up the discussion of their relevance for purchase behaviour. The adaptive conjoint analysis already offers advantages compared to the traditional conjoint analysis. In future studies, however, one could think of applying choice-based conjoint analyses, which are often seen as more realistic approaches. Fifth, market size estimation by means of the classification function of the logistic regression constitutes an innovative approach, which could not be directly supported by previous studies. Future research should discuss this approach by comparing it to other methods of market size estimation.

Besides overcoming the limitations, future research is especially challenged to investigate the purchase barriers of potential social banking customers. As markets are imperfect in reality, the market potential for social banking has not been realised yet. Customers may not switch to social banks because of inertia, mistrust or just the lack of awareness concerning their existence. In light of the huge unused growth potential, future qualitative and quantitative research designs on the purchase barriers of potential social banking customers appear to be particularly useful.

Growing socio-ecological problems and the increasing intensity of economic crises strengthen the need for sustainable consumption in the global banking sector. The huge unused market potential indicates an emancipation of social banking from being a niche and, with that, a basis for a larger consumption of social banking products in the future. Next steps in research and practice should therefore focus on how to activate this potential.

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References

- Axel Springer AG, Bauer Media Group, 2011. VerbraucherAnalyse 2011 Klassik III Märkte – Strukturanalyse. <http://online.mds-mediaplanung.de/vakm> (accessed 14.04.2016).
- Backhaus, K., Erichson, B., Plinke, W., Weiber, R., 2016. *Multivariate Analysemethoden: Eine Anwendungsorientierte Einführung*, 14th edn. Springer, Berlin, Heidelberg.
- Bauer, R., Koedijk, K., Otten, R., 2005. International evidence on ethical mutual fund performance and investment style. *Journal of Banking & Finance*, 29, 1751-1767.
- Bauer, R., Smeets, P., 2015. *Social Preferences and Investor Loyalty*. Maastricht University. <http://www.ssrn.com/abstract=2140856> (accessed 19.11.2015).

- Beal, D. J., Goyen, M., Phillips, P., 2005. Why do we invest ethically? *Journal of Investing*, 14 (3), 66-78.
- Becker, J., 2012. *Marketing-Konzeption – Grundlagen des Ziel-Strategischen und Operativen Marketing-Managements*, 10th edn. Vahlen, München.
- Benedikter, R., 2011. *Social banking and social finance*. Springer, New York.
- Boatright, J. R., 2014. *Ethics in Finance*, 3rd edn. Wiley Blackwell, West Sussex.
- Boyd, W. L., Leonard, M., White, C., 1994. Customer Preferences for Financial Services: An Analysis. *International Journal of Bank Marketing*, 12 (1), 9-15.
- Brécard, D., Hlaimi, B., Lucas, S., Perraudeau, Y., Salladarré, F., 2009. Determinants of demand for green products: An application to eco-label demand for fish in Europe. *Ecological Economics*, 69 (1), 115-125.
- Diamantopoulos, A., Schlegelmilch, B. B., Sinkovics, R. R., Bohlen, G. M., 2003. Can socio-demographics still play a role in profiling green consumers? A review of the evidence and an empirical investigation. *Journal of Business Research*, 56 (6), 465-480.
- Dorfleitner, G., Utz, S., 2014. Profiling German-speaking socially responsible investors. *Qualitative Research in Financial Markets*, 6 (2), 118-156.
- Emerson, J., 2003. The Blended Value Proposition: Integrating Social and Financial Returns. *California Management Review*, 45 (4), 35-51.
- Escrig-Olmedo, E., Muñoz-Torres, M. J., Fernández-Izquierdo, M. Á., 2013. Sustainable Development and the Financial System: Society's Perceptions About Socially Responsible Investing. *Business Strategy and the Environment*, 22 (6), 410-428.
- Federal Statistical Office, 2011. *Statistisches Jahrbuch 2011 – Für die Bundesrepublik Deutschland mit »Internationalen Übersichten«*. Statistisches Bundesamt (Federal Statistical Office): Wiesbaden. http://www.destatis.de/DE/Publikationen/StatistischesJahrbuch/StatistischesJahrbuch2011.pdf?__blob=publicationFile (accessed 07.07.2015).
- Green, P. E., Rao, V. R., 1971. Conjoint Measurement of Quantifying Judgmental Data. *Journal of Marketing Research*, 8 (3), 355-363.
- Haight, M., 2008. What Counts in Social Managed Investments: Evidence from an International Survey. *Advances in Public Interest Accounting*, 13, 35-62.
- Handelsblatt, 2010. Anzahl der Kunden von ethischen Banken in Deutschland von 2007 bis zum 1. Halbjahr 2010, Statista. <http://de.statista.com/statistik/daten/studie/164031/umfrage/kundenentwicklung-ethische-banken-in-deutschland/> (accessed 26.02.2016).
- Heinzle, S. L., Wüstenhagen, R., 2012. Dynamic Adjustment of Eco-labeling Schemes and Consumer Choice – the Revision of the EU Energy Label as a Missed Opportunity? *Business Strategy and the Environment*, 21 (1), 60-70.
- Hofmann, E., Hoelzl, E., Kirchler, E., 2008. A comparison of models describing the impact of moral decision making on investment decisions. *Journal of Business Ethics*, 82 (1), 171-187.
- Homburg, C., Kuester, S., Krohmer, H., 2013. *Marketing Management – A Contemporary Perspective*, 2nd edn. McGraw-Hill Higher Education: Berkshire.
- Johnson, R. M., 1987. Adaptive conjoint analysis, in: Metegrano, M. (Ed.), *Proceedings of the Sawtooth Software Conference on Perceptual Mapping, Conjoint Analysis, and Computer Interviewing*. Ketchum, ID, Sawtooth Software, pp. 253 – 265.
- Junkus, J. C., Berry, T. C., 2010. The demographic profile of socially responsible investors. *Managerial Finance*, 36 (6), 474-481.
- Kaiser, H. F., 1974. An index of factorial simplicity. *Psychometrika*, 39 (1), 31-36.

- Kaiser, H. F., Rice, H., 1974. Little Jiffy, Mark IV. *Educational and Psychological Measurement*, 34 (1), 111-117.
- Kara, A., Kaynak, E., Kucukemiroglu, O., 1994. Credit Card Development Strategies for the Youth Market. *International Journal of Bank Marketing*, 12 (6), 30-36.
- Koellner, T., Weber, O., Fenchel, M., Scholz, R., 2005. Principles for Sustainability Rating of Investment Funds. *Business Strategy and the Environment*, 14 (1), 54-70.
- Koos, S., 2011. Varieties of environmental labelling, market structures, and sustainable consumption across Europe: A comparative analysis of organizational and market supply determinants of environmental-labelled goods. *Journal of Consumer Policy*, 34 (1), 127-151.
- Kotler, P., Keller, K. L., Bliemel, F., 2007. *Marketing-Management – Strategien für wertschaffendes Handeln*, 12th edn. Pearson Studium, München.
- Lancaster, K. J., 1966. A New Approach to Consumer Theory. *The Journal of Political Economy*, 74 (2), 132-157.
- Laukkanen, T., 2007. Customer preferred channel attributes in multi-channel electronic banking. *International Journal of Retail & Distribution Management*, 35 (5), 393-412.
- Laukkanen, T., Pasanen, M., 2008. Mobile banking innovators and early adopters: How they differ from other online users. *Journal of Financial Services Marketing*, 13 (2), 86-94.
- Lewis, A., 2001. A focus group study of the motivation to invest: 'ethical/green' and 'ordinary' investors compared. *Journal of Socio-Economics*, 30 (4), 331-341.
- Lewis, A., Mackenzie, C., 2000. Morals, money, ethical investing and economic psychology. *Human Relations*, 53 (2), 179-191.
- Mackenzie, C., Lewis, A., 1999. Morals and markets: the case of ethical investing. *Business Ethics Quarterly*, 9 (3), 439-452.
- Mazman, S. G., Usluel, Y. K., Çevik, V., 2009. Social influence in the adoption process and usage of innovation: Gender differences. *World Academy of Science, Engineering and Technology*, 49.
- McLachlan, J., Gardner, J., 2004. A Comparison of Socially Responsible and Conventional Investors. *Journal of Business Ethics*, 52 (1), 11-25.
- Meffert, H., Burmann, C., Kirchgeorg, M., 2012. *Marketing. Grundlagen marktorientierter Unternehmensführung*. 11th edn. Wiesbaden, Gabler.
- Morrison, D. G., 1969. On the Interpretation of Discriminant Analysis. *Journal of Marketing Research*, 6 (2), 156-163.
- Nilsson, J., 2009. Segmenting socially responsible mutual fund investors. *International Journal of Bank Marketing*, 27 (1), 5-31.
- Oppewal, H., Vriens, M., 2000. Measuring perceived service quality using integrated conjoint experiments. *International Journal of Bank Marketing*, 18 (4), 154-169.
- Pampel, F. C., 2000. *Logistic Regression: A Primer*. Sage University Paper Series on Quantitative Applications in the Social Science, series no. 07-132. Sage, Thousand Oaks, CA.
- Pasewark, W. R., Riley, M. E., 2010. It's a matter of principle: the role of personal values in investment decisions. *Journal of Business Ethics*, 93 (2), 237-253.
- Rao, V.R., 2014. *Applied Conjoint Analysis*. Springer, New York.
- Renneboog, L., Horst, J. T., Zhang, C., 2011. Is ethical money financially smart? Nonfinancial attributes and money flows of socially responsible investment funds. *Journal of Financial Intermediation*, 20, 562-588.
- Roberts, J. A., 1996. Green consumers in the 1990s: Profile and implications for advertising. *Journal of Business Research*, 36 (3), 217-231.

- Rogers, E. M., 1962. Diffusion of innovations. Free Press, New York.
- Rosen, B. N., Sandler, D.M., Shani, D., 1991. Social Issues and Socially Responsible Investment Behavior: A Preliminary Empirical Investigation. *Journal of Consumer Affairs*, 25 (2), 221-234.
- Sandberg, J., Juravle, C., Hedesström, T. M., Hamilton, I., 2009. The Heterogeneity of Socially Responsible Investment. *Journal of Business Ethics*, 87 (4), 519-533.
- San-Jose, L., Retolaza, J. L., Gutierrez-Goiria, J., 2011. Are Ethical Banks Different? A Comparative Analysis Using the Radical Affinity Index. *Journal of Business Ethics* 100 (1), 151-173.
- Schueth, S., 2003. Socially Responsible Investing in the United States. *Journal of Business Ethics*, 43 (3), 189-194.
- Sreejesh, S., Mohaparta, S., Anusree, M. R., 2014. *Business Research Methods – An applied Orientation*. Springer, Cham, Heidelberg, New York, Dordrecht, London.
- Statman, M., 2000. Socially Responsible Mutual Funds. *Financial Analysts Journal*, 56 (3), 30-39.
- Stern, P., Dietz, T., Guagnano, G. 1995. The New Ecological Paradigm in Social-Psychological Context. *Environment and Behavior*, 27 (6), 723-743.
- Straughan, R. D., Roberts, J. A., 1999. Environmental segmentation alternatives: a look at green consumer behavior in the new millennium. *Journal of Consumer Marketing*, 16 (6), 558-575.
- Tippet, J., Leung, P., 2001. Defining ethical investment and its demography in Australia. *Australian Accounting Review*, 11 (25), 44-55.
- Torgler, B., Garcia-Valiñas, M. A., 2005. The Determinants of Individuals' Attitudes Towards Preventing Environmental Damage. *Ecological Economics*, 63 (2), 536-552.
- Waheeduzzaman, A. N. M., 2008. Market Potential Estimation in International Markets: A Comparison of Methods. *Journal of Global Marketing*, 12 (4), 307-320.
- Weber, O., 2011. Products and services, in: Weber, O., Remer, S. (Eds.), *Social Banks and the Future of Sustainable Finance*. Routledge, London, pp. 96 – 122.
- Weber, O., 2013. Social Banks and their Profitability: Is Social Banking in line with Business Success? *Prospective Innovation at Ethical Banking and Finance* (special issue), 0 (0), 1-22.
- Weber, O., Mansfeld, M., Schirrmann, E., 2011. The Financial Performance of RI Funds After 2000, in: Vandekerckhove, W., Leys, J., Alm, K., Scholtens, B., Signori, S., Schäfer, H. (Eds.). *Responsible Investment in Times of Turmoil*. Springer, Dordrecht, Heidelberg, London, New York, pp. 75 – 91.
- Weber, O., Remer, S., 2011. *Social Banks and the Future of Sustainable Finance*. Routledge, London.
- Yiu, C. S., Grant, K., Edgar, D., 2007. Factors affecting the adoption of Internet Banking in Hong Kong – implications for the banking sector. *International Journal of Information Management*, 27 (5), 336-351.

Appendices

- Appendix A: Descriptive statistics of the independent variables for sample 1 and sample 2
- Appendix B: Comparison of the training sub-sample of sample 2 with the German population
- Appendix C: Comparison of the control sub-sample of sample 2 with the German population

Variables	Sample 1 (n = 2,896)			Sample 2 (n = 641)		
	%	mean	s.d.	%	mean	s.d.
Socio-demographic consumer characteristics						
<i>Gender</i>						
Female ^a	44.3%			49.9%		
Male	55.7%			50.1%		
<i>Age</i>						
Under 20 years old	1.4%			3.7%		
20 to 29 years old	20.3%			14.7%		
30 to 39 years old	24.8%			14.4%		
40 to 49 years old	27.3%			19.8%		
50 to 59 years old	17.1%			15.3%		
60 years and older ^b	9.2%			32.1%		
<i>Highest educational achievement</i>						
No school qualification or still at school	.5%			2.2%		
Secondary modern school qualification ^c	2.5%			34.3%		
Secondary school certificate	10.6%			32.8%		
University entrance qualification	17.7%			13.9%		
University degree	61.3%			15.4%		
Doctorate	7.4%			1.4%		
<i>Size of place of residence</i>						
Below 20,000 inhabitants	24.9%			38.2%		
20,000 to 100,000 inhabitants	17.9%			29.8%		
100,000 to 500,000 inhabitants	23.3%			14.4%		
More than 500,000 inhabitants ^d	33.9%			17.6%		
<i>Monthly household income</i>						
Below 1,000 €	9.3%			12.6%		
1,000 to 2,000 €	20.2%			29.2%		
2,000 to 3,000 €	23.5%			27.6%		
3,000 to 4,000 €	18.5%			15.0%		
4,000 to 5,000 €	11.8%			6.2%		
More than 5,000 €	8.3%			2.3%		
not specified	8.5%			7.0%		
Behavioural and psychographic consumer characteristics						
Purchase of natural and organic products		5.28	0.96		3.04	1.54
Purchase of fair trade products		5.26	0.90		3.89	1.42
Consideration of eco-labels when purchasing groceries		5.26	0.95		3.42	1.47
<i>Preferences</i>						
Social-ecological placement of assets		0.304	0.086		0.179	0.081
Information transparency		0.280	0.077		0.216	0.086
Participation		0.171	0.077		0.188	0.092
Interest rate		0.245	0.116		0.418	0.149
<i>Importances attached to performance features of a bank</i>						
Wide range of products		3.73	1.22		4.41	1.38
Comprehensive online and mobile banking services		5.15	1.19		4.83	1.54
Consulting also in the evening and on weekends		2.84	1.43		3.51	1.64
Competency and fairness in consulting		5.60	0.81		5.22	1.20
Easy access to branches		3.97	1.44		5.02	1.33
Free access to many cashpoints		5.31	0.99		5.40	1.19
Public image		4.08	1.42		4.51	1.37
Social commitment		4.89	1.18		3.65	1.45

Appendix A: Descriptive statistics of independent variables for sample 1 and sample 2

Characteristics	German population ^a	Training		Chi-square test			
	%	%	n	n	χ^2	df	p-value
	100	100	320	320			
<i>Gender</i>							
Female	51.2	53.4	171	164	0.238 ^c	1	0.626
Male	48.8	46.6	149	156			
<i>Age</i>							
Under 20 years old	5.6	3.4	11	18	2.599	5	0.762
20-29 years old	14.3	14.4	46	46			
30-39 years old	14.3	12.8	41	46			
40-49 years old	19.6	20.9	67	63			
50-59 years old	16.5	15.6	50	53			
60 years and older	29.8	32.8	105	95			
<i>Highest educational achievement</i>							
No school qualification or still at school	3.1	2.2	7	10			0.300 ^d
Secondary modern school qualification	42.2	34.1	109	135			
Secondary school certificate	28.8	33.1	106	92			
University entrance qualification	12.2	12.8	41	39			
University degree	12.6	16.3	52	40			
Doctorate ^b	1.1	1.6	5	4			
<i>Size of place of residence</i>							
Below 20,000 inhabitants	41.4	40.0	128	132	0.771	3	0.856
20,000-100,000 inhabitants	27.3	28.4	91	87			
100,000-500,000 inhabitants	15.0	13.4	43	48			
More than 500,000 inhabitants	16.2	18.1	58	52			

^a Figures of Axel Springer and Bauer Media (2011)

^b Category added based on a figure of the Federal Statistical Office (2011)

^c With Yates' continuity correction

^d Fisher's exact test

Appendix B: Comparison of the training sub-sample of sample 2 with the German population

Characteristics	German population ^a	Control		Chi-square test			
	% 100	% 100	n 321	n 321	χ^2	df	p-value
<i>Gender</i>							
Female	51.2	46.4	149	164	1.284 ^c	1	0.257
Male	48.8	53.6	172	157			
<i>Age</i>							
Under 20 years old	5.6	4.0	13	18	1.573	5	0.905
20-29 years old	14.3	15.0	48	46			
30-39 years old	14.3	15.9	51	46			
40-49 years old	19.6	18.7	60	63			
50-59 years old	16.5	15.0	48	53			
60 years and older	29.8	31.5	101	96			
<i>Highest educational achievement</i>							
No school qualification or still at school	3.1	2.2	7	10			0.400 ^d
Secondary modern school qualification	42.2	34.6	111	135			
Secondary school certificate	28.8	32.4	104	92			
University entrance qualification	12.2	15.0	48	39			
University degree	12.6	14.6	47	40			
Doctorate ^b	1.1	1.2	4	4			
<i>Size of place of residence</i>							
Below 20,000 inhabitants	41.4	36.4	117	133	1.917	3	0.590
20,000-100,000 inhabitants	27.3	31.2	100	88			
100,000-500,000 inhabitants	15.0	15.3	49	48			
More than 500,000 inhabitants	16.2	17.1	55	52			

^a Figures of Axel Springer and Bauer Media (2011)

^b Category added based on a figure of the Federal Statistical Office (2011)

^c With Yates' continuity correction

^d Fisher's exact test

Appendix C: Comparison of the control sub-sample of sample 2 with the German population

A conceptual systems thinking and life cycle analysis of the sharing economy

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Abstract

Sharing economy platforms are rapidly expanding worldwide, transforming production-consumption systems and the way people think about their values and fulfilment of needs. These initiatives are shifting consumption focus from ownership to access, tapping upon a growing environmental consciousness and ubiquity of the Internet and social media. Recent definitions of the sharing economy underline consumer-to-consumer schemes wherein temporary access to often under-utilized physical assets is granted. Several authors associate a diversity of business models to this concept, including on-demand, second-hand, and product-service systems. Within this transformative landscape, advocates and critics of the sharing economy have been arguing on the merits and negative consequences of collaborative consumption practices. Amidst the several controversies (e.g., involving platform monopolies, privacy violations, exploitation of labour, unfair competition and growing inequalities) the integrated environmental assessment of sharing initiatives is an issue that has been largely overlooked. Despite the environmental-friendly mindset underlying these social innovations, a systematic account of effects of different sharing schemes is clearly lacking thus far and research on the topic is highly needed. To address these gaps, this paper advances a conceptual analysis of different sharing economy schemes, combining a life cycle and systems thinking framework to define archetypes that support holistic assessments of the environmental consequences of sharing business models. Such archetypes are able to support the formalization of criteria and rules for evaluating whether, and in which conditions, the sharing economy is really good for the environment. Each proposed archetype includes a generic life cycle diagram that provides the analytical framework for comparative environmental impact assessments of “business-as-usual” systems against collaborative consumption schemes. This is combined with a causal loop diagram depicting the main causal relationships and feedback loops underlying aggregated behaviour in consumption systems, leading to the identification of leverage points at the macro level. Causal loop diagrams highlight the causal chain of effects traced through a set of variables characterizing a dynamic issue. Within our framework these models allow to represent the potential life cycle and wider system effects of environmental strategies introduced with a given sharing scheme. To illustrate the practical contribution of the proposed framework, we apply the archetypes to a set of sharing economy business models – redistribution markets, peer-to-peer and business-to-consumer systems – and establish the general criteria and rules for measuring and assessing potential environmental benefits in each scheme, identifying the leverage points for achieving significant impact reductions, dominant feedback loops and potential unintended environmental consequences. Finally, we discuss future developments regarding the integration of the proposed environmental assessment framework within broader sustainability assessments of the sharing economy.

Keywords: Collaborative Consumption, Sharing Economy Archetypes, Causal Loop Diagrams, Life Cycle Diagrams, Environmental Assessment

Environmentally sustainable consumption practice and the missing non-human living element

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Abstract

This study focuses on understanding the impact of non-human living organisms on environmentally sustainable consumption practice. Using practice theory and a case of toxic-free antifouling consumption among leisure boat owners in the Baltic Sea we analyse the use of toxic-free antifouling practices in terms of objects, meaning and doings. We discover that the successful adaption of the environmental friendly antifouling method depends on the interrelations among material elements, what we label microelements. We show that the 'fit' or 'misfit' between material elements plays an important role for the acceptance of environmentally friendly antifouling practice. As such, this study highlights the active role of environmental factors (salinity of water, fouling pressure) shaping consumer practices. This study contributes to consumer practice theory as our analysis of microelements interrelationships expands our understanding of consumer practice in contexts involving non-human living organisms.

Keywords: sustainable consumption practice, antifouling, Baltic Sea, non-human organism agency

1. Introduction

This study focuses on understanding the impact on non-human living organisms on environmentally sustainable consumption practice. Current understandings of sustainable consumption are dominated by cognitive/narrative-based stream of research represented by individualistic and cultural approaches where material elements as part of such consumption are lacking (Shove et al., 2012). Cognitive based studies deal with individual adoption of sustainable consumption patterns as general awareness of climate change and espoused green values an approach that has been labelled the attitude-behavior gap (Young and Middlemiss, 2012), the knowledge-to-action gap (Markkula and Moisander, 2012) or the value-action gap (Shove, 2010). A cultural perspective on sustainable consumption is concerned with consumers' perceptions of sustainable consumption as part of identity making (Autio et al., 2009) and how they identify with environmental issues in every day practices (Connolly and Prothero, 2008). However, the recent practice turn within sustainable consumption studies fully recognizes the significant role of material elements in practices and non-human entities are regarded to be essential for the production of social practices (Preda, 1999; Schatzki 2001; Spaargaren, 2011; Shove, 2010). In sustainable consumption studies the application of practice theory has convincingly shown that material elements including the human body, meanings and competences, configure consumption practice and that the dynamics between these elements have transformational properties (Magaudda, 2011; Shove et al 2012). In terms of behavioral change this means that efforts to promote sustainable consumption could influence, and thus aim to change any of the elements that constitute a specific consumption practice resulting and re-configuration will follow (Shove et al, 2012).

In several consumption studies, such in the investigation how changes can be achieved in climate change, practices have been analyzed in terms of material, meaning and competence (Shove et al., 2012) but these studies have neglected to recognize the importance of the environment as a micro element of the material element. Therefore in this article we want to expand the understanding of the material elements and include non-human living organisms into the materiality aspect. This is not completely new as already Michel Callon (1986) treated non-human

actors (scallops) as parts of networks. In Japan researchers developed a new method for intensive scallop farming and Callon was interested if the scallops could anchor themselves in the St. Brieuc Bay in France in the same way as they did in Japan. He studied how non-humans act in networks and how power relationships in networks are established, sustained and destroyed. Following an ANT perspective Callon treats human and non-human entities symmetrically with the potential being equally important. Compared to Callon's study our case is different. First, Callon investigated if the larvae would anchor the same way as it did in Japan, however we study techniques which are supposed to avoid marine organisms growing. Secondly, we on the one hand study practices to see how material elements and especially their micro elements shape consumption practices, Callon on the other hand studied the moments of translation in networks.

In the case of antifouling practices there exists a relationship between the boat hull, marine organisms, the saltiness of the water and the bodily time spent on the practices. The growth of marine organisms on boat hulls is dependent on the saltiness of the water. The water type in the Baltic Sea differs due to different gradients of salinity in different regions of the sea, which affects the growth of marine organisms and the efficiency of different antifouling techniques, in terms of keeping the boat hull free from fouling. The stronger fouling pressure implies additional work for the boat owner as he has to use for example the hand scrubbing device more often or go to the brush wash more frequently. Bodily time is considered to be a material micro-element and bodily time also interacts with other material microelements. These additional efforts are difficult to handle for some boat owners. For that reason the choice of an environmental friendly method also needs to fit the lifestyle of the boat owner. The behavioural change from a toxic antifouling method to an environmental friendly method depends on several factors, but the impact of the environment is very strong. We therefore argue that it is important to consider the significant role of the environment when promoting environmentally sustainable consumption as in many cases the consumption is dependent on micro-organisms such as plants, animals etc.

We draw on a case of leisure boat owners' consumption of toxic-free antifouling techniques in the Baltic Sea where marine organisms to a large extent influence consumption practice. Marine organisms (fouling) attach to leisure boat hulls and impact on manoeuvrability and speed and boat owners are engaged in antifouling practice of different kinds. The predominant antifouling technique is painting the boat hull with toxic copper-based paint which produces a fouling free boat hull but which has a number of adverse effects on the marine environment. There exist a number of environmentally sustainable antifouling alternatives on the market that have not been adopted by the leisure boat market.

In this article we ask "how do non-human living organisms affect the configuration of environmentally sustainable consumption practice?" The aim of this study is to describe the elements of toxic-free antifouling practice in terms of objects, meanings and doings (Magaudda, 2011) and also to investigate the role of the micro elements of the practice elements. This theoretical lens enables us see how the integration of new toxic-free antifouling techniques into pre-existing unsustainable antifouling practices is dependent on a range of material elements among which marine organisms have a significant role.

1.1 Theories of sustainable consumption

Three different approaches to consumption dominate current understandings of how to promote sustainable consumption. The individualistic approach to sustainable consumption is cognitive-based and focuses on self-reported attitudes, beliefs, values and subsequent hypothesised behaviour (Stern, 2000; Bamberg and Möser, 2006, Tanner and Kast, 2003). As an example energy policy is often based on an ABC framework. A represents attitude, B represents behavior, and C represents choice (DEFRA, 2008; Darnton, 2008). Such individualistic approaches have been contested because individual environmental attitudes/values and sustainability-related product knowledge are unreliable predictors for sustainable consumption at the individual level (Shove, 2010; Spaargaren, 2011). In theory eco-labelling is considered as the preferred tool to promote the purchase of sustainable products, but research has shown that eco-labelling has a limited impact. Reviews of product-related environmental information suggest that, although

consumer information is provided in the marketplace to encourage the purchasing of environmentally sustainable products, the majority of consumers, even environmentally concerned consumers, do not use the information (Csutora and Zsoka, 2011; Leire and Thidell, 2005; Torjusen et al, 2004; Young et al., 2010). In the case of antifouling practice research evidence shows that providing the boat owners with information about the poor sea environment does not guarantee a change towards pro-environmental behavior (Wester and Eklund, 2011). In a similar manner values are seen as predictors of sustainable consumption and contradictory evidence states that consumers who adopt green values do not act accordingly to them, referring to the value-action gap (Blake, 1999). This non-adoption of sustainable consumption patterns despite a general awareness of climate change and espoused green values, has been labelled the attitude-behavior gap (Young and Middlemiss, 2012), the knowledge-to-action gap (Markkula and Moisander, 2012) or the value-action gap (Shove, 2010).

There exist two non-individualistic research streams within the field of sustainable consumption, consumer culture theory inspired studies and studies based on practice theory. From a consumer culture perspective sustainable consumption practices – which typically involve reduced or alternative consumption – is acknowledged as a means of constructing self-identity and social esteem within the dominant cultural codification system (Autio et al. 2009; Connolly and Prothero 2008). In addition discursive understandings of sustainable consumption (Markkula and Moisander 2012; Moisander et al. 2010) show that consumer confusion arises from seemingly contradictory ways of consuming sustainably. Taken together these studies highlight the need to address the potential contradictions between cultures of consumption and sustainable consumption practice. In the case of antifouling practice, leisure boat owners in the Baltic Sea are part of a boat club of marina to be able to have the boat at sea. Such boat clubs or marinas sustain certain ways of boating, so called boat cultures which impact on how antifouling practice as part of the boating lifestyle is understood. From a cultural perspective sustainable consumption can be promoted through changing the socio-cultural meanings of specific consumption practice (Dolan, 2002; Connolly and Prothero, 2003).

Material agency is missing in both individualistic and cultural approaches to promote sustainable consumption. In the case of antifouling where marine organisms have a great impact on the perceived efficiency of different antifouling techniques, the material element has a significant role for the acceptance of toxic free antifouling practice. Theories of practice as the third theoretical approach used to understand how to promote sustainable consumption fully recognizes material agency in terms of configuring consumer doings and consumption meanings. Looking at sustainable consumption through the lens of practices means to withdraw the focus from the individual's attitudes to a broader perspective, where social-technical systems and the cultural world practices are the target of inquiry (Spaargaren, 2011). Practices are defined as: 'a routinized type of behavior which consists of several elements, interconnected to one and another' (Reckwitz; 2002:250) and as a 'block' or 'pattern which can be filled out by a multitude of single or unique actions' (2002:250), referring to the repetitive character of a practice. Practice theories accentuate the significant role of material artefacts in practices and non-human entities are regarded to be essential for the production of social practices (Preda, 1999; Schatzki 2001, Orliokowski, 2007). Shove and colleagues (Shove et al. 2007, Watson and Shove, 2008) have developed a framework where practices are conceptualized as a configuration of elements: material, meaning and competence. Material is a very general term but includes objects, infrastructures, tools, hardware and the body itself (bodily time spent). The competence element contains the skills or the practical knowledge needed to perform the particular practice. The meaning component is about 'making sense of the activities' (Ropke, 2009:2492), especially the emotions, feelings and understanding triggered through the practice. This threefold conceptualization has been developed into different directions. Other scholars have come up with model of practices consisting of understandings, procedures and engagements (Schau, Muniz and Arnould 2009; Warde 2005) or encompassing objects, doings and meanings (Magaudda, 2011). Each of the components in differing conceptualizations of practice should be understood as broad categories covering a variety of "aspects" (Røpke, 2009:2492). For the purpose of our paper it is important to note that non-human living organisms are not acknowledged as explicit material elements configuring practice within any

these conceptualizations. In this paper we use the conceptualization of practice as objects, doings and meanings (Magaudda, 2011) as it enables us to see the actual dynamics between the elements and the possible transformation of elements. By analyzing the different ‘circuits of practice’ and especially focusing on the material and meaning elements of the use of non-toxic alternative antifouling methods will help us to give general explanations why consumers do not switch to environmental friendly alternatives and to detect barriers for sustainable consumption.

3. Methods

Empirical data has been collected through twenty four phenomenological interviews with leisure boat owners. Such interview format aims to collect data about the ‘lived experiences’, in this case of boat owners engaged in different non-toxic antifouling practices (Thompson et al., 1989). This method was suitable as we were especially interested in the material objects included in antifouling practices and related meanings and doings. The water type in the Baltic Sea differs due to different gradients of salinity and the salinity is correlated to the growth of marine organisms on boat hulls. In order to study the impact on marine organisms on antifouling practice we interviewed boat owners from different localities in the Baltic representing different water saltiness (high and low) along the Swedish coast and in Helsinki, Finland. We interviewed boat owners’ involved in antifouling practice using four different toxic free antifouling methods established on the market and for that reason guaranteed documented antifouling efficiency. The following techniques were included in the study; boat wash, hand scrubbing devices, hull cover and boat lift. A boat wash can be compared with a car wash for automobiles. There is a cleaning station equipped with rotating brushes in the water. Hand scrubbing devices mainly consist of brushes or sponges connected to a long shaft. They enable the leisure boat owner to clean the boat hull from standing on the jetty. A hull cover can be understood as plastic membrane floating in the water where the boat is driven on to. This cover compasses the part of the boat hull which is under water and creates a dark environment, which is not favored by marine organisms. Boat lifts are either equipped with a hydraulic pump or a mechanical device to lift up the boat from the water. Without contact with water fouling will not attach to the hull.

We pursued a maximum variation sampling method to ensure that boat owners in water with differing saltiness using different antifouling methods and with different types of boats were interviewed. The most common leisure boat types are private boats and motor boats. Rib boats are commercial leisure boats. Table 1 presents an overview of the respondents.

Table 1. Overview of the respondents in terms of antifouling technique, boat type and water type.

Watertype /method	Brush wash	Scrubbis	Hull cover	Boat lift
High saltiness		sailing boat (3)	motorboat(1)	
Low saltiness	sailing boat (1) motor boat(3)	sailing boat (7) motorboat (2)	Motorboat(3)	motorboat (2) Ribboat (2)

The interviews were conducted between 2014 and 2015. Half of them were conducted face to face and the other half was conducted over the telephone. The interviews lasted between half an hour up to an hour and were mainly conducted in English. A minority of interviews was conducted in Swedish and afterwards translated to English. Interviews were focused on the lived experience of respondents and the first two questions “Can you tell me how you prepare your boat for the next season?” and “Please describe how you make sure that your boat hull is clean/free from fouling?” aimed to focus on respondents’ concrete experiences of antifouling. Further the interviews covered questions regarding previously used antifouling methods, accepted antifouling methods in marinas/boatclubs and boat use.

The data from the interviews has been analyzed and interpreted following a highly accepted process in phenomenological consumer research (Thompson et al., 1989). After reading through the interviews carefully the commonalities of experiences were grouped. The first group consisted of the boat owners which were very satisfied with the method, meaning that they would adopt the method in the future. The second group consisted of boat owners which very not convinced

of the non-toxic method and would not adopt it for the future. The data was structured into three elements, objects, meanings and doings, following Magaudda's (2011) conceptualization of practice (see figure 1). This model visualizes changes and transformations following changes in the material elements of antifouling practices. Marine organisms have, as we will show below, agency and the Magaudda's conceptualization is useful in highlighting the effect of non-human living organism agency on the circuit of toxic free antifouling practice.

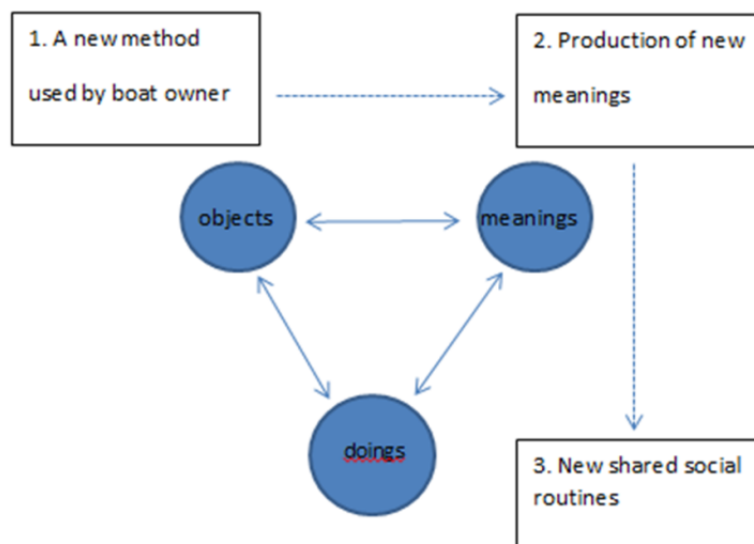


Figure 1. Circuit of practice (Magaudda, 2011)

3. Results

In order to analyze the impact of the marine organisms on toxic-free antifouling practice we have analyzed (1) the interrelation between the marine organisms and other object elements in this practice and, (2) the re-configuration of antifouling practice following from the integration of new materiality (new antifouling method) into existing antifouling practices.

The integration of new toxic free antifouling methods into antifouling practice is viewed as the introduction of one or several new object elements that in interaction with existing object elements (e.g. boat type, marine organisms) configure the meanings and doings of antifouling practice. There are several object elements involved in toxic free antifouling practice; the devices/products used (brush wash, hull cover, boat lift, hand scrubbing device, cellphone) boat, water, marine organisms (algae, barnacles and mussels) and bodily time (see figure 2). There is a strong relationship between these object elements. Research has proven that the saltier the water the higher the fouling pressure of marine organisms in the water is. Consequently the attachment of algae, barnacles and mussels on boat hulls is higher, which increases the bodily time spent on antifouling practices.

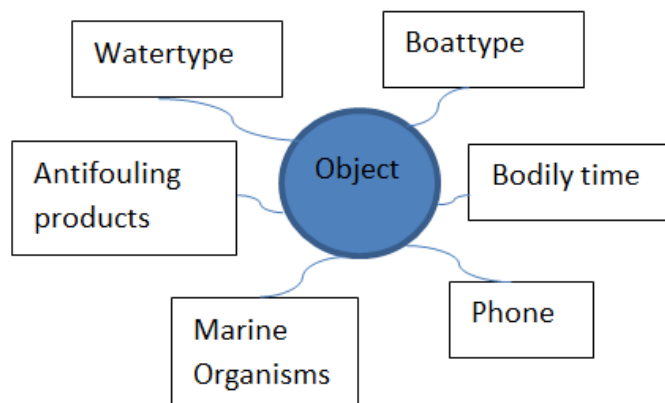


Figure 2. The object element as consisting of several single elements

A change in materiality like the integration of new toxic free antifouling products/devices into antifouling practice is likely to have a performative effect on the meanings and doings as shared social routines of antifouling practice (Magaudda, 2011) and such changes can lead to a 'fit' or 'misfit' to the existing elements (meanings and doings) of an existing practice (Spaargaren, 2013). Our data suggests that the integration of new toxic-free antifouling products/devices into common antifouling practice leads (painting with toxic paint) to a 'fit' or 'misfit' between the variety of object elements. As we show below marine organisms contribute to a big degree to this 'fit' or 'misfit' between the devices/products used (brush wash, hull cover, boat lift, hand scrubbing device, cellphone) boat, water, and bodily time.

3.1 Accepted toxic-free antifouling practice

Boat owners which were satisfied with a given toxic-free antifouling method clearly stated that they would continue doing antifouling in this manner in the future. Our findings show that the adaption of a toxic-free method depends strongly on the fit between the object elements. There is no 'one size fits all' solution rather there has to be a perfect fit between non-toxic free method, the water type, the cellphone, the boat type, the bodily time spent on antifouling activities and the amount of marine organisms on the boat in order for the boat owner to perceive the antifouling effect of the toxic-free methods to be acceptable. Regardless of water salinity the results show that all off these toxic free antifouling methods were considered to work (be efficient) on different boats types (motorboats, sailing boats and rib boats) if there is a fit between object elements. Figure 3 below presents an example how the brush has affected the antifouling practice of one boat owner that has started to use the brush wash. Prior to the introduction of the new material element (brush wash) copper-based paint was applied. The use of the brush wash has created new meanings such as convenience and simplicity. Furthermore the use of the alternative method has led to new habits and routines. Instead of lying on the ground to paint his boat, he just goes to the brush wash and leaves the work to the brush wash.

"It is a quite a hard work to paint the boat bottom because you have to lay down on the ground and paint the bottom and it is quite a hard job I think. So the advantage with the bottom brush in the harbor is that you just place the boat and they will take care of the whole washing procedure. The only thing you do is to pay the bill. So that is quite easy".

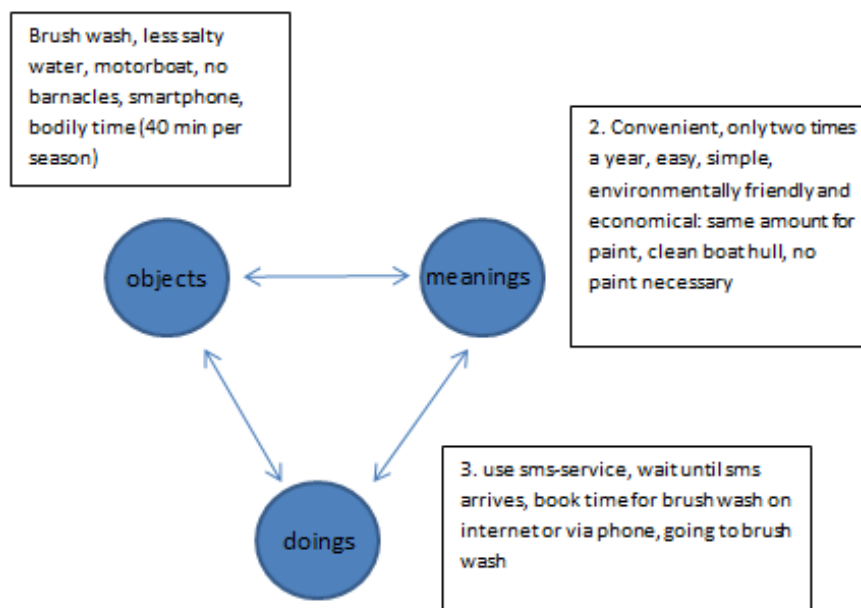


Figure 3. Configuration of toxic free antifouling practice including brush wash in low salinity water

The following quote from an interview shows that the cell phone has been integrated into the practice of using the boat brush. Interesting here is what the boat owner says about the price. In terms of costs he perceives the boat brush to be equal to painting in terms of money. Meanings associated with the non-toxic brush wash are: economical and easy.

“I joined some organization in Sweden which sends me a short message telling me that in the Stockholm area it is time to clean the boat bottom. So I get a signal on my telephone that it is time to use the boat brush. So I started to run that brush from the beginning once a year and nowadays it is 2 times a year. And also you know even when the costs for cleaning the boat bottom with brush it is equal to painting..... It is almost the same amount of money, but it is much easier to run the boat brush instead of painting the boat. “

The bodily time involved with using the brush wash is estimated to 40 minutes per season, *“I think it takes about 20 minutes. I started to run that brush from the beginning once a year and nowadays it is 2 times a year”* as this boat owner has access to a brush wash closely to his marina. The brush wash is seen as a time-saving device also in terms of general boat maintenance; *“When I took the boat out of the water one week ago and it is ready for the next season at once. I don’t have to do anything”*.

This example illustrates that for this type of boat (motorboat) the brush wash, the cellphone and related sms-service and the acceptable time spent on antifouling matches the fouling pressure (the amount of marine organisms in water that can attach to boat hulls).

In the next example the copper-based paint has been replaced with a hand scrubbing device in combination with biocide free paint as antifouling products/devices (figure 4).

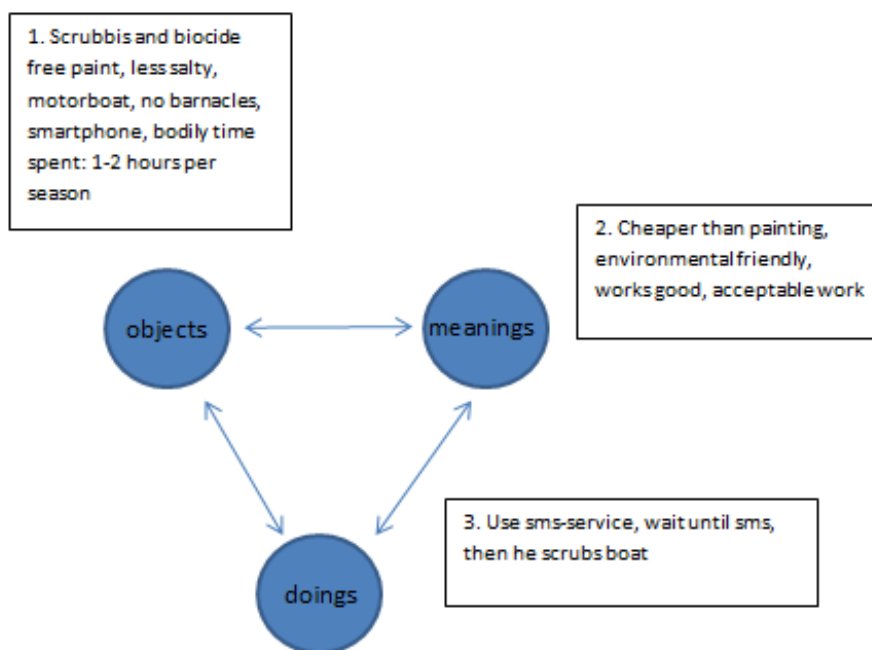


Figure 4. Configuration of toxic free antifouling practice including hand scrubbing device in low salinity water

The use of the hand scrubbing device in combination with the biocide free paint and a cell phone and sms-service have created meanings associated with clean boat hull and environmental friendliness:

“They tell me by SMS, on my iPhone, when these barnacles are small and just about to start grow and stick to the boat. Then they are very soft-standing and then it’s time to go slow with the scrub brush. That’s usually in the end of July. I take the scrubber, and I scrub the boat, and I turn the boat around, and I scrub the other side. As a result that I have never had not had one of these to bother (barnacles) over the last couple of years when I used it”.

In this example the construction of the antifouling device in relation to the boat type and the fouling pressure is the key to understand its antifouling effectiveness and accepted bodily time spent.

“The scrubber has a handle, like a telescope thing. And I can reach the bottom, it is no problem. It’s rather a small boat. But I don’t think you can handle this (boat bottom) the same way if you had a ten meter long boat, or something like that. Then, that boat would go too deep, and you won’t be able to stand in the water, maybe you have to do it from a dock or something”.

In the last example of accepted toxic free antifouling methods the copper-based paint has been replaced with a hull cover (figure 5), called Cleanboatprotector.

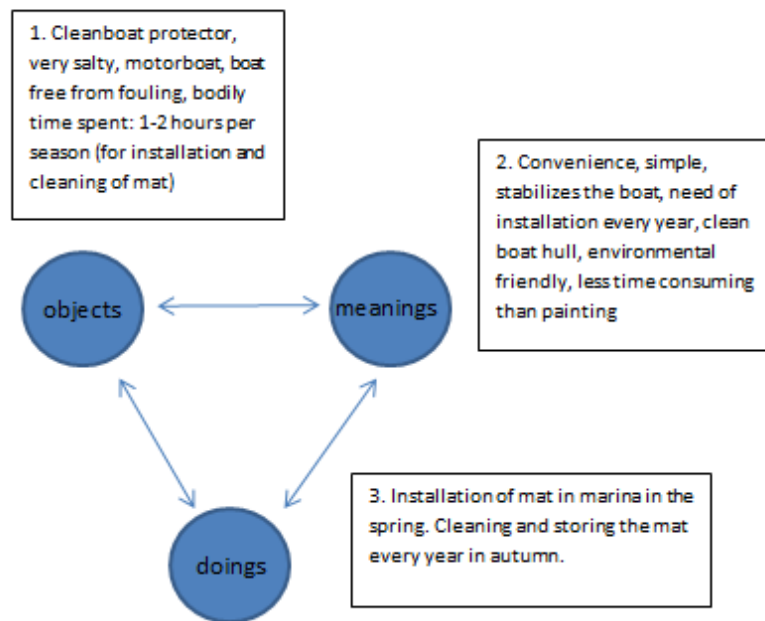


Figure 5. Configuration of toxic free antifouling practice including hull cover in high salinity water

In the case of the hull cover used in high salinity water the 'fit' between the object elements as the construction of the hull cover, the boat type (hull covers are only for motor boats) ensures that no marine organisms can attach to the hull in high fouling pressure water.

3.2 Non-accepted toxic free antifouling practice

Boat owners not satisfied with the antifouling efficiency of non-toxic methods state that they will not use these antifouling methods in the future. Our data shows that the antifouling in efficiency can be explained by a 'misfit' between the object elements. The leisure boat owners who were not satisfied with the antifouling results of toxic free antifouling products and devices all had their boat in high salinity waters and complained about a lot of fouling growth on their boat hull. Furthermore they all stated that they had to spend more than two hours during the boat season to use the alternative method. Figure 6 below presents an example of how a hand scrubbing device combined with biocide paint is perceived as not working, i.e. having very little antifouling efficiency.

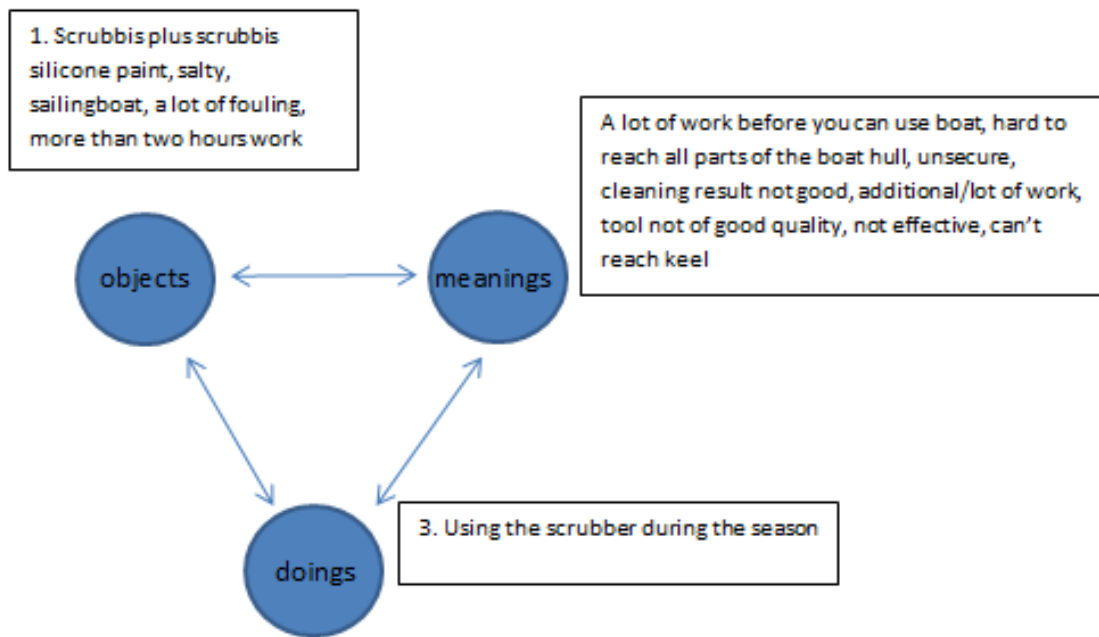


Figure 6. Configuration of toxic free antifouling practice including hand scrubbing device in high salinity water

With higher water salinity the fouling pressure is much higher and therefore more additional cleaning work is necessary compared to when the hand scrubbing device is used in low salinity waters as illustrated in figure 4 above. It is evident that the amount of marine organisms causes a 'misfit' between object elements of accepted bodily time spent, boat type and the antifouling products/devices. The boat owner explained that the shape of the boat hull played a significant role if the method was perceived to be effective.

"And then we tried to move the fouling with the scrubber, we got some of it off but not all of it.... I could get into the boat next to us which was lower, so I could sit at the waterline looking downwards and try to do it. But the boat is also quite wide, its 3 meters wide and 1,5 meters inwards...there are so many areas you need to be able to reach and from that angle it is quite tricky. So maybe from the waterline downwards you can reach 4-5 decimeters down. But then the whole keel section connected to the hull it's quite impossible to reach and also the sides and underneath the keel it is hard to reach."

This example also shows that new routines develop. The boat owner gets on the neighbor ship to be able to scrub his own boat. Meanings associated with these non-toxic methods are not effectiveness both in terms of fouling pressure and time. If boat owners use toxic paint the only thing they have to do is to prepare the boat hull and paint it in the spring. During the season they don't have to worry about anything. But when using the scrubbis the boat owner explains that he has to check his boat every week so he has not too much growth on it.

"I can't have my boat kind of unattended. I have to go there like every week in the summer season. And if I am away with the family, abroad or something, then I have a little kind of guilt, that maybe it's growing too much. And I have to get back to kind of, to check."

In the next example a hull cover is perceived as not being satisfactory in terms of time and antifouling efficiency. Figure 7 presents antifouling practice as the misfit between a motorboat that is at sea for longer periods of time and consequently fouling attaches to the hull when the hull cover is not used (which is attached to the jetty in the marina), the bodily time spent on antifouling activities, the antifouling device and the fouling pressure.

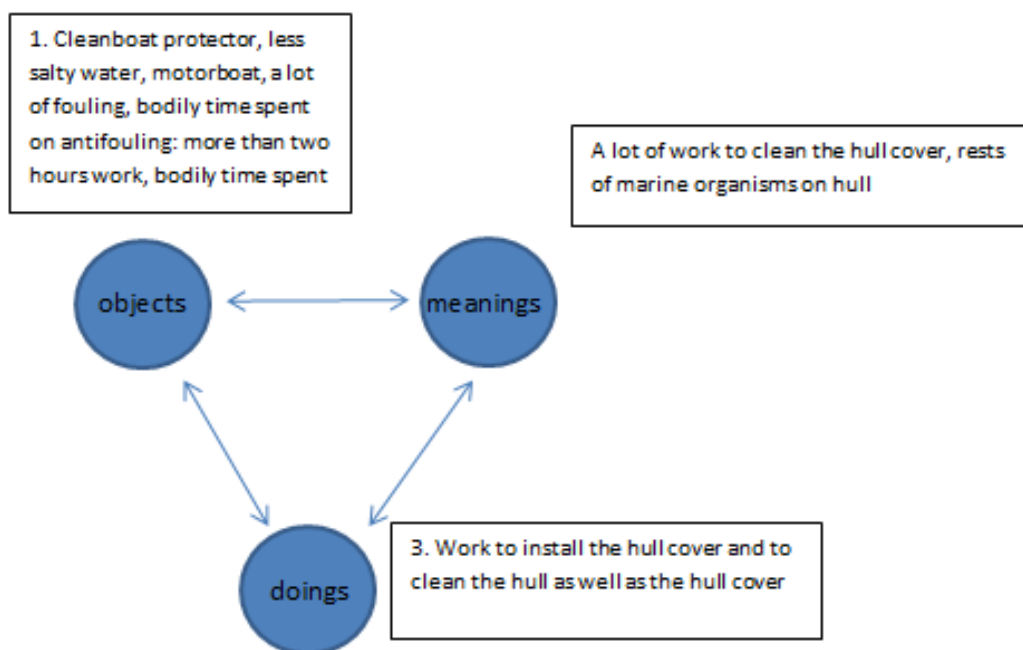


Figure 7. Configuration of toxic free antifouling practice including hull cover in low salinity water

A boat owner says the following about his experience with the hull cover: *"The hull was clean where the hull cover had been close to the hull. Some fouling was found where the hull cover had not been close enough. A great amount of residues of mussels, which had fallen off when the boat had arrived in the marina, where very hard to remove. Twice I had to use high water pressure cleaning for three hours. I believe the hull cover is more suitable for smaller boats that go on one-day tours"*.

4. Discussion

Using a practice-theoretical approach means to concentrate on the practices as 'unit of analysis' (Giddens, 1984; Reckwitz 2002; Schatzki 1996) The 'circuit' of practices was used as an analytical tool to examine the collected empirical material and to illustrate how the practice elements (objects, meaning and doings) relate to each other. Magaudda (2011) investigated the reconfiguration of practices elements in digital music consumption by introducing a new object (Ipod) into existing digital music practices. Magaudda's framework was used in this article to show how the introduction of a non-toxic antifouling method (material element) changes existing antifouling practices and how the practice elements are reconfigured in a new way. By analysing the dataset the investigation of objects, meanings and doings did not bring fruitful explanations why the boat owner did not consider using an non-toxic alternative. It was necessary to look deeper into the different micro-elements of the practice elements. By doing so we investigated that the micro-element of the material element had a great influence on the adaption of toxic free antifouling methods. We expanded the understanding of the material elements and included non-human living organisms into the materiality aspect. Several studies have analysed practices in terms of material, meaning and competence, such as in climate change, (Shove et. al 2012) or adapted the model of practices applying the classification of understandings, procedures and engagements (Schau, Muniz and Arnould 2009; Warde 2005). But these studies have not elaborated on the interlinkages between environmental microelements. We contribute to theories of practice as our data reveals that interdependent environmental organisms have an important role in shaping consumer practices.

Results have shown that the adaption of a toxic free antifouling method did not depend on the 'fit' of elements (objects, doings and meaning), but more specifically on the 'fit' between

interlinked environmental organisms and other material. Our analysis shows how the 'misfit' of the micro elements influences sustainable antifouling practice negatively. Thus interlinkages between material micro elements can help us to explain why consumers do not switch to environmental friendly alternatives and to detect barriers for sustainable consumption. Our data has shown that the adaption of the non-toxic antifouling method depends on several factors, such as the availability, additional work/time and especially the environment (saltiness of water, fouling pressure) is important. In the case of antifouling practices there exists a relationship between the boat hull, marine organisms, the saltiness of the water and the bodily time spent on the practices. The growth of marine organisms on boat hulls is dependent on the saltiness of the water. The water type in the Baltic Sea differs due to different gradients of salinity in different regions of the sea, which affects the growth of marine organisms and the efficiency of different antifouling techniques, in terms of keeping the boat hull free from fouling. A stronger fouling pressure implies additional work for the boat owner as he has to use for example the hand scrubbing device more often or go to the brush wash more frequently. These additional efforts are difficult to handle for some boat owners. For that reason the choice of a non-toxic method also needs to fit the lifestyle of the boat owner.

5. Conclusions

In conclusion, investigating practices beyond objects, meanings and doings and looking into the micro-elements offers a new perspective on sustainable consumption research. Looking especially at the 'fit' or 'misfit' of the micro elements of practice can offer new research possibilities. Furthermore taking the environmental factors such as the salinity of water of the fouling pressure not as for granted and paying attention to their performative effects provides the research community with a new research angle. Please insert your Conclusions text here.

References

- Autio, M., Heiskanen, E., & Heinonen, V. (2009). Narratives of 'green consumers' – The antihero, the environmental hero and the anarchist. *Journal of Consumer Behaviour*, 8 (1), pp. 40-53. DOI:10.1002/cb.272.
- Bamberg, S., & Möser, G. (2007). Twenty years after Hines, Hungerford, and Tomera: A new meta-analysis of psycho-social determinants of pro-environmental behaviour. *Journal of environmental psychology*, 27(1), 14-25.
- Blake, J. (1999). Overcoming the 'value-action gap' in environmental policy: Tensions between national policy and local experience. *Local Environment*, 4(3), 257-278.
- Connolly, J., & Prothero, A. (2003). Sustainable consumption: consumption, consumers and the commodity discourse. *Consumption, Markets and Culture*, 6(4), 275-291.
- Connolly, J., & Prothero, A. (2008). Green consumption Life-politics, risk and contradictions. *Journal of Consumer Culture*, 8(1), pp. 117-145.
- Csutora, M., & Zsoka, A. (2011). Maximizing the efficiency of greenhouse gas related consumer policy. *Journal of Consumer Policy*, 34, 67–90.
- DEFRA, Department for Environment, Food and Rural Affairs, (2008). A Framework for Pro-environmental Behaviours (The Stationery Office, London)
- Dahlström, M., Dahlström, M., Elwing, H., Ytreberg, E., Solér, C. (2014). Bland borsttvätter och fartygsfärger. En studie av fritidsbåtägares attityder till och användning av olika antifoulingtekniker.
- Darnton, A. (2008). Practical Guide: An Overview of Behavior Change Models and their Uses; HM Treasury Publishing Unit, Government Social Research Behavior Change Knowledge Review: London, UK.
- Dolan, P. (2002). The sustainability of "sustainable consumption". *Journal of Macromarketing*,

22(2), 170-181.

Leire, C., & Thidell, Å. (2005). Product-related environmental information to guide consumer purchases—A review and analysis of research on perceptions, understanding and use among Nordic consumers. *Journal of Cleaner Production* 13, 1061–1070.

Magaudda, P. (2011). When materiality 'bites back': Digital music consumption practices in the age of dematerialization. *Journal of Consumer Culture*, 11(1), 15-36.

Markkula, A., & Moisander, J. (2012). Discursive confusion over sustainable consumption: a discursive perspective on the perplexity of marketplace knowledge. *Journal of Consumer Policy*, 35(1), 105-125.

Moisander, J., Markkula, A., Eräranta, K. (2010). Construction of consumer choice in the market: challenges for environmental policy. *International Journal of Consumer Studies*, 34(1), 73-79.

Moisander, J., & Valtonen, A. (2006). *Qualitative Marketing Research: A cultural approach*. Sage.

Orlikowski, W. J. (2007). Sociomaterial practices: Exploring technology at work. *Organization studies*, 28(9), 1435-1448.

Pantzar, M., & Shove, E. (2010). Understanding innovation in practice: a discussion of the production and re-production of Nordic Walking, *Technology Analysis & Strategic Management* Vol. 22: 447-461.

Preda, A. (1999). The Turn to Things: Arguments for a Sociological Theory of Things. *The Sociological Quarterly*, 40 (2), 349-366.

Reckwitz, A. (2002). Toward a theory of social practices. *European Journal of Social Theory*, 5 (2): 243-263.

Røpke, I. (2009). Theories of practice—New inspiration for ecological economic studies on consumption. *Ecological Economics*, 68: 2490-97.

Schatzki T.; Knorr Cetina K.; Von Savigny (Eds.) (2001). *The practice turn in contemporary theory*. London: Routledge.

Schau, H. J., Muñiz Jr, A. M., & Arnould, E. J. (2009). How brand community practices create value. *Journal of Marketing*, 73(5), 30-51.

Shove, E & Pantzar M. (2005). Consumers, producers and practices: Understanding the invention and reinvention of Nordic walking. *Journal of Consumer Culture* 5: 43-6.

Shove, E., Watson, M., Hand, M., & Ingram, J. (2007). *The Design of Everyday Life*. Oxford: Berg.

Shove, E., (2010). Beyond the ABC: climate change policy and theories of social change. *Environment and planning. A*, 42(6), 1273.

Shove, E., Pantzar, M., & Watson, M. (2012) *The Dynamics of Social Practice: Everyday life and how it changes*. London: SAGE Publications.

Spaargaren, G. (2011). Theories of practices: Agency, technology and culture: Exploring the relevance of practice theories for the governance of sustainable consumption in the new world-order. *Global Environmental Change* 21: 813-822.

Spaargaren, G. (2013). The cultural dimension of sustainable consumption practices: an exploration in theory and policy in: Cohen, M. J., Brown, H. S., & Vergragt, P. (Eds.). *Innovations in sustainable consumption: New economics, socio-technical transitions and social practices*. Edward Elgar Publishing, 229-252.

Stern, P. C. (2000). New environmental theories: toward a coherent theory of environmentally significant behavior. *Journal of Social Issues*, 56(3), 407-424.

Tanner, C., & Wölfing Kast, S. (2003). Promoting sustainable consumption: Determinants of green purchases by Swiss consumers. *Psychology & Marketing*, 20(10), 883-902.

Thompson, C. J., Locander, W. B., & Pollio, H. R. (1989). Putting consumer experience back into consumer research: The philosophy and method of existential-phenomenology. *Journal of consumer research*, 133-146.

Torjusen, H., Sangstad, L., O'Doherty Jensen, K., & Kjærnes, U. (2004). European consumers' conceptions of organic food: A review of available research.

Wester, M., & Eklund B. (2011). "My husband usually makes those decisions": Gender, behavior and attitudes towards the marina environment. *Environmental Management* 45, pp. 70-80.

Warde, A. (2005). Consumption and theories of practice. *Journal of consumer culture*, 5(2), 131-153.

Young, W., & Middlemiss, L. (2012). A rethink of how policy and social science approach changing individuals' actions on greenhouse gas emissions. *Energy Policy*, 41, 742-747.

Measuring Sustainable Consumer Behaviour of Residents in Abu Dhabi

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Abstract

On December 2, 2015, The United Arab Emirates (UAE) celebrated its 44th National Day. The most notable achievement of the UAE in the last 43 years (1971-2014) has been in terms of development, GDP of the UAE has grown 236-fold in the past 43 years. This rapid and unprecedented growth however has made UAE increasingly resource dependent. The United Arab Emirates was the country with the largest per capita Ecological Footprint in the world. In 2007, the "Ecological Footprint Initiative" (EFI) a unique public-private partnership was launched to carry out in-depth research on UAE's ecological footprint. A key finding of the EFI was that the household sector contributes to 57% of the UAE's Ecological Footprint (Ecological Initiative Report 2011). This finding is in line with research that suggests "the consumption undertaken by private households accounts for a large proportion of the economy's environmental impact". Actions individuals take, choices they make have both a direct and indirect impact on the environment, as well as on personal and societal well-being. Against this background, the present study aims to measure sustainable consumer behaviour of residents in Abu Dhabi, the largest emirate of the UAE. Sustainable consumer behaviour has been presumed to be unitary and undifferentiated, however, it is becoming increasingly evident that there are several distinct types of environmentally significant behaviour. Environmentally significant behaviour refers to behaviour that harms the environment as little as possible, or, behaviour that benefits the environment. The focus the present study is on sustainable consumer behaviour in the private sphere. Private-Sphere Environmentalism, is mainly focused on behaviour such as the purchase, use and disposal of personal and household products that have environmental impact. Drawing on the work of reputed researchers, we present a theoretical model developed for this study that measures sustainable consumer behaviour. A questionnaire with 25 items was used to collect data from a convenience sample. The first stage in the analysis process was to perform a confirmatory factor analysis, next structural equation modelling was used to measure and validate our theoretical model. This study posits that the first-order estimated dimensions of Green Purchase, Recycling, Sustainable Energy Use and Water Conservation, are correlating sub-dimensions of the broader and more encompassing Sustainable Consumer Behaviour second-order construct. We suggest that modelling SCB as a second order construct is a better approach establishing dimensionality of this construct than the conventional first-order factor model. The conceptualization of the SCB as a second order construct provided satisfactory fit indices ($\chi^2= 323.7$, $df=175$, $CFI=0.918$, $TLI=0.902$, $RMSEA=0.048$) following the literature thresholds. The study makes an important theoretical contribution by presenting and validating the SCB construct as a second order construct, presenting a valuable research tool for future studies. By focusing exclusively on environmentally significant behaviour we acknowledge that we present a very thin slice of a much richer reality. However, by examining specific SCB we provide an important starting point for future research that can explore the factors that affect SCB such as values, knowledge, attitudes, norms and so forth.

Keywords: Sustainable Consumer Behaviour, Green Purchase, Recycling, Sustainable Energy Use and Water Conservation

Citizen-driven sustainability initiatives and sustainability transitions

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Abstract

In the past decade, citizen-driven sustainability initiatives in the Netherlands have gained considerable momentum. Good examples of this are the Repair Cafés, which promote waste prevention and improved reparability of products, and local energy initiatives, in which local groups of citizens collaborate on local and sustainable production of energy. As part of the European GLAMURS project (Green Lifestyles, Alternative Models, and Upscaling Regional Sustainability) we study the role that these citizen-driven initiatives can play in a transition to a green economy at the regional level, building on social practice theory. We focus specifically on the extent that the initiatives act as catalysts in the diffusion of sustainable practices, which may serve as building blocks for sustainable lifestyles. Our study is based on two case studies in the province of Zuid-Holland: Vogelwijk Energie(k), a local energy initiative in The Hague, and three Repair Cafés in Delft, Schiedam and The Hague. For our empirical work we performed desk-research, interview, and focus groups with initiative members, as well as other people from the province of Zuid-Holland. Based on our empirical work we find that citizen-driven sustainability initiatives offer their members a platform to engage in and strengthen sustainable practices that they already engaged in before becoming a member. The initiatives also serve as showcases for (alternative) sustainable practices. However, the role of the initiatives as catalysts for a transition towards a green regional economy is limited. They primarily attract people that already developed sustainable behaviour over a much longer period of time, and to have a transition function the initiatives have to appeal to a much broader group of people. To some extent the Repair Cafés are more successful in this regard: They appeal to a broader group of people because they combine environmental goals with social goals. We conclude that citizen-driven sustainability initiatives have a role in strengthening and promoting sustainable practices, but that their potential transition role as catalysts of sustainable lifestyles can only be fulfilled if they are able to appeal to a wider public. This may for example be achieved by combining sustainability ambitions with other ambitions that appeal to a broader group of people. To build up further momentum, a stronger facilitation by governments of sustainability transitions is also required.

Negotiating Personal and Collective Futures across Diverse Social Contexts

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Abstract

The way that people perceive of the future influences their actions in the present. Literature suggests that often people have hopes for their own personal futures, for example their family and career aspirations, yet remain pessimistic about a collective future both at the local and global scale (Hicks and Holden, 1995). This paper considers the intersections between the personal and collective futures of people from different social contexts. We conclude that connections between personal and collective futures are conceptualised differently according to social context. This paper presents preliminary findings from an in-depth qualitative study located in a regional town of Tasmania, Australia. The study utilised Bourdieu's theoretical framework and drew heavily on habitus as a guiding method as well as an interpretative tool. Five focus groups were held across varying social contexts during 2015 and were subject to dialogical analysis. This paper will present themes that were found to be significant for people in negotiating personal and collective futures, including the role of money, social place and power. Further to this, it will problematize the ways in which futures are primarily conceived of as personal and explore some of the ways that people negotiate positive aspirations for themselves with a negative outlook for the world more generally. The implications that disconnection in conceptualisations of personal futures with collective futures has on sustainable development will be discussed.

Keywords: Future, personal, collective, social context, habitus, diversity

1. Introduction

Futurity is inherently tied to questions of sustainability and sustainable development, most notably illustrated in the Brundtland definition of sustainable development which laments intergenerational needs as a priority (Brundtland, 1989). Recognising the influence of the present for long-term ecological and social futures is paramount to fulfilling sustainable development aspirations (Peters, Flink, Boersma, & Linton, 2010; Sherman, Cialdini, Schwartzman, & Reynolds, 1985; Wade-Benzoni, Tost, Hernandez, & Larrick, 2012; Wallman, 1992). While it may be common sense to suggest that the way we perceive and imagine the future influences our behaviours in the present, research interrogating the implications of these perceptions has to date been limited, with studies in health and psychology being exceptions (D'Argembeau, Raffard, & Van der Linden, 2008; Peters et al., 2010; Sherman et al., 1985).

The concept of sustainable development establishes intergenerational needs as a priority and inherent to this priority is the ability to envisage a sustainable future. This paper contributes to understandings of how people negotiate ideas of selfhood specifically in relation to questions of a collective future across socially diverse contexts. In this study, a personal future is conceptualised as the life lived by the self, including the social and physical space that the self is connected with, while a collective future encompasses essentially everything else (Foster, 2003; Rasmussen, 2011).

This paper will add to a growing body of literature that considers peoples' perceptions of the future

regarding climate change and other wicked problems (Denniss & Davison, 2015; Kinnvall & Lindén, 2010). This literature suggests that there are tensions between conceptions of personal selfhood and conceptions of collective responsibilities (Denniss & Davison, 2015; Killick, 2012; Kinnvall & Lindén, 2010; Lucas, Leith, & Davison, 2015; Raggatt, 2010; Rasmussen, 2011). Expanding on the literature, this paper explores negotiations between personal and collective futures in diverse social contexts.

This paper will present some preliminary findings from a PhD study located in Tasmania, Australia exploring 'how people envisage collective futures and what are the implications of these imaginaries?' In considering this question, one can then ask; how is the self embodied or absent in imaginaries? And how heterogeneous are imaginaries across social contexts? These questions could have been explored using a number of methodological perspectives, however as an emphasis of this research was on the possible interpretations to futures thinking, a hermeneutical lens using a qualitative inquiry was viewed to be most appropriate (Bleicher & Bleicher, 1980; Prasad, 2002). Pierre Bourdieu's theoretical framework was used to investigate the research questions. Bourdieu's theory is useful in considering the social processes involved in negotiating understandings of personal and collective futures.

2. Approaching the Study

2.1 Location of the study

Tasmania is positioned 41° south of the equator and is an island state of Australia. The state covers a land area of over 68,000 km² of which half is currently in national or state reserves. Over 513 000 people live in Tasmania, with half of residents living in the greater Hobart precinct. The median age of Tasmanian's is 40, however the percentage of children in the community is decreasing (from 22% in 1996 to 19% in 2011) (Department of Premier and Cabinet, 2016), as well as having the highest rate of children living in lone families in Australia (24.5%) (Australian Bureau of Statistics, 2011).

The three largest employment industries in Tasmania are health care and social assistance (12.2%), retail trade (10.3%) and public administration and safety (9.2%), followed closely by education and training (8.9%), manufacturing (8.7%) and tourism (8.6%) (Department of Premier and Cabinet, 2016). These statistics show Tasmania to be a diverse state for employment, however the opportunity to join the work force are becoming increasingly more difficult, with unemployment rates rising from 5% in 2007 to over 7% in 2012 (Australian Bureau of Statistics, 2013).

Traditionally, the four main industries in Tasmania were mining and mineral processing, agriculture, tourism and forestry and had this title due to their contributions to the Tasmanian economy. However the collapse of Gunns Limited saw a massive reduction in the size and scale of the forestry industry, exemplified by the decreasing export figures on woodchips and wood products (Gale, 2013; West, 2013). This has only added to agriculture and forestry remaining highly politicised topics in Tasmania, which have been this way for decades (Stratford, 2006; Stratford, Armstrong, & Jaskolski, 2003).

Tasmania's social and political environment makes the state a rich area for research on questions relating to sustainable development within the community (Stratford, 2006; Stratford et al., 2003). Political divides have the potential to enrich the research and provide an alternate dimension that would not be included without this context. Additionally, the demographics of Tasmania are such

that a large proportion of the population are involved in industries that are traditionally associated with sustainability, either in terms of resource management or methods of practice. This context provides a curious dynamic for consideration for sustainable development research.

2.2 Methodological Framework

Hermeneutics was used to frame the research because it recognizes the complexities in the interpretative processes of meaning-making at multiple scales in the world (Bleicher & Bleicher, 1980; Prasad, 2002). Focus groups were used with the intention of gathering views on how the future is perceived and made meaningful in the lives of participants across a diverse range of social fields in Tasmania. Recruitment of participants occurred through a community organisation and subsequent snowball sampling using the title *You and the Future: Exploring Social, Environmental and Economic Futures*.

Diversity of participants' social context was actively sought during recruitment because "...there will be different or even antagonistic points of view [among participants in different contexts], since points of view depend on the point from which they are taken, since the vision that every agent has of space depends on his or her position in that space" (Bourdieu, 1977, p. 130).

Five focus groups of between 40 and 180 minutes were held predominantly in locations determined by the group.

2.3 Analysis

Interviews were transcribed by the researcher and linked with field notes made during and initially after the sessions. Field notes included descriptions of the setting, body language of participants and researcher reflections. All data was managed and analysed using NVIVO software.

A combination of process coding using a two cycle coding system and dialogue analysis to the coded text was applied to transcripts (Markova, Linell, & Grossen, 2007). During analysis, heterogeneity of the agents was considered in recognition that in a group setting the voice of an individual is negotiated and intersected by the voices of others in the group (Longhurst, 2010; Markova et al., 2007). The way ideas were circulated and formed was considered in recognition that focus group discussions are not simply an arena where participants display pre-formed ideas (Longhurst, 2010; Vicsek, 2007). The transcripts were considered for the knowledge that was taken as shared within the group, relating to the ideas of shared habitus and also doxa, explained below (Bourdieu, 1977, 1990b). Considering what knowledge was shared by the group and what knowledge was perhaps unsettled during the conversations, by whom and in what contexts, are inherently relevant to unpacking how questions of the future are negotiated across social contexts.

2.4 Theoretical Framing: Key concepts from Bourdieu

2.4.1 Habitus

Habitus is a theory renowned for considering the dialectic between structure and agency in explanations and explorations of social phenomena. As defined by Bourdieu (1977, p. 94), habitus is "an acquired system of generative schemes objectively adjusted to the particular conditions in which it is constituted, the habitus engenders all the thoughts, all the perceptions, and all the actions consistent with those conditions, and no others".

More simply, Reay (2004) describes habitus as the dynamic through which the individual body is present in the social world while the social world is present in the body. Habitus is fluid within

agents and changes depending on the exposures and experiences of the social world and within each field. Applying this to notions of the self, we find that 'habitus thus implies a "sense of one's place" but also a "sense of the place of others" (Bourdieu, 1989, p. 19).

Place in the context of this paper is defined differently to recent conceptions and the ever-growing body of literature on 'place' most notably found in geography and education literature (Cheng, Kruger, & Daniels, 2003; Gruenewald, 2003). Sense of one's place and to have a sense of place for the purposes of this paper recognises the historical, cultural, political, social, physical, economic and familial relations of an agent in the world. It speaks to ideas of self-perception and being in the world rather than recent conceptions which signifies the relation an agent has with a place as defined by locality (or the meanings that a place may possess for an agent).

2.4.2 Doxa

Bourdieu surmises that habitus is informed by what he termed *doxa*, the macroscale understandings that shape what people understand to be 'knowledge' and 'truth' (Bourdieu, 1977, p. 164). Doxa offers a way of understanding how it is that the social world is objectively ordered. Doxa can be described as the rules that are prescribed and in-scripted in the social world and onto bodies in such a way that they are beyond recognition in the consciousness.

Bringing attention to and attempting to recognise the undisputed and undiscussed elements that order social life assists in making sense of how and why agents perceive of futures in particular ways. As doxa is more than the provision of rules, it is by very definition objectively structuring the way in which people orient themselves and give meaning to each social field.

Neo-liberalism has been put forth as a doxa that objectively orders social life and determines predominantly the ways in which people perceive and understand social order and individual purpose (Chopra, 2003). Bourdieu and Wacquant (2001) describe neoliberalism as a grand narrative that has spread predominantly out of America. Bourdieu (1998, p. 126) considers "Neoliberalism [as] a powerful economic theory whose strictly symbolic strength, combined with the effect of theory, redoubles the force of the economic realities it is supposed to express".

As such, the axiological lens of Western populations remains one primarily driven by the accumulation of material wealth. The way that people *know* the world is through the capitalist system, to the extent that this is *the* way of being, unquestioned by the majority of the population.

2.4.3 Capital

Considering the intricacies of how it is that agents *are* in the world, Bourdieu defers to notions of capital. The social field and the relations between agents are structured by capital. Further to this, Bourdieu (1984, 1986) suggests that ownership of capital is a precondition for greater ownership of capital.

Capital can be present in three fundamental forms: as economic, cultural and social capital (Bourdieu, 1986, p. 47). Economic capital includes resources that can be immediately converted into money and also property. Cultural capital exists in three forms, embodied in agents in the form of knowledge or skills; the objectified state, such as cultural goods i.e. books, tools; and in the institutionalised state such as educational qualifications. Social capital refers to the resources available within a network of relationships, or in the membership of a group. The volume as well as the type of capital that an agent owns at any given time largely determines their position within a

field (Bourdieu, 1986).

2.4.4 Field

Bourdieu's theory of fields recognises the distinctions of different worlds operating in social life that each have their own kind of common sense, ways of thinking and ideas that are all inseparable of each other and co-constructed (Bourdieu, 1990a). In summary, a field is a space in which agents are positioned based on the interaction between the specific regularities of the field, the agent's habitus and capital. The field is often described by Bourdieu (1984, 1990a) as a 'game' with 'players'.

Conceptualising the complex web of human relations using Bourdieu's frame for reference draws the point of analysis beyond the individual and onto the social context in which the individual is positioned. In what follows, a description of each of the participant groups is described before presenting a narrative analysis of how self is negotiated in questions of the future.

2.5 Participant Groups

2.5.1 The Mothers Group

The mothers group operated within a small neighbourhood house located in a suburb categorised within Tasmania's 10th percentile of socio-economic disadvantage (Australian Bureau of Statistics, 2011). The group consisted of all women, each of whom had at least one child in their care. Present at the session was Jesse, a lady in her early 40's and her son who was around two years old. Jesse was an embedded fabric of the group and of the neighbourhood house more generally. Jesse's older sister was present, though without children, but at home in the neighbourhood house. Sandy was in her late 40s and attended the group with her grandson. Her daughter Heidi also came along specially to attend the focus group. Heidi, Sandy's daughter, was in her early 20s and had both her sons at the session. Heidi, Jesse and Sandy were the main participants during the session with Mary coming in and out as the children would allow or if a topic was of particular interest to her. Jesse's sister also entered and exited depending on the topic of conversation.

2.5.2 The Over 65 Group

Present at the session was Sally, who was a new member to the group and partially retired. Patricia was one of the oldest group members and appeared from observation as the matriarch of the group. Patricia, Wendy and Sherryl were widows within the group and shared a common understanding between them and typically agreed with each other. Alfred and Donna were the only married couple attending the group. While saying little, Donna's gestures such as nodding and slight utterances were affirming acts for other participants and were significant for the group as a whole. Alfred on the other hand was expressive and a key contributor to many of the conversations.

2.5.3 The Philippine Group

Emma, Philippine born, established a group specifically to connect with emigrated Philippine people a number of years ago. She sought connections with people who shared her culture and her understandings and appreciations of life. Present at the session was Poppy, who had been in Tasmania for three years with her husband. Mary, who lived around the corner from Poppy and had travelled to the session with her. Bella was a similar age to Mary and had also been in Tasmania for a similar length of time after meeting her Australian husband in the Philippines. Bella

was one of the oldest members of the group (30-39 yrs) and had a son a little older than Poppy's. Rosa too lived a large distance away and arrived shortly after the session had begun due to travelling. Fiona was the youngest member of the group and also had a son of similar age to Bella. All but one of the participants on the day had graduate and/or post-graduate qualifications.

2.5.4 The Mens Group

The Mens Group operated out of a hall and a recently acquired shipping container. The group brought men together while participating in projects to create material objects as a service to the community. Roy, Paul, Bob and John were present for the session. Paul was in his 50's and a father of four. Bob was in his late 60's and appeared to be the considered voice of the group. Roy was less forthcoming with his opinion but played an important role as the affirming voice for the group. John while present for the session largely did not contribute, however often demonstrated agreement or disagreement with his body language through head nods and utterances.

2.5.5 Those on Higher Income Group

The neighbourhood house was a productive recruitment site, however, there were no existing groups that represented people who could be identified as having a high socio-economic status. In response to this, the technique of snowballing was employed whereby the researcher contacted individuals in the researcher's network.

The session was held at a local café, owned by Clara, one of the participants. Clara had lived in Launceston all of her life and was the only female at the session aside from the researcher. Clara's husband Roger also attended. Roger was in his early 60's and was keen to contribute throughout the session. Henry was a local police investigator and a father with young children who lived around the corner from Clara and Roger. Henry was a reserved but respected presence in the group as evidenced by other participants deferring to him to give his opinion. Winston, a father with two teenagers was a strong voice during the session; he led conversations confidently and was often the first person to respond to a question.

3. Findings

3.1 Money Matters

A theme shared across all groups was an emphasis on economic capital as a pre-condition to being able to envision a positive future. Sally from The Over 65 Group indicates this when she says 'If we haven't got any money what can we do without it?' A similar assumption is made in the Mothers Group when '...the people that have the money...' are identified as the 'others' who have the capacity to make decisions that affect the collective. This was further evidenced in the Mens Group with the comment, 'there would have to be bigger subsidies to make [solar power and recycling] more affordable.'

Economic struggle was experienced by many of the members in the groups recruited through the neighbourhood house. In the Mothers group Sandy expressed concern about the ability of her daughter and son-in-law to continue making the repayments on their recently purchased unit.

Sandy: You do, you worry about your kids. How much they've gotta do now just to buy their own place. And yet, what annoys me is, here's Heidi buying their unit, they're struggling to buy it...but they are buying it so they've got something for the kids you know, for the future and all of

that and they don't get no help.

A lack of financial security reduces capacity to participate in activities outside of the self-world. Patricia from The Over 65 Group makes the point during a conversation that not only was the idea of moving into politics challenging the familiar dispositions of her habitus, she was also giving much of her time to economic necessities and was restricted in participating in activities outside of what was essential.

Participants viewed economic wealth as an enabling factor in the participation of envisioning collective futures. Within Western neoliberal discourse, economic capital is one of the dominant ways that society is objectively organised (Bourdieu, 1977; Bourdieu & Wacquant, 2001; Chopra, 2003). Objective organisation facilitates subjective principles of organisation that encourage natural and social worlds to appear unequivocal (Bourdieu, 1977; Bourdieu & Wacquant, 2001; Chopra, 2003). To organise economically is in the doxa of capitalist society and the hierarchical accumulative principle of economic capital purports that those with more have more authority over societal directions (Chopra, 2003).

Additional support for the above explanation was evidenced among groups where economic struggle was less apparent. For example, The Higher Income Session suggested that politicians need to be paid more to 'encourage smart people'. Economic capital was identified by many of the groups as a pre-condition to either make changes at a collective level or to envision the way forward. However, Bourdieu considers that accumulation of economic capital is used as a vehicle for the accumulation of the necessary social and cultural capital required to operate successfully in any particular field; in this instance the field can be considered conceptually as referring to the collective future (Bourdieu, 1986, 1990b).

The structure of the power relation between groups is produced and guaranteed practically by the social mechanisms that encourage individuals to defer responsibilities to the structures accepted in the social world to have authority in that space (Bourdieu, 1977; Bourdieu et al., 1999). The majority of participants viewed the government as well as politicians as the responsible agents in ensuring the collective future. As will be discussed in the following section, the way responsibilities are perceived influences peoples participation in envisaging and creating a collective future.

3.2 Social place and power

When discussing personal futures, participants were generally very positive. People from across groups were focused on reaching retirement and would often envisage themselves spending more time with family, travelling and being 'time rich'. However, positivity remained largely absent across groups when asking participants to envisage collective futures. These findings are in support of previous research (Denniss & Davison, 2015; Hicks & Holden, 1995; Wallman, 1992).

When questioned about how people were creating a 'better' future, response from three participants of The Over 65 Group suggested they felt powerless to make any meaningful change for the future. Illustrated by the following dialogue between Patricia and Sherryl during a discussion on resource use over the next 35 years:

Sherryl: What can we do about it?

Patricia: We can whinge about it...well you've gotta get up there with 'em [politicians] if you want to have a say. It's no good us really complaining because we're not up there to do anything.

At a later point in the conversation Patricia puts forth the idea that to make a difference ‘we can put a garden in, but that’s about all’, demonstrating with the addition of ‘that’s about all’ that she recognises this as a small contribution and perhaps of little significance. Following on from this, Alfred offers ‘we are complaining about it’ as an action, which is said in the context of the groups conversation, but Wendy makes the point that she doesn’t believe that their complaints are heard by ‘...the right people [politicians]...’

This short extract illustrates that members of The Over 65 Group consider that to personally influence the collective, one must be the right person, or at least be able to speak with and make themselves’ heard to the right people. The right people as noted earlier are viewed as the government and politicians. This extract mimics similar conversations had in the Mothers Group, the Philippine Group and the Mens Group. Participants are demonstrating their ‘sense of one’s place’ and at the same time indicating their ‘sense of the other’s place’ through these statements (Bourdieu, 1977, p. 131). A sense of one’s place within a social order encompassed member’s conceptualisation of who was responsible for a collective future. “It’s this sense of one’s place which, in interactions, leads people...that is, ‘ordinary people’, to keep to their ‘ordinary’ place...These strategies...may be perfectly unconscious...” (Bourdieu, 1977, p. 128).

The ways in which participants negotiate personal and collective futures is through sense of place and beliefs that reflect an absorption of the neoliberalist doxa. The individual is responsible for their own life while the government is positioned to handle interests of society (Janoski, 1998; Salvaris, 2000). Conceptualising the collective future is recognised as the responsibility of the other, as indicated by Sally’s comment when she says ‘the government should be there to provide essential services like hospitals and all that, ambulances, things like that we need’. Embedded within this comment is the neo-liberalist triumph of citizen’s disengagement with issues outside of the self (Janoski 1998; Salvaris 2000). However, The Over 65 Group participants similarly to the Philippine Group maintain hopeful and empowered that to be a part of the collective is achievable, as evidenced by Sherryl’s comment when she reflects on the idea of running for election;

Interviewer: Why don’t you run as a politician [gesturing at Sherryl]

Sherryl: Oh I’m too old now. But I wished I had of done in a way. But I got to old before I thought of it.

The sense of place expressed by members of the Mothers Group and Mens Group was different to that of The Over 65 Group. The Over 65 Group discussed issues of broad relevance to society and their personal roles within these. By comparison, the Mothers Group held a similar position to members of the Mens Group and concentrated on issues that were of direct relevance to themselves and their families. Their sense of place was firmly grounded in notions of family and the local and questions of what it means to be together and live together. Shown in the following dialogue when members were asked about what the issues for the future are likely to be.

Interviewer: So if I was to ask what do you think the future is going to be like in another 10 or 15 years, what are gunna be the main things.

Sandy: Less jobs, I reckon there is gunna be less jobs.

Jessie and Heidi: Yeah, less jobs.

Heidi: More, ummm like technology and like more more ways and tricks to get people to spend more money on unuseable items...I think we have these issues now. But I think there is more of an opportunity for them to get out of hand.

Jessie: the worrying age of technology. With the phones for examples, you know like, iphone iphone iphone.

Sandy: Its gunna get sneakier how they make you do things.

Jessie: you know, to find ways to make you know to have more technology. Because there will be machines, you can see it now, like at the supermarket and stuff. Like umm yeah you know like bein able to serve yourself and mmm even simply down to tapping your card to pay without having to [inaudible]

Sandy: All those things too, even like just shopping online. You lose the face to face with people. Like groceries, get your groceries online. You lose face to face with people and the social interaction. You always see someone at the supermarket that you know. And you lose that because that and they use that as a tool for mothers as well.

The concept of 'other' was identified as the Government and discussed with an implicit acceptance of its role and power. Participants expressed the injustices felt personally as a consequence of the decisions made by the 'other'. Mens Group participants expressed concerns that the government was 'dictating their lives'; identifying injustices between 'white collar' workers who have more opportunities, for example, in growing and accessing superannuation. At the same time and common across both groups was an acceptance of, and an attempt to, justify their own circumstances with comments such as 'well there's people worse off than you isn't there'.

The focus of these participants was on the self and the local. The future of the collective was viewed as the power of the 'other'. This position is supported and encouraged by wider social discourses (Bourdieu & Wacquant, 2001; Chopra, 2003; Janoski, 1998). In contrast with The Over 65 Group, there was little imagining of being the 'other'. Personal and collective futures were interlinked in these groups through an understanding and concern for the local, reflected in the conversations with participants when envisaging futures.

Decision making for the future was spoken as a responsibility of the 'other' in the Philippine Group as well. Literature from citizenship theory posits this as common and reflects a dichotomy of passive/active citizenship (Janoski, 1998). However as understood using habitus, an agent's ability to be an active citizen is regulated by the capital they have access to and also the familiarity they have with the field of being a citizen (Bourdieu, 1984; 1977). The participants of the group alluded to having influence over those elected as decision maker, however being a decision maker was outside of what was comfortable or imaginable in their habitus. In contrast, actively preparing for and creating ones' personal future was referenced multiple times during the session. For example, Poppy notes that she is taking her daughter to swimming lessons in preparation for sea level rise, demonstrating how an issue of global scale is made meaningful and actioned in a field that is personally comfortable and known in the habitus.

The responses that people have to climate change have been the topic of interest in two other studies based in Tasmania (Denniss & Davison, 2015; Moore, 2012). Moore (2012) suggests that a sense of agency is a necessary attribute of environmental citizens to meet the ongoing commitment of an ecological sustainable society. While the present study did not focus on participants who identified with being environmental, the point that resonates from Moore's (2012) work is that a sense of agency is necessary to effect or to conceive of change (Macnaghten & Urry, 1998). Participants of the Philippine Group had a similar sense of place to The Over 65 Group in believing that the 'other' was changeable; however, a meaningful role beyond the voting ballot was unimagined. The following dialogue illustrates how members related to 'the other'.

Daria: Yeh, because the federal government are changing lots of policies and all this issues now that coming together.

Someone: The government can change

Someone: Because we are the government right

Daria: Yes but we need to elect another one.

Fiona: Hopefully it's a good one. We have the power to change the government.

Daria: Its actually nice here because we can do that. In the Philippines we can't really do much.

In contrast with other groups, the Higher Income Session participants often identified as 'decision maker'. Envisaging futures included 'we' as the responsible agents, in comparison to the other groups where 'they' (the government and/or people with money) were responsible. When Henry problematizes the under population of Tasmania he says; '...So moving into the next 10 years we have to work out as a state how to get people to come here' (emphasis added), demonstrating his sense of place as 'decision maker'. The resources, goods and powers that Henry and other participants of the session draw on enable the identification with what other groups had defined as 'other'. Similarly evidenced by Roger when he says "...the real population problem is replacement for Tasmania and *who* you are bringing in and looking after population with what we need to do. In some ways *who* you bring in, where you put them and what they do becomes important... (Emphasis added)".

Reay (1995) observed a similar phenomenon as what has been described in this paper. Using habitus as method, Girls in two different primary schools were found to relate to the characters in a computer game differently (Reay, 1995). At one school, girls playing the game would identify with the servant girl character, while at the other school, girls would identify as the mistress of the servant girl. The girls from each of the schools illustrated different relationships to goods, services and powers through their relations with the characters of the game, similarly to the participants from the different groups identified in this study.

Having a sense of place grounded in the possibility of 'we' encouraged creativity to envisaging the future. Illustrated by Winston when he expressed his thoughts on making Tasmania a 'viable' state; 'To turn this state around financially, having another under sea bass link cable because we are limited in what we can transfer... Get rid of all the power hungry industry. Just get rid of them. Pay every employee 50/100 thousand to go on a holiday. You could sell 800 to a billion dollars power down another line every year...'. The Higher Income Session participants spoke authoritatively and as decision maker; however, the praxis accompanying such speak needs to be interrogated as there was no evidence that the higher income session participants were involved in any advocacy in the political realm.

Costas and Grey (2014, p.931) note that temporality can be used as a subversive attack on disciplinary power; "in cases of imaginary future selves the future provides subjects with a powerful space for constructing their resistant selves". Yet, there is no evidence of any action that influenced political change (e.g. a statement of something the participant had done). This suggests that the imaginaries of participants regarding power are significant but the practice is not evident: resistance is only evidenced as verbal (to the researcher) and devoid of action. In summary in this study the participants could hardly be described as resistant in praxis. In fact, the findings suggest that neo-liberalism is prolific across social contexts and has pacified agency in praxis outside of selfhood (Chopra, 2003).

4. Conclusions

The concept of sustainable development establishes intergenerational needs as a priority. Inherent to this priority is the ability to envisage a sustainable future. Exploring the ways in which people

negotiate ideas of self specifically in relation to questions of a communal future across socially diverse contexts has been the focus of this paper.

Evidenced through the above discussions, people from varied social contexts position themselves in the social world differently. This implicates how people participate and make sense of the future. Sense of place can be a useful way of understanding the negotiations that occur between personal and collective futures.

Sense of place is for the most part an unconscious positioning by an actor, informed by and responsive to a persons' habitus. The majority of participants from across the spectra of social contexts didn't feel that it was their place to envisage collective futures beyond the context of their immediate lives. Where envisaging futures remained grounded in the self, issues global in scale were made meaningful and actioned in a field that was personally comfortable and known in the habitus.

Common across social contexts was the way that participants knew the world through the economic system, to the extent that this was how participants made meaning in the world. Similarities in doxic understandings were shown to materialize most strongly in discussions on aspirations for personal futures. Within this way of knowing, insinuated power relations restricted creativity and possibility for envisaging a collective future for many of the participants. In effect, participants alluded to economic wealth as an eligibility criterion for envisaging futures beyond the self.

However, there were some participants that evidenced a sense of agency and were empowered in envisaging collective futures. Positioning oneself as decision maker tended to result in positive and creative collective imaginaries. Although the 'effect' of positive collective imaginaries in a tangible sense does need further investigating.

Finally, this paper has explored how sense of place mediates the negotiations that occur between personal and collective futures. However this summation of positioning is by no means fixed. What this paper has hoped to achieve is an appreciation for the diversity in the negotiations that occur for people when envisaging futures.

References

- Australian Bureau of Statistics. (2011). 2033.0.55.001 - Census of Population and Housing: Socio-Economic Indexes for Areas (SEIFA). Australia: Commonwealth of Australia.
- Australian Bureau of Statistics. 2013. Feature article: Households and renewable energy. 1301.0 - Year Book Australia, 2009–10. <http://www.abs.gov.au/AUSSTATS/abs@.nsf/Lookup/1301.0Chapter2082009%E2%80%9310> (accessed 02.02.2016).
- Bleicher, J., & Bleicher, J., 1980. Contemporary hermeneutics: Hermeneutics as method, philosophy and critique. Routledge & Kegan Paul, London.
- Bourdieu, P., 1977. Outline of a Theory of Practice, Vol. 16. Cambridge university press.
- Bourdieu, P., 1984. Distinction a social critique of the judgement of taste. Routledge and Kegan Paul Ltd., Great Britain.
- Bourdieu, P., 1986. The forms of capital, in: Richardson, J.E. (Ed.), Handbook of theory of research for the sociology of education, Greenwood Press, pp. 46 - 58.
- Bourdieu, P., 1989. Social space and symbolic power. Sociological theory, 7(1), 14-25.
- Bourdieu, P., (1990a). In other words. Stanford University Press, California.

- Bourdieu, P., (1990b). *The logic of practice*. Stanford University Press, California.
- Bourdieu, P., 1998. A reasoned utopia and economic fatalism. *New left review*, 125-130.
- Bourdieu, P., & Wacquant, L., 2001. Neoliberal newspeak: notes on the new planetary vulgate. *Radical philosophy*, 105, 2-5.
- Cheng, A. S., Kruger, L. E., & Daniels, S. E., 2003. Place as an Integrating Concept in Natural Resource Politics: Propositions for a Social Science Research Agenda. *Society & Natural Resources*, 16(2), 87-104.
- Chopra, R., 2003. Neoliberalism as doxa: Bourdieu's theory of the state and the contemporary Indian discourse on globalization and liberalization. *Cultural studies*, 17(3-4), 419-444.
- Costas, J., & Grey, C., 2014. The temporality of power and the power of temporality: imaginary future selves in professional service firms. *Organization Studies*, 35(6), 909-937.
- Debesay, J., Nåden, D., & Slettebo, Å., 2008. How do we close the hermeneutic circle? A Gadamerian approach to justification in interpretation in qualitative studies. *Nursing Inquiry*, 15(1), 57-66.
- Dobson, A., 1999. *Fairness and futurity*. Oxford University Press, Oxford.
- Ezzy, D., 2002. *Qualitative Analysis, Practice and Innovation*. Allen & Unwin, Wellington.
- Foster, J. L. H., 2003. Beyond Otherness: Controllability and Location in Mental Health Service Clients; Representations of Mental Health Problems. *Journal of Health Psychology*, 8(5), 632-644.
- Gadamer, H., 2008. *Philosophical hermeneutics*. University of California Press.
- Gadamer, H., Malpas, J., Arnswald, U., & Kertscher, J., 2002. *Gadamer's century essays in honor of Hans-Georg Gadamer*. MIT Press, Cambridge.
- Gale, F., 2013. Tasmanian forests agreement: deeply flawed, worth backing. *The Conversation*, <http://theconversation.com/tasmanian-forests-agreement-deeply-flawed-worth-backing-14035> (accessed 08.05.2016)
- Geanellos, R., 2000. Exploring Ricoeur's hermeneutic theory of interpretation as a method of analysing research texts. *Nursing Inquiry*, 7(2), 112-119.
- Gruenewald, D. A., 2003. The best of both worlds: A critical pedagogy of place. *Educational Researcher*, 32(4), 3-12.
- Hicks, & Holden, C., 1995. *Visions of the future*. Trentham Books, Great Britain.
- Hudson, L. A., & Ozanne, J. L., 1988. Alternative ways of seeking knowledge in consumer research. *Journal of Consumer Research*, 14(4), 508-521.
- Ireland, E., Kerr, D., Lopes, J., & Nelson, J., (2006). *Active Citizenship and Young People: Opportunities, Experiences and Challenges in and beyond School Citizenship Education Longitudinal Study: Fourth Annual Report*. Research Report RR732, ERIC.
- Janoski, T., 1998. *Citizenship and civil society: A framework of rights and obligations in liberal, traditional, and social democratic regimes*. Cambridge University Press.
- Kerski, J. J., Demirci, A., & Milson, A. J., 2013. The Global Landscape of GIS in Secondary Education. *Journal of Geography*, 112(6), 232-247.
- Liamputtong, P., & Ezzy, D., 2005. *Qualitative research methods*. Oxford University Press, Melbourne.
- Longhurst, R., 2010. Semi-structured interviews and focus groups, in Clifford, N., French S., and Valentine, G., (Eds.), *Key methods in geography*. Sage, Cornwall, pp. 103-115.
- Macnaghten, P., & Urry, J., 1998. *Contested natures*. 54, Sage.
- Moore, S., 2012. *Climate change and environmental citizenship: transition to a post-consumerist*

future? Doctoral dissertation, University of Tasmania.

Mueller-Vollmer, K., 1985. *The Hermeneutics reader, texts of the German tradition from the Enlightenment to the present.* Continuum, New York.

Prasad, A., 2002. The contest over meaning: Hermeneutics as an interpretive methodology for understanding texts. *Organizational Research Methods*, 5(1), 12-33.

Rasmussen, S., 2011. Encountering being, identity, and otherness: Reconsidering Guimarães's "Amerindian anthropology and cultural psychology" and Amerindian perspectivism, with insights from anthropology of religion, African humanities, and collaborative ethnography. *Culture & Psychology*, 17(2), 159-176.

Reay, D., 1995. 'They Employ Cleaners to Do That': Habitus in the Primary Classroom. *British Journal of Sociology of Education*, 16(3), 353-371.

Ricoeur, P., 1984. The Model of the Text: Meaningful Action Considered As a Text. *Social Research*, 51(1/2), 185-218.

Salvaris, M., (2000). *Community and social indicators. how citizens can measure progress.* Institute for Social Research, Swinburne Institute of Technology, Australia.

Schultz, P. W., & Zelezny, L., 2003. Reframing environmental messages to be congruent with American values. *Human ecology review*, 10(2), 126-136.

Schulze, U., Gryl, I., & Kanwischer, D., 2014. Spatial citizenship: Creating a curriculum for teacher education. *GI_Forum*, 2, 230-241.

Stratford, E. 2006. Technologies of agency and performance: Tasmania Together and the constitution of harmonious island identity. *Geoforum*, 37(2), 273-286

Stratford, E., Armstrong, D., & Jaskolski, M., 2003. Relational Spaces and the Geopolitics of Community Participation in Two Tasmanian Local Governments: A Case for Agonistic Pluralism? *Transactions of the Institute of British Geographers*, 28(4), 461-472.

Vicsek, L., 2007. A scheme for analyzing the results of focus groups. *International Journal of Qualitative Methods*, 6(4), 20-34.

Wade-Benzoni, K. A., Tost, L. P., Hernandez, M., & Larrick, R. P., 2012. It's Only a Matter of Time: Death, Legacies, and Intergenerational Decisions. *Psychological Science*, 23(7), 704-709.

Wallman, S., 1992. *Contemporary futures.* Routledge, Great Britain.

West, J., 2013. Obstacles to progress: What's wrong with Tasmania really? <http://theconversation.com/obstacles-to-progress-whats-wrong-with-tasmania-really-11330> (accessed 20.04.2016)

Wise, P., (2014). *Grow your own: the potential value and impacts of residential and community food gardening.* The Australia Institute, Canberra.

The Rio de Janeiro's Paradox: A comparison between the determinants of subjective well-being of three distinct neighborhoods

Monique dos Santos Barreto, Roldan Muradian, Claude Cohen

Abstract

According to the most known definition of sustainable development, that of the Our Common Future Report, it consists in meeting “the needs of the present without compromising the ability of future generations to meet their own needs”. Different literatures argue that what really matters in life and should be one of the main goals of the development process (and therefore needs to be sustained) is the happiness and/or the satisfaction/enjoyment of life. Despite of that, many authors try to associate this subjective wellbeing with economic or other objective matters. There are evidences, however, that Brazil and other countries of Latin America have high levels of happiness and satisfaction while have not that high performance in economic and other objective measures, such as: education, life expectation, security, environment, health, etc. In this paper we try to investigate the existence of such paradox by narrowing our analysis to three distinct areas of the Rio de Janeiro city: the Morro dos Prazeres Complex, which is a slum under pacification process; the neighborhood of Campo Grande, the most populous district; and Copacabana and Ipanema, an area of high economic level. This paper seeks to enhance our understanding of the paradox that Rio de Janeiro is through the comparison of these three cases. We realized a Subjective Wellbeing Survey during the period of August of 2015 to May 2016 with a sample of 615 individuals, in which we confirm the existence of this paradox. Then we used an Ordered Probit model to try to identify the main determinants of our dependent variable, satisfaction with life as a whole. Some of the hypotheses we analyzed are: the ability of individuals to adapt or conform to adverse situations; the influence of natural, social and economic factors; and how the cultural capital introjected, based on which one apprehends and analyzes the reality, may represent a predisposition to self-report as happy and satisfied. The aim is therefore to deepen the discussion about the importance of considering subjective indicators. We confirmed the existence of the paradox between objective and subjective indicators, and verified that although there are some features that can help us to explain a certain predisposition to give a positive response, some of the determinants are different for the distinct neighborhoods we are analyzing, which can be a consequence of different cultural aspects due to the differences in socioeconomic conditions, among other things. We conclude that the subjective measures should be considered as a way to complement the development analysis but they cannot be the only measure once people do not take essential things into consideration. We propose that educational policies may be a good starting point to overcome these factors that distract individuals ("pseudo-satisfiers") from factors that are really important, such as environmental and health conditions, a reliable government, etc.; and to make the self-reported satisfaction a more robust tool.

Changing consumption through self-efficacy and community

Danielle Eiseman, Iain Black, Katharine Sang

Abstract

Background context. This paper builds on online community and social practice research by examining the role of self-efficacy in the uptake of sustainable consumption. It further explores the role of an online community in reinforcing self-efficacy and thus higher effort pro-environmental behaviours. Both esteem and efficacy are described as cognitive processes, which serve to motivate the undertaking of certain behavioural decisions. Esteem is repeatedly defined as a self-monitoring mechanism based on one's status position and prestige (Judge and Bono, 2001; Buss, 2007; Ivanic, 2015). Stemming from the evolutionary theory of social attention holding potential (Buss, 2007), self-esteem is a subjective meter of other people's perceptions based on social acceptance. Comparatively, self-efficacy relates to perceived control and expected outcomes or performance of certain behaviours (Bandura, 1977; Judge and Bono, 2001). Within the literature, esteem is considered to be an underlying factor in perceived prestige (Buss, 2007; Cheng et al., 2010; Ivanic, 2015). Self-efficacy, as demonstrated within this research, appears to be a greater predictor of behaviour, not only in self-reported surveys but also as an emergent pattern among interviewees. Bandura (1977) further indicates in his theory on self-efficacy that the level of perceived self-efficacy determines the level of effort and length of time an individual will engage in certain types of behaviour. Thus, the higher the perceived self-efficacy, the greater effort put forth in the behaviour and the more time devoted to that behaviour. **Aim.** This research demonstrates how self-efficacy and community could lead to the adoption of higher effort PEBs. **Methods/approach.** This research uses netnography to explore the cognitive processes behind pro-environmental decisions among an Instagram community called the Litterati. The netnography consisted of participant observation, informal interactions and semi-structured interviews. The participant observation was conducted for a period of 15 months and 106 members were followed within Instagram. Over that period of time, this author was able to build relationships with community members thus making it easy to acquire interview participants. The data collected was analysed both visually and retroductively, and applied to existing theory on brand communities, self-efficacy and socially motivated behaviour. **Results and conclusions.** Notions of self-efficacy, visibility and community in the online world extend the current literature on community and social practice. The data indicates a strong relationship between self-efficacy and pro-environmental behavior, compared to other predictors such as personality and perceived social status. As perceived self-efficacy and feelings of community increase participants adopt higher effort behaviours, especially when it came to product choices. This relationship could benefit from further exploration, especially into the core factors that contribute to self-efficacy and how to effectively apply it to policy and marketing communications.

Keywords: Sustainable consumption, self-efficacy, self-esteem, collectivism, online community

The role of trust and uncertainty in the start-up phase of local renewable energy initiatives: A mixed method analysis

Fleur Goedkoop, Jacob Dijkstra, Andreas Flache

Abstract

This paper looks at the influence of trust and uncertainty in the start-up phase of bottom-up local renewable energy initiatives in the Netherlands. In bottom-up energy initiatives, citizens take the lead to save and self-produce energy sustainably within their communities. Generally, a smaller group takes the lead in these community initiatives. The focus of this paper is twofold. First it looks at the role of interpersonal and institutional trust in facilitating the coordination between community members in this first phase. Second, it investigates in-depth what the motivations of team members are to take the lead, once a team has been established. Earlier research indicates that trust determines people's environmental behavior and is important for fostering co-operation. However, trust might be multidimensional concept especially when considering local initiatives instead of centralized ones. We investigated the role of trust in the government, green merchants and, importantly, trust in specific others in the community. It was hypothesized that trust in government could decrease (instead of increase) in this case the likelihood of people joining community initiatives, since people expect the government to solve environmental problems. Furthermore, trust in specific others might also have a negative effect instead of the earlier mentioned positive effect. Olson (1965) coined the phrase "the exploitation of the great by the small", arguing that some people with a very high interest will always provide the good while others will free-ride because they know the highly interested people will contribute anyway. Finally, diving in to the mechanisms underlying these possible effects, and, due to the fact that we look at highly innovative technologies and initiatives, uncertainty might play an important moderating role here. Data are used from three villages and one neighborhood in the Northern part of the Netherlands (N=265). A mixed method approach is used. To investigate all community members, questionnaires are used and for the in-depth knowledge about the team members qualitative semi-structured interviews with team members and observations of their monthly meetings were conducted. Results suggest that for the average team member trust in the government and green merchants has a positive effect on acting pro-environmentally whereas trust in specific others within the community has a negative effect on their willingness to join these initiatives. This counters earlier findings, mainly from qualitative case studies with a main focus only on the initiative takers. In addition, these different findings show that trust is indeed a multidimensional concept. For the different teams, lower levels of trust seem related to more willingness to join. In conclusion, these findings give support for what Olsen called "the exploitation of the great by the small"; A particularly small team of highly resourceful people, who value the public good most, take the lead, whereas the rest of the community awaits action at this first stage.

Keywords: Local renewable energy, trust, uncertainty, collective action, team of initiators, community members, mixed method

Theme 6 posters

Cultural Values and Trust in Agents and Technology in the Anticipation of Change to a Dynamic Prices Grid

Maria Breda

Abstract

The study addresses social-cultural values and societal risks' perceptions influence upon trust in agents and trust in IT, and intention to rely upon digitalized grid with dynamic prices and types of auxiliary technologies for managing electricity consumption at home. CT theory predicts different groups' risk perceptions and polarized attitude to solutions to environmental problems. The exploratory study aims to identify Clusters of respondents in set of measures of myths of nature and risks perception, and assess differences in trust in agents, trust IT and relying upon devices in managing electricity at home. It predicted that groups endorsing nature as fragile trust IT less, favour less automation, comparatively to those supporting Nature tolerant, who credit specialists for averting harmful environmental impacts, or support Nature benevolent, adhering to solutions in light of economic gains. Respondents (571) were given descriptions of smart meters, dynamic prices grid and several auxiliary technologies, and answered a questionnaire comprising demographics, saving practices, beliefs, trust in several agents, technology trust, ratings of willingness to adhere to dynamic prices and adopt different devices, ratings of phrases about myths of nature and of concerns with several risks. Principal components analysis of several blocks of variables, hierarchical followed by k-means cluster analysis (retaining 8 clusters) on the combined measures of concerns of risks and myths, and pairwise comparisons with Bonferroni correction t tests were run to determine differences among clusters. Multiple regression analysis (stepwise method) were performed of the intention to adopt technical devices in the new grid upon agents and IT-trust. PC analysis yielded 3 components explaining 72,87% variance: social conflicts, environmental and economic concerns. Correlations with myths yielded some significant moderate coefficients. Nature fragile is endorsed by a large number, frequently combined with tolerant, and even with benevolent nature. While global warming was a concern for many, only one cluster rated all environmental risks higher than others. Pairwise comparison among groups for agents' trust, yielded significant differences, concerning energy providers and consumer organizations. Trust in agents proved to be higher in clusters with high concerns across risks. Trust IT in relying on use at home displayed a similar pattern. Distrust feelings about the dynamic prices grid distinguished clusters less economically concerned,. Beliefs that progress in science, technology and society espoused by clusters CI7 and 8, in contrast to CI 5 and 1 suggest different ground for facing technology for less economically, more environmentally concerned, respondents. Four Clusters were selected regression analyses of determinants of intentions to rely on a solution comprising adherence to dynamic prices, and adoption of the three technical devices. CI 7 displays the highest means in intention variables, followed by CI 8, CI4 and CI 6 in the lower third, and CI5 the lowest. Models explained moderate to high proportion of variance (R2 from 0,40 to 0,74). Trust in agents and in IT is interpreted as driven by economic concern, and compatibility of fragility and tolerance of nature.

Keywords: Cultural values; Myths of nature; Risk perceptions Agent trust; IT_trust

Extravagant Consumption and its Implications for Sustainability: The Case of the Ultra High Net Worth Emirati

Amer Kamleh and Iain Black

Abstract

An abundance of wealth has been bestowed on the people of the Arabian Peninsula countries due to the exploitation of oil and gas resources. This allowed United Arab Emirates (UAE), in particular, to rapidly become recognized as a huge market for the consumption and display of luxury goods as particularly evident from the “extravagant” consumption displayed by Emirati Ultra High Net Worth Individuals (UHNWI). For a befitting example, a recent Wealth-X study shows that ultra-wealthy Middle-Eastern private jet owners spend a larger percentage of their wealth on buying more expensive planes (on average) than their global counterparts. While consumption of luxury goods has been widely discussed in consumer behaviour literature, it is important to understand the extravagant consumption behaviour of the superrich, as the network-effect they initiate with the masses of consumers has been implicated in generating high levels of over-consumption which could have detrimental consequences on environmental and social sustainability. This is because as the much larger number of middle class consumers aspire to replicate the consumption behaviour of the ultra-wealthy, the damage that befalls financial and natural resources will greatly escalate. Veblen’s Conspicuous Consumption theory suggests that the super-rich set the trend in consumption for the masses of average consumers who imitate them in hopes of attaining a measure of their glamorous lifestyle. However, recent research also examines how the consumption of the “elite” is driven by those traditionally seen as followers. Understanding these relationships will provide important lessons as to how consumer tastes and high levels of consumer demand are formed and satisfied. The implications this extravagant consumption has on the already unbalanced consumption practiced in this country will be presented. This poster will use a Consumer Culture Theory (CCT) approach to present a conceptualisation of the “extravagant consumption” behaviour practiced by UHNWIs in the UAE. CCT is described as “a family of theoretical perspectives that address the dynamic relationships between consumer actions, the marketplace, and cultural meanings” (Arnould and Thompson, 2005, p. 868). CCT emphasises the role cultural context plays in shaping our consumption behaviours. Three of the four main CCT streams will be employed to this end, namely, consumer identity projects, sociohistoric patterning of consumption and, finally, massmediated marketplace ideologies and consumers’ interpretive strategies. The first will help in examining how an individual belonging to this specific slice of consumers negotiates conflicting and contradicting ideals as he/she tries to establish a distinguished self. The second will provide a basis for analysing social and cultural structures (for example, being members of a Muslim community which represents a formal social group, as well as belonging to the elite class) which might influence their consumption choices and behaviours. The final CCT stream is used to examine whether UHNW Emiratis adopt capitalist marketplace ideologies or, influenced by Islam’s emphasis on modesty, choose to resist them. All of the above is especially relevant considering that the UAE continues to develop and change both economically and socially.

Keywords: Sustainability, conspicuous consumption, extravagant consumption, Consumer Culture Theory, Ultra High Net Worth Individuals.

References

- Arnould, E. and Thompson, C. (2005). ‘Consumer Culture Theory (CCT): Twenty Years of Research’. *Journal of Consumer Research* [Online]. 31(4): 868-882. JSTOR Journals, EBSCOhost. [Accessed 15/6/2015].
- Veblen, T. (1925) *The Theory of The Leisure Class*. n.p.: Allen and Unwin, 1925.
- Wealthx.com. (2015). *Ultra Wealthy In United Arab Emirates Control US\$255 Billion Of Private Wealth* [Online]. Available at: <http://www.wealthx.com/articles/2015/ultra-wealthyin-united-arab-emirates-control-us255-billion-of-private-wealth/>. [Accessed 21/10/2015].
- Wealth-X and WingX Advance. (nd). *Private Aviation in the Middle East: Owner Profile, Trends and Business Opportunity* [Online]. Available at: [Http://www.wealthx.com/wpcontent/uploads/2015/11/Wealth-X-and-WINGX-Advance-Private-Aviation-in-the-MiddleEast1.pdf](http://www.wealthx.com/wpcontent/uploads/2015/11/Wealth-X-and-WINGX-Advance-Private-Aviation-in-the-MiddleEast1.pdf). [Accessed 4/11/2015].

Perceptions of Relying Upon Smart Meters Within a Digitalized Grid With Dynamic Prices and of Using Technology in Managing Consumption of Electricity at Home: The Role Of Trust

Maria Breda and Lisete Monica

Abstract

This work concurs to a psychosocial framework of energy efficiency. Behaviors are challenged by new contexts, “Intelligent efficiency” concept of intertwined technological and behavioral responses. IT application to the power grid grounds demand response, with predicted efficiency gains. It is susceptible to arise consumer uncertainty, risk feelings, given potential harms along with beneficial outcomes. We propose that trust concepts and multidimensional models from general and trust in IT literatures, will be applicable, affording prediction of intention to adhere to dynamic prices and rely on classes of technical devices to manage electricity use at home. Trust-IT model was validated in studies of online transactions, IT adoption, post-adoption exploration and use. This paper deals with trust cognitions, the initial phase of trust. Because this represented a new domain of application, it aims at modelling the most relevant concepts, for enhancing prediction. It also aims to integrate and compare the roles of trust in moral agents (research institutions, consumers’ organizations, electricity providers) and IT-trust in the intention to rely on technologically-infused solutions (in this study only dynamic prices grid, monitors, programmable plugs and thermostats). Respondents (571) enrolled in a market firm answered the questionnaire anonymously. Final sample size was 418, complete responses free of outliers. Respondents were given descriptions of smart meters, dynamic prices grid and several auxiliary technological devices. The questionnaire comprised demographics, questions about home, saving practices, beliefs, trust in several agents, technology trust, experience with kinds of technology, ratings of willingness to adhere to dynamic prices and adopt different devices. Exploratory and confirmatory factor analyses were performed with XLSTAT and Partial Least Squares Equation Modelling PLSPM, to adjust a measurement model and test structural models. Structural models with solely IT-trust and comprising also moral agents trust were estimated and assessed. Results supported validity of two trust-IT constructs: a) propensity to believe that technologies are generally functional, take stance of trying, believing that science, technology, and society progress makes new uses normal (Propensity and Normalcy_general); b) expecting proposed kinds of devices will be functional for this purpose, will be comfortable and work well (Outcome expectations and Affective anticipations for the devices). Concerning paths from IT-trust cognitions to intentions, Propensity_and Normalcy_general and Outcome_and_Affective_Anticipations_for the devices ($\beta=0,37$) had significant paths, together explaining 41,6% of variance in Intention. Results support direct ($\beta =0,34$) and indirect (0,23) effects from Propensity and Normalcy_general. The results didn’t support direct nor indirect effects of agent trust upon Intention. Agents trust affected IT-trust. To Trust Propensity, Trust in researchers yielded $\beta =0,327$; and Trust in Consumer Orgs, $\beta =0,248$. To Outcome and Affective expectations, direct and indirect effects emerged, from Trust_researchers; and from Trust_Consumer Org. Trust-IT propensity and beliefs about devices retained sole predictive power for intentions, in line with McKnight’s model paths. Moral agents’ trust contribution to trust-IT existed but relation to intentions was overruled. These results are compatible with the notion that consumers reason prospective decisions about technology use by accessing appraisals and propensities to trust IT, in a domain of application in private sphere.

Keywords: Energy efficiency; Agent Trust; Trust_IT; Rely upon technology at home

Predicting behaviour - energy efficiency types in organizational settings

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Abstract

Targets of the European Union prescribe nearly-zero energy by the end of 2018 for all new buildings used and owned by public authorities. Although sophisticated energy efficient construction and technology is available, energy-related behavior of the building users often counteracts efficiency efforts. Thus, there is a need to build general awareness for energy efficiency among building users and to identify effective approaches how to engage building users in everyday energy saving. A lot of studies have been conducted in the field of energy-related user behaviour with the aim to investigate predictors or to examine the effectiveness of intervention strategies, which aim at changing behaviour. Most of these studies address energy consumption in the private household context. We draw on these studies as proxies to inform our understanding about predictors and behaviour in the organizational context. The difference between the residential and the organizational setting is, that among large groups of co-workers who jointly use appliances and energy systems, individual responsibility diffuses in social dilemma dynamics, although collective action would be necessary to reduce energy consumption. Indeed, previous studies did not sufficiently elaborate on public buildings in the organizational setting. Therefore, there is a call for more work on how community aspects influence energy-related behaviour. We developed own items (individual, group and organizational goal as well as social perceived behavioural control) which take the social dilemma regarding the need of collective action for energy efficient behaviour, especially in the organizational setting, into account. The aim is the investigation of occupants' energy-related behaviour in the organizational context in order to identify energy efficiency types. Based on these types we examine different behavioural determinants (already established ones as well as newly self-developed ones). By conducting a survey we examine energy-related behaviour (e.g. use of heating, cooling, lights and appliances) behavioural determinants (based on the Theory of Planned Behaviour and the Norm Activation Model) and socio-demographic characteristics of users in different buildings related to organizational settings. Energy efficiency types as well as their description in terms of characteristics in behavioural determinants are identified by cluster analysis. Three energy efficiency types ranging from very inefficient to efficient in the workplace as well as the academic organizational context were identified also differing in their characterization of behavioural determinants. Determinants' scales dealing with the social dimension consistently show that the least efficient types have lowest values meaning that this type does not have the impression of an organizational or group goal regarding energy efficiency and that there is no social pressure perceived to behave energy efficiently. The identification of energy efficiency types with relevant behavioural determinants leads to substantive points of references to create concrete intervention strategies for different target groups stimulating behavioural changes towards energy efficiency in organizational settings.

Sustainability of the Energy System: Transition through Stakeholder Activation

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Abstract

Behaviour, practices and culture constitute a powerful human factor in the energy system; in particular the interactions between technologies, practices and norms lock us in to certain patterns of (often inefficient) energy use. This poster presents an overview of the ENTRUST project, which is actively researching how the human factor in the energy system can be leveraged to deliver a more sustainable, low carbon paradigm. Means through which situated, practice-based understandings of new technology, behaviour and integrated socio-technical interventions can best support a transition to a low carbon energy system are investigated. The project aims to strategically promote energy transition by means of mobilising social actors and coordinating the actions of dispersed agents. To change behaviour, it needs to be firstly understood. A practice-based understanding of the social aspects of the energy system is applied to deliver new understandings of energy-related behaviours. The research is framed according to the following research questions: How are householders changing their practices (or likely to change them) in response to various demand management pricing and technology programmes? What role do behaviour change initiatives and other non-technical interventions play in a low carbon transition? What is the role of narrative framing in motivating uptake of energy efficiency options? How can practice based approaches be best applied and more widely disseminated? Initial outcomes from community engagement from two study countries viz. the UK (urban, social housing community) and in Ireland (rural, mixed ownership) are reported on. In addition, this paper reports on the development of a Participatory-Action-Research methodological framework across the selected communities, aiming to empower members to contribute to the shaping of their energy system in ways from which a low carbon paradigm will be forthcoming. Key community actor awareness, attitudes, risk perception, consumption behaviour and investment decisions are addressed, providing an understanding of the connections between integrated system components and actors, including interactions between these. By developing new insights into Europe's energy system, including key actors and their intersections, technologies, markets, policies, innovations, ENTRUST provides new understanding of how human practice and behaviour around energy is shaped by both technological systems and socio-demographic factors (especially gender, age and socio-economic status). The means through which new technologies and energy system stakeholders can be engaged to actively shape – and progressively interact with – the energy system in ways that successfully deliver a low carbon paradigm are identified.

Keywords: Sustainability; transitions; community; behaviour change; practices

The importance of reducing food waste in restaurants for the minimization of environmental impacts

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Abstract

The restaurants produce large-scale meals, generating large amounts of solid waste, which if not properly managed cause environmental and sanitary problems. It is generated various types of waste during the production process, mainly the organic waste, due to the food waste which occurs in these restaurants. So, it is important to search mechanisms that can contribute to the environmental conservation, such as waste reduction, low-pollution, and saving resources, associated to green education and social responsibility. Therefore, the objective of this study was to evaluate the food waste in a University Restaurant, aiming to create environmental management programs aimed to minimize the generation of waste and improve the environmental quality of the services provided by the restaurant. The methodology involved the quantification of the waste generated in the production of the meals. The losses were divided into different types: preparation losses, which are mostly seeds, peel, etc. from fruits and vegetables; service waste, which are prepared food never served; and customer leftovers, which are left on serving dishes. The environmental management programs were developed based on the obtained results. The results indicate that, in the studied period, it was produced 18,083.08 kilograms of food in the University Restaurant, of which 557.7 kg were service waste and 3,228.95 kg were customer leftovers. It was observed that the pre-preparation food process (handling food and sanitizing food) is well controlled and conducted in order to make the most of raw material and there aren't significant food losses at this stage. The percentage of service waste was reducing throughout the research (4.90 to 2.42%), indicating improvement in the meal planning. Unfortunately, the customer leftovers have been above 17%; thus the performance of the University Restaurant service can be considered critical, demonstrating flaws in the distribution of meals. The University Restaurant's users put larger quantities than their ability to consumption and don't have awareness to the problem of food waste and the subsequent generation of waste. For improvement of this condition, it was proposed the following programs: selective collection, composting of organic waste, solid wastes reduction and environmental education. It is hoped that the adoption of these programs can improve the waste management and sensitize users and employees to reduce waste.

Keywords: food waste, university restaurant, environmental management

1. Introduction

Food is lost or wasted throughout the supply chain that starts with farm production and ends when food is consumed (Engström and Carlsson-Kanyama, 2005; FAO, 2011). According to Beretta et al. (2012) food loss over the entire food value chain represents a significant loss of resources invested in food production, transport and storage. Resources as land, energy, fresh water, agricultural inputs are limited in nature. These resources should be applied efficiently and sustainably.

According to Food and Agriculture Organization of the United States – FAO (2011) about one-third of the edible parts of food produced for human consumption gets lost or wasted in the world, which is about 1.3 billion ton per year.

As specified by Brasília (2009) Brazil is among the 10 countries that produces more food waste in the world, about 35% of all agricultural production is wasted, this means that more than 10 million

tons of food could feed 54 million Brazilians that are living below the poverty line.

Collison and Colwill (1987) related that a large amount of edible food is wasted globally, but the amount is particularly high in restaurants, hotels and public houses.

Households and food service operations like restaurants, cafeterias, fast food and caterers, together lost 86 million pounds of food in 2008, equivalent to 19 percent of the total U.S. retail-level food supply (Gunders, 2012).

According to Gunders (2012) approximately 4 to 10 percent of food purchased by restaurants becomes kitchen loss, both edible and inedible, before reaching the consumer, and another significant portion is served but never eaten. Other reasons of waste food service include large portions, inflexibility of chain-store management, and pressure to maintain enough food supply to offer extensive menu choices at all times, furthermore, staff behavior and kitchen culture can contribute to food waste.

Scientific studies highlight the importance about food waste in all its complexity, its underlying reasons and the consequences related not only to social, ethical and nutritional aspects, but also to health and environmental issues, since the enormous amount of unconsumed food contributes strongly to global warming. Food waste is a issue that it is complex and interacts with multiple aspects, which requires organizations to address issues relating to the impacts that occur on a global basis with regard to the adequacy of the natural systems, the control of natural resources, the loss of biodiversity, climate change, soil and erosion, the reduction in scarce resources such as agricultural land and water, and the pollution caused by the use of chemicals (Lucifero, 2016).

The production of large-scale meals generates many types of solid waste, majority organic, often caused by losses that occur in these establishments.

According to Pirani and Arafat (2014) the issue of appropriate waste management must be addressed not only by the staff of the establishments at the different stages of operation, but also the administration must draw out strategies which would encourage customers to generate less waste.

Jibril et al. (2012) mentioned that solid waste management comprises of many drivers that can be used to reduce the volumes of solid waste, such reusing and recycling materials, composting, and source reduction.

Environmental indicators and systems of environmental indicators represent an instrument for implementing various tasks in the area of environmental protection, controlling this process and searching for optimal potential. Environmental management instruments are used for environmental management in an enterprise to identify the enterprise's impacts and effects on the environment and indicate the possibilities to minimize them. The choice of instruments and scope of their use in an enterprise may be further subject to modifications, in order to meet constantly changing requirements (Brzozowska et al., 2015).

Therefore, this study was conducted at the FCT/UNESP University Restaurant – São Paulo, Brazil and the aim of this paper was a diagnosis about the solid waste generation in the restaurant and researching the reasons for these, besides of proposing environmental management programs based on the principles of conserving natural resources, minimizing environmental impacts, reducing the generation of solid waste and the combat of food waste.

The higher education institutions perceive their commitment to society but it is essential that they know the reality in which they are inserted, so that means, which benefit both society and higher education institution can be implemented without discomfort in the environment or in nature in general. Being aware of new changes the environment is undergoing and centralizing their efforts in benefit of a higher education institution that provides education, information and prepares their academics to life in society, is the fundamental part of an environmental management which seeks to raise consciousness, a continuous alert, as well as a knowledge proposition in every level of society about environment issues (Rauen et al., 2015).

2. Methods

The studied University Restaurant provides, approximately, 300 meals per day, from Monday to Friday, at lunchtime. Data collection about the quantification of food waste and its evaluation occurred in the months of January, March, May and June 2015.

To perform the quantification of solid waste generated in the meals production process, it was weighed the following items: vegetables before and after being cleaned; produced meals; served meals, but not consumed; and food that have been discarded by the consumers.

The weighing and the recording of the collected data were performed by the restaurant employees.

To evaluate the food waste it was determined three losses indicators: the correction factor, the service waste and the costumer leftovers. According to Abreu et al. (2009) the correction factor is related to losses of non-edible parts of food, during the pre-preparation food step. The service waste represent the food that are prepared but not served, while the costumers' leftovers represent what are left on serving dishes and on food distribution counter (not consumed).

The correction factor was obtained by Equation 1 (Abreu et al., 2009). The main foods that were commonly used in the pre-preparation step during the studied months were: chard, lettuce, carrots and cabbage.

$$\text{Correction Factor} = \frac{\text{Gross weight}}{\text{Net weight}} \quad (1)$$

In order to evaluate the service waste it was used the Equation 2 (Abreu et al., 2009).

$$\text{Service waste (\%)} = \frac{\text{Total Produced} - \text{Total Distributed}}{\text{Total Produced}} \times 100 \quad (2)$$

To determine the costumers' leftovers it was used the Equation 3 (Abreu et al., 2009).

$$\text{Costumers' leftovers (\%)} = \frac{\text{Weight of rejected meal}}{\text{Weight of distributed meal}} \times 100 \quad (3)$$

After the analysis of the indicators mentioned above, it was possible to assess the food waste in the University Restaurant. The results were compared to the literature, because the University Restaurant doesn't have a data or a standard for comparison.

It's important to intervene through actions that improve the management of solid waste in the University Restaurant, with changes that can be continuous and permanent. Based on this assumption, the following programs were developed for proper solid waste management in the University Restaurant: Selective Waste Collection Program, Organic Waste Composting Program, Solid Waste Reduction Program and Environmental Education Program.

Goals and targets were planned for each program, which considered the real needs of the University Restaurant, according to the results obtained in the assessment of food waste.

All of the above programs followed the same basic formatting line for defining the necessary actions in each area, in terms of: justification; proposed actions; interrelationship with other programs; benefits programs.

To assist in the preparation of programs, it was used as reference the administrative tool 5W2H (what, why, where, when, who, how, how much) as a checklist to cover all the development of the action plans.

3. Results and Discussion

The University Restaurant has the followed menu: base plate (rice and beans), main dish, trim, salad, dessert and juice. The provision of meals is the centralized mode, in which the garnish and the main dish are portioned and the base plate and the salad are self-served.

During the evaluated months (January, March, May and June 2015) the University Restaurant produced 18,083.08 kg of food, of which 557.7 kg of food were not served (service waste) and 3,228.95 kg of food were discarded such as costumers' leftovers.

After weighing, the service waste and the costumers' leftovers were discarded as waste, which means that 20.94% of all production is lost. This organic waste is destined for feeding pigs and other animals, being collected daily by third parties.

According to a case study done at Western Michigan University in 2007, approximately 6055.45 kg of food waste was generated on campus daily, by a total student population of 25,045. The majority of this waste was either deposited in local landfills or disposed directly into the sewage system, by washing it down in industrial garbage disposals in the campus kitchens (Merrow et al., 2012).

The food waste in the pre-preparation step, which occurs in the cleaning of leaves and in the removing of peels, seeds, stalks, is indicated by the correction factor, showed at Table 1. With the exception of carrots and lettuce, the other items showed average values lower than the pointed in the literature, indicating that the loss of these foods in this step isn't the main cause of waste generation. The average correction factor obtained for the carrot is the same found in the literature and the lettuce is within the range indicated as acceptable by the literature.

Table 1. Correction factor for the greenery more consumed during the months evaluated.

Greenery	Number of samples	Average gross weight (kg)	Average net weight (kg)	Correction Factor	
				Average	Ornelas (2007)
Chard	16	71.92	66.96	1.07	1.54-1.66
Lettuce	21	75.66	63.38	1.19	1.09-1.33
Carrot	17	58.67	50.13	1.17	1.17
Cabbage	16	77.65	63.17	1.23	1.72

The obtained results are due to some measures adopted in the restaurant to avoid the disposal of raw material. It was observed that the restaurant employees are guided by the nutritionist to inspect received food items, to utilize the most of raw material, to take care when they are washing, cleaning and handling food, and others. The University Restaurant also began to acquire some frozen items, because some fresh vegetables quickly spoiled and were thrown away, causing waste. The acquisition of frozen items is a practice that in addition to avoid waste, saves the food for a longer period of time, and it is financially better.

Addition to the measures that have already been made, others could be incorporated to prevent the waste generation, as the full utilization of food (stems, barks, seeds), which also can make the meals more nutritious and economical.

The percentage of service waste mainly reflects the efficiency of the planning of the number of meals to be served. The obtained data indicated that the percentage value of the service waste in the studied months fell consecutively, as shown in Table 2.

According to Vaz (2006) acceptable values of service waste are at most 3%, closed to the values obtained in this study. It is important to note that every restaurant should establish its own value as a parameter, because each restaurant has different characteristics that must be considered.

Table 2. Percentage of service waste during the months evaluated.

Month	Average weight of produced meals (kg)	Average weight of distributed meals (kg)	Service waste (%)
January	243.58	231.63	4.90

March	227.40	220.60	2.99
May	235.80	229.77	2.55
June	235.91	230.20	2.42

The service waste in January was the highest one. In January, it was the summer season in Brazil, with high temperatures that could have interfered in the amount of food consumed; on the hottest days there was a higher consumption of salad, instead of rice and beans; already on cold days the opposite occurred. During this month it was necessary rethink the amount of food produced in order to avoid the service waste.

In the subsequently months, the planning of the meals was more efficient. Based on the January results, in the following months it was adopted a standard amount of rice and beans production. According to the menu of the day, this amount was changed, for example, in the days when it was served stroganoff, the quantity of beans produced was smaller than the quantity of rice produced, because when it is served this dish the users consume less beans and more rice.

Katajajuuri et al. (2014) examined several restaurants and found that service waste (over production) generally represented the main category of food waste. For the authors the main difference between self-service restaurants and restaurants where food was prepared to order was that in the latter the main component of food waste was leftovers. The authors found in their study that the restaurants evaluated discarded 19% of all food produced and food served. Of that, 6% was kitchen waste, 5% service waste and 7% leftovers. Silvennoinen et al. (2015) when examining restaurants and diners, observed that service waste (overproduction and food left from buffet) wasted 3.7 percent of all food produced, to the authors in restaurants and diners only, the main cause of food waste was customer leftovers at 9.5 percent. A similar situation was observed in this study because the customer leftovers were the leading cause of food waste.

The obtained results indicated that there is a planning of the meals to be served at the University Restaurant, fundamental step to avoid the food waste as leftovers. At the restaurant, the quantity of food produced is based on the number of meals sold. This control is performed daily and avoids that a larger quantity of food is produced without demand. Evaluate which foods are best accepted by the consumers and the turnover of the menu, are measures taken by the restaurant, which also helps in the reducing of the service waste. However, the evaluation of a more efficient planning must be constant, and it is essential to trace attainable goals for controlling of service waste.

The reuse of service waste is a practice that avoids waste. At the restaurant, when there are remains of salads in good quality, it's reused on the following day. It's important to note that these practices should be carried out under intense hygienic-sanitary control in order to ensure that consumers have access to food that isn't harmful to health.

The costumers' leftovers index can be seen at the Table 3. Teixeira et al. (2006) indicate an acceptable value below 10% to the index; to Castro and Queiroz (2007) the values from 0 to 5% = great; 5 to 10% = regular; 10 to 15% = bad, and above 15% = terrible. Thus, according to the latter classification, the performance of the University Restaurant service can be considered terrible, because all values of the index were higher than 17%. Gunders (2012) says that on average, diners leave 17% of meals uneaten and 55% of these potential leftovers are not taken home.

Table 3. Percentage of costumers' leftovers index.

Month	Average weight of distributed meals (Kg)	Average weight of rejected meals (Kg)	Costumers' leftovers (%)
January	231.63	43.28	18.68
March	221.87	42.48	19.14

May	229.77	41.49	18.05
June	230.20	40.89	17,76

The University Restaurant controls the amount of food that is discarded as costumers' leftovers, but, currently, no action is performed to its reducing.

Several factors may have affected the quantity of costumers' leftovers, as a failure in the distribution of meals for the consumers who take larger quantities than their consumption capacity; failures in the portioning of meals prepared, lack of interaction between restaurant employees and consumers that not ask to serve smaller portions, food preferences of each one, and lack of awareness about the problems caused by food waste (environmental, economic and social).

It was observed that the size of the served portion (trim and main dish) by employees in the studied restaurant is bigger than the served in others universities restaurants. To Collison and Colwill (1987) a portion size considered to be over large has an important effect on the leaving of food.

It was observed the following situation in the restaurant: on the day it was served steak, the portion was constituted by two steaks, but many consumers dismissed one of its intact. Faced to this situation, decreasing the portion of meals is a measure that should be considered by the University Restaurant, in order to avoid waste, not only food, but financial resources and inputs (gas, water and energy) for the production of the meal. At the University Restaurant there is no feedback mechanism in which users can opine on the menu or giving suggestions. This lack of interaction between the restaurant and the customers reflects the high values of the costumers' leftovers index. Assess the acceptability of the menu by users through questionnaires is critical to a good performance by a restaurant.

Based on these results, the need to incorporate environmental planning into the routine of the University Restaurant is visible, in order to improve the management of solid waste so that its activities have the least impact on the environment and serving as an example for the academic community.

By focusing on waste reduction the university will be practicing institutional ecology, will help to create an institutional culture of sustainability, and will increase awareness of environmentally sustainable development around campus (Merrow et al., 2012).

From the data obtained by the evaluation of food waste, there was the need for the development of environmental management programs focusing on solid waste. So, it was proposed programs that would fit in the restaurant reality.

The programs were based on "3R's" principle, namely: reduce, reuse and recycle, which are the basic principles to solve problems related to the solid waste management (Shuanggui et al., 2011). To Jibril et al. (2012) 3R's practices comprise different measures and skillful techniques to reduce the volume of discarded waste materials that was generated to dispose out. The hierarchy for solid waste management is an internationally accepted guideline for waste management practice, giving priority to reduce waste at source, not being possible this should be reused, and the impossibility of it, should be sent for recycling. Other "R" can be include, namely: rethink, it's important to rethink our acts of consumption in the search for a sustainable society, ensuring natural resources for future generations.

Therefore, the environmental management programs were elaborated to incorporate these principles in the production process of the university restaurant. The Solid Waste Reduction Program aims to reduce the amount of waste that are generated daily; the Organic Waste Composting Program aims to reuse the generated waste; the Selective Waste Collection Program aims recycling the waste generated in the restaurant that can't be reuse and the Environmental Education Program aims to be the basis of all other programs through actions to raise awareness of employees and users.

The Selective Waste Collection Program focuses on improving segregation and the quality of recyclable waste generated in the restaurant, in order to promote environmental, economic and social benefits. Currently, all waste generated in the kitchen and in the refectory are separated into organic and dry matter. In the kitchen is generated per month approximately 51.4 kg of dry matter; the dry waste generated in the refectory wasn't quantified. The goal is that 100% of recyclable waste can be segregated properly over time. It was observed in the refectory that the dry waste materials with potential to be recycled ended mixed up with the used napkins, compromising the quality of the material that can be recycled in cooperatives. To this study, it will be proposed to install appropriate waste containers for each type of waste (paper, plastic, metal and glass) improving the segregation of recyclable waste, and thus, preventing non-recyclable waste is mixed with those that are recyclable.

The Organic Waste Composting Program has the goal to develop a composting technique to the organic waste from the university restaurant, transforming it into organic fertilizer, which can be used in the campus gardens, reducing the volume of waste that need to be disposal in the municipal landfill. To make the composting of organic waste on campus, firstly, a data survey will be made on which method (windrows or reactors) is the most suitable one to treat the organic waste in the campus.

The Solid Waste Reduction Program is essential to maintain the daily control of food waste in order to reduce the values found in this research. Currently, 20.94% of all food produced in the University Restaurant become waste. In the short term, the ideal is to reduce this rate to 10% through an employee training, more efficient equipment and processes in the production of food, decrease the size of the portions served and consumers' awareness.

The Environmental Education Program will include actions to disseminate information on the issue of food waste and the impacts of solid waste generation, contributing to the awareness of employees and users about environmental responsibility and generating changes in habits to the preservation of the environment. This program will work as a basis for the development of other programs. It will be developed two main actions for this program: the preparation of posters that will be placed in the restaurant's dining hall with phrases about food waste, the importance of selective waste collection and environmental issues to stimulate the consumers' awareness; and meetings with the restaurant's employees, in which the results of this research will be presented and it will be discussed environmental issues about solid waste generation, its management and the food waste.

Environmental education, one of the pillars of sustainable development, contributes to the fundamental understanding of the relationship and interaction between mankind and the whole environment and promotes public environmental ethics regarding the ecological balance and quality of life, awakening, in individuals and organized social groups, the desire to participate in the construction of their citizenship (Rauen et al., 2015).

Studies show that campaigns in restaurants have contributed significantly to the reduction of food waste. Corrêa et al. (2006) related a reduction of 91.95% in the index of costumers' leftovers and 85.87% in the clean service waste index, after a campaign against waste in a restaurant. To Merrow et al. (2012) education will prove to be a major contributor to the success of any dining services waste prevention/reduction program, it is necessary that student consumers become aware of the degree to which their food purchasing/consumption patterns greatly contribute to the waste that is generated in campus.

4. Conclusions

It can be concluded with this research, that the correction factor and service waste indicators are within the acceptable range cited in the literature and there is a concern about the meal planning.

The amount of costumers' leftovers was very high. It demonstrates the urgent need for adopting more sustainable practices and promoting actions to raise awareness and educate users and employees about the environmental impacts associated with food waste.

It's noteworthy that the daily monitoring of waste indicators is a fundamental tool to identify how the waste is occurring, but should be linked to the waste control measures to be effective.

The results of this research served as the basis for developing the proposed environmental programs. It's intended that with these programs the University Restaurant can reduce the main impact of its activities, due to the generation of solid waste. It is also expected that the programs can serve as an example for other sectors of the university to incorporate the environmental issues into its routine services.

Finally, to integrate efficiently the production of meals with environmental management tools is one of the purposes of the programs proposed in this research, because this is certainly the best way to sustainability be achieved, necessary characteristic to the contemporary world.

References

- Abreu, E. S., Spinelli, M. G. N., Pinto, A. M. S., 2009. *Gestão de unidades de alimentação e nutrição: um modo de fazer*. 3a. ed. São Paulo: Metha.
- Beretta, C., Stoessel, F., Baier, U., Hellweg, S., 2012. Quantifying food losses and the potential for reduction in Switzerland. *Waste Management*, v. 33, pp. 764-773.
- Brasília, D. C., 2009. Desperdício – Custo para todos – Alimentos apodrecem enquanto milhões de pessoas passam fome. *Desafios do Desenvolvimento*, edição 54, ano 6. Available at: http://www.ipea.gov.br/desafios/index.php?option=com_content&view=article&id=1256:catid=28&Itemid=23. Accessed on: 10 Mar. 2016.
- Brzozowska, A., Bubel, D., Pabian, A., 2015. Implementation of technical and information systems in environmental management. *Procedia – Social and Behavioral Sciences*, v. 213, pp. 992-999.
- Castro, F. A. F., Queiroz, V. M. V., 2007. *Cardápios, Planejamento e Etiqueta*. Viçosa: Universidade Federal de Viçosa.
- Collison, R., Colwill, J. S., 1987. Food waste in public houses and restaurants and customer attitudes. *International Journal of Hospitality Management*, v. 6, n. 3, pp. 163-167.
- Corrêa, T. A. F., Soares, F. B. S., Almeida, F. Q. A., 2006. Índice de resto-ingestão antes e durante a campanha contra o desperdício, em uma unidade de alimentação e nutrição. *Higiene Alimentar*, v. 21, n. 140, pp. 64-73.
- Engström, R., Carlsson-Kanyama, A., 2004. Food losses in food service institutions: Examples from Sweden. *Food Policy*, v. 29, pp. 203-213.
- FAO – Food and Agriculture Organization of the United Nations. *Global food losses and food waste*. Roma – Itália, 2011. Available at: http://www.fao.org/fileadmin/user_upload/ags/publications/GFL_web.pdf. Accessed on: 10 Mar. 2016.
- Gunders, D., 2012. *Wasted: How America Is Losing Up to 40 Percent of Its Food from Farm to Fork to Landfill*. Available at: <https://www.nrdc.org/food/files/wasted-food-ip.pdf>. Accessed on: 26 Mar. 2016.
- Jibril, J. D. A., Sipan, I. B., Sapri, M., Shika, S. A., Isa, M., Abdullah, S., 2012. 3R's Critical Success Factor in Solid Waste Management System for Higher Educational Institutions. *Procedia - Social and Behavioral Sciences*, v. 65, pp. 626 – 631.
- Katajajuuri, J-M., Silvennoinen, K., Hartikainen, H., Heikkilä, L., Reinikainen, A., 2014. Food waste in the Finnish food chain. *Journal of Cleaner Production*, v. 73, pp. 322-329.
- Lucifero, N., 2016. Food loss and waste in the EU law between sustainability of well-being and the implications on food system and on environment. *Agriculture and Agricultural Science Procedia*, v. 8, pp. 282-289.
- Merrow, K., Penzien, P., Dubats, T., 2012. *Exploring Food Waste Reduction in Campus Dining*

Halls. Available at:
<<https://wmich.edu/sites/default/files/attachments/ENVS%204100%20Final%20Project%20Report%20-%20Merrow,%20Penzien,%20Dubats.pdf>>. Accessed on: 09 Mar. 2016.

Ornelas, L. H. 2007. Técnica Dietética: seleção e preparo de alimentos. 8^a. ed. São Paulo: Atheneu.

Pirani, A. I., Arafat, H. A., 2014. Solid waste management in the hospitality industry: A review. *Journal of Environmental Management*, v. 146, pp. 320-336.

Rauen, T. R. S., Lezana, A. G. R., Silva, V., 2015. Environmental management: an overview in higher education institution. *Procedia Manufacturing*, v. 3, pp. 3682-3688.

Shuanggui, Y., Baoguo, J., Chun, L., 2011. The tentative idea of energy recovery based on "3R" principle. *Procedia Engineering*, v. 21, pp. 1188-1192.

Silvennoinen, K., Heikkilä, L., Katajajuuri, J-M., Reinikainen, A., 2015. Food waste volume and origin: Case studies in the Finnish food service sector. *Waste Management*, v. 46, pp. 140-145.

Teixeira, S., Oliveira, Z. M. C., Rego, J. C. 2006. Administração aplicada às unidades de alimentação e nutrição. São Paulo: Atheneu.

Vaz, C. S. 2006. Restaurantes – controlando custos e aumentando lucros. Brasília: Editora Metha.

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The potential of Social network media in Sustainable marketing policy and the role of Electronic Word of Mouth (EWOM)

Mohammad Reza Nemat Gorgani, Golnaz Mostaghimi

Abstract

Given the virtual world's ascendant role in everyday life, no one can ignore its crucial impacts on the physical world. In this term social network media play a considerable role in peoples' daily lives and business. Changing, developing in the dynamic marketplace and access to information on a level never experienced before, are possible benefits to companies. Social media influences companies' strategies because of the wealth of information that customers yield while interacting on platforms such as social networking sites (i.e. Facebook), micro blogging sites (e.g. Twitter), photo sharing sites (i.e. Instagram), and video sharing sites (i.e. YouTube). Due to the impacts of their potential benefits, adapting communication technologies and being aware of the new virtual lifestyle are necessary for modern businesses to adapt and expand their reach in the sustainable development strategies such as marketing policies, supplier chain management, etc. Therefore, Companies have been investigated and noted in sustainability and resilience models. This paper aims to analyze the role of social network media in marketing strategy and the new phenomenon of resilience marketing, in this term, the main scientific objective is to investigate the Electronic Word of Mouth (EWOM) in social network media as resilience marketing policy in sustainable management systems. In this study, Structural equation modeling (SEM) is used to assess and defines latent variables using one or more observed variables, and a structural model that imputes relationships between latent variables. Regarding to This model, have found that the EWOM has an impact on brand awareness and brand image which are influence the brand attitude and concluded that the brand attitude has a direct relationship with brand demand for the products or services. Data were collected from Iranian consumers and Facebook followers of contemporary jewelry design company –Kia Gallery- that yielded a final usable sample size of 350. The results of the research described the fit indexes in this article illustrate the capacity of social media and EWOM as effective tools to entice demand for products and services.

Keywords: Social network media; Sustainable marketing; resilience

Theme 7. Institutions and Governance Structures for SD

Track 7a. Local and Regional Governance

Track 7c. Advocacy and Public Participation

Track 7d. Rethinking the Fundamentals of Economic Systems

Track 7e. Legal Aspects of Sustainability

Track 7a. Local and Regional Governance

Session 7a-01

Session 7a-05

Session 7a-06

Session 7a-07

Discretion, Accountability and China's Local Governance Capacity: Evidence from its practice in addressing local debt crisis

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Abstract

To stave off the impacts of economic slowdown in the aftermath of global financial crisis, China had initiated a set of large-scaled economic stimulus package, in which local government are permitted to finance local infrastructure projects. However, under the country's tax-sharing system, the local-government debts far outstripped their revenues and the closing repayment time raised the question how the debts can be repaid. Although the country has taken stringent policies and measures to mobilize local governments to take responsible actions, the efficaciousness is still marginal and doubts persist. Governance capacity plays important roles in policy formulation and implementing. Strengthening discretion and accountability contributes to the improvement of local governance capacity and the creation of development benefits. How have the discretion and accountability been working in China's policy implementation? Do they interact in a concerted way that leads to better local governance in China? This papers aims to examine the changing intergovernmental relationship and the governance quality in the Chinese context. The case study focusing on how it has tried to cope with the local government debt crisis is adopted in the research. The research is framed by a conceptual framework that connects decentralization, discretion, accountability, and governance capacity. The research shows that massive administrative efforts have been taken in China to stabilize economic growth. However, coupled with the inexperience and weak capacity in local governments, local debt market has not be well operated as expected, and the locals still rely heavily on the center to support balancing their fiscal budgets and provide funding support. The research concludes the varied extent of decentralization reforms influence policy implementation. Although the Chinese central government has initiated some new measures and programs that allow local governments to exert more discretionary power, the effectiveness is marginal, since at the local lever, no sound mechanism for downward accountability has been built and simplistic policy duplicating could not bring the improvement of local governance capacity.

Keywords: Discretion, Accountability, Local Governance, China

Capital Building through Collaboration aiming Sustainable Communities

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Abstract

Growing awareness of coastal resources value by the citizen may encourage local communities to become themselves promoters of sustainability through the use and dissemination of good practices. To promote this, participatory methodologies involving citizens in the decision making process were explored within three projects. MARGov aimed to empower key actors for change assuring a more sustainable Ocean and strengthen the socio-ecological dimension, contributing to conflict minimization through the promotion of an eco-social dialogue among scientists and citizens. A Governance Model for Marine Park was collaboratively constructed. VoW - Value of Waves and Ocean Culture project considers the economic, environmental, social and cultural dimensions assessments, and a collaborative model of governance is now underway. MARLISCO aiming to promote a wider awareness on marine litter problems brings together all the societal sectors targeting the generation of joint solutions and actions to reduce this impact. While doing this scientific and lay knowledge were brought to the table, debated, confronted and challenged, generating new emerging collective knowledge that prove itself valuable for building up common understanding and for the pursue of a joint path towards sustainability. Besides this intellectual capital, two other types of capital – social and political – emerged and strengthen ties and networks contributing to create community of practices, essential for co-management of natural resources. Comparing and reflecting upon these three collaborative processes of social innovation provide us with the hints and the conceptual framework required to carry out successful participatory processes able to engage the stakeholders, build a common language and to create the right dynamics for the emergence of communities of practices able to work autonomously in the pursuing of sustainability while co-managing responsibly the natural resources. This communication presents the three case studies, the inclusive methodologies developed, the results achieved and the lessons learned. It also explores the key requirements for the success of the participatory practice, discussing the level of participant contribution, the role of knowledge in the process and the importance of trust building. Comparing three cases, contribute to evaluate the processes against each other, and gave room for generalization, to support future practices in these contexts. From this it is possible to develop collaborative inclusive methodologies toward sustainability able to be replicable elsewhere.

Keywords: Collaboration, Social Capital, Knowledge Building, Active Participation, Co-Construction

Development, Tax Regulation and Welfare: Examining the European Union Approaches

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Abstract

Today's struggles of the welfare states in Europe and elsewhere are tightly intertwined with concentration and mobility of capital that enable aggressive corporate tax planning and tax avoidance. These dynamics are regarded as both developed and developing world challenges, which put at risk the capability of national tax systems to mobilise resources for social protection and development. Increasingly private sector is seen as a partial solution to narrowing the gap between the rich and the poor at local and state levels, but state control of different proxies of global supply chains for financing development requires thinking of the existing trade and market systems locally, regionally and globally. Under the 2030 Agenda domestic resource mobilisation (DRM) for the achievement of the Sustainable Development Goals (SDGs) has become one of the leading actions, therefore the debate is not around whether, but rather around how and by whom private sector involvement should be organised. The European Union (EU) is an example of supra-national actor and more recently, tax regulative body that can have an impact on the ways trade, development and redistribution of resources interconnect for development outcomes. However, the choice of its action is decisive: whether the EU considers the SDGs a development cooperation strategy, which presents a risk of DRM boiling down to a mere programming leitmotif, or whether it mainstreams the SDGs across its policy spectrum. The latter approach is an ideal that is aligned with the EU's pursue for equity, but it would bring new responsibilities in regulating the European markets so as to regulate the operations of European companies in third countries. This may be in contradiction to the liberal ideas of the European single market and competitiveness, which may create tensions between the actors in the EU. We have examined the EU's strategies and means to pursue tax good governance and corporate taxation, and the involvement of private sector in development outside of the Union's borders. We have focused on the EU Platform for Tax Good Governance, examining why it was established, what the conditions under which it has to sustain its operations are, and how the institutional entrepreneurs affect the platform's functionality for coordinating tighter corporate tax control. On the basis of an interview data of 10 EU officials and a set of EU policy documents, we argue that while joint tax initiatives are important for the EU's pursuit for more just and equal states, it might be difficult for the EU to agree on, or execute common tax rules due to the differing intra-institutional interests. Equally importantly, the lack of organisational information sharing, owing to both differing interests and a lack of culture to cross policy boundaries, has a negative impact on effectiveness of the initiatives such as the platform. This results in strong policy but under-utilised potential of it, weakening the EU's efforts to promote and support tax good governance at home and in third countries.

Keywords: development, EU, private sector, tax regulation, welfare

The weight of words in a sustainability transformation

Filippa Säwe and Johan Hultman

Abstract

Sometimes, the strategic direction of a sustainability transformation in society depends on single words. In the context of the (1) UN Food and Agriculture Organization (FAO) guidelines for the promoting small-scale fisheries (SSF) and (2) EU common fisheries policy (CFP) as structuring forces in the development of local and regional economies, we critically examine an ongoing process where a Swedish professional fishing strategy - aiming for national sustainable fisheries through market-based resource management principles - is taking shape. For the purposes of the study, the FAO guidelines, the CFP and e-mail correspondence between fisheries governance stakeholders are used as empirical material. We perform the analysis in two steps. First, the FAO and EU texts are subjected to a discourse analysis to reveal their societal logic. Second, we use one instance in the articulation of the national professional fishing strategy to illustrate how different fisheries governance actors struggle over acceptance for two different versions of the central goal and vision of the strategy. Both suggestions prioritize the goals of environmental sustainability and 'societal benefits', but then take off in different directions. One suggestion, from central authorities, leaves out the critical management dimension of the allocation of the resource. Furthermore, it does not specify any perspective with which to understand and deal with the concept of societal benefits. The opposing suggestion, from regional authorities, social scientists and local stakeholders working in cooperation, state the importance of the allocation of the resource for achieving greatest total societal benefits. It also specifies that social and economic perspectives should be used to understand and assess societal benefits. We first show how the FAO guidelines and EU policy for promoting small-scale fisheries rest on a specific logic. In the second part of the analysis, we show that the two suggestions for the central goal and vision of the strategy correspond in different degrees to this logic. The suggestion from central authorities is primed to rely on measurable parameters of societal benefits and is reluctant to acknowledge qualitative considerations in future fisheries regulation and legislation situations. The regionally and locally derived suggestion, on the other hand, promotes the inclusion of non-measurable parameters in future fisheries policy and regulation situations. We conclude that the strategy proposition from governance stakeholders closer to fisheries practitioners is more in accordance with FAO guidelines and the CFP. However, an obstacle in implementing the guidelines and CFP can be found in central authorities interpretation of societal benefits, where economic calculations within a systems approach and ad-hoc principles for resource allocation take precedence over a process-based, knowledge-accumulating approach to resource management.

Catalysing participatory governance in Portugal: visions, practices and political recommendations of bottom-up initiatives to foster social transformation

Sara Rocha, Cristina Albuquerque, Gil Penha-Lopes, Patrícia Santos, and Maria Nolasco

Abstract

The multiplicity of challenges that societies face today, along with the lack of understanding on their intricate impacts, demands proposals for social change with the capacity to address multiple dimensions of life in an integrated way. On the last decades, governmental institutions and other governance actors recognize the need to work together through the sustainable development of their territories. This step challenges traditional visions and practices of governance management, while all over the world a great diversity of bottom-up initiatives are emerging. These initiatives are locally based concrete contexts of experience and experimenting of solutions for global issues in a day-to-day basis, embodying practices, projects and local movements, of rural and urban base, anchored on principles of participation, cooperation, solidarity and integral sustainability. In this sense, the "bottom-up" action principle refers to an inductive logic of enhancement and building of the knowledge base (community-based) and to the closeness of context, in small scale, in order to determine more general guidelines for medium/large scale. However, the relationship between these two levels of knowledge and action are not always carried out properly in order to build a real change of practices, of social and political conceptions. Differences of scale in analysis, and also difficulties in accessing and understanding information and knowledge, frequently puts into question inter-knowledge and participation processes, which are essential for local governance. In the case of Portugal, the country is undergoing deep changes within the confluence of crisis and austerity enforcement and both seem to provoke and accelerate transformations, with several initiatives pushing forward through innovative proposals to current problems such as unemployment, poverty, rural exodus and loss of biodiversity. However, the proposals of these initiatives are little known. Therefore, using an exploratory approach, the action-research project CATALISE has identified thematic networks to map and characterize these innovations by means of a questionnaire and a deeper analysis through interviews to case-studies, in order to understand their visions, practices, trajectories and impacts. The main goal was to produce and disseminate useful knowledge to increase the potential of bottom-up governance, resulting in a framework of good-practices and political recommendations based on the identification of difficulties of coordination between various agents of the local contexts and between the local and the macro scale. In what concerns to the bottom-up initiatives, constraints of different order (as the lack of resources like time, people, money, commons, educational level of the population) seems to constrain possibilities of a wider and more continued participation on local governance processes, while responding to several dimensions of action (environmental, social, economic, political, cultural). On the other side, institutions and other governance actors indicate difficulties to deepen their support due to lack of resources, the gap between technical decisions and top-down political decisions, the institutionalist, centralist and bureaucratic organizational culture and due to the difficulty to evaluate the real impacts of these initiatives.

Keywords: bottom-up, integral sustainability, participatory governance, social innovation.

Toward Better Case Studies: Understanding what ecourbanism means for urban governance

Meg Holden

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Abstract

In this workshop, which forms a part of the 5-year Ecourbanism Worldwide research project, researchers will engage in cross-case discussion of their ongoing empirical research in sustainable city governance. The workshop will begin with a brief introduction to the Ecourbanism Worldwide research project, research questions and themes of work, provided by Meg Holden (Simon Fraser University, Canada). Dr. Holden will then present the seven-part framework of ecourban extreme principles, together with her rationale and organization of the principles as constituting extreme types of ecourbanism if applied individually or in an imbalanced way, all the while holding potential to constitute holistic ecourbanism if applied in a balanced and synthetic way. The extreme nature of each principle will be demonstrated using an example of a commercial sustainable neighbourhood certification system or actual ecourban development applying it in disproportion. The implications for applied local governance of the inputs to and outcomes of ecourbanism at the neighbourhood scale will be discussed. Other presenters include Dominica Babicki (Aix-Marseille University), Robin Chang (TU Dortmund) and Constance Carr (University of Luxembourg). These additional perspectives of local governance failures and possibilities of sustainable development practices in a European-specific context will lead to a full-workshop discussion about what is needed from (1) researchers of ecourbanism in order to contribute more meaningful case studies to advance better practices and (2) local governance systems in order to incentivize more productive and potentially transformative practice.

A German Example: the ‘ESSEntial’ motivations and arguments for the 2017 European Green Capital award

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Abstract

As the result of a joint initiative between 15 European cities, the European Commission launched the European Green Capital award in 2008 to highlight urban sustainability examples of improvement in the environment and health. The legacy of the original 2006 memorandum continues to feature municipal role models, provide impetus for healthier and safer urban environment, facilitate opportunities to share best practices and build environmental co-operation as demonstrated with the recent award of the 2017 title to the Germany city of Essen. Working with a platform “changing the way we act,” Essen’s recognition with the Green Capital award not only reflects on current ideals for green governance, but convincingly narrates the story of structural and economic transformation in the most densely populated region of Germany. The municipality’s application emphasized green infrastructure in the form of ecological renaturation, transportation connections, brownfield redevelopment, and neighbourhood projects, in addition to its extensive engagement with other sustainability networks, and strategic processes at regional and local levels demonstrates a progressive governmentality for coordination and governance. With this in mind, this paper presentation proposes that the investigative framework from Holden et al. regarding the emergence of ecourbanism is a suitable base from which a clearer and more detailed understanding of how the European Green Capital initiative benchmarks successful examples of green governance. Policy and project documents analysis for Essen’s application process reveals an inter-translatory narrative between physical and governmental management of the natural and societal environment. How Essen’s model of urban sustainability materializes at the local scale, what priorities drive the decision making and strategic processes, and how a unique governmentality and governance profile has developed to represent the sustainability exemplified in the Ruhr region is articulated and detailed through taxonomic research on extreme types of ecourban neighbourhood developments. This research explores potential ecourbanism inspired insights in a German context for future comparative purposes. In doing so, not only will motivation and arguments supporting Essen’s success with the 2017 Green Capital award be discussed, but also the insights it has to offer to the growing list of ecourban development facilitated through sustainable EU policy and initiatives.

Keywords: European Green Capital Award, urban governance, ecourbanism

Powerful sustainable development master-signifiers in urban planning discourses

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Abstract

Master-signifiers are speech/textual acts or linguistic devices that in turn shape and constitute social worlds. This paper addresses the problem of sustainability as a master-signifier used in planning discourses that, then, result in contradictory policy discourses, and in further social spatial imbalances. The paper draws on empirical research in the Glatt Valley of Switzerland, where governing officials of small municipalities are confronted with coordinating land use planning and development under intense growth pressure. Meanwhile, upper levels of government endorse planning frameworks and strategies that claim to target sustainable development, aggregating certain sets of disassociate problems with respect to housing, economic development and mobility. Given the mismatch between the objectives of these policies and the challenges unfolding locally, it is clear that sustainable development will not be achieved. In fact, further fragmentation, worsening conditions, and new sets of urban planning challenges are the result. It is thus seen, that sustainable development is a master-signifier that policy-makers can engage in order to quell a certain hegemonic discourse, and one that is a discourse of power.

Keywords: Sustainability, urban development, discourse

Eco-districts as an example of transformative change? An investigation of energy use in Parc Marianne, Montpellier (France) and Olympic Village, Vancouver (Canada)

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Abstract

The issue of climate change adaptation and transformation towards sustainability will be investigated by providing a preliminary assessment of the success two eco-districts (Parc Marianne, Montpellier, France and Olympic Village, Vancouver, Canada) from the perspective of energy use. While these urban housing projects share some similarities, they also exhibit important differences and thereby provide key insights for assessing the effectiveness one form of local climate action. Eco-districts typically address a broad range of sustainability actions such as environmental preservation, transportation and culture; however, the focus here is to assess to what extent energy systems in eco-districts are rooted, or territorialised, in the local community. Housing developments where energy is locally produced, managed and distributed, provide powerful examples as to how communities can both reduce CO₂ emissions and build resilience to climate change at the local level. In this presentation, preliminary results of the case study analysis of Parc Marianne and Olympic Village will be discussed. Using qualitative and quantitative data gathered through in-depth interviews and energy consumption data, I investigate how energy is used and understood by both the developers of eco-districts and their residents. This will provide important indicators for assessing the efficacy of eco-districts in territorialising energy. The aim of the research is to understand the different processes and underlying factors that support eco-districts. Using both political ecology and the multi-level perspective for my analysis, I provide an initial understanding of the role that these urban developments have made in the establishment of new low-carbon development patterns. In essence, the central question being asked is whether eco-districts are little more than a new form of housing for elites, providing negligible improvements in energy consumption, or are they a veritable example of transformative change and the transition to a more sustainable energy path.

Notes from the watershed: What community stories can tell us about sustainable water management practices.

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Abstract

The integrity of renewable freshwater resources is critical for the sustainable development of economies and societies. However, to add to existing complexity, water environments will face a further range of acute challenges over the next twenty five years. These dynamic changing conditions are exacerbated by a complex range of drivers including water resource competition due to rapid population rises and urban clustering, different, sometimes conflicting, use of catchments by a variety of stakeholders, together with factors associated with climate change perturbations. These challenges are multifarious, multi-scalar and multi-temporal and so require novel natural resource management techniques which reframe the way that societies use and value water. Approaches such as Integrated Water Resources Management, Adaptive Water Management and 'Nexus' thinking recognise the central role of water in cementing economic development and societal continuity. Whilst these models utilise both 'top-down' and 'bottom up' initiatives to share knowledge and support participation at all levels of society, there are still lacunae around capturing the granularity of individual perceptions and responses with regards to water resources management. This paper asserts that to effectively communicate sustainable policies and strategies at a societal level we first need to understand how water users themselves comprehend the challenges that management practitioners face. In order to do this we need to undertake empirical fieldwork which is located at the micro, catchment level. Through talking to residents in waterside communities with an interest in a range of management issues we can begin to build a picture of where 'water' sits within individual lifeworlds. These insights reveal just how effectively, if at all, water resource managers and practitioners have communicated their key sustainability messages around changing water conditions and how water users have interpreted and responded to these articulations. Through exploring these local level knowledges, responses and actions, it may be possible to determine what types and what temporality of changes to water resources management people will accept in support of resource sustainability. The research was conducted along the River Adur catchment in West Sussex, UK. Three village communities were selected, each adjacent to the river, but with variability in terms of socio-economic demographics and water management challenges. The research utilised qualitative, in-depth semi-structured interviews, conducted with individuals and in small groups. Parish councils and local environmental groups were approached to access individuals with an interest in water management issues, with a 'snowballing' technique implemented to access a wider range of respondents. Initial findings reveal that awareness of water management policies or strategies only corresponds to the interests of the respondents' different lifeworlds, preventing most people from having an holistic, comprehensive engagement with the sustainability agenda for freshwater resources, even at a local level. To support sustainable social practices and promote policies, technologies and lifestyle changes which all champion freshwater resource integrity, there needs to be deeper engagement with community groups and businesses at the catchment level. Understanding the different lifeworld perspectives provides opportunities rather than barriers, and allows for targeted messages which accords with individual's own experiences, be these land management, water quality or biodiversity issues.

Keywords: NEXUS thinking, sustainability, hybrid knowledges, lifeworlds.

1. Introduction

Water environments, in developed and developing economies, will face an increasing range of acute challenges in the coming years. These dynamic changing water conditions are

produced by a complex range of drivers, including water resource competition due to population rises and urban clustering, different, sometimes conflicting, use of catchments by a variety of stakeholders, together with factors associated with climate change perturbations (IPCC 2012). These changes are multifarious, multi-scalar and multi-temporal, and create unknown future pathways which require a re-evaluation both of natural resource management techniques and a shift in the way we as a society use and value water (Dovers and Handmer 1992).

Up until the early 1980s the dominant paradigm, in most developed countries in particular, has been universal potable water supply, based on principles such as public health, equitable access to resources and centralised economic planning delivered through state institutions (Sauri and Del Moral 2001). Over the last thirty years the infrastructure maintenance and development of the water utility sector has moved away from state only provision to include a spectrum of private sector investment and management approaches (Bakker 2003). This is in part due to a shrinking of the fiscal base supporting state intervention in water provision, together with policy objectives which sought to reduce the cross subsidisation that enabled cheap water provision. Reduced financing, coupled with what Smith (2004) has identified as a critiquing of the tenets of welfare provision to question issues around entitlement and citizenship, shifted government objectives in many Western countries towards alternative models of water provision. These range from commercialisation, changes in norms and practices towards cost recovery, to corporatisation, setting performance targets and benchmarking, to wholesale privatisation, profit orientated service delivery. Neo-liberal strategies, which support free market economies to attract investment and competition in what had traditionally been a closed market sector, have also been championed as a route through which to expand the provision of potable water in developing countries by attracting foreign investment. Consequently in many global economies the role of the state in the water management sector has been rolled back, with the financing and management of potable water infrastructure increasingly delivered through privatised organisations (Hall and Lobina 2006, Marin 2009).

However, as climate change science has evidenced, the scale and pace of anthropogenic change on the environment (Maslin and Lewis 2015), there is a growing recognition that mitigation strategies are reliant upon co-ordinated and targeted approaches only possible at the level of state and multi-state intervention and governance (Rockstrom et al 2009). This is combined with data which demonstrates that neo-liberalised markets have not increased the number of people worldwide being able to access potable water, mainly due to cost barriers rather than to physical access (Mollinga 2001). Over time it seems that privatised water sectors have tended to exclude often the very poorest from accessing water; with this impacting on citizens in developed countries too (Baltimore Sun 7th July 2015, Sawkins and Dickie 2005).

Governments need to plan on a national and international level to ameliorate the impacts of climate change. As part of this process they must also work in tandem with private companies who are involved in the water sector, whose long term ability to commercially thrive is intimately connected both with sustainable use and guardianship of the resource, but also with ensuring their activities are profit making. Together, both the government and the private sector must connect with water users to clearly deliver messages around sustainable futures and sustainable uses of water. There is then a twofold challenge: Firstly the scale of sustainability planning – a national issue in a globalised context. Secondly, the ability to enable that sustainability planning in the context of privatised service delivery expectations. The next two sections will discuss these related concerns in more detail.

1.1 IWRM, AM and Nexus approaches in support of resource sustainability

Integrated water resources management (IWRM) is argued to be the first step towards a recognition of the embedded nature of key infrastructures in the future sustainability of economies. An in-depth critical engagement with the concept is outside the remit of this paper. IWRM's conceptual scale as an holistic approach to water management which seeks to address the needs of economy, people and ecosystem services (Biswas 2008) can leave it vulnerable to claims of over-ambition (Jeffrey and Gearey 2006). IWRM's focus on reconciling national systems with catchment based planning has been criticised for excluding specific ecosystems and

expertise (Butterworth et al 2010). Even single river catchments can be populated by starkly different governance institutions and local water knowledges (Gearey and Jeffrey 2010, Strang 2004). There has been much criticism of IWRM levelled at its grand ambition to provide a generic, universal toolbox to shape water delivery systems. This has led to what Mukhtarov and Gerlak (2014) have described as a stalemate or impasse for IWRM, centred around the dominance of certain epistemologies. For Mukhtarov and Gerlak, the dominance of certain disciplinary perspectives, such as engineering or hydrology, in the creation of IWRM policies has had a tendency to exclude certain social and environmental actors and groups whose knowledge and expertise sit outside of these dominant narratives. Mukhtarov and Gerlak argue that it is 'knowledge versatility of water through storytelling' (2014:116) that will enrich the IWRM approach and overcome this tendency towards normativity. In particular, the isolation of water as the central ambit point in developed economies has been pinpointed by turns as hierarchical (Hirsch 2011), vague (Biswas) and something of a political red herring (Allan 2003). Theorists such as Biswas (2008) and Benson, Gain and Rouillard (2014) go on to argue that IWRM stops short of delivering real utility; that identifying water alone as the critical infrastructure in any developed economy fails to address the need to link other 'chronic' interdependent sectors such as energy and food security. Chronic in this sense means nothing less than a continuous, essential part of a functioning society. Water is critical; but is not the only constituent part.

Adaptive Management approaches (AM) sought to address the rigidity of IWRM's tightly defined framework. Here, a 'learning by doing', experiential approach recognised the need to adapt policy to individual place, institutions and river catchments. Whilst a movement forward from IWRM it was argued by ecologists such as Walker and colleagues (2003) and Brugnach et al (2008) that elasticity of boundaries and plurality of contexts rendered it vulnerable to saying everything and doing nothing. Particularly for sustainability theorists (Poerksen 1995), a key element in adaptive and transformative planning is an ability to clearly signpost actions which will enable wholesale shifts in how we prepare for the impacts of climate change.

In recognition of the interdependence of national economies within globalised markets, and the potential impacts of climate change on these interdependencies, there is increasing value placed on the contribution of NEXUS framework planning to ensure sustainable futures. The interdependencies between water, energy and food within any individual economy, combined with the perturbances caused by climate change, creates a nexus; a latin term to describe 'that which is bound or tied together'. From this perspective, planning for water resources management must be made in concert with future energy use and innovation and with national food security. Unlike free market thinking, NEXUS framework theorists argue that these long term societal adaptations or transformations can only be optimised through state level planning, with the success or failure of one part of the nexus impacting significantly on another (Benson et al 2014).

Whilst it is possible to objectively detail the types of macro level planning needed to operationalise NEXUS approaches, there is a dearth of empirical data which details how citizens who both are impacted by these policies and who elect the politicians who shape and enact these policies interpret and understand these adaptive, transformative changes. There is a three stage challenge. Firstly to formulate national policy which will underpin sustainable futures within globalised economies. Secondly, to communicate the importance of these policies and the impact they will have on individual lifestyles. Thirdly to effectively communicate sustainable policies and strategies at a societal level we first need to understand how water users themselves comprehend the challenges that management practitioners face. Understanding this will enable a closer correspondence between policy intention and policy interpretation.

We have then a potential 'legitimacy gap' (Gearey and Jeffrey 2010) between asking people to radically alter how they currently use and value water whilst profit making privatised water companies are closely involved in the provision of that water supply. Policies which utilise the sustainability or climate change narrative may fall short due to the contested nature of privatised water delivery. Due to the expectations of service delivery associated with the private sector this may add to the challenge of attenuating everyday lifestyle choices. We need to know where water 'sits' within the lives of ordinary citizens. This next section of the paper details a piece of empirical

fieldwork which aims to capture how citizens both interpret changes to their water environments and how this maps onto current and future water resources management practices.

2. Methods

Heraclitus' epigram 'no man can ever stand in the same river twice' perfectly describes the practice of social science fieldwork. Capturing the 'reality' of people's lives through qualitative empirical research is complex. Ask the same set of questions twice to the same cohort and you may uncover what Latour describes as 'the paradoxical presence of something at once invisible yet tangible' (Latour, 2005:21). This is less to do with inconsistency of a respondent's opinion or worldview, but more to do with the 'hybrid' nature of people's lives with the 'folding in' of *techne*, landscape, whim and experience leading to responses which have a core of rooted identity and values but shifting, often ephemeral ways in which those opinions are articulated. Does this mean then that any attempt to understand what Husserl (1970) would call the 'lifeworld' of citizens is hampered? If empirical research actively engaged with Latour's suggestion to 'describe and continue describing' would we have a plethora of useless data or a rich seam of knowledge?

We raise these questions in order to interrogate the practice of social science investigation, particularly around sustainable development practices. We know that social science research 'enacts' (Law and Urry 2004) changes in the social world; that social science practise is not free from ontological weight, even as Latour (2005) encourages methods to bypass the desire to structure, categorise and 'explain'. To specifically investigate sustainable development practices is to denote to respondents their importance. It infers that this is a subject area worthy of research; and worthy of a response. Empirical fieldwork creates effects. Yet rather than this subconscious directioning being a hindrance it is argued in this paper that in many respects it is entirely necessary. Evidence shows that many current water management practices, at multiple scales, are not sustainable. Through capturing where water 'sits' in everyday practices and approaches it may be possible to close the sustainability gap. Listening to, exploring, contrasting the community stories around water use, water management and perceptions of water futures is crucial for the long term integrity of water resources. Recognising that these multiple stories are partial, subjective, unfocused, contradictory, is not a reason to dismiss them. Rather they highlight the inherent difficulties of resolving our lived experiences at the micro, granular level of the social, with the higher level governmental or scientific messages around being 'sustainable'.

This paper details empirical research conducted within three co-located villages, adjacent to a small river catchment, the River Adur, based in the South East of the UK. Projections over the next twenty five years indicate that this part of the country will experience conditions of increasing water stress. Drivers include the region having endemic low rainfall, growing population density and high land prices making mitigation strategies expensive. Through a series of interviews with a wide variety of water users we begin to uncover opinions, strategies, actions, knowledges and connectivities which reveal what is found at the watershed level. Using these fieldnotes we begin to build a picture to understand how macro level initiatives to support the sustainability of water resources are both understood by citizens and how they are incorporated into what Habermas (1984) drawing on Husserl describes as the 'lifeworld' of the social. The research highlights the multiple ways that sustainability is understood and is contextualised by the lived experience at the watershed. The community stories shared with the research are intimately linked with the lifeworld and the lived experience of the narrator. This intimacy leads the research away from hard conclusions, but towards an appreciation for how the experiential is crucial for fixing sustainable practices at the micro level.

Adger's et al's work (2005) exploring adaptive capacity has highlighted the importance of place connectivity. Our individual and community psyche is attached to our surroundings, whether taskscape (Ingold 1993) or landscape, and our ability to effect or enact innovations, adaptations or wider transformations is influenced by these intimate connections between ourselves, our community and our environment. Scannell and Gifford's work (2012) on climate change messaging and community goes further to suggest that it is 'place attachment' combined with Myers et al

(2012) local messaging that improves the breadth and longevity of engagement with global warming issues.

The empirical fieldwork referred to within this paper is drawn from a wider piece of research orientated around the relationship between citizens, modes of governance and water resources. It is primarily concerned with exploring how people comprehend changes to their water environment and how this may impact on the way in which we collectively govern our water resources in the future. Understanding where water 'sits' within people's everyday lives will have direct relevance for how we manage water at a river catchment or 'micro' level, and for a wider macro perspective for planning around critical NEXUS infrastructures. An important focus in this research is in exploring how living and working in a landscape can shape our understandings of change in our natural environment. It is important here to note that adaptations to climate change is not directly referred to in the research aims but is implicit within the scope of the study, given that managing water resources in the future will involve responding to the impacts of global warming and the consequent impacts on climate.

The aim of the overall research project from which these community stories are drawn was to understand individual responses to, and articulations of, changing water environments to explore the range of local knowledges evident within a specific geography of place connected with water resources. In order to uncover these nuanced response profiles from residents, the fieldwork adopted a qualitative semi-structured interview methodology. The research focused on a small section of a river corridor to begin to map the various spatial and temporal relationships between citizens and their immediate water resources. Through examining linked communities, in this case connected by the river itself and also through shared economic and highway resources, shared water resource management administrative and regulatory institutions, the aim was to pinpoint the actions, people, processes and behaviours which would be indicative of resilient responses or assemblages of resilient performativity. The research was predicated on no fixed interpretation of knowledge, or hybrid knowledges, but instead sought to ask interviewees themselves what they understood by changing water conditions and their attendant responses.

Contacts were made within the study area through generating contacts with community archive and heritage sites. These initial inroads into finding out about the life of the local communities' water resources then began to uncover contact points for those people and organisations who were involved in dialogues about water. In all, twenty eight one to one and small group interviews with respondents were undertaken across the three study sites covering a wide range of age, experiences, interests, expertise and knowledges.

3. Results

Community Story 1: 'Row Row Row Your Boat'

In this first story of sustainable practices we have four interlocutors. The first are the residents of a small lane in a large village who are impacted by nature, the curse of satellite navigation, austerity politics which has reduced highways investment and the legacy of ambiguous land boundaries. The second are the parish councillors who are required to interface between the residents and the next tier of governance, the local district council. The third are the landowners of a large country estate whose land management techniques impacts on the residential lane and lastly, the recollections of a village resident who remembers taking her daughter to the lane to sail homemade paper boats on the natural spring fed stream upon which this story is orientated.

The story could easily fall into a parody of man vs nature, but this is a far more subtle and complex interplay between how a community wishes to manage its resources and external elements, influences and events which prevents this from happening. The residential lane in question is based at the end of a long slow slope which leads to the South Downs National Park in West Sussex, a county within the South East of the United Kingdom. The South Downs are formed of gently undulating grassland, based on a porous chalk topography from which natural springs are a key feature. This particular section of the downland is partly managed by the South Downs National Park Authority, who are the local planning authority, and a large local landowner

who privately owns the land. The lane in question has a number of small springs which converge on the lane and form a year-round small stream which varies in size according to the time of year and rainfall levels. It is therefore a consistent feature and one for which the lane is renowned. Residents moving here would be aware of it due to its year round prominence. One interviewee, who does not live in the lane, told me it was well used by local parents as a play area to float boats and let children splash in their wellington boots.

Local residents attribute three changes in circumstance which seem have altered the stream's benign status. Firstly, changing highways maintenance. There is a clear narrative that as local district and county councils, the meso level administrative authority structure, strip back resources due to financing constraints, they have changed the frequency and extent of work needed to maintain the grips, culverts, drains, cutaways and other man-made diversions which traditionally let the stream flow in a steady fashion along the surface of the lane to eventually join an underground sewer. Over time, as the maintenance frequency and scale decreased and local council teams were replaced with subcontractors unfamiliar with the idiosyncracies of the lane, residents argue there is a concordant perception that expertise is lost. As a result drains collapse and block, grips get filled and fail to redirect water to fallow ground alongside the lane, and leaves and other debris blocks the stream channel, causing it to billow out and spill across the road. The resulting pools of stagnant water rot the mortar of residential garden walls, scour the roadway itself and this debris is constantly washed against walls and cars as traffic passes along the lane. This also results in broken car windows and scratched bodywork as stones in the water are thrown up by passing traffic. For residents the situation is so bad in the wetter winter months that they constantly have to wear wellington boots to gain entry and exit to their homes, and post and deliver drivers refuse to access the residential part of the lane while it is flooded.

The second change prevalent in the residents' dialogue is connected with land management practices higher up the lane. This is attributed by the residents to both the planning authority and the local landowner. The residents argue that drains managed by both parties are not being maintained leading to field water, rather than spring water, cascading down the lane. In return the landowners argue that their drains are maintained at great cost but that to divert the extra water, which they determine is the result of heavy rainfall events, requires support from the local councils due to the scales of costs involved. This then feeds into a separate discussion regarding planning for climate change and indicators of climate change.

A third narrative is that of satellite navigation, signage and in many ways the construction of a narrative tableau through which processes external to the lifeworld of the lane is viewed as threatening. Residents pinpoint satellite navigation systems as a direct threat. In their retelling of the lane's chronology, problems accelerated when this technology became widespread. Now GPS systems reroute overly large trucks and delivery vans down this small lane as they try to access the landowners' country estate and its onsite businesses and tenants at the top of the slope. The estate landowners say they clearly use a postcode which would signal to delivery drivers and visitors an alternative route, but it is the technology itself that directs drivers to use the lane. Meanwhile the parish council, the lowest tier of local authority, states that they have no monies to pay for highways signage to deter drivers from accessing the lane and suggest that the residents themselves fundraise to enable them to pay for their own signage. For local residents this is the final indignity, asked to fundraise for a problem not of their own making and which they feel no-one is assisting them to mitigate.

The residents' response has been to use social media to highlight their concerns, to petition the parish council to assist in highways maintenance and to collaboratively work together to research legal documents and other forms of official data to support their campaign. Their arguments are pivoted around living in harmony with the stream, and they have brought drainage engineers' reports and sustainable urban drainage management techniques into the debate to highlight affordable, environmentally sensitive ways to manage the natural passage of water in a small residential lane. For them, they want the other actors involved, the parish, district and council councils, the estate owner and the South Downs National Park Authority, to acknowledge their responsibility in managing the water on their land and make a fair contribution to paying for

ongoing maintenance and drainage infrastructures.

This community story reveals how what was historically a symbiotic relationship between residents and council, within which both undertook work which reflected local knowledges and the general upkeep of an area, has changed into a bureaucratic, officious and hamstrung dialogue. What is reflected is a complex interplay of clashing realities on the part of the lane's residents. The narrative they offer is a wish to live ergonomically and simply with a sympathetic relationship with a natural watercourse. Yet in order to make this possible what is required is financial investment and an entente approach to managing the needs and desires of the SDNPA and the landowner higher upstream. This mediation falls to the parish council, who are themselves elder volunteers with often little experience in managing technical data. The residents have then, in many ways, what could almost be regarded as outdated expectations of the competency of parish councils, who have had to take on more responsibility as local councils divest themselves of staff and commitments as they respond to financial pressure stemming from central government's austerity cut backs. There is then a tension between duties and expectations which feeds into the paradigm of sustainability. Our second community story goes further.

Community Story 2: 'They don't live here, they just sleep here'

Throughout the community resilience literature there is an emphasis on localism, on agency, of the engaged resilient actor-citizen (Edwards 2009). These attributes are associated with vitality and vigour, associational strength and a motivation that is linked with community mindedness as demonstrated with Community Story 1. Yet the fieldwork revealed something more complex, more nuanced, with the starting point leading from what Harvey (2011) has termed 'fractionality'. Cloke and Goodwin (1992) have noted the way in which economic reconfiguration and a creation of a rural 'idyll' has reshaped the nature of rural spatiality. Commuting, home working, leisure economies rather than agricultural economies have altered expectations of where and how income is generated. This combined with the packaging of an idealised rural 'lifestyle' leads to a rupture between embedded locals and those who have in-migrated.

The above quote is taken from a respondent who has spent all of his working life in one of the study site villages, leading a council team of workmen whose role was to undertake the management of the river under the guidance of hydraulic engineers. His family and his working life were embedded within the landscape. He does not present an idealised version of village life, but his comments did infer that, in reversal of concepts of ageing, it is the young in the village who had become invisible: they were either in their cars commuting, or at home recovering from the working week. They were not connected or engaged with the life of the village. Their visibility only comes to the surface when there is a problem or issue which affects their home. This casts Community Story 1 in a different light. If the lane had not flooded or eroded the hard-standing of the road, or become in any way problematic, would the residents of the lane still relate to each other so closely? Firm friendships have been forged through the problems arising from the stream on the lane – would this have been the same if problems had not arisen? And has the experiential learning created by the problems raised awareness of other issues around sustainability and climate change, and indeed around the nature of governance and personal responsibility?

Another local resident and parish councillor also noted how his community only attends council meetings when their lifeworld is deemed under threat. In this situation it is to do with defunct landfills leaching foul-smelling waste into the local river. According to the resident, only when the pollution becomes obvious – due to smell, discolouration of the water, or algae blooms due to the pollutants, will residents take action and petition. For this respondent the threat needs to be obvious and close at hand. Too far removed and the urgency declines. Again, he links this with a lack of community cohesion as he recalls:

'When we had trouble with the tips and everything and, you know, we'd manage, we would manage to fill the village hall when there was a threat, when there was a threat of something happening, yeah, then you can get them bandied together, but when there's no threat it's very difficult. You know, I mean one of the community things here, my, my previous wife years

ago and a lot of neighbours around, and women were in their thirties then, come together and put a, they put a Christmas dinner on for the retired folk of the village and over the years the same women have got older and older and older and older and they're now, you know, they're all in their sixties and seventies....and the younger generation, not interested, haven't got the time. They can't find anybody to help them and they've just stopped'.

This story tells us that there is a community presumption around how the river should function – it should flow, be clear, provide a thriving ecosystem, be free of smell or of any attributes of anthropogenic artifice. Yet rivers are intimately linked with our industrial heritage and, particularly in this study site river system as emblematic of Victorian enterprise and economic wealth. In industrialised economies communities relied upon rivers to convey goods and act as a means to discharge effluent. This sanctifying of the river system can be seen to connect with the rural idyll about our imaginary landscape. Thinking ahead to sustainable futures we may need to find routes to reshape this imaginary to both reaffirm the multiple role of rivers in our societies and use this as a way of engaging citizens with an understanding of how their daily choices impact over time on the landscape. Pristine rivers can only be achieved through everyday changes in how we choose to live. Rather than presenting landfill leachate as a governance problem, it should be represented as an issue of our everyday, intra-generational lifestyle choices, to highlight that there are trade-offs of which we need to be cognisant.

This also involves an affirmation to be engaged with our lifeworld in the everyday, beyond and above challenging times, as a way of imprinting ourselves positively on our environment. Returning to our original story statement 'they don't live here, they just sleep here' this leads us to our final community story. This entwines the environment, voluntary work and an older cohort of respondents actively engaged in sustainable practices.

Community Story 3: 'If you get it right for the fish you get it right for everything else'

In our final community story we explore the way in which sustainability can often develop from counter-intuitive sources. Within the study area there are several active voluntary groups each with their own orientation around environmentalism and sustainability. One group campaigns within their local neighbourhood to reduce energy use within domestic homes and is active in organising awareness raising events, holding open access talks and getting involved in educational interventions. Another leads a community orchard project to get people involved in growing their own fruit and socialising with others. The intent is clear and well understood with sustainability at its heart. A third group is involved in a range of conservation and wildlife protection actions, including clearing habitats for birdlife, opening scrubland areas to encourage nesting grounds and also re-naturalising rivers to support fish spawning. It is in this last area that a number of the interviews were orientated. These conservationists were very supportive of the research not least because it was an opportunity to highlight work which, by its very nature, needed to remain invisible. As they stated: 'if you get it right for the fish you get it right for everything else'.

This invisibility was linked to poaching, and in particular to the action of renegade anglers. Reveal where you are developing spawning grounds and you reveal the sites of vulnerable fish, easy to catch which, over time, reduces the number of breeding adults. The work in developing the spawning grounds, or gravel 'redds', of migrating trout was very important in this section of the study area. For many years the decline of trout was linked to the river system being neglected, with the smaller tributary streams left to become silted up and in-filled with debris preventing returning sea trout from accessing spawning grounds and those spawning grounds decimated by poor watercourse management. Equally, young trout setting off to sea were deterred in joining the main river through its faster movement which had led to greater sluice use. This fast movement can, in part, be attributed to increased run off from new building development and heavier episodic rainfall events.

There is then a close relationship between the conservationists who clear the smaller streams of debris and fundraise to buy and place large quantities of gravel; the anglers whose licences help support these activities and whose campaigns to improve water quality locally and nationally is impactful and the local rivers' and wildlife trust who provide advice and additional volunteers. Of great importance are the elder cohort of volunteers. This is not only because they are retired

and, as we have seen from Community Story 2, have more time to get involved, but also because their memories of rivers feeds into a body of expertise which ensures that knowledge is passed on. As the village has a high percentage of in-migration of residents, particularly retired residents, this knowledge is not directly attributable to the river itself or long standing place-based expertise. Instead it is a mobile, hybrid set of knowledges which combine to provide generic understandings of riverine life and riparian ecosystems.

4. Discussion

These community stories enable us to reflect on sustainable development narratives. Of special note is that throughout the analysis of all twenty eight interviews there were scant direct references to sustainability, environmentalism or even being 'green'. This terminology was outside the language of the respondents. Instead the focus was on action; meetings that were taking place to raise awareness, organising letters of support, fundraising, clearing out drains and digging in gravel. The responses were experiential, physical and communal in nature.

What is revealed is the hybrid nature of the knowledges exchanged, developed and built upon. There is a tendency within some of the literature concerning lay or local knowledges and the environment to move towards idealising the lived experience. Within some of the work there is an emphasis on place-based knowledge, intra-generational knowledge and a linking of the self as a direct extension of the immediate environment (Whatmore 2009, Adger et al 2005). Whilst this is perfectly valid and useful within the context in which these pieces of work were undertaken, for sustainable management practises to thrive there has to be some kernel of application which can be translated across communities, across nations, across different development trajectories.

These three Community Stories reveal the all encompassing importance of the immediate in the way we make sense of our world. The inchoate, abstracted idea of 'out there' makes the sustainability agenda feel remote and removed. Throughout the fieldwork the term 'sustainability' or even 'climate change' rarely appeared. The work that was being undertaken, the actions taken to improve or argue for the improvement of river water quality, utilised individual heuristics of what functioning watercourses should look like and in what form they should appear. The respondents therefore showed quite narrow horizons of how their local water resource issues fit into the bigger national or global picture. What links these three stories is the way in which it is the need to action something locally which galvanises responses – whether neighbours along a street, episodic village meetings in response to algae blooms and foul smelling water, or protecting streams to support recreational angling.

These stories suggest that what enables change is creating forum in which very immediate issues can be discussed, explored and enacted. Potential could lie then in communicating sustainability messages through making local issues connect to wider macro level agendas. This involves finding ways to support a deeper engagement between the stakeholders within these micro communities, which together combine, potentially, to not only enlighten and empower people within communities but to allow them to see the interconnectedness between events and processes. This is not to say people are unwilling or unable to do this by themselves, but rather that this ability requires a neutral space, experienced facilitators and time dedicated to make these linkages.

In all three of these Community Stories the forum which offers the potential to discuss issues widely could be through non-binding, non-implementation fora, such as citizens juries, held in some community or communal space. Using the concept of sustainable futures as the guiding principle, these juries enable ideas to be explored and perspectives to be shared. There are limitations to this approach (Crosby 1995) but they do enable a means for all the interlocutors discussed above to make a contribution and understand the limitations, concerns and viewpoints of others joined within the debate, and to locate their experiences within the wider narratives and discussions around sustainable futures.

Within the context of NEXUS thinking and renewable freshwater resources, the process of, outcomes of and longstanding relationships developed through, these citizens juries could both share existing knowledges and develop new knowledges to develop and enrich these extant

hybrid knowledges. The empirical fieldwork shows that there is a vernacular understanding of what it means to be sustainable in relation to sustainable water management practices – what seems to hamper enabling sustainability are the impediments of reduced resources within and above the community level. In the first story parish councils are run by elder volunteers with no experience and no access to additional finance whilst upstream riparians are trying to be sustainable within tight financial constraints. In the second narrative short-term planning has led to long-term waste leaching, with no regulatory authority having the means to tackle the problem and an episodic and haphazard response from the local community. Finally in the last story the pragmatic approach to river clearing and cleaning has been undertaken by volunteers whose horizon remains resolutely bound together with species sustainability – offering a glimpse of possible future ways of broadening this narrative to encompass sustainability more generally.

A broad perspective would argue that to enable sustainability you simply need to support and nurture the processes and practices already visible. This means financial support and other, more transformative changes. Implicit within the study is the scarcity of time – in multiple senses. Respondents and volunteers are mainly elders – as the younger adults are working, commuting, raising families, caring for elderly relatives. Younger adults seem to be locked out of sustainability debates – not through lack of interest, but lack of time. Yet time is precious when we return to the climate change science evidence and may be the very factor that will ultimately be transformative.

5. Conclusions

Reviewing all three stories we see evidence of attempts to support freshwater sustainability. In the flooded lane the residents want to live harmoniously with the water – but need support in order to do that. In the second story there is the recognition that when faced with pressing water issues community response will galvanise – although fleetingly. In the third, a thriving ecosystem is seen to be beneficial for all. And yet there is a limited horizon in all three.

These three community stories reveal in more nuanced detail the difficulties faced by policy makers, educationalists and environmental campaigners attempting to persuade citizens to embrace sustainable futures discussions. Most routes to assessing the success of public engagement with climate change data ask respondents about climate change directly. Through this piece of research, focusing on water resource issues, we have explored if local actors are able to make cognitive leaps to join up the strands of the sustainability narrative and make links across scientific disciplines. What we find is that the climate change ‘story’ has not filtered down. The term may be common – though we should be pertinent of the fact that over half the respondents made no direct allusions to it at all – but is not clearly understood. There are differences in understanding likely scenarios in terms of temperature changes and seasonality, in global warming or cooling and no spontaneous connection with how this may affect, in this study at least, water resources. We can say that respondents’ horizons are limited, contested and to a great extent disengaged when contextualised with sustainable futures.

To make sense of the overarching climate change narrative, those tasked with communicating climate change messages need to rewrite the script to show how these localised knowledges and experiences are central to making positive change happen. Agency needs to be re-appropriated by individual actors. This fieldwork sheds light on the micro level of everyday perspectives, opinions and practices which support sustainable water resources management. To support sustainable social practices and promote policies, technologies and lifestyle changes which all champion freshwater resource integrity there needs to be deeper engagement with community groups and businesses at the catchment level. Understanding the different lifeworld perspectives provides opportunities rather than barriers, and allows for targeted messages which accords with individual’s own experiences.

References

Adger, W. N., Arnell, N. W. and Tompkins, E. L., 2005. Adapting to climate change: perspectives

across scales. [in special issue: Adaptation to Climate Change: Perspectives Across Scales] Global Environmental Change Part A, 15, 2, pp. 75 - 76.

Allan, J.A., 2003. IWRM/IWRAM: A new sanctioned discourse? Water Issues Study Group. London: University of London. Discussion Paper No. 50.

Bakker, K., 2003. A political ecology of water privatization. *Studies in Political Economy*, 70, pp. 35 - 58.

Baltimore Sun editorial., 18.05.2015. Water Shut off Inequities. Baltimore Sun. Available: <http://www.baltimoresun.com/news/opinion/editorial/bs-ed-water-shutoffs-20150518-story.html> (accessed 07.07.2015).

Benson, D., Gain, A.K. and Rouillard, J.J., 2014. Water Governance in a Comparative Perspective: From IWRM to a 'Nexus' Approach? *Water Alternatives*, 8, 1, pp. 756 - 773.

Biswas, A., 2008. Integrated Water Resources Management: Is It Working? *International Journal of Water Resources Development*, 24, 1, pp. 5 - 22.

Brugnach, M., Dewulf, A., Pahl-Wostl, C. and Taillieu, T., 2008. Toward a relational concept of uncertainty: about knowing too little, knowing too differently, and accepting not to know. *Ecology and Society*, 13, 2, Art 30. [online] URL: [http:// www.ecologyandsociety.org/vol13/iss2/art30/](http://www.ecologyandsociety.org/vol13/iss2/art30/).

Butterworth, J., Warner, J., Moriarty, P., Smits, S. and Batchelor, C., 2010. Finding practical approaches to Integrated Water Resources Management. *Water Alternatives*, 3, 1, pp. 68 - 81.

Cloke, P. and Goodwin, M., 1992. Conceptualizing Countryside Change: From Post-Fordism to Rural Structured Coherence. *Transactions of the Institute of British Geographers*, 17, 3, pp. 321 - 336.

Crosby, N., 1995. Citizens Juries: One solution for difficult environmental problems. In: Renn, O., Webler, T. and Widemann, P., (Eds.). *Fairness and competence in citizen participation*. Springer, Netherlands, pp. 157 - 174.

Dovers, S.R. and Handmer, J.W., 1992. Uncertainty, sustainability and change. *Global Environmental Change*, 2, 4, pp. 262 - 276.

Edwards, C., 2009. *Resilient Nation*. Demos, London.

Gearey, M. and Jeffrey, P.J., 2010. Using legitimacy dialogues to explore flooding issues in a UK catchment. *Water and Environment*, 24, pp. 320 - 327.

Habermas, J., 1984. *The theory of communicative action: Volume 1*. Beacon, Boston.

Hall, D. and Lobina, E., March 2006. *Pipe dreams: The failure of the private sector to invest in water services in developing countries*. Public Services International Research Unit, London.

Harvey, D., 2011. *The enigma of capital: and the crises of capitalism*. Profile, London, UK.

Hirsch, P., 2011. IWRM as a participatory governance framework for the Mekong River Basin? In Öjendal, J., Hansson, S., and Hellberg, S. (Eds.) *Politics and Development in a Transboundary Watershed: The Case of the Lower Mekong Basin*. Springer, Netherlands, pp.155 - 170.

Husserl, E., 1970. *The idea of phenomenology*. The Hague: Nijhoff.

Ingold, T., The temporality of the landscape. *World archaeology*, 25, 2, pp. 152 – 174.

IPCC., 2012. *Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation: A Special Report of Working Groups I and II of the Intergovernmental Panel on Climate Change*. Cambridge University Press, Cambridge, UK and Cambridge University Press, New York, USA.

Jeffrey, P.J. and Gearey, M., 2006. Integrated water resources management: lost on the road from ambition to realisation? *Water Science & Technology*, 53, 1, pp. 1 - 8.

Latour, B., 2005. *Reassembling the social: An introduction to Actor-Network theory*. Oxford

University Press, Oxford.

Law, J. and Urry, J., 2005. Enacting the Social. *Economy and Society*, 33, 3, pp. 390 - 410.

Marin, P., 2009. Public-private partnerships for urban water utilities: A review of experiences in developing countries. *World Bank trends and policy options number 8*. The World Bank.

Maslin, M.A. and Lewis, S.A., 2015. Anthropocene: Earth System, geological, philosophical and political paradigm shifts. *The Anthropocene review*, pp. 1 - 9.

Mollinga, P., 2001. Water and Politics, Levels, Rational Choice and South Indian Canal Irrigation. *Futures*, 33, 8, pp. 733 - 752.

Mukhtarov, F. and Gerlak, A.K., 2014. Epistemic forms of integrated water resources management: towards knowledge versatility. *Policy Sciences*, 47, 2, pp. 101 - 120.

Myers, T.A., Maibach, E.W., Roser-Renouf, C., Akerlof, K. and Leiserowitz, A.A., 2012. The relationship between personal experience and belief in the reality of global warming. *Nature Climate Change, Letters*, 2nd December 2012, pp. 1 - 5.

Poerksen, U., 1995. Plastic words. The tyranny of a modular language. Penn State Press, University Park, PA.

Rockstrom, J., Steffen, W., Noone, K., and Persson, A. et al., 2009. A safe operating space for humanity. *Nature*, 461, pp. 472 - 475.

Saurí, D. and Del Moral, L., 2001. Recent developments in Spanish water policy: Alternatives and conflicts at the end of the hydraulic age'. *Geoforum*, 32, 3, pp. 351 - 362.

Sawkins, J.W. and Dickie, V.A., 2005. Affordability of household water and sewerage services in Great Britain. *Fiscal Studies*, 26, 2, pp. 225 - 244.

Scannell, L., and Gifford, R., 2010. Defining place attachment: A tripartite organizing framework. *Journal of Environmental Psychology*, 30, pp. 1 - 10.

Smith, L., 2004. The murky waters of the second wave of neoliberalism: corporatization as a service delivery model in Cape Town. *Geoforum*, 35, pp.375 - 393.

Strang, V., 2004. The meaning of water. Berg Press, Oxford.

Walker, W. E., P. Harremoës., J. Rotmans., J. P. van der Sluijs., M. B. A. van Asselt., P. Janssen., and M. P. Kraayer von Krauss., 2003. Defining uncertainty. A conceptual basis for uncertainty management in model based decision support. *Integrated Assessment*, 4, pp. 5 - 17.

Whatmore, S.J., 2009. Mapping knowledge controversies: science, democracy and the redistribution of expertise. *Progress in human geography*, pp. 1 - 12.

Supporting EIA for a regional road project by HIA and stakeholder engagement

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Abstract

In the Austrian province of South-East Styria, the construction of a new section for a federal road - the "B 68" - has been discussed since decades. In order to support the decision-making process for this road section, a mixed approach is being applied, consisting of three key elements: First, the Environmental Impact Assessment (EIA) process that is prescribed by the Austrian EIA Act; second, an additional Health Impact Assessment (HIA) process, conducted on a voluntary basis; and third, a comprehensive engagement of stakeholders. The results of this combined approach should enable policy-makers, local and regional undertakings and the affected population to get relevant information from different perspectives and to identify the most sustainable solution for the planned traffic project. A special emphasis was put on the involvement of stakeholders regarding the project's health impacts: Citizens, politicians, representatives from lobby groups and other stakeholders did participate through a household survey, two focus groups, or workshops regarding scoping, appraisal and recommendations for the project's expected health effects. With the support of the HIA and the public participation, the subsequent EIA can be thoroughly prepared and enriched. The key outcome of this process was the formulation of ten recommendations for different target groups. Those can be used as valuable input for the forthcoming EIA, e.g., in terms of suggestions for mitigation measures for the road project, or for minimizing its impacts on human health or for contributing to the regional mobility plan.

Keywords: Environmental impact assessment (EIA); health impact assessment (HIA); stakeholder engagement; transport sector; public participation

Adopting a place-based approach: incorporating community interest into the multi-level governance of inland waterways

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Abstract

This paper examines the contribution of community adoption to the sustainable governance of inland waterways in England and Wales. It considers how the recent launch of community adoption schemes by the Canal & River Trust impacts upon and serves to shape the multi-level governance of a national networked resource. Guided by a critical review of the meaning of community adoption in a resource context, particular attention is given to the process of learning to co-manage individual stretches of waterway as place-specific community assets. This includes facilitating the practices of repeat place-based volunteering and inclusive decision-making that community adoptions seemingly have the potential to motivate, and managing the feelings of local ownership that they are able to stimulate. The institutional context for this study is dominated by the decision, in 2012, to transfer the authority for over 3,000 kilometres of canals and rivers within England and Wales from a public body (British Waterways) to a purposively created charitable trust (Canal & River Trust). In this instance, therefore, the conceptual frame of multi-level governance is drawn upon to explore the case of sustainable waterways management by a non-governmental body. The paper reports findings from semi-structured interviews and focus groups undertaken with relevant Trust employees and with a sample of community adoptees. The research suggests that the localized, place-based and participatory nature of waterway adoptions present considerable challenges to existing ways of managing the waterways and addressing the parallel commercial, regulatory, navigational and environmental responsibilities of the Trust. Conclusions are drawn on the contribution of adoption schemes to enabling a shared sense of ownership and authority to take root at a local level, but also the challenge of learning to accommodate place-based forms of community interest within the multi-level governance of national environmental resources.

Keywords: Community, adoption, governance, water, participation

Agrarian Cooperatives as Sustainable Governance Structures in the Region of Algarve, Portugal

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Abstract

Sustainability is generally viewed as a guide for the formulation of economic and social policies in harmony with the ecological. The term has its origins in the mid-70s, and nowadays the number of research, papers and importance of the term has grown increasingly. In keeping with the theory of sustainable development, which aims to meet all basic and involve all people a chance at a better life needs. Nearly three decades that the World Commission on Environment and Development (WCED) defined sustainable development and put the concept of sustainability on the global agenda. Despite this, the specific meaning of these terms and their suitability for specific cases has sparked much debate between academia and business world. Given the need for governance structures from agricultural cooperatives in the region of Algarve, Portugal understood the term "governance" as the coordination of individual actions, institutional, corporate and including agricultural cooperatives as vectors of a social construction and more equitable economic order and plural. In this sense, cooperatives are understood as an alternative form of economic organization with enormous potential to emerge new ways of social and economic coordination. Cooperatives in Algarve are enclaves of regional and local growth, governed by democratic principles and with a huge potential to promote structural solutions to social problems, self-management and community changing social relations of production. The objective of this paper is to analyze the role of the agrarian cooperatives in the region of Algarve, Portugal, as a link of structure of governance. The methodology is based in a qualitative nature of research, grounded in content analysis, from semistructured interviews and documental analysis. applied exploratory purpose, in a first stage, then turned descriptive, into an exploratory and descriptive approach. The findings show that the agrarian cooperatives has a crucial role in the economic and social life of stakeholders and serves as a key structure to the governance in the region.

Keywords: Agrarian Cooperatives. Sustainability. Governance Structures. Algarve.

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The governance capacity of Indonesia's public standard (the ISPO) for sustainable palm oil production

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Abstract

Palm oil is the most traded vegetable oil worldwide. The increased demand for palm oil stimulates the debated expansion of oil palm plantations in developing countries, among which Indonesia. Although the expansion of palm oil production positively contributes to Indonesia's economy, it is also associated with sustainability problems related to deforestation, the emission of greenhouse gasses (GHG), biodiversity loss, and social conflicts. Private sustainability standards, like the RSPO, have emerged as new governance arrangements aiming to overcome these adverse effects of conventional palm oil production. However, these private voluntary standards are debated in terms of their effectiveness, inclusiveness of stakeholders' interests, and their ability to contribute to sustainability changes. Recently, Indonesia developed its own public standard aiming to increase the competitiveness of Indonesian palm oil while guaranteeing the sustainability of its production, particularly in terms of the prevention of deforestation and the release of GHG. The ISPO targets to include more than 2000 palm oil plantation companies and millions of palm oil smallholders into their scheme. Given the variety of producers involved -ranging from big, powerful companies to millions of vulnerable smallholders- the inclusion of all palm oil producers in the ISPO can be considered a major challenge. We hypothesize that such a challenge may only be successfully met in the presence of a very strong governance capacity on behalf of the Indonesian government. Therefore, given the fact that the ISPO is only recently developed (in 2011), this is a forward looking study analysing the governance capacity of ISPO and potential barriers to bring in all palm oil producers including smallholders. We assess the governance capacity of the ISPO by addressing two main questions: To what extent may the ISPO realize its objectives; and to what extent may the ISPO be able to solve sustainability problems related to the production of palm oil? We conducted 45 in-depth interviews with stakeholders which we analysed by computer-assisted qualitative data analysis (CAQDA). Methodological triangulation was performed by document analysis and observation of meetings such as ISPO evaluation meeting. Based on the interviews, we identified 4 crucial barriers hampering the ability of ISPO to realize its objectives. First, a lack of knowledge and the existence of different, sometimes contradictory, interpretations of the regulations. Second, a lack of support towards the ISPO resulting from different interests among actors. Third, limitations of human resources, budgets, and authority of the ISPO commission to impose the regulation to other Ministries and local governments, resulting in a lack of power from the ISPO commission to enforce punishment in the case of non-compliance. Lastly, contextual factors like acceptance of ISPO in the global market, political factors, and societal/ cultural characteristics may seriously hamper the extent to which ISPO may be able to achieve its objectives. First results indicate that ISPO is considered to have the potential to reduce deforestation in Indonesia, although it may not significantly solve biodiversity loss, GHGs emissions and social conflicts. In the paper we will also suggest improvements that may increase the governance capacity of ISPO further.

Keywords: public sustainability standards, ISPO, sustainable production, governance capacity, policy arrangement approach

The well-being of future generations (Wales) Act and higher education

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Abstract

In Wales, 2015 marked the introduction of the Well-being of Future Generations Act, the first of its kind in the World, where the well-being of future generations will be considered at the heart of government decision making. Going forward there will be a requirement for public bodies to make sure that when making decisions they take into account the impact their decisions could have on people living their lives in Wales in the future. It will expect them to work together better, to involve people reflecting the diversity of Welsh communities, to look to the long term as well as focusing on now and to take action to try and stop problems getting worse, or even stop them happening in the first place (Welsh Government, 2015). Seven goals have been identified, these are: a prosperous Wales; a resilient Wales; a healthier Wales; a more equal Wales; a Wales of Cohesive communities; a Wales of vibrant culture and thriving Welsh language; and a globally responsible Wales. It is very early days for the Act, and how it will be fully implemented is still being debated. In this paper the author looks at the Act, its intentions, reporting structure and proposed outcomes, and discusses how universities are well placed to not only meet the requirements of this act but also to support others to do so through their learning, teaching and research activities.

Keywords: Sustainable Development, Universities, Reporting, Research, Teaching and Learning

Certification and farmer organization in the Indonesian coffee sector: benefits from a smallholder point-of-view

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Abstract

In this paper we distinguish three types of farmer organizations in the Indonesian coffee sector; farmer groups, cooperatives and KUBEs. These organizations differ in their organizational structure, have been initiated and managed by different ministries and adopt different sets of rules. We are interested in the way in which different organizational structures affect Indonesian coffee smallholders and whether certified group members perceive more or different benefits than their uncertified counterparts. The paper addresses three questions: (1) 1. How do different forms of farmer organizations differ in their organizational structure, and what is the role of certification? (2) How and to what extent can the differences in perceived benefits be related to differences in organizational structure? (3) What is the relative importance of certification -compared to organization- in explaining differences in perceived benefits? To answer these questions, we include certified and uncertified smallholders in our research. The certified smallholders are part of different schemes: Fairtrade, Utz certified, Rainforest Alliance, and 4C. Both for the certified and uncertified farmers, we include farmers who are member of farmer groups, cooperatives or KUBEs (or a combination), and farmers who are not part of any formal form of organization. We found that the differences of organizational structure and certification schemes have little effects on the differences of farmers' perceive benefits, the organizational structures the certified farmers are part of do not necessarily create more benefits than the organizational structure of uncertified farmers, organizational structures in different certification schemes do not differently benefit farmers, and organization is relatively more important than certification in explaining the differences of perceived benefits.

Keywords: coffee certification, farmer organizations, organizational structure, perceived benefits, Indonesia

1. Introduction

Farmer organizations have been progressively promoted as important means for linking smallholders to global certified coffee markets. They are believed to bring a form of collective action that contributes to the success of the smallholders' participation in certification ([Narrod et al., 2009](#)). Farmer organizations make certification of smallholders economically feasible through offering economies of scale that reduce compliance costs for farmers and facilitates the distribution of costs among smallholder members, consolidating them as larger producers, reducing individual upfront investments and providing better access to resources (Maertens & Swinnen, 2009; Mausch, Mithöfer, Asfaw, & Waibel, 2009). These organizations also reduce the transaction costs for service providers working with smallholders and serve as essential instruments for systematic knowledge transfer (Brandi et al., 2013). It is, however, not easy to distinguish between effects of certification on the one hand and effects of organization on the other hand, as membership of a farmer organization has become de facto mandatory for smallholders in order to become certified (Brandi et al., 2013; Loconto & Dankers, 2014). Certification is unable to deal with farmers individually because they are large in number and vary widely in terms of financial opportunities, knowledge, and skills. These variations and individual limitations can be overcome by encouraging farmers to form organizations and work together. Although farmer organizations seem to play

important roles for farmers they cannot be analysed or compared as homogeneous entities as different forms of organizations with distinguishing organizational structures exist in practice. In Indonesia for example, we observe three types of farmer organizations that play a role in the coffee sector: farmer groups, cooperatives and KUBEs. These organizations have different organizational structures since they were initiated and managed by different ministries, and are currently regulated by different sets of rules.

Although different global certification schemes in Indonesia such as Fairtrade, Rainforest Alliance, Utz-certified and 4C may have different procedures on how to include smallholders in their schemes, they all approach smallholders through the farmer organizations. This paper will offer insights from the Indonesian coffee sector by analysing benefits resulting from the different types of farmer organizations for certified and conventional farmers.

In certification literature, studies mainly focus on evaluating the benefits from participation in certification, and they found certification provides opportunity for farmers to improve their social, economic, and environmental conditions as well as to enhance their capacity building (Bray, Sanchez, & Murphy, 2002; Raynolds, Murray, & Leigh Taylor, 2004; Taylor, Murray, & Raynolds, 2005). In organization literature, studies are rich regarding the benefits of farmer organization (Fischer and Qaim, 2012; Hellin, Lundy, & Meijer, 2009; Kaganzi et al., 2009; Markelova, Meinzen-Dick, Hellin, & Dohrn, 2009;). According to the studies, farmer organization benefits farmers in term of higher access to credit and farming inputs. Farmer organization is also considered as a key factor to enhance smallholder access to market and innovation adoption. However, rarely studies that evaluate both the impact of certification and organization concurrently. While certification needs organization to include farmer in certification, we have lack of knowledge whether certification or organization that is relatively more important in providing benefits for farmers. We also lack of knowledge whether different schemes and different organizational structures meaningfully lead to different benefits.

Organizational structures are believed to influence the fundamental functions of organizations to deliver support and services to smallholders. Smallholders consider support and services as the benefits of their organizational membership. In the context of certifications, it is therefore important to analyse in what way and to what extent the differences in organizational structure matter for the organizations' provision of support and services, and ultimately for farmers' benefits. This paper addresses the following research questions:

1. How do different forms of farmer organizations differ in their organizational structure, and what is the role of certification?
2. How and to what extent do differences in organizational structure lead to differences in perceived benefits from the farmers?
3. What is the relative importance of certification - compared to organization- in explaining differences in perceived benefits?

1.1. The landscape of farmers' organizations in Indonesia

In Indonesia, many existing farmer organizations were unproductive or they merely limit their function as a distributor of aids (material and cash) from the government. However, in 2001, local governments open negotiations with farmers for utilizing protected forests for coffee production activities. The governments only interest to have the negotiations with a group of farmers rather than individual smallholders. This triggers farmers to revive the existing organizations or establish the new ones (Arifin, 2010). The role of organizations for farmers seems to be more important since the presence of certification.

1.1.1. Farmer groups

In Indonesia, farmer groups were initiated by the central government in 1979 and have a formal status in the country. The organization is currently regulated by the Ministry of Agriculture. According to the ministry's regulation of Peraturan Menteri Pertanian Nomor 82 (2013), a farmer group is defined as a group of farmers formed on the basis of mutual interest, similarity of commodities, and geographical closeness among individuals. Averagely a farmer group

consists of 30 individual members who mostly live in the same village. The main functions of a farmer group are to facilitate farmers' learning process and to enhance cooperation among them. A farmer group also serves as a production unit in which members are not seen as individuals but as a whole or a unit to achieve economies of scale.

1.1.2. Cooperatives

Cooperatives are developed based on the principles stated in the Indonesian Cooperative Law (Undang-undang Nomor 17, 2012). According to the law, a cooperative is founded by at least twenty individuals who contribute some of their wealth to the initial capital of the organization. Their agreement to form a cooperative must be drawn up by a notary and legalized by the Ministry of Cooperative. A cooperative therefore has authorised rights and responsibilities, but can also be sanctioned if the organization performs against the law. The main functions of a cooperative are to increase economies of scale, production efficiency, and the bargaining position of farmers.

1.1.3. KUBEs

KUBEs have been initiated by the Indonesian Ministry of Social Affairs since 1983 in a response to the government regulation on welfare services for the poor (Peraturan pemerintah Republik Indonesia Nomor 42, 1981). The underlying idea of the development of KUBEs is to strengthen the existing micro businesses by integrating them into a larger business venture. KUBEs are found in both rural and urban areas and they may differ in their size. A small KUBE consists of five to seven small household-scale businesses that agree to collaborate and merge their available assets. Medium and big KUBEs consist of eight to fifteen, and sixteen to thirty micro businesses respectively. In the Indonesian coffee sector, KUBEs manage different farmer groups, and transport the coffee beans to the roasting companies (in the case of conventional coffee) or exporters (for certified coffee) after cleaning and drying the coffee beans (Ibnu et al., 2015).

1.1.4. Hypotheses regarding organizational structure and certification

Organizational structures influence how organizations provide support and services to their members (Gibson et al., 2011). First, structures influence organizational processes that relate to regularly-occurring organizational activities. In this context, structures provide the foundation for standard operating procedures, routines, and orientations. The later refers to whether an organization focuses more on internal (e.g., strengthening cohesion and increasing mutual support among members) or external (e.g., representing and negotiating farmers interests) relationship.

Second, structure determines which individuals participate in decision-making processes, and thus to what extent their views shape the organization's actions. Third, structure shapes the information flow through organizations and to key decision makers and therefore influences which problems are tackled by an organization and which solutions are considered.

Although not specifically considering the role of certification, the literature is rather rich in presenting the benefits of organizations. These benefits vary widely and differ from better job opportunities (Jena, Stellmacher, & Grote, 2015; Place et al., 2004; van Rijsbergen, Elbers, Ruben, & Njuguna, 2016), to improved skills (Bitzer, Glasbergen, & Arts, 2013; Neilson, 2008; Ruben & Zuniga, 2011 ;Utting, 2008), and from better bargaining power (Bacon, 2010; Taylor, Murray, & Raynolds, 2005) to better networking (Raynolds, Murray, & Leigh Taylor, 2004). For this paper, we divide these benefits in 5 categories. First, economic benefits such as saving costs through collective marketing, better prices for their products, better access to inputs and production facilities, more secure land tenure and better access to credits and options for saving money.

Second, social or community benefits in the form of better education, health, and housing services as well as access to public facilities (e.g. safe drinking water and sanitation). Farmer organizations also contribute to the organization of social events, strengthening social relations among community members, and providing job. Third, we identify benefits in the domain of representation. Organizations represent farmers in formal meetings, and negotiate their interests with external parties such as the government or firms. In this context, organizations play a role in strengthening the farmers' bargaining power. Fourth, capacity building benefits facilitated by farmer organizations refer to improved knowledge and skills on behalf of the farmers through training, the provision

of information and technical support, but also to enhanced participation in decision making (Bitzer, Glasbergen, & Arts, 2013; Neilson, 2008). Finally, we observe benefits in terms of networking. This often takes the form of networking and collaborating with other organizations (like private companies) to enhance financial capital and secure market access.

The extent to which farmers' benefits should be attributed to certification or organization remains questionable. Based on the certification and organization literatures, we developed four hypotheses regarding the relationships between certification, organizational structure, and benefits for farmers:

Hypothesis 1: Different organizational structures lead to differences in perceived benefits

Hypothesis 2: the organizational structures the certified farmers are part of do not create more benefits than the organizational structures the uncertified farmers are part of.

Hypothesis 3: Organizational structures in different certification schemes differently benefit farmers.

Hypothesis 4: Organizational structures are relatively more important than certification to explain differences in farmers' benefits.

2. Methods

We surveyed coffee farmers in Lampung and Aceh provinces, and the certified farmers are those participating in 4C, Utz-certified, Fairtrade (FT), and Rainforest Alliance (RA). For being certified with 4C, Utz, and RA, individual farmers in Lampung have to join farmer groups, and these groups become member of KUBEs. In Aceh, cooperatives play a role in the FT scheme. Certified farmers mostly have a dual membership status: farmer group plus KUBE (FGKUBE) or farmer group plus cooperative (FGcooperative). Uncertified farmers only involve in farmer groups or become independent smallholders. KUBEs and cooperatives are found to participate in certification, but not all for farmer groups. The uncertified farmer groups refer to independent farmer groups (IFG), and they do not join either a KUBE or a cooperative. Hence, the organizations compared in this paper are IFG, FGKUBE, and FGcooperative.

To answer the first research question, we determine (general) structural aspects based on the government's rules and regulations for the organizations. We then conducted interviews and had open discussions not only with farmers but also with ICS personnel, staffs of cooperatives and KUBEs, and village leaders to have more specific information about the structures.

Table 1 presents our respondents that can be distinguished based on participation in certification (i.e., certified and uncertified farmers) and organizational membership (i.e., being members of organizations and independent smallholders). This study uses a proportional random sampling to collect data from certified and uncertified respondents (i.e., each consisting of 80 farmers). Since four schemes are included in the study, we took twenty respondents per scheme, and this makes 160 respondents in total.

Table 1. Types of respondents

Type of respondents		Schemes
Certified smallholders	Members of FGKUBE	4C, Utz, RA
	Members of FGcooperative	FT
Uncertified smallholders	Members of IFG	-
	Independent smallholders	-

To answer the second research question, we asked the organized farmers several questions (measured by a five-point Likert scale) related to the perceived benefits (see Appendix A). We used One Way Anova test to analyse potential differences in the perceived benefits based on the differences of their organizational structures.

To answer the third research question, we operationalized the benefits. For example, the perceived economic benefit is operationalized by asking farmers whether organizations benefit them in term of easier marketing of their produce, better price, and higher access to farming input, production facility, credit, and financial saving as well as a greater secure of land tenure. All

the questions can be seen in Appendix B and are derived from the different literature sources. Each benefit is also presented on a five-point-Likert-scale, ranging from 1 (strongly disagree) to 5 (strongly agree).

We then operationalize organizations and certification with codes. For organizations, the codes are ranging from 0 (independent farmers) to 3 (FGcooperative). For certification schemes, the codes are ranging from 0 (uncertified) to 4 (FT) (see Table 2).

Table 2. Codes used in the ordinal logistic regression for the dependent variables

Organization	Code	Certification Scheme	Code
Independent farmers *	0	Uncertified	0
IFG*	1	RA	1
FGKUBE**	2	Utz	2
FGcooperative**	3	4C	3
		FT	4

* uncertified

** certified

We applied an ordered logistic regression model to see the influences of certification schemes, organizations, and demographic variables on the perceived benefits. Hence, our general model is the outcomes or dependent variables (i.e., the perceived benefits) are measured by looking at the influences of the predictor or independent variables (i.e., certification schemes, organizations, and demographic variables). Demographic variables included in the regression are age (years), education (years), family number (number of people), experience (years), and landownership (hectares).

The overall score of a perceived benefit per respondent is obtained by summing up the respondent's scores for the benefit's items. The overall response score varies between individual farmers but falls within the ranges set up by the Likert scale. The ranges are distances between the maximum scores per level of Likert scale. For example, if a respondent's overall score for the perceived economic benefit is 30, the score actually fall between 27 (resulted from 9=number of questions items multiply by 3=neutral) and 36 (resulted from 9 multiply by 4= agree). The respondent's score is therefor in the range of 'neutral to agree.'

Based on the ranges, four ordered levels of responses are determined: level 1 = 'disagree to strongly disagree', level 2='neutral to disagree', level 3='neutral to agree', and level 4='agree to strongly agree.' Since the maximum Likert scores depend on the number of question items, the ranges differ among the category of perceived benefits. We code the levels from 1 (disagree to strongly disagree) to 4 (agree to strongly agree) (see Table 3).

Table 3. Ordered category of the perceived benefits

Perceived benefits	Number of question items	Likert Scale	Maximum score	Range	Levels	Code
Economic	9	1	9			
	9	2	18	<18	disagree to strongly disagree	1
	9	3	27	≥18 to <24	neutral to disagree	2
	9	4	36	≥27 to <36	neutral to agree	3
	9	5	45	≥36	agree to strongly agree	4
Social/community	15	1	15			
	15	2	30	<15	disagree to strongly disagree	1
	15	3	45	≥30 to <45	neutral to disagree	2
	15	4	60	≥45 to <60	neutral to agree	3
	15	5	75	≥60	agree to strongly agree	4
Representation and/or negotiation	4	1	4			
	4	2	8	<8	disagree to strongly disagree	1
	4	3	12	≥8 to <12	neutral to disagree	2
	4	4	16	≥12 to <16	neutral to agree	3
	4	5	20	≥16	agree to strongly agree	4
Capacity building	11	1	11			
	11	2	22	<22	disagree to strongly disagree	1

	11	3	33	≥22 to <33	neutral to disagree	2
	11	4	44	≥33 to <44	neutral to agree	3
	11	5	55	≥44	agree to strongly agree	4
Networking and/or partnership	3	1	3			
	3	2	6	<6	disagree to strongly disagree	1
	3	3	9	≥6 to <9	neutral to disagree	2
	3	4	12	≥9 to <12	neutral to agree	3
	3	5	15	≥12	agree to strongly agree	4

The significant influence of certification and organization is shown by estimate (i.e., the regression coefficient) in the regression model which has a P-value of 0.05 or lower. The sign of the estimate (positive or negative) show the directions of the influences of organization and certification on the perceived benefits. The interpretation of the estimate is that for a one unit increase in a predictor variable, a perceived benefit level is expected to change by the value of its estimate while the other variables in the model are held constant. We determine the relative strength of organization compared to certification by summing up the estimates of the significant predictor variables to obtain the total estimates.

The ordered logistic model uses the concept of odds ratio to show the predicted probability of independent variables in the regression. The strength of the predictive probability is shown by the proportional odds ratios (i.e., the coefficient exponentiated) and is displayed in the output of regression as ExpB. The interpretations of ExpB are different between categorical and continuous independent variables. For categorical independent variables (e.g., 'organization', which has 4 groups: 'independent smallholder,' 'IFG,' 'FGKUBE,' and 'FGcooperative'), we interpret the odds that one group (e.g., 'independent smallholder' which is significant at P-value≤0.05) has a higher or lower value on the perceived benefits. A higher value means that the independent farmers are likely to 'agree to strongly agree' to the benefits rather than they 'disagree to strongly agree' compared to other reference groups (i.e., groups with ExpB equal to 1). For continuous independent variables (e.g., 'age', measured in years), we interpret that a single unit increase or decrease in age (e.g., a one year increase or decrease in age), is associated with the odds of the perceived benefits having a higher or lower value. A higher value means that a one year increase in farmers' age increasing the odds that they would consider 'agree to strongly agree' to the benefits.

3. Results and discussion

3.1. The influence of different structures of IFG, FGKUBE, and FGcooperative on the perceived benefits

Based mainly on discussions with respondents and the government regulation, Table 4 presents structural aspects of farmer groups, KUBEs, and cooperatives.

Table 4. Structural aspects of farmer groups, KUBEs, and cooperatives

Structural aspects	Farmer groups	KUBEs	Cooperatives
Administration	Rarely record financial activities	Start to manage cash-flow records.	Complete financial report (audited if requested)
Administrative sanction	No legal sanction for administrative failure	No legal sanction for administrative failure	Receive legal sanction for administrative failure
Focus of activities	Production activities	Pre-harvest activities and marketing.	Pre-harvest activities and marketing.
Orientation	Inward oriented (focus on internal relationship)	Start to be outward oriented.	Outward oriented (connect to local buyers, exporters, roasters etc.).
Decision making	Consensus	Consensus	Consensus, if not voting
Member participation in decision making	Tend to passive, rely on leader and other colleague farmers	Tend to passive, rely on business operator	Tend to active, have a right to vote
Level of formality inside the organization	Low	Low	High

Structural aspects	Farmer groups	KUBEs	Cooperatives
Leadership style	Often centralize on group leader	Often centralize on business operator	More decentralize
Flow of information	Mostly through agricultural extension officer and group leader.	Mostly through social worker and business operator.	Through member meeting, supervisory, and executive board
Type of membership	Exclusive (based on many similarities such as neighborhood, type of farming, even ethnicity and language).	Rather exclusive (restricted to those in the nearby neighborhood and similarity of business type).	Inclusive (tries to include many different types of people from different regions).
Sources of funding	Highly depend on internal (e.g., member contribution) and external (i.e., government funding) sources	Internal (member) but still highly depend on additional capital from government	Independent, relies on both Internal (member) and external (private creditors) funding
Legal status	Mostly non-legal entity	Mostly non-legal entity	Legal entity

Certification triggers farmers to join more than one organization. Farmer group membership is insufficient to include farmers in certification. The farmers through their groups must be connected to KUBE which has a relationship with certificate holder (mostly multinational companies) or cooperatives (mostly hold certificate). Discussions with respondents revealed that connection with KUBEs/cooperatives has improved FG's administration aspect since they have to record both quantity and price of the coffee which they sell to KUBEs/cooperatives. FGs also changed their focus of activities from only focusing on production to more considering post-harvest and marketing especially regarding the quantity and quality of coffee requested by KUBEs/cooperatives. FGs farmers have also learned that both KUBEs and cooperatives are not the final buyers of their coffee. Consumers abroad are the final buyers and therefore their coffee production must be oriented to satisfy the consumers' demands as guided by certification principles (e.g., do not use banned pesticides and do not mix certified with uncertified coffee beans). Furthermore, farmers admitted that they no longer depend on group leaders for information. ICS (internal control system) personnel employed by KUBEs and cooperatives (to help farmers to comply with certification requirements) are other sources of information for the farmers.

However, farmers argue that some FGs structures are not influenced by KUBEs and cooperatives. FGs still maintain the informality of situation within the groups, member recruitment procedure, source of funding, and how they reach a decision in the groups. FGs are also still considered as non-legal entity and face no legal sanction for administrative failure. Following the interview results, we re-summarize the structural aspects of IFG, FGKUBE and FGcooperative as presented in table 5.

Table 5. Structural aspects of IFG, FGKUBE and FGcooperative

Structural aspects	IFG	FGKUBE	FGcooperative
Administration, focus of activities, orientation, and flow of information	Maintain FG's structure on Table 6	FG's structure is influenced by KUBE	FG's structure is influenced by cooperative
Administrative sanction, decision making, member participation in decision making, level of formality inside the organization, leadership style, type of membership, sources of funding, legal status	Maintain FG's structure on Table 6	Maintain FG's structure on Table 6	Maintain FG's structure on Table 6

We then run Anova test for administration, focus of activities, orientation, and flow of information to see their influences on the perceived benefits. The results are presented in Table. 6. The table shows that the structural aspects are only significant for the perceived benefits of representation of interests (P-value=0.003) and collaboration with others (P-value=0.000). First, FGKUBE and FGcooperative farmers perceived more benefits in term of representation of interests than the IFG farmers. The farmers perceive that FGKUBE or FGcooperative can connect them to buyers such as exporters or multinational companies. In contrast, the IFGs are perceived lack of direct access to such a buyer. Second, compared to IFG farmers, both FGKUBEs and FGcooperative farmers perceive they have more opportunities to have collaborations with other farmers outside their groups through meetings and events organized by KUBEs/cooperatives.

Table 6. Anova results for organized farmers

Perceived benefit		Sum of Squares	df	Mean Square	F	Sig.
Representation of interests *	Between Groups	4.841	2	2.420	6.263	.003*
	Within Groups	41.350	107	.386		
	Total	46.191	109			
Collaboration with others *	Between Groups	7.691	2	3.845	10.550	.000*
	Within Groups	39.000	107	.364		
	Total	46.691	109			

*. The mean difference is significant at the 0.05 level.

Multiple comparisons (Table 7) further show the effects of structural differences between FG, FGKUBE, and FGcooperative. However, the results tell us that the differences of administration, focus of activities, orientation, and flow of information do not lead FGKUBE versus FGcooperative farmers to be significantly different in the perceived benefits. We are thus unable to confirm the hypothesis 1 that different organizational structures lead to differences in the perceived benefits.

Table 7. Multiple comparison of Anova

Perceived benefit	(I) Administration, focus of activities, orientation, and flow of information	(J) Administration, focus of activities, orientation, and flow of information	Mean Difference (I-J)	Std. Error	Sig.
Representation of interests *	FGKUBE	IFG	.46667	.13901	.003
		FGcooperative	-.01667	.16051	1.000
	FGcooperative	IFG	.48333	.17945	.025
		FGKUBE	.01667	.16051	1.000
Collaboration with others *	FGKUBE	IFG	.61667	.13500	.000
		FGcooperative	.13333	.15588	1.000
	FGcooperative	IFG	.48333	.17428	.020
		FGKUBE	-.13333	.15588	1.000

*. The mean difference is significant at the 0.05 level.

3.2. The influence of different forms of organizations and certification schemes on the perceived benefits

Table 8 presents the descriptive statistic of farmers' responses for the perceived benefits. Overall, the highest response is 'neutral to agree' (46.6%), followed by 'agree to strongly agree' (28.8%) and 'neutral to disagree' (24.6%). This statistics therefore implies that farmers tend to value higher the benefits rather than they value them lower.

Table 8. Descriptive statistic of farmers' responses for the perceived benefits

Perceived benefit	Response	N	Marginal Percentage
Overall	neutral to disagree	197	24.6%
	neutral to agree	373	46.6%
	agree to strongly agree	230	28.8%

Table 9 shows the results of ordered logistic regression which reveals the individual influences of the predictor variables of organization and certification on the perceived benefits. For the perceived economic benefits, we can see that all the predictor variables of organization (i.e., Independent farmers, IFG, FGKUBE, and FGcooperative farmers) have no significant results (all P-values > 0.05). This implies that the different forms of organization do not lead to differences in the perceived economic benefits. The results also reveal that the organization in which FT certified farmers are part of (i.e., FGcooperative), and the organization in which RA, Utz and 4C certified farmers are part of (i.e., FGKUBE) do not significantly lead the farmers to perceive the benefit differently. Thus, we cannot confirm hypothesis 3 that organizational structures in different certification schemes differently benefit farmers.

For the predictor variables of certification, only 4C certified farmers that significantly value the economic benefit (P-value= 0.035). Indicated by the positive sign of estimate (1.499), the 4C certified farmers value higher the benefit which means they 'agree to strongly agree' to feel the benefit rather than they 'disagree to strongly disagree.' Based on ExpB, the odds of 4C farmers considering 'agree to strongly agree' is 4.88 (95% CI, 1.11 to 18.11) times that of uncertified farmers (ExpB=1), RA certified (ExpB=1), and FT certified farmers (ExpB=1). Nevertheless, Utz certified farmers (insignificant with P-value=0.061, and ExpB=3.74) cannot be treated as a

reference group to 4C certified farmers, meaning their odds differ insignificantly. The Utz certified farmers also have no considerable different from uncertified farmers, RA certified, and FT certified farmers.

Table 9. The results of ordinal logistic regression for individual predictor variables of organization and certification

Perceived benefits	Predictor Variables	Estimate	Std. Error	Wald	df	Sig	ExpB	Lower 95_Ci	Upper 95_Ci
<i>Economic</i>	<i>Organization</i>								
	Ind. smallholders	0.015	0.576	0.001	1	0.979	1.02	0.33	3.14
	IFG	1.218	0.654	3.466	1	0.063	3.38	0.94	12.19
	FGKUBE	0.895	0.709	1.591	1	0.207	2.45	0.61	9.82
	FGcooperative	0.000	-	-	0	-	1.00	-	-
	<i>Certification</i>								
	Uncertified	0.000	-	-	0	-	1.00	-	-
	RA certified	0.000	-	-	0	-	1.00	-	-
	Utz certified	1.319	0.705	3.498	1	0.061	3.74	0.94	14.90
	4C certified*	1.499	0.713	4.424	1	0.035	4.48	1.11	18.11
FT certified	0.000	-	-	0	-	1.00	-	-	
Social/ community	<i>Organization</i>								
	Ind. Smallholders*	1.175	0.519	5.133	1	0.023	3.24	1.17	8.95
	IFG	0.714	0.566	1.591	1	0.207	2.04	0.67	6.19
	FGKUBE	0.575	0.614	0.877	1	0.349	1.78	0.53	5.92
	FGcooperative	0.000	-	-	0	-	1.00	-	-
	<i>Certification</i>								
	Uncertified	0.000	-	-	0	-	1.00	-	-
	RA certified	0.000	-	-	0	-	1.00	-	-
	Utz certified	0.950	0.613	2.400	1	0.121	2.58	0.78	8.59
	4C certified*	1.847	0.639	8.363	1	0.004	6.34	1.81	22.16
FT certified	0.000	-	-	0	-	1.00	-	-	
Representati on and/or negotiation	<i>Organization</i>								
	Ind. Smallholders*	-3.407	0.728	21.901	1	0.000	0.03	0.01	0.14
	IFG	-1.293	0.732	3.118	1	0.077	0.27	0.07	1.15
	FGKUBE*	2.433	0.945	6.624	1	0.010	11.39	1.79	72.68
	FGcooperative	0.000	-	-	0	-	1.00	-	-
	<i>Certification</i>								
	Uncertified	0.000	-	-	0	-	1.00	-	-
	RA certified	0.000	-	-	0	-	1.00	-	-
	Utz certified*	5.017	1.047	22.947	1	0.000	150.99	19.38	1176.14
	4C certified*	2.070	0.949	4.758	1	0.029	7.92	1.23	50.88
FT certified	0.000	-	-	0	-	1.00	-	-	
Capacity building	<i>Organization</i>								
	Ind. Smallholders*	-5.367	0.920	34.067	1	0.000	0.00	0.00	0.03
	IFG	-0.589	0.633	0.865	1	0.352	0.55	0.16	1.92
	FGKUBE	1.123	0.686	2.684	1	0.101	3.07	0.80	11.79
	FGcooperative	0.000	-	-	0	-	1.00	-	-
	<i>Certification</i>								
	Uncertified	0.000	-	-	0	-	1.00	-	-
	RA certified	0.000	-	-	0	-	1.00	-	-
	Utz certified*	3.363	1.140	8.712	1	0.003	28.89	3.10	269.56
4C certified	1.233	0.702	3.089	1	0.079	3.43	0.87	13.58	
FT certified	0.000	-	-	0	-	1.00	-	-	
Networking and/or partnership	<i>Organization</i>								
	Ind. Smallholders*	-4.961	0.903	30.213	1	0.000	0.01	0.00	0.04
	IFG	-0.079	0.648	0.015	1	0.903	0.92	0.26	3.29
	FGKUBE*	1.651	0.707	5.448	1	0.020	5.21	1.30	20.86
	FGcooperative	0.000	-	-	0	-	1.00	-	-
	<i>Certification</i>								
	Uncertified	0.000	-	-	0	-	1.00	-	-
	RA certified	0.000	-	-	0	-	1.00	-	-
Utz certified	22.789	0.000	-	1	-	7.89E+09	7.89E+09	7.89E+09	

	4C certified*	1.551	0.709	4.790	1	0.029	4.71	1.18	18.90
	FT certified	0.000	-	-	0	-	1.00	-	-
*. Significant at the P-value 0.05									

For the perceived social/community benefit, the effects of the predictor variables of organization and certification are significantly shown by independent farmers (P-value=0.023) and 4C certified farmers (P-value=0.004) respectively. Both independent smallholder (estimate=1.175) and 4C certified (estimate=1.847) farmers value higher the social/community benefit. The odds of independent farmers considering 'agree to strongly agree' is 3.24 (95% CI, 1.17 to 8.95) times that of the farmers belong to FGcooperative (ExpB=1). However, no significant differences among the independent farmers, IFG, and FGKUBE farmers. These results once again reveal that different forms of organizations do not lead to differences in perceived benefits. The results also tell us that the organizational structures the certified farmers are part of (i.e., FGKUBE) do not create more benefits than the organizational structure of uncertified farmers (i.e., IFG). Thus, confirming hypothesis 2. Additionally, the odds of 4C certified farmers valuing 'agree to strongly agree' is 6.34 (95% CI, 1.81 to 22.16) times higher than uncertified farmers (ExpB=1), RA certified (ExpB=1), and FT certified farmers (ExpB=1). The odds of these 4C farmers nevertheless differ insignificantly from Utz certified farmers.

In term of the benefit of representation and/or negotiation, the significant results of the predictor variables for organization are revealed by independent farmers, and for certification are shown by Utz certified and 4C certified farmers. The independent farmers significantly value lower the benefit (estimate=-3.407, P-value=0.01), meaning these farmers is likely to consider 'disagree to strongly disagree' to the perceived representation and/or negotiation benefit. The odds of the independent farmers considering 'disagree to strongly disagree' is 0.03 (95% CI, 0.01 to 0.14) times that of the farmers belong to FGcooperative (ExpB=1). In contrast, the farmers belong to FGKUBE significantly value higher the benefit (estimate=2.433, P-value=0.010) with the odds of considering 'agree to strongly agree' equal to 11.39 (95% CI, 1.79 to 72.68) times that of the farmers belong to FGcooperative (ExpB=1). The results, however, reveal that the odds of the independent farmers differ insignificantly from FGKUBE farmers. For the predictors of certification, both Utz certified (estimate=1.047, P-value=0.000) and 4C certified farmers (estimate=2.070, P-value=0.029) significantly value higher the representation and/or negotiation benefit. Their odds of valuing 'agree to strongly agree' insignificantly differ to each other, but their odds are 150.99 (95% CI, 19.38 to 1176.14) and 7.92 (95% CI, 1.23 to 50.88) times respectively that of uncertified farmers (ExpB=1), RA certified (ExpB=1), and FT certified farmers (ExpB=1).

Regarding the perceived capacity building benefit, the significant predictors of organization and certification are independent smallholders (P-value=0.000) and Utz certified farmers (P-value=0.003) respectively. The independent farmers value lower the benefit, but Utz certified farmers value it higher. Based on the odds ratio equal to 0.00 (95% CI, 0.00 to 0.03), the chance of comparing the independent farmers and FGcooperative (ExpB=1) will never happens, meaning that their differences are very large. The independent farmers also differ insignificantly regarding their perception of the capacity building benefit from IFG, FGKUBE, and FGcooperative farmers. Furthermore, the odds of Utz certified farmers valuing 'agree to strongly agree' is 28.89 (95% CI, 3.10 to 269.56) times that of uncertified farmers (ExpB=1), RA certified (ExpB=1), and FT certified farmers (ExpB=1). The odds of these Utz farmers nevertheless differ insignificantly from 4C certified farmers.

For the benefit of networking and/or partnership, the effects of the predictor variables of organization are significantly shown by independent farmers (P-value=0.000) and FGKUBE farmers (P-value=0.020). The effects of the predictors of certification are significantly revealed by 4C certified farmers (P-value=0.029). The independent farmers value lower the benefit (estimate=-4.961) with the odds of valuing 'disagree to strongly disagree' equal to 0.01 (95% CI, 0.00 to 0.04) times that of FGcooperative farmers (ExpB=1). FGKUBE farmers oppositely value higher the benefit (estimate=1.651) and have the odds of valuing 'agree to strongly agree' equal to 0.020 (95% CI, 1.30 to 20.86) times that of FGcooperative farmers. 4C certified farmers similarly value higher the benefit (estimate=1.551). The odds of these farmers considering 'agree to strongly

agree' is 4.71 (95% CI, 1.18 to 18.90) times that of uncertified farmers (ExpB=1), RA certified (ExpB=1), and FT certified farmers (ExpB=1).

3.3. The relative importance of certification compared to organization in explaining differences in perceived benefits

Table 10 presents the results of ordered logistic regression evaluating overall, cumulative influence of both organizational structure and certification on the perceived benefits. The results reveal that organization is found to have significant influences on the perceived economic benefit (P-value=0.000), representation and/or negotiation (P-value=0.000), capacity building (P-value=0.000), and the perceived networking and/or partnership benefit (P-value=0.000). We can also see that the sign of estimates are positive. This means one unit increase in organization (e.g., going from 0=independent smallholder to 1=IFG) will cause 0.894, 3.410, 4.051, and 4.470 increase in the ordered log odds of being in a higher level of perceived economic benefit, representation and/or negotiation, capacity building, and perceived networking and/or partnership benefit respectively. The results also reveal that, based on ExpB, for one unit increase in organization (e.g., going from 0 to 1) the odds of 'agree to strongly agree' versus 'neutral to agree,' and 'neutral to agree' versus 'neutral to disagree' are 2.44 times greater (for the perceived economic benefit), 30.27 times greater (for the perceived representation and/or negotiation benefit), 57.44 times greater (for the capacity building benefit), and 87.32 times greater (for the perceived networking and/or partnership benefit).

Table 10. The results of ordered logistic regression for the overall influences of organization and certification on perceived benefits

Perceived benefit	Predictor Variables	Estimate	Std. Error	Wald	df	Sig	ExpB	Lower _95_CI	Upper _95_CI
Economic	Organization*	0.894	0.308	8.392	1	0.004	2.44	1.34	4.47
	Certification*	-0.613	0.264	5.398	1	0.020	0.54	0.32	0.91
Social/community	Organization	-0.009	0.256	0.001	1	0.971	0.99	0.60	1.64
	Certification	-0.059	0.222	0.070	1	0.791	0.94	0.61	1.46
Representation and/or negotiation	Organization*	3.410	0.432	62.189	1	0.000	30.27	12.97	70.65
	Certification*	-1.588	0.302	27.715	1	0.000	0.20	0.11	0.37
Capacity building	Organization*	4.051	0.512	62.482	1	0.000	57.44	21.04	156.82
	Certification*	-1.878	0.326	33.157	1	0.000	0.15	0.08	0.29
Networking and/or partnership	Organization*	4.470	0.561	63.446	1	0.000	87.32	29.07	262.27
	Certification*	-2.232	0.359	38.703	1	0.000	0.11	0.05	0.22

*. Significant at the P-value 0.05

The results reveal that certification is also found to have significant influences on the perceived benefits of economic (P-value=0.020), representation and/or negotiation (P-value=0.000), capacity building (P-value=0.000), and networking and/or partnership (P-value=0.000). The sign of estimates, however, are negative. One unit increase in certification (e.g., going from 0=uncertified to 1=RA certified) will cause 0.613, 1.588, 1.878, and 2.232 decrease in the ordered log odds of being in a higher level of perceived economic benefit, representation and/or negotiation, capacity building, and perceived networking and/or partnership benefit respectively. For one unit increase in certification (e.g., going from 0 to 1), the odds of 'agree to strongly agree' versus 'neutral to agree,' and 'neutral to agree' versus 'neutral to disagree' are 0.54 times lower (for perceived economic benefit), 0.20 times lower (for perceived representation and/or negotiation benefit), 0.15 times lower (for capacity building benefit), and 0.11 times lower (for perceived networking and/or partnership benefit).

Based on the value of estimates, organization has the highest influences on the perceived networking and/or partnership benefit (estimate=4.470), followed by capacity building (estimate=4.051), representation and/or negotiation (estimate=3.410), and perceived economic benefit (estimate=0.894). Similar in order with organization, certification has the strongest

effects on the perceived networking and/or partnership benefit (estimate=-2.232), followed by capacity building (estimate=-1.878), representation and/or negotiation (estimate=-1.588), and the perceived economic benefit (estimate=-0.613). If we compare the relative importance of organization to certification, we found that organization (with overall estimate value=12.825) is more important than certification (overall estimate value=-6.311) in explaining the differences in the perceived benefits. Based on these results, we therefore confirm hypothesis 4 that organizational structures are relatively more important than certification to explain differences in farmers' perceived benefits.

4. Conclusions

Several conclusions are drawn from the findings. First, organization overall has significant influences on the perceived economic benefit, representation and/or negotiation, capacity building, and the perceived networking and/or partnership benefit. However, the differences of organizational structure have little effects on the differences of farmers' perceived benefits. Similarly, different schemes have little influence to the differences of the perceived benefits although certification overall also significantly influences the perceived benefits.

Second, the organizational structures the certified farmers are part of do not necessarily create more benefits than the organizational structure of uncertified farmers. Without being certified, farmers feel they can obtain the benefits of representation and/or negotiation, capacity building, and networking and/or partnership through their uncertified farmer groups. These make uncertified farmers' perceived benefits differ insignificantly from certified farmers.

Third, organizational structures in different certification schemes do not differently benefit farmers. However, schemes determine organizational structures that can survive. As observed in Aceh, FT scheme requires buyers to collect coffee directly from farmers, implement floor price, give farmers price premium, give payment in advance/credit if farmers ask, and pay farmers on schedule. The buyers consequently need to have sufficient financial capital. KUBEs are hardly able to fulfil the requirements, but cooperatives supported by various stakeholders and creditors are likely to meet the requests. The other schemes (4C, RA, and Utz) in Lampung do not emphasize FT-like requirements, allowing KUBEs to emerge as an alternative to cooperatives in the schemes.

Fourth, organization is relatively more important than certification in explaining the differences of perceived benefits. The order of the perceived benefits influenced by organization and certification is, however, similar. This similarity can be the immeasurable (cross) effects of certification on organization that are not clearly detected in the logistic regression model (since both are independent variables with categorical data).

References

- Arifin, B. (2010). Global Sustainability Regulation and Coffee Supply Chains in Lampung Province, Indonesia. *Asian Journal of Agriculture and Development*, 7(2), 67.
- Bitzer, V., Glasbergen, P., & Arts, B. (2013). Exploring the potential of intersectoral partnerships to improve the position of farmers in global agrifood chains: findings from the coffee sector in Peru. *Agriculture and Human Values*, 30(1), 5-20. doi: 10.1007/s10460-012-9372-z
- Brandi, C., Cabani, T., Hosang, C., Schirmbeck, S., Westermann, L., & Wiese, H. (2013). *Sustainability certification in the Indonesian palm oil sector: benefits and challenges for smallholders*. Bonn, Germany: The German Development Institute.
- Bray, D. B., Sanchez, J. L. P., & Murphy, E. C. (2002). Social dimensions of organic coffee production in Mexico: lessons for eco-labeling initiatives. *Society & Natural Resources*, 15(5), 429-446.
- Fischer, E. and M. Qaim (2012). "Linking Smallholders to Markets: Determinants and Impacts of Farmer Collective Action in Kenya." *World Development* 40(6): 1255-1268.

- Gibson, James L., John M. Ivancevich, Jr. James H. Donnelly, and Robert Konopaske. 2011. *Organizations : behavior, structure, processes*. Fourteenth Edition ed. New York, United State: McGraw-Hil.
- Hellin, J., Lundy, M., & Meijer, M. (2009). Farmer organization, collective action and market access in Meso-America. *Food Policy*, 34(1), 16-22. doi: <http://dx.doi.org/10.1016/j.foodpol.2008.10.003>
- Ibnu, M., Glasbergen, P., Offermans, A., & Arifin, B. (2015). Farmer Preferences for Coffee Certification: A Conjoint Analysis of the Indonesian Smallholders. *Journal of Agricultural Science*, 7(6). doi: 10.5539/jas.v7n6p20
- Jena, P. R., Stellmacher, T., & Grote, U. (2015). Can coffee certification schemes increase incomes of smallholder farmers? Evidence from Jinotega, Nicaragua. *Environment, Development and Sustainability*. doi: 10.1007/s10668-015-9732-0
- Kaganzi, E., Ferris, S., Barham, J., Abenakyo, A., Sanginga, P., & Njuki, J. (2009). Sustaining linkages to high value markets through collective action in Uganda. *Food Policy*, 34(1), 23-30. doi: 10.1016/j.foodpol.2008.10.004
- Loconto, A., & Dankers, C. (2014). Impact of international voluntary standards on smallholder market participation in developing countries. *Agribusiness and Food Industries Series (FAO) eng no. 3*.
- Maertens, M., & Swinnen, J. F. M. (2009). Trade, Standards, and Poverty: Evidence from Senegal. *World Development*, 37(1), 161-178. doi: <http://dx.doi.org/10.1016/j.worlddev.2008.04.006>
- Markelova, H., Meinzen-Dick, R., Hellin, J., & Dohrn, S. (2009). Collective action for smallholder market access. *Food Policy*, 34(1), 1-7. doi: <http://dx.doi.org/10.1016/j.foodpol.2008.10.001>
- Mausch, K., Mithöfer, D., Asfaw, S., & Waibel, H. (2009). Export Vegetable Production in Kenya under the EurepGAP Standard: Is Large "More Beautiful" than Small? *Journal of Food Distribution Research*, 40(3), 115-129.
- Narro, C., Roy, D., Okello, J., Avendaño, B., Rich, K., & Thorat, A. (2009). Public-private partnerships and collective action in high value fruit and vegetable supply chains. *Food Policy*, 34(1), 8-15. doi: 10.1016/j.foodpol.2008.10.005
- Neilson, J. (2008). Global Private Regulation and Value-Chain Restructuring in Indonesian Smallholder Coffee Systems. *World Development*, 36(9), 1607-1622. doi: <http://dx.doi.org/10.1016/j.worlddev.2007.09.005>
- Peraturan Menteri Pertanian Nomor 82 (2013) *Peraturan menteri pertanian nomor 82/Permentan/OT.140/8/2013 tentang pedoman pembinaan kelompok tani dan gabungan kelompok tani* (The Minister of Agriculture Regulation No. 82 of 2013 concerning the formation and development of farmer groups and joined farmer groups).
- Peraturan Pemerintah Republik Indonesia Nomor 42 (1981). *Pelayanan kesejahteraan sosial bagi fakir miskin* (the Indonesian Government Regulation No. 42 of 1981 concerning social welfare services for the poor).
- Preißel, S., & Reckling, M. (2010). Smallholder group certification in Uganda—Analysis of internal control systems in two organic export companies. *Journal of Agriculture and Rural Development in the Tropics and Subtropics (JARTS)*, 111(1), 13-22.
- Place, F., Kariuki, G., Wangila, J., Kristjanson, P., Makauki, A., & Ndubi, J. (2004). Assessing the factors underlying differences in achievements of farmer groups: methodological issues and empirical findings from the highlands of Central Kenya. *Agricultural Systems*, 82(3), 257-272. doi: 10.1016/j.agsy.2004.07.001
- Raynolds, L. T., Murray, D., & Leigh Taylor, P. (2004). Fair trade coffee: building producer capacity via global networks. *Journal of International Development*, 16(8), 1109-1121. doi: 10.1002/jid.1136
- Ruben, R., & Zuniga, G. (2011). How standards compete: comparative impact of coffee

certification schemes in Northern Nicaragua. *Supply Chain Management: An International Journal*, 16(2), 98-109. doi: doi:10.1108/13598541111115356

Rueda, X., & Lambin, E. F. (2013). Responding to Globalization: Impacts of Certification on Colombian Small-Scale Coffee Growers. *Ecology and Society*, 18(3), 215-227. doi: Unsp 21Doi 10.5751/Es-05595-180321

Taylor, P. L., Murray, D. L., & Reynolds, L. T. (2005). Keeping trade fair: governance challenges in the fair trade coffee initiative. *Sustainable Development*, 13(3), 199-208.

Trebbin, A. (2014). Linking small farmers to modern retail through producer organizations – Experiences with producer companies in India. *Food Policy*, 45, 35-44. doi: 10.1016/j.foodpol.2013.12.007.

Undang_undang Nomor 17 tahun 2012 (2012). *Tentang perkoperasian* (The Act of Republic of Indonesia No. 17 of 2012 on cooperatives).

Utting, K. (2008). Assessing the Impact of Fair Trade Coffee: Towards an Integrative Framework. *Journal of Business Ethics*, 86(S1), 127-149. doi: 10.1007/s10551-008-9761-9

van Rijsbergen, B., Elbers, W., Ruben, R., & Njuguna, S. N. (2016). The Ambivalent Impact of Coffee Certification on Farmers' Welfare: A Matched Panel Approach for Cooperatives in Central Kenya. *World Development*, 77, 277-292. doi: 10.1016/j.worlddev.2015.08.021.

Appendices

A. Question items for the farmers that are member of an organization (or more organizations):

Items*
<ol style="list-style-type: none"> 1. Being a member of an organization(s) allows me to experience financial benefits. 2. Economic benefits of being a member of an organization(s) outweigh economic disadvantages 3. Being a member of an organization(s) allows me to experience benefits for my health 4. Being a member of an organization(s) allows me to experience social benefits, for example strengthening social relationship through using public facilities. 5. Being a member of an organization(s) allows me to experience benefits for acquiring knowledge 6. Being a member of an organization(s) allows me to experience benefits for acquiring skills 7. Personally, benefits of being a member of an organization(s) outweigh the disadvantages 8. Being a member of an organization(s) allows me to experience benefits of better representation of my interests 9. Being a member of an organization(s) allows me to experience benefits from stronger relations between the farmers in my group 10. Being a member of an organization(s) allows me to experience benefits in the collaboration with others

* Measured by likert scale, ranging from 1 to 5 (1= strongly disagree; 2= disagree; 3=neutral; 4=agree; 5=strongly agree)

B. Question items for all farmers

The perceived benefits	Question items*
Economic	<ol style="list-style-type: none"> 1. It is easy for me to sell my coffee 2. I can sell my coffee at different places 3. The prices I receive for my coffee are good 4. I have good access to farming inputs 5. I have easy access to coffee processing equipment 6. I have good access to storage facilities 7. I have good access to credit 8. I have enough opportunities to save money 9. I feel secure regarding land tenure

The perceived benefits	Question items*
Social/ community	<ol style="list-style-type: none"> 1. Access to health services is good 2. People receive proper assistances to build their houses 3. People receive proper assistance to renovate their houses 4. Opportunity to have well education is high 5. Working opportunity is good for people in my area 6. Safe drinking water is available 7. Sanitary conditions are good 8. Funerals are well organized in my community 9. Funerals are well financed in my community 10. Wedding are well organized in my community 11. wedding are well financed in my community 12. <i>Arisan</i> (i.e., form of social gathering) is common in the community 13. <i>Gotong royong</i> (i.e., form of communal work) is regular in community 14. We have strong social relationships in our community 15. People are willing to help one another in community
Representation and/or negotiation	<ol style="list-style-type: none"> 1. I feel my interests are represented in governmental authorities 2. I feel my interests are represented in firms or businesses 3. I feel there is enough negotiation with the exporters 4. I think I have strong bargaining power over buyers
Capacity building	<ol style="list-style-type: none"> 1. I have a good opportunity to enhance my knowledge on farming practices 2. I have a good opportunity to develop my farming skills 3. I can easily find information regarding farming inputs 4. I can easily access information regarding market price 5. I receive trainings on technical aspects (e.g., how to use chemical inputs, new tools, new technique etc.) regularly 6. I receive trainings on managerial aspects (e.g., how to make bookkeeping, how to make a plan etc.) regularly 7. I meet extension workers regularly 8. It is easy to get help from agricultural experts 9. Helps from agricultural experts solve my problems 10. I can freely express my opinion in a meeting 11. I can use my rights to vote in an election
Networking and /or partnership	<ol style="list-style-type: none"> 1. I know farmers from other groups pretty well 2. I can easily contact farmers from other groups 3. We collaborate with other groups

* Measured by likert scale, ranging from 1 to 5 (1= strongly disagree; 2= disagree; 3=neutral; 4=agree; 5=strongly agree)

Management of protected areas in Romania – from governing to governance

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Abstract

Protected areas represent the main tool for conserving biodiversity and the area benefiting of legal protection has been sharply increasing in Europe after the implementation of EU Habitats Directive. The expansion of Natura 2000 is almost complete in Europe, but a coherent vision for enforcing the management is lacking, and the management framework of Natura 2000 sites varies from command-and-control to a more adaptive management. The Natura 2000 Romanian sites are managed by public or private organizations, appointed by the Ministry of Environment, which is responsible for defining, implementing and controlling the conservation policies. Thus, on-site management is implemented by a plethora of management bodies such as national agencies (e.g. Danube Delta Biosphere Reserve Authority), county level Environmental Protection Agencies, county level local government, companies, state companies, universities, NGOs, etc., each category using different management tools. Nevertheless, in Romania there are still obstacles in enforcing the Habitats Directive. In this regard, the aim of the paper is to identify the evolution of management models during the implementation of EU Habitats Directive and to link them with the state-of-the art at EU level. To understand the management models, we analyzed and compared legal norms, management reports, meeting minutes, and newspapers and identified the patterns of organization of management, institutional changes, and best practice examples. As case studies, we selected Natura 2000 areas with different management bodies: state owned, multinational NGO, local NGO. Our results revealed that the governance system is hierarchical and highly centralized, although, there are examples of adaptive management at local scale. We identified the bodies and authorities formally and informally involved in the management of protected areas, and the relations between management bodies and local population. The results are important for the theory of governance of protected areas in Romania and at European level and might be useful for improving the governance models. The research was supported by a grant of the Romanian National Authority for Scientific Research, CNCS – UEFISCDI project number PN-II-RU-TE-2014-4-1039.

Keywords: Natura 2000, protected area management, policy actors, conservation

The role of the Polish public statistics in the monitoring process of sustainable development

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Abstract

Planning and strategic management requires a solidly coordinated actions undertaken by all stakeholders. The identification of priority issues, accurate diagnosis of the current situation and achievable goals are of key importance for the efficiency of the entire process. Accuracy of taken decisions can be guaranteed through basing them on solid and reliable information which is statistical data. The data is also used to monitor the degree to which the set objectives are attained. Effective planning and monitoring system requires selecting the high-quality statistical measures, most relevant to given issues, permanently and easily available. Therefore, it is necessary to base monitoring system on official statistics' resources and include its representatives in the policy programming at an early stage of the decision-making process. These assumptions remain valid for each development planning system, including sustainable development. This is an area where Poland has achieved some good practices – close cooperation between official statistics and institutions responsible for elaboration of respective strategic documents allowed mutual understanding of expectations, capabilities and limitations. It contributed to define the effective sets of measures and to facilitate data dissemination and analysis due to advanced profiled tools built by official statistics. A significant effect is a common image of official statistics as an equal partner in the process of strategic planning and management. Sustainable development is one of the priority areas in which official statistics is actively involved. Adoption of Sustainable Development Goals poses a number of challenges for official statistics related to suitable information support. The official statistics has been identified as a partner for decision-makers, which is able to provide an expert knowledge for appropriate selection of indicators and to coordinate a process of monitoring the goals, towards which the world will endeavour over the next fifteen years. Therefore, the statistical institutions will need to face the request of effective reporting and analysis. The aim of this document is to present the activities of Polish official statistics, undertaken as a response to global changes and coherent with international initiatives on sustainable development. They include developing a set of indicators monitoring sustainable development in Poland at the national, regional and local level as well as building an application for data dissemination and analysis. This application, equipped with tools for data visualization in the form of tables, charts and maps, will also be used for monitoring the goals of the 2030 Agenda for Sustainable Development agreed at national level. A special bookmark on the CSO's of Poland official website presents information on the sustainable development and international initiatives focusing on this subject. This leads to perceive the CSO of Poland not only as a national coordinator of information support for decision-makers, but also – as a promoter of knowledge about the concept of sustainable development.

Keywords: sustainable development, official statistics, indicators, monitoring, 2030 Agenda

1. Introduction

Sustainable development is a multidimensional issue aimed at achieving balance between the three areas: social, economic and environmental. The stability of sustainable development necessitates a long-term perspective. Achieving long-term goals requires a strategic approach to management – the formulation and implementation of an adequate strategy. Success in strategic

management is guaranteed only when all of its stages are based on reliable, objective data.

The necessity of using statistical data is becoming increasingly visible at all levels of development management – the international, national and regional level. In the field of sustainable development, the necessity of integrating official statistics in the planning process and implementing development goals was clearly emphasised by the UN in September 2015 in the 2030 Agenda for Sustainable Development (hereinafter: the 2030 Agenda).

Poland's experiences from the recent years presented in this paper are examples of good practices and benefits arising from the active inclusion of official statistics in the programming and monitoring of development policy both at the level of central and local government. The innovative products prepared by the Central Statistical Office in response to the specialised needs of decision-makers have contributed significantly to improving the quality of development management in Poland. Projects associated with monitoring sustainable development implemented on the initiative of the CSO confirm that official statistics can be an active partner in supporting decision-makers and initiating discussions on key problems.

2. The role of official statistics in strategic management

Effective strategic management requires coordinated actions with the participation of all stakeholders. Building on the knowledge and experience of experts, including specialists in the field of statistics, contributes to specifying adequate goals and tools for their implementation. Cooperation should be based on a solid retrospective analysis (assessment of the past), a comprehensive operative analysis (diagnosis of the current situation) and a prospective analysis (forecasting). Identifying the starting point allows an accurate and realistic specification of the target point.

Hence, the decision-making process should be based on accurate and reliable information developed on the basis of statistical data. A properly selected set of statistical indicators should also be used to monitor the progress of the determined goals. As an early warning system, it will make it possible to notice tendencies significantly diverging from the planned development path. Statistical data can therefore constitute support for decision-makers in quick response, drawing conclusions and making adequate decisions.

Therefore, an efficient planning and monitoring system requires the selection of high-quality statistical measures which are most relevant for the given subject matter, with a constant and easy access to them. In the majority of cases only official statistics guarantees the meeting of all these conditions simultaneously, and its resources usually constitute a basis for the monitoring system.

The need to base the decision-making process on reliable statistical data has been known for years. At the international level, the sets of relevant indicators have been used, i.a. by the European Union for monitoring the progress in implementing the Lisbon Strategy (2000) and the Sustainable Development Strategy (2001), and by the OECD for the purpose of monitoring the Green Growth Strategy (2009). However, the Europe 2020 Strategy made a breakthrough in the strategic development management, replacing the Lisbon Strategy in 2010. The number of goals of this strategy, limited to the minimum (five), is monitored with a small set of indicators (eleven). The distinguishing feature of Europe 2020 in relation to the previous strategic documents is the assigning of target values to each indicator, to be achieved by 2020.

The creation of a limited set of indicators for the qualitative monitoring of the defined goals has marked a new role of official statistics in conducting the development policy. The decision-makers noticed the necessity to involve the representatives of statistics in the earliest stages of action planning, which enabled parallel work on goal setting and the creation of an efficient system for monitoring them. A similar understanding of strategic management was also adopted in Poland. Official statistics was actively incorporated in the work on the concept of development management at the national and regional levels. The results include, inter alia, a unique system for the programming and monitoring of the development policy, which constitutes an example of good practice and is much appreciated in other countries. The gained experiences are a solid foundation

for continued cooperation between governments and official statistics directed at implementing sustainable development goals specified in the 2030 Agenda.

2.1. Running a development policy in Poland

In Poland, as an EU Member State, development policy is implemented on the basis of strategic documents associated with the Europe 2020 Strategy. This system encompasses strategies divided according to the criteria of time horizon and thematic area. The major document with the longest time horizon is the Long-Term National Development Strategy – Poland 2030, which includes a multiyear direction of changes. The development policy in the medium term is presented in the National Development Strategy 2020 (a Polish equivalent to the Europe 2020 Strategy). Medium-term goals were specified in nine integrated strategies for particular domains, such as the innovativeness and efficiency of economy, transport, energy security and environment, agriculture, regional development, efficient state, human and social capital and national security.

Taking into consideration the necessity to develop planning at the regional level, strategic documents were also drawn up for sixteen voivodships (equivalent to level NUTS 2) and four supra-regional areas. The integration of all sectoral and regional strategies with the goals of horizontal strategies makes it possible to ensure coherence of actions undertaken at various levels of management.

In line with the Europe 2020 Strategy, the goals in each strategy have been defined in a measurable way and expressed as indicators with specific target values. The representatives of official statistics, involved in work at the central and regional level from the beginning, have supported decision-makers with their expert knowledge, facilitating the selection of the most relevant measures. Close cooperation is continued at the stage of strategy implementation monitoring. The cooperation has made it possible for the parties to become fully aware of their capabilities and limitations. A detailed specification of management needs, especially at the lower levels of territorial division, has initiated research work on the possibility of completing information gaps. It has also enabled statistics the creation of the STRATEG system an advanced analytical tool streamlining the implementation of the development policy.

2.2. STRATEG as a tool supporting the development policy

Adopting a number of strategic documents with a set of monitoring indicators has created the need to build an IT tool facilitating data analysis. In 2013 the Central Statistical Office launched [STRATEG](#), a development policy monitoring system. It is a database gathering indicators from all national and regional strategies and the Europe 2020 Strategy, as well as the number of contextual measures useful in development management. In support of the implementation of the EU cohesion policy in Poland, STRATEG also includes indicators monitoring national and regional operational programmes. Predefined tables for each document enable a comprehensive assessment of their progress. The indicators were also grouped according to cohesion policy goals (sustainable development, smart development, inclusive development, and strengthening the potential of administration), and also thematic areas. The database features advanced tools allowing users to create their own tables and visualise data with charts and maps. Numerical data are supplemented with glossary and methodological information, due to which the system also performs an educational function. Gathering data for all available level of Poland's territorial division (up to LAU 2) and additionally for EU regions, STRATEG is often used by the public administration at each level. The website is assessed positively not only by national users but also internationally, where is perceived as an example of good practices, the system was appreciated among others by the European Commission.

STRATEG's success can be attributed to its being tailored to individual user needs. Government administration representatives participated in the work on the database carried out by the CSO already at the design stage. Users comments serve as an inspiration for the continuous development and streamlining of STRATEG's functionalities.

3. Actions of the CSO in the field of sustainable development monitoring

The Polish example shows how to effectively use the potential of official statistics in strategic management. Official statistics in Poland takes a number of actions on its own initiative by identifying areas in which it can provide decision-makers with specific support. Sustainable development is one of such areas.

The CSO, as a member of international statistical systems, for a number of years has participated in the work on monitoring sustainable development by the UN, OECD and the EU. However, contrary to other EU Member States, Poland does not have a complex sustainable development strategy which would form a basis for the preparation of a generally applicable set of indicators monitoring this area. Recognising the need to draw decision-makers' attention to this issue, Polish official statistics has taken a number of independent initiatives for the measurement of sustainable development in Poland and the promotion of the idea. The experiences gained so far are particularly relevant for the approaching necessity to monitoring the goals of the 2030 Agenda.

3.1. Sustainable development goals for Poland

The reference to sustainable development in the Constitution of the Republic of Poland, the most important Polish legal act, shows the significance of this idea. Poland, pursuant to Article 5 of the Constitution, "shall safeguard the independence and integrity of its territory and ensure the freedoms and rights of persons and citizens, the security of the citizens, safeguard the national heritage and shall ensure the protection of the natural environment pursuant to the principles of sustainable development". The idea of sustainable development is present in many other generally binding national legal acts. Its broadest definition is included in legal acts on environmental protection, including in particular the Environmental Protection Law of 2001. The act provides a comprehensive framework of environmental protection principles and the conditions of utilising its resources. Another act of law which contains a reference to sustainable development, is the Act of 1997 – Energy Law, which purpose is "the creation of the conditions for sustainable development of the country, energy security, efficient and rational use of fuels and energy, development of competition, counteracting negative consequences of natural monopolies, consideration of natural environment protection requirements and obligations stemming from international agreements, and balancing the interests of energy enterprises and fuel and energy customers."

In Poland, despite the absence of a national sustainable development strategy, references to this concept are present in the valid general and sectoral strategies. These provisions and the experience gained during work within international community has become a basis for Polish official statistics to develop a set of indicators characterising sustainable development goals set for Poland.

3.2. The national set of SD monitoring indicators

The work on defining sustainable development indicators for Poland, launched by the Polish official statistics in 2009, was inspired by other similar initiatives at the EU level. These were based on the need to adjust the goals and indicators defined at the EU level to the country's specific conditions.

The selection of indicators was preceded by a detailed analysis aimed at specifying which socio-economic and environmental factors should be measured. Sustainable development principles developed by the European Commission constituted the main "filter" for selecting priority areas and the identification of goals specified in national strategic documents. The outcome of the analysis was the formulation of the notion of integrated domain.

The category of integrated domain adopted by Polish official statistics specified a general target model of sustainable development. Put simply, it denotes a cohesive (non-contradictive) and simultaneous coexistence of four domains(Fig. 1):

- social (social sustainable development) – domain identifying strategic goals, measures and undertakings designed to improve the quality of life of society,

- economic (economic sustainable development) – domain specifying strategic goals and measures that foster effective socio-economic development),
- environmental (sustainable environmental protection) – domain identifying the circumstances and strategic goals of the protection and rational development of natural environment aiming at stabilising ecological sustainable development (eco-development),
- institutional and political (isolated from the social domain to underline the institutional framework of sustainable development) – domain regarding global partnership and good governance.

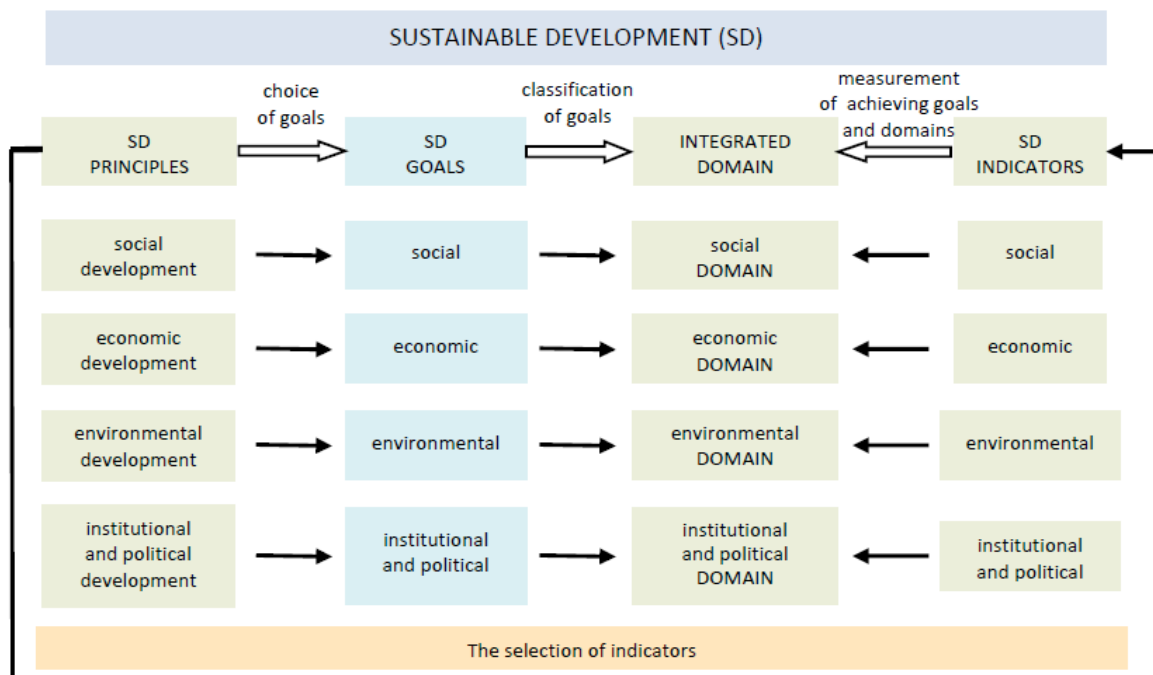


Figure 1. Construction and classification of national sustainable development indicators

Source: Sustainable Development Indicators for Poland 2015, Central Statistical Office, Statistical Office in Katowice, Katowice 2015

The structural basis for the forming of an integrated domain comprises a system of strategic goals tailored to specific domains types. Efforts made with a view to attaining these goals, as positive states that should be reached within a definite time perspective, are registered by selected indicators of sustainable development.

The indicators were selected subject to criteria such as the availability of data, presence on the list of indicators monitoring the EU Sustainable Development Strategy, and international comparability. In line with the adopted rule, the domains, where possible, should be integrated by means of measures suggested for more than one domain.

As a result of this work, in 2011, indicators were selected to create a system of monitoring of the country's sustainable development. The set of indicators is being constantly improved (verifying the availability of data and the adequacy of goals, identifying new sources of information) and now consists of approx. 100 indicators.

The effects of work accomplished to date were presented in the publications *Sustainable Development Indicators for Poland* (the [2011](#) and [2015](#) editions). These studies offer an analytical description of the measures, supplemented with tables and charts (based on data gathered since 2004). The data for Poland were compared to those for European Union and individual Member States. Indicator descriptions are accompanied by additional information such as definitions, basic methodological clarifications, and information on the significance of the trend illustrated with the indicator for sustainable development.

3.3. Sustainable development at the regional and local level

Whether sustainable development will prove successful is largely dependent on the implementation of its idea at the lowest territorial management levels. Therefore, at the next stage of work, the CSO had to compile a list of indicators for the monitoring of the regional and local levels. Creating a separate list was necessary, considering the fact that the features and priorities of lower territorial levels were different from those at the national level, in addition to limited availability of data.

A starting point for the preparation of regional and local modules were the EU sustainable development indicators prepared by Eurostat. The work started with an analysis of their availability at the targeted territorial levels. An assumption was made that the lower-level indicators should not collide with their higher-level counterparts. This means that they should allow the monitoring of possibly similar areas, taking into account the specific features of respective regions. After being selected, the measures were divided across 9 topics (socio-economic development, sustainable consumption and production, social inclusion, demographic changes, public health, climate change and energy, sustainable transport, natural resources, and good governance). For each of these topics, sub-topics were defined and assigned the relevant indicators.

The indicators to be included on the list had to be restricted in number and only include those indicators which were most suitable for the monitoring of sustainable development at the regional and local levels, and eligible for being covered with data. As a result of this work, a list of 115 indicators was compiled.

3.4. The Sustainable Development Indicators Application

In the course of the work presented above, the necessity was identified to reach the broadest possible users and to present the compiled sets of indicators in a format that would offer maximum clarity, intuitiveness and functionality. For this purpose, the database [Sustainable Development Indicators Application](#) was developed as a publicly available tool for sharing and presenting sustainable development indicators at the national (Poland and other EU Member States), regional (NUTS1), voivodship (NUTS2), and powiat (LAU 1) levels. One of the functionalities offered by the Application is the possibility to draw comparisons between Poland against the entire EU-27 and/or EU-28 (as a table, being the default data presentation format). Comparison can also be drawn between the values of any EU Member States. The indicators were grouped by thematic field across four domains: social, economic, environmental, and institutional and political. The analysis of information is aided by data visualisation tools, with which the data can be presented in an attractive graphical form (charts and maps), as well as an extensive collection of metadata, including indicator metrics.

3.5. Green economy

The idea of sustainable development is closely related to the concept of green economy, which, similarly to the sustainable development, is founded on three pillars: environment, economy and society. However, the social aspect within the concept of green economy is presented from a narrower perspective, i.e. only in this part which is closely related to environment or economy.

Polish official statistics, building on OECD's experience, has taken on the work on defining the areas of green economy tailored to the specific features of the country and selecting appropriate monitoring indicators. Green economy is an economy which fosters economic growth and development, while maintaining access to the natural capital and eco-system services, on which human wellbeing depends.

The developed set of a total of 76 indicators monitoring green economy has been divided into 4 indicator groups monitoring:

- natural asset base – 16 indicators,
- environmental and resource productivity of the economy – 19 indicators,
- environmental quality of life – 16 indicators,

- economic opportunities and policy responses – 25 indicators,

The set also includes the fifth group of 16 context indicators monitoring the socio-economic conditions, serving as a background and the source of basic information on the country's situation.

The application of these measures will only be possible through close cooperation between official statistics and national and international institutions collecting data. For the purpose of comparing the situation of Poland with that of other countries, the data from Eurostat, OECD, and the European Environmental Agency (EEA), among others, will be used.

4. Popularising the concept of sustainable development

The role of official statistics in the field of sustainable development does not focus solely on the monitoring of its goals. The Central Statistical Office in Poland is making constant efforts also when it comes to popularising the knowledge of sustainable development. In early 2015, a special [Bookmark](#) was published on the CSO Information Web Portal, gathering and ordering information on national and international projects in the field of sustainable development. Its elements are dedicated to the following matters:

- the concept of sustainable development in which the origin of and the evolution of this concept were presented,
- the 2030 Agenda, including the process during which the final document for the Agenda was drawn up, and the role of statistics in this process,
- the monitoring of sustainable development of Poland, with the Sustainable Development Application being at its centre,
- the concept of green economy, which is closely related to the subject matter of sustainable development,
- key publications, both Polish and international.

Additionally, the Web Portal features access to national and international legal acts and strategic documents related to sustainable development as well as links redirecting visitors to the websites of organisations active in this area.

With a view to popularising sustainable development in Poland and highlighting the major role played by official statistics in the process of its monitoring, a seminar on sustainable development will be held at the CSO headquarters in October 2016. This event, in addition to experts in official statistics, will be attended by representatives of the academia and institutions involved in the implementation of sustainable development goals in Poland (including the Ministries of Development, Environment, and Foreign Affairs).

5. The 2030 Agenda for Sustainable Development as a challenge for official statistics

The year 2015 marked the deadline for the implementation of the Millennium Development Goals established for the world by the United Nations. The conclusions drawn from their implementation offered groundwork for the establishment of a new development agenda. In September 2015, following 3-year negotiations, 193 UN Member States reached compromise on the final document entitled Transforming our world: the 2030 Agenda for Sustainable Development.

In contrast to the Millennium Development Goals, the 2030 Agenda stipulates efforts aimed at sustainable development at three levels: the global, the regional (meaning 'the regions of the world') and the national. The goals that have been set so far reflect global aspirations and constitute a starting point for defining goals for regions and then for countries. This results from the provision under which all countries are invited to specify their priorities referring to the goals of the 2030 Agenda, but taking local specific features into account.

The process of defining global 2030 Agenda goals was accompanied by work on a list of indicators

for their monitoring, in which experts in statistics were engaged. The long-term negotiation process underlined the role of official statistics as a tool which offers basic informational support and provides indicators which to the broadest extent reflect the implementation of goals and priorities defined at the political level.

The set of indicators adopted in March 2016 by the UN Statistical Commission is designed to monitor the goals of the 2030 Agenda at the global level. This means that not all indicators from this list are adequate to the national needs. Responsibility for developing a list of indicators to monitor the regional and national levels was delegated to UN agendas and national statistical offices, respectively. Accomplishing the work on the 2030 Agenda therefore entails a number of challenges for official statistics, stemming from the need to provide a monitoring system for each level. In order to be effectively monitored, the 2030 Agenda goals require the strengthening of statistical potential, the enhancement of the information system, and the filling of information gaps.

Hence, the Central Statistical Office will be facing some ambitious challenges. As an institution in charge of coordinating the monitoring of sustainable development goals in Poland, the CSO will have to address reporting needs at the global and regional levels. At the same time, it will be obliged to prepare and maintain a monitoring system for the goals defined for Poland. Difficulties with accomplishing these tasks result from the fact that statistics performs a supportive role, so before any actions can be taken in this field, appropriate decisions must be made and development priorities defined at the political level. This is therefore another undertaking designed to support the planning of the development policy, which requires close cooperation between decision-makers and statisticians. However, Poland's experience to date in this regard offers a promising outlook on the possibility of completing these tasks.

6. Conclusions

Official statistics, as a pillar of the state's information system, plays a crucial role in implementing the development policy, including sustainable development. With its potential being effectively used by decision-makers, it greatly supports the stages of identifying, programming and monitoring of the policy development process. Official statistics is therefore a vital instrument when it comes to decision making, and its representatives being engaged on an increasingly broad basis in the development management process is indeed a positive trend.

As seen on the example of Poland, close cooperation between decision-makers and the statistician community is possible across all territorial levels of management and is clearly manifested in improvements in the quality and efficiency of the decision-making process. With so many initiatives launched on its own or in response to specific needs, official statistics can indeed be perceived as an active, innovative and valuable partner. As success stems from openness to working together, flexibility and awareness of one's own needs, capabilities and limitations, mutual education is no less significant, especially when it comes to spreading knowledge of statistics among its potential users.

Sustainable development represents a foremost challenge for the world at the moment. Attaining its goals requires cooperation among a broad group of stakeholders at all levels of development management. The tasks currently faced by international organisations, as well as national governments and local governments, will be a test for their ability to cooperate effectively and leverage the potential of their partners, also those representing official statistics. Polish experiences, as regards institutional cooperation and achievements of statistics in the field of sustainable development, form a solid foundation for drafting a detailed plan of actions aimed at fulfilling the goals of the 2030 Agenda in Poland.

References

Legal acts

Constitution of the Republic of Poland of 2 April 1997 (Journal of Laws No. 78, item 483 with later amendments)

Act of 27 April 2001 Environmental Protection Law (Journal of Laws 2008, No 25, item 150)

Act of 10 April 1997 The Energy Law (Journal of Laws 2006, No. 89, item 625 with later amendments)

Scientific publications

Borys T., 2005. Wskaźniki Zrównoważonego Rozwoju, Wydawnictwo Ekonomia i Środowisko, Warszawa-Białystok

Statistical publications

Sustainable Development Indicators for Poland, Central Statistical Office, Statistical Office in Katowice, Katowice 2011

Wskaźniki zrównoważonego rozwoju Polski 2015, Central Statistical Office, Statistical Office in Katowice, Katowice 2015

Strategic documents

EUROPE 2020. A strategy for smart, sustainable and inclusive growth, the Communication from the Commission, Brussels 2010

Long-term National Development Strategy for Poland

National Development Strategy for Poland

The Millennium Development Goals, United Nations Millennium Declaration, New York 2000

The renewed EU Sustainable Development Strategy, the EU Council, Brussels 2006

Transforming our World: The 2030 Agenda for Sustainable Development, United Nations, 2015

Websites

Sustainable Development Bookmark, Central Statistical Office of Poland, Information Portal <http://stat.gov.pl/en/sustainable-development/>

Local Data Bank website <https://bdl.stat.gov.pl/BDL/start#>

Online Legal Database <http://isap.sejm.gov.pl/>

Sustainable Development Knowledge Platform <https://sustainabledevelopment.un.org/>

Sustainable Development Goal indicators website <http://unstats.un.org/sdgs/>

Ministry of Development, official website <https://www.mr.gov.pl/en>

STRATEG system website <http://strateg.stat.gov.pl/#>

The new waste economy: a comparison between two urban solid waste management systems inside favelas of Rio de Janeiro, Brazil.

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Abstract

Waste accumulation in the common areas of Rio de Janeiro's favelas is a persistent social dilemma. It can be addressed through modifications of the conventional collective action theory and/or by analyzing local environmental governance instruments able to induce a desirable local institutional change. Under the premise of waste as having the power to reorganize social life, the interactions between social agents are analyzed underlying the two different models of municipal solid waste management. In Morro da Babilônia, a favela in the south area of Rio, there's a project called "Light Recicla", where the electricity company gives a discount on the electricity bill in return of the purchase of recyclable materials. While Morro dos Prazeres, a favela located in the city center, constitutes a case of an ongoing community-based initiative related to a change in collective action towards waste disposal and management. Both these territories are characterized by a hilly topography, high density of poor housing settlements, high criminal violence rates and insufficient public services, especially sanitation, education and health, among others, which makes waste-related activities even more challenging. During decades, an inefficient top-down waste management system and the absence of community organized responses were prevalent. In addition, several factors (including attitudes and perceptions towards waste by local dwellers) interacting through negative feedbacks reinforced the status quo, resulting in ineffective waste collection, a dirty environment and a high incidence of health-related risks. However in Prazeres, in a given point of time, the system suffered a radical change, towards a model dominated by a much more effective community-based waste management. Such shift (which took place in 2013) was triggered by the project called "Reciclação". The project aims to introduce a different perspective on waste collection and destination, and to reduce the socio-environmental risk caused by wrong waste-related behavior. The project follows the guidelines of the National Policy on Solid Waste, in which different sectors of society - the government, companies and consumers - have shared responsibility towards waste disposal, aiming to reuse or recycle whenever possible. With one year of existence, this community-based waste management system managed to reduce by 50% the waste produced inside the community. Currently the project is collectively coordinated by a Working Group formed by different partners such as: local institutions, the municipal urban sanitation company, a social investment institution, private companies, non-governmental organizations and the city hall. It has the goal of being the first favela that recycles 100% of the waste produced. The results are discussed under seven analytical dimensions: waste production; recyclable materials production; disposal; obstacles and motivations; attitude-behavior gap; responsibility and perceptions about system operation. The differences are discussed from the viewpoint of participatory governance structures involved, the inconsistency of attitude-behavior relationship towards waste disposal, and the desirability of increasing the level of cooperation and reducing environmental degradation. The responses found intend to contribute to the development of policies of shared responsibility between different levels of governance, which are capable of attaining collective benefits.

Keywords: Community-based waste management; Favelas; Collective action; Commons; Participatory governance.

Track 7c. Advocacy and Public Participation

Session 7c-03

Session 7c-04

Session 7c-07

Coding sustainable development: contributions from the social representations theory

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Abstract

This paper intends to discuss the definition and operationalization of sustainable development overview as an interesting critical analysis that aim to highlight the silences and the shadows that these buzzwords print in the reality of the lives of each of us and all of us. Since its popularization from the Brundtland Report, it became increasingly clear that this project is neither sustainable nor development. However, it is urgent to critically reconsider both sustainability and development as goals that guide an environmental approach to economic policy. In political debates the concept of sustainability has been widely used in a set of questions aiming to redirect the focus of economic prosperity as well as of contemporary cultural identity in a corporate material culture of more efficient consumption, however, unsustainable. Both in the *media* and in the social sciences, it becomes evident that the simple use of the concept in itself can reconfigure both the political discourse and the material culture, being the product of interrelations and mutual influences of the capacity among decision-makers (top-down process) and citizens (bottom-up process). Following the analysis and critical approach to the theory and practice of sustainable development it should be noted that it is permeable in time and space, now reaffirming the core that characterizes it, sometimes rewriting and appropriating the context. It is shown that this concept highlights certain dimensions according to academic paradigms, political discourse, economic interests, and citizens' insights. We argue that sustainable development discourse is socially constructed and reproduce power relations. Social Representations are considered as one form of collectively validated rational knowledge; they work to code reality. However, sustainable development social representations are not static and they also represent possibilities of creative and polyphasia of meaning. So, the theory of social representations offers a theoretical and methodological framework upon sustainable development critical analysis: (1) to clarify how scientific concepts are appropriated by common sense; (2) to identify the influence of power relations on the prevalent image and discourse of this societal project, exploring difference and similarity, diversity and consensus.

Keywords: Sustainable development, Social construction of reality, Social representations theory.

1. Introduction

Since the Brundtland Report, sustainable development (SD) appears linked to a normative set of ideas: protection of the environment, promotion of human well-being, concern for the well-being of future generations, and public participation in decision-making on environment and development. Basically, SD is about the reorientation of the development trajectory so that genuine societal advance can be sustained. SD has been a complex and contested concept (Simão, 2008) and despite the "consensus documents" adopted at conferences and by international agencies, many different perspectives remain about what it really entails and the scale of the reforms that will be required. In the academic world there has been strong debate about whether SD is a philosophical or economic concept, as well as on the difficulty of translating it into policy measures.

The transformation to SD implies a process of "societal self-steering": society as a whole must be involved in the critical questioning of existing practices and be aware of the efforts that will bring

change. Thus, this involves not only the actions and policies to guide development according to certain guidelines, but also collective discussion and the decisions that are required to define such lines. The choice of values, about the kind of society we live in, about the world we want to leave to posterity, is the basic dimension of governance for sustainable development. In fact, SD is not a technical/administrative project, even though technical knowledge is essential, but an inherently political design, in the sense that it targets the values, needs, interests and expectations of the members of a society: "its practical bearing cannot be established independent of the concrete life circumstances of a particular society" (Meadowcroft, 2007: 302). It entails a process of iterative reform which will take place over several decades, whereas the intergenerational solidarity is a fundamental requirement, built both with the support of dynamic communities and activist citizens and with the skills and dedication of political leaders.

The mechanisms of representative democracy give the state legitimacy to set and intervene in the common good, and it is undeniable that there is an important role for public authorities at all levels, regional, national and local governments, supranational unions and international corporations; unilateral government action is required to break the resistance to established interests and disturb the apparent balance. Government is central to the governance in support of SD: it is assumed, simultaneously, as a structure that formally sets the society and enables participation in societal change process-orientation.

When it comes to SD, the power to change social practices towards sustainability is remarkable; however, this implies that we need to deal with distributed power centers, since sustainability issues feature transversal administrative areas, territorial jurisdictions and several societal subsystems. The study of Haveri et al. (2009) about the practices of governance in Finnish and Norwegian local governments is an example of this transversality and the growth of networks of agreements for inter-organizational and self-organized governance, that develop with the aim of reconciling relations between representative governments and cooperating organizations: "the more formalized the collaboration is, the easier it is for local governments to use the tools of meta-governance and get the collaboration actors committed (Haveri et al., 2009:552).

According to Meadowcroft (2007), a central issue is the interaction between the political power and economic power, particularly how the diverse actors mobilize resources to ensure the achievement of their objectives, taking into account that this authority is marked by a multitude of power centers, also horizontally and vertically fragmented and diversified, and expressing several controversies and tensions. Besides, there are many other social groups, movements and organizations, from labor unions to religious organizations, landless struggles or learning communities, which have specific features that can be used in certain contexts to influence the course of events.

In fact, the diffusion of power is crucial, since it is essential in the process by which goals are formulated (democratic interaction) and the development of knowledge (scientific and social discourse). However, in this scenario marked by an ambitious reform agenda, when power is fragmented into many actors and subsystems, reflective capacity on the readjustment of practices and initiatives and societal interactions become intrinsic critical governance components – both reflective and interactive – for SD.

The aim of this article is to contribute to the critical analysis of "sustainable development" (SD) psychosociological phenomena, considering the theory of social representations (SRT) approach. This study focuses on the analysis of this phenomenon as an object of social construction of reality and knowledge. What follows is a brief historical, economic, political and societal contextualization to clarify how these dimensions have influenced, and have been influenced by this individual and societal, glocal and timeless, project.

First, a short presentation of social representations theory is given, since its consignment with Serge Moscovici, and later contributions of various authors for purposes of social explanation. The history of the concept is too rich to be easily compressed into a single definition; others see this as a precondition for further development and elaboration (Wagner, 1994; Howarth, 2006). At the same time, the theory has its critics. Many of the criticisms deserve serious consideration: particularly important are the claims that social representations theory has yet to fully conceptualize the relationship between representations and (a)social practices and (b)power.

Nevertheless, as Denise Jodelet states “the highest degree of the truth of an idea is to be the source of new truths” (Jodelet; 2008: 411) and the SRT has been studied in many social arenas, and across the world. So, the social construction of the concept and discourse of sustainable development, as a psychosocial phenomenon, will be clarified, identifying the processes by which one can unfold the identification process, the determinations vs. consensus, the top-down and bottom-up dialogues of the actors which intervene in several areas of society.

Secondly, following a theoretical and reflexive line of thought, it is essential to highlight some questions that clarify the meanings and significance, the dimensions and scales, opportunities and constraints that the paradigm of sustainable development brought to the societal project: what caused the emergence of the SD concept? What does it mean in its historical context? Why is it necessary for development to be sustainable? How to match discourse and practice? Sustainability of *whom*? What kind of future do we want? And, what can we do for a better world? Although the central theme is clear, SD gives rise to different understandings depending on political positioning and actors’ interests which, according to Hopwood et al. (2005), evinces the fragility of the outlined strategies. Regarding the European Commission’s Strategy for the SD and the Lisbon strategy itself, also Steurer and Berger (2010) show these misalignments, denoting differences and inconsistencies in the design and implementation of these strategies. No definition is neutral; in fact, the whole conceptual definition is relative and contingent and, in this way, an echo of a historical moment, of a cultural environment, geographical location, of the social status of an individual personality and, finally, a political commitment (Scholte, 2002). The challenge, then, is to try a critical definition of this concept in order to better understand contemporary reality, but also look for its transformation.

2. Methods

The critical thinking presented in this article is based on bibliographical research and state of art selected from the main theoretical-methodological references focused on the conceptualization of “sustainable development” and on “social representations theory”. The later is grounded in the proposal presented by Serge Moscovici’s psychosocial approach, and following developments, in particular on the structural approach of School Aix en Provence, and in symbolic organizers of social relations followed by the Geneva school. Leading studies in Portugal, namely those of Jorge Vala, were also considered. The present study does not intend to undertake a thorough analysis of sustainability in the light of the SRT, which would be unworkable at this time for obvious reasons, but it intends to clarify how the scientific concepts become understandable to citizens, in the particular case of SD, and how associated practices contribute to (re)define and legitimize the concept in a dialectic between world and thought.

3. Results and Discussion

3.1. The theory of social representations in the (de)construction of psychosocial phenomena

In contemporary times, the structural difference of society has created an increase in the number of niches, and their discourses. Globalization has triggered knowledge systems previously confined to geographical boundaries. “In these and other contexts we are witnessing the breakdown of collective, homogeneous and “total” knowledge structures and the emergence of a pluralistic field of representations” (Gillespie, 2008:376), allowing people to navigate between several ‘knowledges’ and discourses, choosing what they consider relevant to a given context. Under the pressures of globalization, therefore, meanings become highly contested and negotiated (Howarth, 2006).

It is Serge Moscovici who introduces the concept of “Social Representation” in his doctoral dissertation published in 1961, *La Psychanalyse, Son image et Son Public*, and later on in 1976, seeking to respond to psychoanalysis social representations, in France. In the beginning, the concept takes on a “mixed” position between psychology and sociology, between the individual and the social. However, the concept gradually departs from “Collective Representation” of Émile Durkheim, here understood as a form of organization of communities imposed to individuals

without a social conscience of it: "Social life must be explained not by the conception of it held by those who participate in it, but by profound causes which escape consciousness; and we also think that these causes must be sought chiefly in the way in which the associated individuals are grouped». (Durkheim, *apud* Harré, 1984, 933). Collective Representation incorporates many types of intellectual forms, rooted in a given community, shared evenly by its members (Farr, 1993).

For Moscovici social representations are collective, not in the sense required to individuals, but rather the inner universe representations present in individuals, making familiar what initially wasn't so (Moscovici; 1976). They are of a dual nature: on the one hand, they are seen as individual attributes (or structures of knowledge) shared by members of a group and, on the other hand, they are socially constructed as they emerge. Thus, SR are "sets of beliefs, images, metaphors and symbols collectively shared in group, community, society or culture" (Wagner; 1994: 199). Serge Moscovici distinguishes *hegemonic*, *polemic* and *emancipated* representations (Gillespie, 2008; Vala 1993, 1997). *Hegemonic* representations are described by the author as being a contemporary variant of collective representations (Durkheim), incontestable, uniform and coercive, they are self-centered and do not dialogue with alternative perspectives; they are shared to some extent by all members of a society and signify the societal identity, allowing very few degrees of freedom on the individual level. The *emancipated* representations circulating with a certain degree of autonomy of society, are worked in the context of a field of several alternatives; they are distinctively constructed information by small sections of a society, yet they're not incompatible with the hegemonic representations. The *polemic* representations are drawn up in the context of an inter-agency ideological conflict, they tend to have a main alternative representation (which is not feasible) but work as a rhetorical counter-point; they are formed by subgroups in the course of a dispute or social conflict when society or social authorities do not share them. The social constructionist approach (Berger and Luckmann, 1967) of SRT highlights social phenomena as socially constructed by individuals, in which individuals do not react to social phenomena, but to the shared image of the phenomena itself (Pivetti, 2005).

The founding assumptions of theoretical guidelines in social psychology are: the assumption of knowledge-action ratio, the image of man as subject-actor vs. subject-agent, and the assumption of the individual-society relation, the primacy of the individual over society, the image of man as socially dependent subject. Starting with those assumptions Ditch (1993) establish the relationship between representations and identity processes, and uphold the hypothesis that representations can be understood as the organizing principles of more specific cognitive activities, such as causal attribution and the perception of people and groups. In fact, SRT do accentuate that knowledge takes shape on day-to-day interactions, and social identity theory provides the groundwork for understanding the symbolic code of social groups, this is, the social anchoring of the SR. In this sense, social groups are formations arising from cognitive and symbolic processes, and not objective assumptions of the social structure. SR cannot be considered as causal explanations of behavior; rational beliefs, decisions, and acting necessarily involve socially constructed knowledge, indorsed by social consensus, that is, the beliefs of the relevant others (Wagner, 1993, 1994).

The representations are constructed through a dynamic process of communication and the ability to function as a social body, sharing ideological codes. As Wagner (1993) argues this knowledge may takes many forms: symbolic, iconic, cognitive, affective or metaphorical, but it must be potentially communicable in order to fulfill its communicative function. Gillespie (2008) analyzes SR in a sharing and communicational context with the aim of understanding the representation of difference given the fact that representations are "reflective" and enable communication with the alternative representations. The representations of "others" are distinct from "ours"; they are the ideas that are assigned to other, real or imaginary. For Moscovici (1976), SR enable people to master their material and social worlds, and enable people to communicate, by performing two functions: the instrumental function, the relationship between the self and the object, and the communicative function, regarding the relationship of the self to the other. SR can be explicit, in the content of the communication, as implied in the context. It should be noted that, in the SRT, even if there is the need to share a context for that communication flow, a difference between the interlocutors is also necessary, otherwise there would be nothing to say (Moscovici, 1994) and, as Gillespie states "It is more often disagreements than agreements which keep people talking"

(Gillespie, 2008:379). Thus, "alternative representations" are a component of SR, and that explains why people experience a plurality of potentially competitive representations, simplifying and stereotyping the alternative, existing as a "dialogical" shadow under controversial representations and emancipated ones.

Social Representations serve the dual purpose of making the unfamiliar familiar and constructing a group identity. They are "social" because they are expressed by social groups, produced collectively, and because they contribute to the processes of behavior formation; they constitute a "common sense" or a lay knowledge provided with images and shared meanings (Moscovici, 1971, 1984). Two other aspects to consider in the theory of social representations refer to specifications regarding the elaboration of a descriptive social representation, and the processes by which they are constituted.

As to the descriptive elaboration, Moscovici (1976) states that SR are a set of propositions, actions and ratings issued by public opinion; they are organized in several ways (according to classes, cultures or groups) and constitute several universes of opinions. In turn, each universe has SRT internal dimensions: attitude (overall and evaluative orientation relative to the object), information (knowledge) and field of representation (which refers to the idea of image, with concrete content of propositions).

As far as the construction of SR is concerned, Moscovici distinguishes between *anchoring* and *objectification*, in a dialectic relation between social conditions and the social construction of reality, in a circular movement between world and thought (Jodelet, 2008). *Anchoring* concerns "the establishment of a network of meanings in approximation to existing categories, which guides the connections between this and the social environment" (Castro, 2002:950), they draw unusual ideas into categories and ordinary images defined in a familiar context. *Objectification* is the process that allows one to make a conceptual schema real, it transforms what is in the mind into something in the physical world, in order to facilitate the understanding of the social world; it gives an image, a material counterpart; and it is achieved in SRT steps: selective construction, drafting and naturalization.

More recently, Wagner, Elejeberrrieta and Lahnsteiner (1995) developed the notion of objectification, integrating it the in the metaphor theory of Lakoff and Johnson (1980). They assumed that metaphorical thinking and objectification make familiar something that was less familiar, allowing the understanding of abstract phenomena. Moreover, the emotional and moral connotations of the metaphor are generalized to representations so that "those connotations impregnate the representations with the characteristics of the content of the metaphor (Pivetti, 2005:11). With time, images are fully assimilated, becoming elements of the reality of mind, bridging representation and the element of representation itself, sometimes in process of "symbolic coping" (Wagner, Kronberger and Seifert; 2002).

According to Jodelet (2008), *Themata* refers to the trans-historical principles, or "basic knowledge" (Pivetti, 2008) and allows an understanding of how SR are structured, while also giving emphasis to the role of memory and tradition, together with emotion and subjectivity, that can be presented in the form of pre-categorizations of antonymic nature (Markova, 2000) such as, freedom/oppression, man/woman, rich/poor, among others, because they are historically and culturally rooted. Moscovici (1988) also reflects upon the study methodologies of SR: (1) they should be adjusted to the specific objects of study, contemplating first description and then explanation; (2) the "social" dimension is increasingly measured from the social construction of meaning, allowing the individual-social articulation via social-cognitive representation guided by social processes (and, therefore, changing in time and space); (3) group consensus, known as hegemonic SR; and (4) the relationship between the groups and SR, where SR can both be studied in taxonomic groups as in structured groups.

In fact, experimental research seminally led to the definition of two original models, which took over the designation of their respective universities – School of Aix en Provence (Abric, Flament, Guimelli and Rouquette) and the Geneva school led by Doise, Clemence and Lorenzi-Cioldi – that offer further perspectives on social representations: the study of structural properties and socio-genesis research. The former is a structural approach that examines the structure, the

relationship with the procedures and processes of transformation, according to which the stability of the observed state confers credibility and expression to the central system, thus allowing regulation and adaptation to the social context; It is also called the "Theory of the central nucleus", distinguishing the central and peripheral elements of the representational state. This approach is characterized by the systematic exploration of the formal and functional properties of SR organization. The Geneva School advocates the SR approach from a social psychology perspective, considering different levels of analysis (intra-individual, inter-individual, intergroup and ideological) and different explanatory systems; what is more, it takes the understanding of SR as positions linked to specific social fields and integrations and as symbolic organizers of social relations (Jodelet, 2008). Vala (2013) in his analysis of racism as a social representation, considered most important to better understand the social representations that create and legitimise processes of social differentiation and hierarchisation that produce categories and groups as if they were natural entities: "The inevitability of the social construction of differences, of their categorisation, labelling and hierarchisation appears to be real. Equally real, however, are the effects of political and institutional constraints on the acceleration or alleviation of conflicts" (Vala, 2013:20).

3.2.(De)constructing sustainability: definitions, meanings and discourses.

With reference to SRT, the scenario is marked by a plethora of definitions of SD that arise from various disciplines and perspectives (for example, ecology, economics, sociology, biology), existing at least approximately 100 definitions (Holmberg and Sandbrook *apud* Banerjee, 1992). In the contents analysis of this concept several themes including human development are identifiable: inclusion (of ecological systems, economic, political, technological and social); Connectivity (of socio-political, economic and environmental goals), equality (fair distribution of resources and property rights) caution (avoid irreversibility and recognize the support capabilities) and security (reaching a high standard of living, safe and healthy) (Gladwin et al. 1995). This analysis of the scientific, political, economic speech is based on the social representation of SD as "human development", as common denominator of sustainability which expresses precisely the hegemonic representation arising from the power centers that consensually reiterate these fundamental principles. But if the focus is shifted to the controversies that underlie the definition of SD as it is presented in the Brundtland Report (WCDE, 1987) it becomes manifest that there is considerable disagreement among academics and different disciplines about how this definition should be operationalized and how sustainability should be measured, resulting in controversial representations which stem from ideological conflicts and different conceptual frameworks. These controversies around the SD can be considered healthy and constructive social reality, once the discursive confrontation allows to clarify positions and explore what in the previous point was referred to as "alternatives".

Ivan Bolis (2014) conducted a systematic hermeneutic analysis of literature by proposing a conceptual model known as Sustainable Development with an axiological perspective, covering SRT perspectives: satisfaction of basic needs, natural resources and decision-making. This model proposes that SD can be understood as the development that aims to improve the well-being of society as a whole (including future generations), qualified by an axiological perspective to the decision-making process, taking into consideration the limits of environmental resources. The SRT perspectives identified by Bolis in this hermeneutical analysis provide basic images of reference on the social representation of SD, and which allow the anchorage for the existing categories for individuals and groups as a whole. In fact, to refer to "basic need satisfaction" is something that common sense has assumed, being easily associated for the understanding of the meaning of sustainability.

As previously stated, since the publication of Our Common Future, a diversity of "sustainable development" approaches and interpretations have arisen. The very concept of "sustainable" has been conjugated in the most varied situations which, on the other hand, can lead to its own ambiguity and vagueness. Baker (2006) highlights the following key concepts in the discourse on sustainability: sustainable production, which expresses the need to maintain the regenerative capacity of natural systems and preserve the balance of the ecosystem; environmental

sustainability may either refer to the sustainability of the processes and systems of the natural environment or the need to emphasize the environmental dimension in the various processes and social institutions; social sustainability refers, on the one hand, to the ability to maintain the satisfaction of basic needs of health and reproduction of the population and, on the other hand, to sharing a social purpose of promoting integration and social cohesion; and sustainable development, which, due to its popularity, has become ambiguous and inconsistent, decreasing its effectiveness to the point that "the lack of clarity in the definition allows anything to be claimed as" sustainable "(Jacobs *apud* Baker, 2006:27). Additionally, it hinders the accuracy of the evaluation criteria about whether the development of programs is, effectively, contributing to the promotion of sustainable development. Hopwood et al. (2005) consider it critical to leave the concept open to multiple interpretations, at the risk of emptying the concept of its meaning and, therefore, of becoming completely null for mankind. Since the Earth Summit in 1992, in Rio de Janeiro, the difficulty to identify specifically what sustainability is reveals the obstacles that have been emerging on the operationalization of the theoretical discourse, especially due to technological and political constraints (Matthew and Hammil, 2009 *apud* Bolis, 2014).

The proliferation of the meaning of sustainable development does not make it necessarily useless; indeed, this proliferation is part and parcel of the social transformations which are inherently confusing and conflicting, in the search of direction. Politically, this lack of definition becomes advantageous, since political factions with different (and sometimes conflicting) interests can share an understanding about what policies should be implemented. Robinson argues that the SD polysemic interpretation can be an opportunity; the author argues that sustainability isn't really just a political act, but rather an idea that leads to critical reflection and to build bridges of convergence, promote consensus about what kind of world we want to live in and hand in for the future (Robinson, 2004 *apud* Bolis, 2014). This polysemic interpretation of SD reveals precisely the process of objectification, which, depending on the context and the social groups that put it forward, makes real conceptual schemes.

According to Bourdieu, the simple act of giving names to things without meaning is a typical demonstration of such "power-in-action" of rhetorical terms "experts will opine about these phenomena and laypersons will repeat their opinions confirming the new doxa of these discourses" (Bourdieu, 1998, *apud* Luke, 2005, 39-63). Howarth argues that the reproduction of power relations depends on the continuous and creative (ab)use of representations that mystify, naturalize and legitimize access to power "Different representations speak to different interests and so silence, or at least muffle others" (Howarth, 2006: 79). Many of the discussions focus only on the hypothetical exploration of what this phenomenon of sustainability could be, rehearsing abstractly what (this phenomena) must be. The importance of context and the specific nature of social groups shown in the SRT is expressed by Bourdieu through what he designates as "habitus", structured matter and socialized matter which incorporates the immanent structures of the world or of a part of it. According to this, the imperatives of need, desire, and universality are communicated to institutions, as well as other ideas, through the general habitus. This process of acculturation "retranslates" intrinsic and relational characteristics of a position in a world with various lifestyles in a unitary set of people's choices, goods and practice, "Once the effects of sustainability begin to shape the fields of action and decision, they are integrated into the shared habitus "(Luke, 2005:230).

Once the concepts of SD are constructed at the level of the discourse by technoscience and civic discourse, the contemporary art of governments is still focused on finding the "principles of its rationality" connected "to the specific reality of the state" (Foucault, 1991:97), in which the rhetoric of globalization, sustainability and development is formatted to serve the systemic requirements of politicians. Foucault shows that a political speech binds security to the idea/concept, on the one hand, and it influences policy, economic interventions, new configurations and ideological campaigns by raising the standards of morality, individual responsibility and collective (community) commitment, on the other hand, this rhetoric may also act as a discourse of a regulatory process that impels people to believe in the established order (dominant power) by leading them to unconsciously reproduce the dominant discourse, which effectively endorses the actions and thoughts of a ruling, powerful and controlling, elite. Luke (2005) clarifies that the rhetoric of

governments (and power) is widespread and part of common vocabulary through persuasive campaigns made by "owners" and/or marketing channels. SD is perfect for this mission. The globalization of information networks and markets makes the coping of this language accessible to anyone. In many ways, SD is a social movement in favor of a bigger market, working in two top-down directions. Such models (e.g. the "being green" marketing) are neither uniform nor dominant around the world, however, where they are established, people develop communication networks, discuss and mediate their collective and individual interests while parties that support the corporate entities and civic structures which, simultaneously, perpetuate their civil society (Habermas, 1989).

In the name of job creation, growth, stabilization and development of advanced technology, the banner of global stability, sustainable development and a communitarian ethic gains increasing recognition and acceptance. Through the images of rhetoric, a new order of things begins to emerge from theories of sustainability, as they operate in standardizing the debates of corporations, states and media. This project of command, control, and communication is a vast undertaking, but these terms are starting to circulate in networks of public speeches, in international politics and in neo-liberal capitalism "the political, economic, and technical incitement to talk about "sustainability" is a notion that reimagines economy and society against some notion of environment, nature or ecology" (Luke, 2005: 231). The term "sustainability" creates discourses about the planet whose goals stem not just from the morality of civic morality, but also of the industrial rationality shared with material culture. What was seen merely as political concern now became a matter of national environmental security, of the appropriate use of resources and of property rights.

The effects of the dogmatic rhetoric about sustainability effects easily permeate both official policy and critical analysis, evident in the work of academic activists, NGO leaders, social groups and governments. The dogmatic philosophy of neoliberal markets and of green capitalism blends easily with the utopian vision expressed by Bourdieu as follows: it generates a strong "free trade faith" not only among those who materially live off it, such as financial agents, businessmen, among others, but also among those who depend on it for their daily survival such as senior workers and politicians who challenge the power of the markets in the name of market efficiency, and claim the suppression of political and administrative borders that may hinder the holders of capital from the pursuit of maximum profit, instituted as a model of rationality "when one, however, hears such "ready-made phrases all day", (...) they become elements in a doxosophy or "a whole doxosophy and a whole worldview which engender fatalism and submission" (Bourdieu, 1998:57 apud Luke, 2005).

4. Conclusions

There is no doubt that development is required and the concept of sustainability should go beyond the compromise between environmental protection and economic growth. The SRT offers an analytical framework conducive to a psychosocial analysis of sustainable development discourse and practice. As we stated, SR are more than social psychological tools that orient our understanding of the worlds we live. In supporting a particular version of the social order they protect interests over others. Nevertheless, representations cannot be seen as a way of imprinting meaning as static and consensual on to us. They also carry the possibility of the hybridity and polyphasia of meaning, and so demands dialogue, debate, and even resistance in the ideological construction of realities.

In fact, SD requires reinventing the industrial tenure of nature; the structural and natural limits of SD requires the search not so much of development alternatives, but alternatives to development. The current focus on capital and the markets makes it impossible to think and to get to know other SD perspectives and approaches. It is necessary to extend the discourse to other forms, the more "traditional" they may appear, and to interpret SD in economic, scientific, political, cultural and social terms, challenging the existing views of the world and of nature. The shadows and silences in certain ambiguities of rhetoric about sustainability are the living proof that there is a need to rethink the present and the future of the planet in an inclusive and human logic in which "the quality of life should be measured not by our wealth but by our freedoms" (Sen, 1999:3) and,

perhaps, follow the proposal of Jan Tinbergen and to give the GNP the GNH a name: Gross Natural Happiness (Tinbergen, 1972 *apud* Latouche, 2006), since there are still many activities and resources that are not considered just because they're not market, despite their incalculable value to the well-being of people, organizations and communities. And when we refer to this dimension, we are highlighting the importance of socio-genesis in the construction of the social representation of this concept; being the expression of symbolic organizers of social relations.

The societal process-orientation towards sustainable development is today a strong challenge for governments, facing polycentric power scenarios. The answer to this challenge entails taking interactive and reflective governance modes which steer society to "self-analysis", of how to orient and reorient themselves in the path of development, and explore interactive processes that promote long-term change management. This interactive approach allows the accumulation of social knowledge, the extension of co-governance agreements, and the promotion of a vibrant public sphere, and it can help build consensus on societal goals, and so reduce ambivalence, centering on what is desirable and feasible in the societal project of sustainable development: *What is needed is not a common future but the future as commons!* (Banerjee, 2003: 173).

References

- Banerjee, S., 2003. Who sustains whose development? Sustainable Development and the Reinvention of Nature. *Organization Studies*, 24 (1): 143-180.
- Baker, S., 2006. *Sustainable Development*. Routledge. New York and London.
- Berger, P., Luckmann, T., 1967. *The Social Construction of Reality: A Treatise in the Sociology of Knowledge*. Penguin Books. England.
- Bolis, I., Morioka, S., Sznalwar, L., 2014. When sustainable development risks losing its meaning. Delimiting the concept with a comprehensive literature review and a conceptual model. *Journal of Cleaner Production*, 83, 7-20.
- Bourdieu, P., 1998. *Acts of Resistance: Against the Tyranny of the Market*. New Press. New York.
- Castro, P., 2002. Notas para uma leitura da teoria das representações sociais de S. Moscovici. *Análise Social XXXVII* (164), 949-979.
- Doise, W., 1993. Debating social representations, in: Breakwell, G., Canter, D., (Eds.) *Empirical Approaches to Social Representations*. Oxford, Oxford University Press, 157-170.
- Farr, R., 1993. The theory of social representations: whence and whither?. *Papers on Social Representations*. Vol. 2, 1-138.
- Foucault, M., 1991. Governmentality, in: Burchell, G., Gordon, C., Miller, P., (Eds.) *The Foucault Effect: Studies in Governmentality*. Hemel Hempstead: Harvester Wheatsheaf, pp. 87-104.
- Gladwin, T., Kennelly, J., Krause, T., 1995. Shifting paradigms for sustainable development: implications for management theory and research. *Academy of Management Review*, vol. 20, Nº 4, 874-907.
- Gillespie, A., 2008. Social representations, Alternative Representations and Semantic Barriers. *Journal for the Theory of Social Behavior*, 38:4, 375-391.
- Habermas, J., 1989. *The structural transformation of the public sphere*. The MIT Press, Cambridge, Massachusetts.
- Harré, R., 1984. Some reflections on the concept of social representations. *Social Research*, 51, 927-38.
- Haveri, A., Roiseland, A., Vabo, I., 2009. Governing Collaboration: Practices of Meta-Governance in Finnish and Norwegian Local Governments, *Local Government Studies*, 35(5), 539-556.
- Holmberg, J., Sandbrook, R., 1992. Sustainable development: What is to be done?, in: Holmberg, J., (Ed.) *Policies for a small planet*. Earthscan, London.

- Hopwood, B., Mellor, M., O'Brien, G., 2005. Sustainable Development: Mapping Different Perspectives. *Sustainable Development*, 13, 38-52.
- Howarth, C., 2006. A social representation is not a quiet thing: Exploring the critical potential of social representations theory. *British Journal of Social Psychology*, 45, 65-86.
- Jodelet, D., 2008. Social Representations: The Beautiful Invention. *Journal for the Theory of Social Behavior*, 38(4), 411-430.
- Lakoff, G., Johnson, M., 1980. *Metaphors We Live By*. Chicago University Press, Chicago.
- Latouche, S., 2006. *O Desafio do Decrescimento*. Instituto Piaget, Lisboa.
- Luke, T., 2005. Neither Sustainable nor Development: Reconsidering Sustainability in Development. *Sustainable Development*, 13, 228-238.
- Markova, I., 2000. Amédée or how to get rid of it: social representations from a dialogical perspective. *Culture & Psychology*, 6 (4), 419-460.
- Matthew, R., Hammil, A., 2009. Sustainable development and climate change. *International Affairs*, 85, 1117-1128.
- Meadowcroft, J., 2007. Who is in Charge here? Governance for sustainable development in a complex world. *Journal of Environmental Policy and Planning*, Vol.9 (3,4), September-December, 299-314.
- Moscovici, S., 1961. *La psychanalyse, son image et son public*. PUF, Paris.
- Moscovici, S., 1976. *La psychanalyse, son image et son public*. 2nd Ed., PUF, Paris.
- Moscovici, S., 1984. The phenomenon of social representations in: Farr, R., Moscovici, S., (Eds.) *Social Representations*, Cambridge University Press, Cambridge, pp. 3-69.
- Moscovici, S., 1988. Notes towards a description of social representations. *European Journal of Social Psychology*, 18, 211-250.
- Moscovici, Serge (1994). Social representations and pragmatic communication. *Social Science Information*, 33, 2, 163-177.
- Pivetti, M., 2005. Natural and Unnatural: Animal welfare and rights activists' representations of animals and animal biotechnology in Italy. *Social Psychological Studies XXI*.
- Robinson, J., 2004. Squaring the circle? Some thoughts on the idea of sustainable development. *Ecological Economy*, 48, 369-384.
- Scholte, J., 2002. *Global Governance*, Vol. 8, No. 3 (July–Sept.), Lynne Rienner Publishers.
- Sen, A., 1999. *Development as freedom*. Anchor Books, New York.
- Simão, J., 2008. *O Sector Público e o Desenvolvimento Turístico Sustentável*. Universidade Aberta, Lisboa.
- Steurer, R., Berger, G., 2010. *The Lisbon Strategy and sustainable development strategies across Europe: how different governance arrangements shape the European coherence of policy documents*. Discussion paper 1/2010, Institute of Forest, Environmental and Natural Resource Policy, University of Natural Resources and Applied Life Sciences, Vienna (BOKU).
- Vala, J., 1993. As representações sociais no quadro dos paradigmas e metáforas da psicologia social. *Análise Social*, vol. XXVIII (123-124), 887-919.
- Vala, J., 1997. Representações sociais e percepções intergrupais. *Análise Social*, vol. XXXII (140), 7-29.
- Vala, J., 2013. Racisms: Social Representations, Racial Prejudice and Normative Pressures. *Papers on Social Representations*, 22, 6.1-6.29.
- Wagner, W., 1993. Can Representations Explain Social Behavior? A Discussion of Social

Representations as Rational Systems. *Papers in Social Representations*, Vol.2 (3), 236-249.

Wagner, W., 1994. Fields of research and socio-genesis of social representations: a discussion of criteria and diagnosis. *Social Science Information*, 33, 2, 199-228.

Wagner, W., Elejabarrieta, F., Lahnsteiner, I., 1995. How the sperm dominates the ovum: Objectification by metaphor in the social representation of reproduction. *European Journal of Social Psychology*, 25, 671–688.

Wagner, W., Kronberger, N., Seifert, F., 2002. Collective symbolic coping with new technology: Knowledge, images and public discourse. *British Journal of Social Psychology*, 41, 323-343.

WCDE, 1987. *Brundtand Report- Our Common Future*. World Commission on Environment and Development. Oxford University Press.

World Bank, 1991. *Managing Development: The Governance Dimension*. Washington.

Kowork: Socially Engaged Codesign Project

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Abstract

This paper is an exploratory reflection on a socially engaged and participatory activity developed within the project KOWORK E5G and the collaboration between Grupo de Estudos Socio-territoriais Urbanos e de Acção Local (GESTUAL/CIAUD), a research group engaged with social, urban and local action studies from the Faculty of Architecture, University of Lisbon (FAUL), and Gabinete de Apoio ao Emprego e Empreendedorismo (GIP), the department for employment inclusion of Associação Cultural Moinho da Juventude (ACMJ), a local institution developing social work with the community of the neighbourhood Alto da Cova da Moura. Located in Amadora Commune, Greater Lisbon. Cova da Moura is a self-built neighbourhood mainly inhabited by immigrants from Portuguese-speaking African countries and respective descendants. Just as many other informal settlements in Lisbon's periphery, the sustained lack of support from public institutions and precarious access to means and resources for its development and/or qualification, has been perpetuating social exclusion, conditions of poverty, and the neighbourhood's controversial criminal reputation. KOWORK E5G is a social and employment inclusion project funded by Programa Escolhas Pontual of Alto Comissariado para as Migrações, created by GIP/ACMJ to empower young people living in Cova da Moura expand individual and collective employment opportunities and/or build their own business ideas. Through the arrangement of a diverse partners consortium, the project provided a wide curriculum of activities to young participants. From learning how to build résumés, preparing for interviews and working on the topics of citizenship and entrepreneurship, practice wall painting techniques, build 3D printers, print objects and work in the newly furnished workshop with rapid-prototyping and laser-cut machines. The Faculty of Architecture, University of Lisbon, was invited too, through the group studies GESTUAL, proposed an activity that promoted the use of the workshop as well as harnessed carpentry, building and design interest and skills in participants. In light of this, four design PhD researchers from GESTUAL developed a codesign process with youngsters to build local and concrete solutions for and with the community of Cova da Moura neighbourhood. The following sessions are a thorough account of this process. From the educational approach to the collaborative understandings of the field, swot analysis, ideation, prototyping and implementation – it aims to reflect and explore four fundamental aspects of social design (which correspond to the four researcher's perspectives): (1) the notion of social sustainability, (2) social design methods, tools and methodologies, (3) its political and ethical dimensions, and (4) the activist role of communication of such kinds of participatory and designerly acts and actions. To further support the questioning of what and how sustainable and meaningful principles and practices of design can be activated, constructed and communicated in society.

Keywords: Sustainability, Social Design, Codesign, Design Activism, Participation

1. Introduction

In times of widespread participation when there are many people involved in designing the transition towards sustainable futures, how is design contributing? What are and have been meaningful acts, takes and materializations of this particular discipline and profession on an endeavor that concerns us all? Embracing such general orientations as a design challenge,

designers have been reconfiguring their practices and ways of acting along the last decades. The complexity of issues and their singularities, that is the inter-connectedness of macro problems and their intrinsic micro relations to the specific localities, communities, everyday living and people where and when they are set, have been raising questions to the level of not only what but how to design.

KOWORK E5G is a social initiative created and promoted by Gabinete de Apoio ao Emprego e Empreendedorismo (GIP) the department for employment inclusion of Associação Cultural Moinho da Juventude (ACMJ) and funded by Programa Escolhas Pontual of Alto Comissariado para as Migrações, a Portuguese funding program promoting social and employment inclusion. Set about in Bairro Alto da Cova da Moura, a neighborhood located in Amadora Commune, Greater Lisbon, the initiative aimed to empower young people to expand individual and collective employment opportunities and/or build own business ideas.

Since 1984 ACMJ has been an active actor and stakeholder (together with two other main local organizations) in the mobilization and development of the community in neighborhood Alto da Cova da Moura, increasing its living conditions. Just as many other informal settlements in Lisbon's periphery, the neighborhood emerged from the rapid growing expansion of the city around the 1960s and 70s. Born from the occupation of agricultural land and unregulated self-building during the Portuguese rural migration and the independence of, until then, Portuguese colonies. Today, Cova da Moura is mainly inhabited by Portuguese-speaking African families and respective descendants as the flows of immigration from Cape-Verde, São Tomé and Príncipe, Angola and Mozambique continue. However, unresolved jurisdiction over land ownership has been putting Cova da Moura under threats of massive or partial demolition along the years. Furthermore, being on a precarious and difficult (power) position to access means and resources for its development and/or qualification within Amadora social, political and cultural landscape and planning strategy. Despite the struggles to mobilize residents and dwellers as well as public and private institutions, to support the cause for human and social rights, the local organizations including ACMJ have been succeeding so far. Still such continued (re)production of social exclusion and poverty conditions has fostered the climate for its criminal reputation, which is very mediated.

Attending to issues of inclusion, employment and cooperation — building on years of experience of working *in tandem* and establishing synergies between institutions — ACMJ/GIP assembled a diverse partners' consortium, including the Faculty of Architecture, University of Lisbon, and proposed a wide curriculum of activities directed towards enhancing the skills and capabilities of young 'loose' Cova da Moura residents. Moreover to foster entrepreneurial and autonomous attitudes to enter the job market or start-up potential business ideas.

The Faculty of Architecture, University of Lisbon (FAUL), was invited through the Grupo de Estudos Socio-territoriais Urbanos e de Acção Local (GESTUAL/CIAUD), a research group engaged with social, urban and local action studies that has been working and collaborating with Cova da Moura and the local organizations for more than ten years. Guided by Henry Lefebvre's "Right to City", GESTUAL gathers formally and informally a range of people from diverse backgrounds — mainly architecture, urban planning, anthropology, sociology and more recently design — who actively and conceptually engage in research and/or in practice such principles. In light of the challenge proposed by ACMJ/GIP — to cultivate carpentry, building and design skills in participants fostering the use of a newly furnished workshop with rapid-prototyping and laser-cut machines — four design PhD researchers collaborating with GESTUAL embraced the initiative.

This paper is a constructive and exploratory reflection on the interplay between what designers mean by 'sustainable' and 'meaningful' and how these two principles today affect how things — products, services, spaces, communications — are designed in the contemporary world. The codesign activity with 12 young residents, under thirty years of age, recruited by ACMJ/GIP according to personal employment records and interests, started in September 2015 and is still ongoing. Nevertheless the encounter with this very (social, political and ethical) questions emerged already, throughout and within the collaborative doings of design. What and how to design meaningful and sustainable contributions spanning from the young participants, the KOWORK social initiative, Cova da Moura neighborhood and the city of Amadora to national and

universal forms of resilience, democracy and sustainability, has driven the designer's actions so far and now opens reflexive discussion in between action.

Before describing the process in depth, the first section of this paper outlines a general notion of sustainability that set the framework for the activity. Thus introducing Social design, or socially engaged design, as the main standpoint, the second section gives a thorough account of the process. From a boundary-breaking activity with eggs to the joint ideation and prototyping sessions to materialize ideas and visions of well-being, "codesign" will emerge as a fundamentally inclusive and relational methodology, method or tool to design together with people that which can become the unfolding of new future possibilities for social sustainability. As communication plays a fundamental role in bridging and connecting participants together and further extending the project's effects and affects, the third section discusses activism in or within design and how the very process of documenting and recording the project is itself a social and political act. Finally, in the end of the paper the project limitations and strengths are presented in order to reflect on the methods used and project them to future social design works.

2. Methods

2.1. The Notion of Social Sustainability

The current economic system, as well as forcing a great part of humanity to live in unworthy conditions of poverty, threatens life itself (Smith and Max-Neef, 2011). Environmental problems and social inequalities are becoming more apparent all over the world. In this context, the concept of sustainable development emerges, often including the three pillars of social, economical and environmental (Sachs, 2000; Spangenberg, 2001; UN, 1987), which can be considered the triple bottom line of sustainability.

The environmental dimension consists in the sum of biological processes and its elements, requiring the preservation of the environment as a means of subsistence for humanity; the social dimension encompasses personal resources, experiences and behaviours, demanding human development, poverty eradication, better health care and people's abilities; the economic pillar, although part of the social aspect, is considered a pillar in itself due to the view of human beings as potential profit, its sustainability involves a system that fulfils the needs of everyone involved, generating enough jobs and reinventing itself as required (Spangenberg, 2001).

Besides concerns with social, environmental and economic matters, other authors include more pillars, such as cultural – consists in the preservation of cultural identities and roots of people (Sachs, 2000); of institutions – political organs, civil societies, administrative systems and even social traditions and orientations, to achieve institutional sustainability there must be as much equality as possible, without social, gender or ethnic discrimination and no corruption in its administration (Spangenberg, 2001); spatial or territory – aims for balance in the rural-urban division and better land distribution (Sachs, 2000). When thinking of sustainability there must be an attempt to include as many pillars as possible.

In its traditional practice, design occupies itself mainly with economic sustainability, since it aims to develop products which generate profit for companies. However, in the last sixty years there have been changes in consumption patterns which are leading to new practices in design focused in sustainability and the minimization of social problems (Veiga and Almendra, 2014). Designers themselves started questioning their role, as well as there being demands from society, leading to the appreciation of new meanings in product development. As it was pointed out before, sustainability is a broad concept thus its repercussion in design leads to different approaches.

Designers' knowledge and abilities can help divert us from this destructive path through initiatives that integrate social, environmental and economic aspects through creativity and cooperation, aiming for human development growth and social equity, as well as environmental protection and economic security (Walker and Dorsa, 2001). The main issue is that design is a discipline that deals with the management of complexity (Morello in Margolin and Buchanan, 1995) and, when working with sustainability aspects, this complexity deepens. As Walker and Dorsa (2001:47)

put it: “sustainability is a highly complex undertaking with myriad interrelated, interdependent facets”. When social sustainability becomes the focus, the practice of Social Design emerges, having as its main characteristic the quest for well-being and common good.

2.2. Social Design Methods, Tools and Methodologies

When investing in solutions for communities in social vulnerability situations, it is becoming more common to follow the path that unites social innovation, entrepreneurship and collaboration between designers and users, as a means of promoting better ideas and results for new products, product-service systems or new businesses (Franzato et al., 2013).

Through short workshop sessions which explored in conceptual and practical terms what is (and can be) design and being a designer, a collaborative activity was established with a group of youngsters from Bairro da Cova da Moura to develop their creative capacities, as well as an entrepreneurial and engaged citizen view of their lives and futures. Within the frame of KOWORK E5G initiative, the action began in September 2015 and is now at the stage of implementing the ideas generated by the group’s collaboration. The project had as one of its main goals to amplify the participant’s knowledge to facilitate their insertion in the job market.

In this perspective, collaboration is one of the pillars of Social Design, an approach that aims for the development of a social model and design process that aims to contribute to the wellbeing of society (Manzini apud Peruccio, 2008; Fuad Luke, 2009). Broadening the matter, Fuad Luke (2009) argues that the main goal of Social Design is to improve “social quality”, which he draws from a concept defined by Leonardis (apud Morelli, 2007) which is the measurement of the capacity citizens have to participate in the social and economic life of their communities in conditions that improve their individual wealth as well as the conditions of the community.

Codesign, or ‘designing together’, an approach which encourages the various actors and stakeholders of a problem to build a solution together, is in the center of a more democratic, open and innovative design process and has been more expressive in nonprofit sectors. “As a design approach it can potentially generate new affordances and new values but demands a new skill set and underlying philosophical approach from designers” (Fuad-Luke, 2009, p. 147).

According to Binder et al. (2015) codesign practices are a most valid response to rethink the relation between design and democracy. Drawing from Actor Network Theory (ANT) oriented sociology and the Scandinavian participatory design tradition, the authors argue that design practice and research within the social “is not about projecting utopian visions of frictionless futures. On the contrary, it is about staging socio-material conditions for controversial issues in ways that facilitate contradictions, oppositions, and disagreement through direct engagement” (Binder et al., 2015, p.1).

The design PhD researchers proposed a codesign process with the group of young participants to materialise “things” for the community while aiming to enact future possibilities for using the workshop. Exploring in a ludic approach how designers work, what are existing challenges, opportunities and what might be meaningful and viable contributions, besides fostering the ‘designerly’ within participants each encounter also attempted to prompt some sort of tangible output to convey participants a sense of accomplishment and enough motivation to continue.

In this sense, codesign is an integrating project approach which encourages individual and collective participation, as well as being a powerful social technology for the conception of solutions for public spaces. In the codesign process, participation is built through the capacity of establishing dialogue, listening, exchanging ideas, and understanding others, and this is crucial to find an effective solution to problems which are often unclear or badly formulated. And this significantly increases the possibility of constructing a satisfactory result for the project.

The project also used the perspective Nigel Cross (2011) denominates “Design ability” which emphasizes the act of designing things as an inherent human capacity. As the author claims ‘design’ was not always considered as a practice that requires special abilities “Design ability used

to be somehow a collective or shared ability, and it is only in fairly recent times that the ability to design has become regarded as a kind of exceptional talent". (Cross, 2011, p. 4)

In this domain, Manzini (2015: 45-46) refers that social design has a relevant part in society to which both those who specialize in problem resolution and other specialists who are more focused in the production and communication of meaning can contribute. It is an activity that happens due to determined contexts, in which different actors and approaches that interconnect and present themselves cohesively are included. In social design the relationship between expert designers and empirical designers is recurring, as well as local institutions, and other actors, as means to potentiate the development of specific problems.

Each area of design has its own ways of searching for solutions and tools to achieve them, but it is possible to visualize similarities in the way these diverse specialities act. In 2005, UK's Design Council developed the model called 'Double Diamond Design Process' to point it out. Divided in four distinct stages, defined as: Discover, Define, Develop and Deliver, the 'Double Diamond' model illustrates the design process "from points where thinking and possibilities are as broad as possible to situations where they are deliberately narrowed down and focused on distinct objectives". (Design Council UK, 2005. P. 6).

2.3. Participatory Process

Starting in September 2015, the first activity playfully introduced 'what is design'. Before adopting the 'Double Diamond' model, the researchers decided to propose a small challenge that provided a perception of how designers use creativity to work the relation between problems and solutions: the famous 'Egg drop Project' exercise. With a limited amount of materials, the group was challenged to build a structure to protect an egg from breaking when dropped from a window. Each made her/his structure individually, simultaneously helping and teasing each other turning the activity into a kind of design competition. The exercise served as a basis to a discussion on how designers deal with time constraints and material scarcity to solve a defined problem. Despite all eggs being broken, the session proved to be fundamentally boundary-breaking inviting participants' attention to "the experimental, the playfulness and diversity within the everyday design practice" (Binder et al., 2015, p.11).

The following sessions the collective engaged in literal "making things together" as Binder et al. (2015, p.6) describe. Not only by dialogue, 'we' (the group of young participants and the researchers) engaged in a designerly collaborative exploration through prototyping activities and joint trail blazing (Binder et al., 2015). Matters of concern and care for deliberation emerged "in the very making of them" (Binder et al., 2015).

The first stage of the 'Double Diamond' is 'Discover' where inspiration and ideas are gathered to identify potential project opportunities and its level of complexity as well as proposing initial possibilities. In this project, a large map of the neighbourhood was printed for participants to pinpoint problems and potentialities in Cova da Moura (Figure 1). A group discussion took place around specific 'problematic' issues but also potential ideas on how to improve them.



Figure 1. Mapping of the neighbourhood's problems.

Thus during the mapping several matters of concern on the neighborhood's living conditions were addressed, such as: building of accesses and ramps for disabled people and baby strollers, implementation of green spaces with urban gardens, installation of new trash cans and extension of the garbage collection system, development of signaling for streets and potential touristic places, leisure spaces with urban furniture, amongst others. The places which could receive some sort of intervention were marked on the map and later visited by the group and registered in photos, at this point, new matters were identified as well.

At the "Define" stage, the group aimed to better develop the questions for the challenges raised in the previous stage (Figure 2). Analysis tools like SWOT (Strengths, Weaknesses, Opportunities and Threats) and 5W2H (What, Why, Where, When, Who, How and How much) were used to define questions such as: What were the priorities? What was the complexity level in each one's implementation? Who were the main actors for the development of networks that enabled the viability of the ideas?

In the third phase, "Develop", the group developed solutions for the priority matters. Through a long discussion we agreed on the strategy of uniting all solutions proposed in one space. In a first moment, the young participants identified an area that showed itself as very complex for implementation because of terrain characteristics but also, and most importantly, the need for an authorization to intervene from residents and both public and private constituencies.

In another tour around Cova da Moura, we decided to chose instead another void space located near ACMJ's kindergarten facilities (Figure 3) This space encompassed by a small wall had not been given much use and its immediate surroundings often serve to accumulate garbage. Nevertheless it was discussed to have potential by being close to public transportation stops as well as low density of houses, which would guarantee less disturbance for the residents. Thus, making the necessary photographic records and on site measurements, as well as outlining how to occupy the space, later the group prototyped the area and possible solutions through scale models to test viability and perform adjustments.



Figure 2. Development of solutions for the priority matters.

Having in mind a conversation on site with some of the members of ACMJ and one coordinator of the kindergarten, the group decided to make a digital rendering of the multi-functional space to allow a better visualization of the idea and also to use it as tool for presenting the project to the kindergarten and ACMJ/GIP.

The last stage of the 'Double Diamond' model is deliver, when resulting solutions are analyzed and tested, defining the action strategy, implementation cronogram and desired goals. The intervention consists in a wooden structure built with prefabricated pallets where cultural events such as musical presentations, popular festivities might take place also making allowance for selling food, drinks, crafts, etc. It is a multi-functional space purposely made open so has to be appropriate by dwellers and the everyday uses they find most suitable. Components of the structure would be made in the carpentry workshop and then assembled on site. According to measurements eighty palettes were needed and in the course of three weeks the construction would be finished (Figure 4).

The proposal was presented to ACMJ/GIP and the kindergarten who decided to embrace the project. Immediately the group began to search for who might donate the palettes making direct contacts to possible partners. Waste management company EGEO, based in Sacavém, municipality of Loures, Lisbon District, Portugal, kindly accepted to support the project donating the palettes and becoming an official partner of KOWORK E5G. At this moment, the group is waiting on further instructions from ACMJ/GIP as issues regarding land ownership and permit came to the fore. The palettes are waiting to be used, stored inside Santa Casa da Misericórdia Day Care Center installations located right in front of the kindergarten and who decided to support the initiative and approved its keeping.

To conclude, the delivery phase is not yet reached hence actual implementation is in current doubt. The young participants are still enthusiastic although as time goes by the researchers are concerned that the active *momentum* the previous process sustained might begin to lose strength and its ability to prompt and engage participation.



Figure 3. Space chosen for construction.

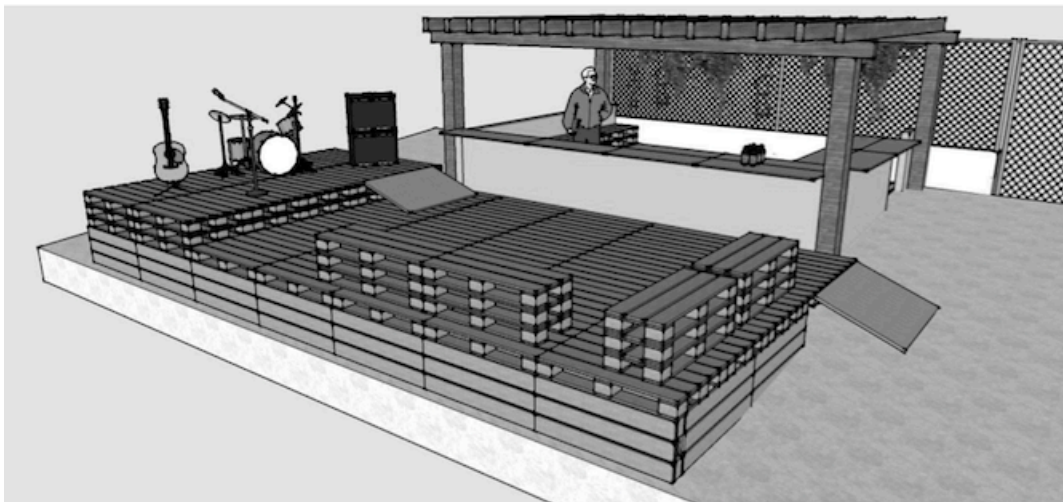


Figure 4. Final digital rendering.

3. Results and Discussion

3.1. The Political and the Ethical

Kowork is not delivery-driven but an event-driven process. That is, a chain of events set up a design space for collective learning and production. Concerned with the young participants' experience the design researchers focused on the open unfolding of the experiment rather than materialising polished and finished solutions. However, making a design project together while framing the community of Cova da Moura as the client amplified the relational and networked nature of design itself expanding the effects of the project well beyond those humans and nonhumans immediately involved (Binder et al., 2015).

According to authors (Binder et al., 2015; Halse et al. 2010), exploratory and prototyping techniques set among actual and concrete interaction with communities inevitably imply the emergence of meaningful (that is, grounded and contextual) design opportunities and therefore subsequent processes of implementation. Such transition, as Binder et al. (2015) mention, not only assures that a consensual outcome and/or decision has been reached it also renders a shift from "participation" to "appropriation" therefore bringing forth political and ethical (design) questions as

to whether those affected have or might be rightfully represented (Binder et al, 2015).

As individual and personal issues were rendered visible through the activities they also became processed as collective, or community, concerns that might be envisioned differently. As opposed to a place to know or identify unmet or latent needs Cova da Moura became a place for invention (Halse et al, 2010). It was the common subject of interactions inside and outside the classroom but also the very material from which things might be reconfigured and (future) possibilities might become reachable. According to John Thackara (2005, p. 94) the most valuable contribution and success factor in “design-for-locality” projects is the ability to support citizens perceive their own everyday through fresh eyes: “to develop a shared cultural vision of the future, but not to design that future for it.” This is clearly an ethical statement and way of being in the field working ‘together’ with people.

Design was a collective fluid and unpredictable process of collaborative decision and material making that reached a possible concrete implementation. The palettes intervention is indeed a design outcome made manifest in the collaborative doings of design. However, from the perspective of building new sustainable production systems and ideas of well-being the *actual* design (aimed) contributions were to enable agency, authorship and benefits to be formed, (re)negotiated and (re)distributed — that is creating the conditions to prompt civic engagement and activism from the young participants. Thus, the palettes intervention is not a *solution* to fill in a gap or need. The stage, the benches, the stands... are enacted possibilities of what the young participants can do and what Cova da Moura might be. It’s a prototype and a political and ethical tool to project imagination and open the future.

Reaching such step implies that the group extends participation and codesigning to the citizens who dwell the chosen site — the current and future users — but to those who become partners that directly (in material, administrative, etc terms) contribute to making things happen. For example, having been able to successfully invite EGEO to collaborate in the project means that the waste management company can become a future partner of the workshop providing palettes and/or other materials for making even other things - the workshop can turn into a maker, recycling or upcycling space. However, it also means an additioned responsibility for the group to materialize something with the palettes already donated so that a relation of trust with the company might be fostered and sustained.

According to Manzini (2015, p.167), “[w]hen a collaborative organization is put into practice for the first time, the people involved work like bricoleurs: the required artifacts are found among those that already exist; they are adapted in function and meaning and are finally put together to fit their own purpose.” Indeed, putting together the palettes intervention demands for a high degree of personal commitment and motivation by participants but mainly by designers.

However, if as Manizini (2015, p.167) claims “these initial applications of an idea can be seen as working prototypes” then in the inherent aspect of ‘craft’ incompleteness lies a space of possibility rather than closure. As Binder et al (2015, p.12) claim “at the heart of democracy lies the option to disagree and explore alternatives” and this is where we argue that the very process of codesign projects the accessibility, flexibility and open-endedness necessary to unfold the “prototype” towards either more advanced ways of functioning or different ways of being itself. The focus of the overall project is the experience of participants and how to give hope and unlock theirs and neighbourhood’s future possibilities of work through a local workshop.

Between parliament and laboratory, as Binder et al. (2015) state, the overall experiment foregrounds design actions and objects as political, controversial and contested “things” in themselves across the span between macro and micro codesignings. But for design to enrich the repertoire of sustainable and democratic forms of representation it must make concrete interaction a starting point and process — embracing the inherent and dynamic complexities and contingencies of issues and publics emerging and shifting over time. KOWORK is a socially, politically and ethically engaged design project as it cares for the everyday relations and how they might be transformed, in a resilient and sustainable way, from within the community of Cova da Moura while considering that, in a globalised connected world, the local and the small are

simultaneously open and connected as Manzini (2015) claims.

3.2. Visual Communication and Activist Role

Design is an area of knowledge with a particular vocation to influence society on determinant aspects which allow a creative and balanced evolution. It is a mechanism of expression which allows human beings, both individually and in collaboration with its peers, the planning and creation of a more sustainable society (Fuad-Luke, 2009).

A perspective that must be pointed out in Social Design is the activist component, whose objective is to encourage, provoke and conduct citizens in a social transformation perspective. The system in question is characterized by a democratic, critical and equitable participation that aims to promote a larger problematization and consequent valorization of the social context. After the creation of the participant structure in the activist Social Design process, it is necessary to find the tools which are able to involve actors and promote participation (Fuad-Luke, 2009).

In this context, it is important to refer french philosopher Félix Guattari's concept of ecosophy, a theory which is structured upon three guiding principles called by the author 'three ecologies': environment, social relations and subjectivity. The concept of ecosophy praises a political, social and cultural revolution aiming to reorient production and consumption of material and nonmaterial goods in defense of a global sustainable development. In this manner, the social component of ecosophy, like social and activist design, is characterized by the implementation of specific practices whose goal is the transformation and creation of sustainable procedures in varied social contexts. The main matter is the reconstruction of humanity's ways, not only through communication, but also through existential transformations in the domain of subjectivity, which can contribute to a renewed relationship of humans with their bodies, their subconscious and their existence (Guattari, 1989).

In the scope of Kowork project, the intervention is simultaneously fruitful and symbolic. As noted before, the process happens through the creation of an educational and participatory context of codesign involvement with the local population. In parallel, the subjective expression of social design intervention is valued, resulting from the visual communication of the various project actions. In this context, a file of videos recorded through the sessions was produced with the aim of creating a final documentary, and also to be used as a tool in the codesign process as a way of providing visibility to the sessions done with participants and, so, to stimulate reflection on the project in course. It must be pointed out that, through explanations given during the actions, participants absorbed the notion that they were facing a cultural challenge, in a context from which they must emancipate themselves, as well as the symbolic values the group's attitudes represent.

The visual message in the images of the project is based on two understandings, on one side the denotative information, where the codesign project objectives are present, and on the other, a connotative form of communication, from which a more subjective understanding derives. In relation to the denotative message, there is a more direct reading, as well as an informative and descriptive role associated to a determined context or situation. As for the connotative message, it relates to the pre existing culture of the message receptor, having an important part in 'meaning construction'. Another relevant aspect of communication is linked to the emotional reaction and its consequences, which result from the understanding of the visual message. This psychic and physical reaction is decisive for the interiorization and memorization of the content transmitted in the message (Frascara, 2004).

The final documentary of the Kowork project constitutes a way of residents of the neighbourhood, local and governmental entities, as well as society as a whole knowing about the collective actions that occurred in the project. The main goal of visual communication in Kowork is the representation of Cova da Moura where interventions happened and residents had an active role in the context of creativity and emancipatory activities.

Thereby, beyond objective interpretations of the images that reproduce the codesign interventions, a sensitive dimension is projected and opens the possibility of expanding the visual content present in the documentary to other possible understandings. This ambivalent perception of

images is the reflection of a particular imagination in accordance to a kind of thinking that stimulates transversal knowledge (Didi-Huberman, 2013).

3.3. Kowork Codesign Obstacles and Possibilities

The development of the current codesign project brought to light certain aspects which are relevant to a deeper reflection, specifically some negative and positive factors that were noticed within the methods used by the design researchers, the participant's performance and the interaction with Kowork supporting entities.

The codesign methods chosen brought results within the frame of what was expected, however some particularities can be improved in future projects. In relation to the 'What is design' phase, the experimental participation of researchers was to encourage young participants to search for solutions to the 'Egg Drop Project' challenge. Since among participants artistic culture varied, embracing the experimental in the process of building effective structures to protect the eggs proved to be hard, as it implies taking the risk of failure (in front of others and assuming that 'mistakes' are learning steps to progress). Thus direct involvement of researchers was necessary, which brings forth the need for more exploration and reflection on how to design empathic and performative involvements that might allow participants to actively take part in activities.

Along the next stages of the 'Double Diamond', where the model itself was explained, as well as the principles of other design methodologies, the notion of sustainability and 'design thinking', a lack of interest from the participants was noticed. The same happened in the application of SWOT and 5W2H methods, which needed many sessions to be finalized and had many group members revealing less assiduity and punctuality. It is important to refer that despite difficulties presented in the theoretical contextualization and application of the methods, participants showed in general a very critical understanding, which helped in a positive way the definition of the project to be developed.

The approximation to the Other, as in listening to his thought, as well as being listened to, is related to the concept proposed by David Levin (1989, p.223), denominated 'enlightened listening'. In the same way, it is important to refer Gemma Fiumara's (1995, p.19) understanding, which criticises the authoritative rationalist speech, hegemonic in western culture, that depreciates the Other's opinion. In Fiumara's optic, the development of a horizontal process is determinant, being based on a democratic relationship with the Other, with the goal of stimulating the ability to listen. This is a way of generating knowledge and potentiating social sustainability.

Another relevant point deriving from this kind of equitable relationship with the Other is the capacity that this has to promote emancipation, which is another sensitive issue for the ones who guide someone that wants to learn, as is the case of the designers conducting participants on the codesign process. This form of generating knowledge is based on the concept of "Universal Education" that defends the learning of anything, and its relation to everything else "according to the principle that all men have equal intelligence". Thus, it is very important promoting equality between all the Kowork group elements. The 'skilled' designer, who has more knowledge, must be sensitive to the amount of information that his co-creative group already have in order to stimulate their participation. The existence of social disparities among the codesign group is something that should be devalued and understood as irrelevant in the development of learning and producing new designerly situations. The designer and his co-creative team must be placed in the same space of understanding from which they start exchanging information aiming to achieve the codesign project objectives. (Rancière, 2002, pp. 10-11, 23-25, 30, 44).

Relatively to the application of brainstorming methods, a very active involvement of participants was noticed, they demonstrated strong critical sense and showed some cultural prejudices typical of this type of disfavored residential areas, namely an unfavorable opinion of government entities, political divergences, gender inequality, amongst others. This animosity which resulted from the discussion of the neighbourhood's problems, as well as many ideas for the respective solutions, caused negotiations between group members and stimulated the progress of the design process.

However, despite the strong critical sense and intense problematization, a difficulty in clarifying the situation and select the most pertinent project possibility was noticed.

A relevant question which permeates the many phases of the Kowork project relates to the way in which it was created and supported. Despite the interaction between various entities involved in the creation of the present codesign project being quite positive, it would be important to consider some particularities aiming for a more productive development. Considering the urban idiosyncrasies of Alto da Cova da Moura neighbourhood, as well as social, economic and cultural characteristics of potential Kowork participants, it would have been important to create a more motivating context, specifically through better material conditions for the development of various design methods (drawing materials and multimedia), the supply of more meals, payment of transport subsidy and, fundamentally, the availability of a study scholarship which allowed participants a more focused participation, as well as detachment from the social and economic problems which, without exception, manifest themselves. Eventually, these social involvement artistic initiatives should be supported by other entities with greater financial capacity, through european and state funds. In this context, it is important to note that conditions made available by locally involved entities were as good as possible and they were always willing to collaborate.

4. Conclusions

At the moment, after the codesign process, the group has reached a deadlock concerning the construction of the designed structure. Everyone is expecting a positive answer in order to start the project implementation. However, bearing in mind that several social interventions of this kind are blocked when institutional bureaucracies are involved, as well as by the fact that the group already has the necessary materials, which in terms of implementation processes is one of the most difficult stages, why not turn the intervention into a mobile stage, stand-alone benches or selling-stands? Why not instead make a signage system, as it was one of the other ideas initially proposed? And these are questions emerging within the group today.

To conclude, in the scope of the Kowork Project, there has been an attempt to approach environmental, social and cultural aspects of sustainability. The environmental impact, although not being the focus of the project and there having not been a deep analysis, was in part resolved by the utilization of materials that were going to be discarded and gained a new use. Also, since the structure will be made of wood, its biodegradable. Dyes will be preferred over paint and only in certain parts to minimize the use of toxic materials. Last but not least is the fact of this being a public space rehabilitation of the main squares of Cova da Moura, where too many examples of unauthorised and degraded housing conditions exist, as well as other urban problems. Thus, this is also an example of local civic and social intelligence demonstration in the benefit of its environment sustainability.

The social dimension was the main goal of the activities as bringing improvements to the community was the most crucial aspect. Through engaging young participants in designing or making things together, the project was able to prompt active civic engagement as well as unfold the process towards an 'actual' and contextual implementation. However, the move from imagination to reality increases the level of complexity and when the group is faced with making things 'real', the design researchers, contrary to intentions and expectations, still continue to be the 'leaders' for setting up those conditions. This raises the questions of empowerment but also of sustainability. Will the project continue? will the workshop be used? will things be produced in Cova da Moura after the researchers are away? With the construction of the space, as well as a better living environment, there will be an empowering of all those involved, as they will see themselves capable of doing things to make their community better. Also, the cultural aspect of sustainability was considered, as the designed space will be used for traditional festivities and other activities which are part of the culture of the inhabitant's countries of origin.

Designers can be important agents in the construction of new social paradigms and new ethical models in the search for a more sustainable future, having potential to play a significative role in society (Manzini, 2011), especially when acting together with those who need social improvements the most. Acting as agents of change, the Kowork team aimed to transmit their knowledge to

Cova da Moura youngsters, so that together they could search for sustainable solutions for the neighbourhood. In a near future, the design researchers will continue their studies in this transdisciplinary field concerning social innovation and sustainability, through the development of the Kowork project, the dissemination of its results, as well as promoting new collective and individual interventions.

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References

- Binder, T., Brandt, E., Ehn, P., Halse, J. (2015). Democratic design experiments: between parliament and laboratory. *CoDesign*, 11:3-4, 152-165. <http://dx.doi.org/10.1080/15710882.2015.1081248>
- Cross, N. (2011). *Design Thinking: Understanding How Designers Think and Work* (p. 4). A&C Black Non-Trade. Kindle Edition.
- Didi-Huberman, G. (2013). *Atlas ou a Gaia Ciência Inquieta*. KKYN+EAUM, Lisboa.
- Fiumara, G. (1995). *The Other Side of Language. A Philosophy of Listening*. Routledge, New York.
- Franzato, C. (2011). O processo de inovação dirigida pelo design: um modelo teórico. *REDIGE – Revista de Design, Inovação e Gestão Estratégica*, 2, 1. SENAI-CETIQT, Rio de Janeiro.
- Frascara, J., (2004). *Communication Design. Principles, Methods and Practice*. Allworth Press, New York.
- Fuad-Luke, A. (2009). *Design Activism: beautiful strangeness for a sustainable world*. EarthScan, London.
- Guattari, F., (1989). *As três ecologias*. Papirus, Campinas.
- Halse, J., Brandt, E., Clark, B., Binder, T. Eds. (2010). *Rehearsing the Future. The Danish Design School Press*, Copenhagen.
- Levin, D., (1989). *The Listening-Self: Personal Growth, Social Change and the Closure of Metaphysics*. Routledge, Minnesota.
- Manzini, E. (2009). New design knowledge. *Design Studies*, 30, 4–12.
- Manzini, E. (2015). *Design, When everybody Designs: An introduction to Design for Social innovation*. MIT Press; translated by Rachel Coad.
- Manzini, E. (2011). Design Schools as Agents of (sustainable) Change. 1st International Symposium CUMULUS//DRS for Design Education Researchers, 9–16.
- Peruccio, P. (2008). Some issues emerged on the Changing the Change newsletters. *Changing the Change: Design Visions, Proposals and Tools*, Changing the Change conference. Umberto Allemandi & Co, Turin.

- Margolin, V., Buchanan, R. (1995). *The idea of Design: A Design Issues Reader*. MIT Press, Cambridge.
- Margolin, V., Margolin, S. (2002). A “social model” of design: Issues of practice and research. *Design Issues*, 18, 24–30.
- Papanek, V. (1995). *The Green Imperative: Ecology and Ethics in Design and Architecture*. Thames & Hudson, London.
- Rancière, J. (2002). *O mestre ignorante: cinco lições sobre a emancipação intelectual*. Autêntica, São Paulo.
- Sachs, I. (2000). *Caminhos para o desenvolvimento sustentável*. Garamond, Rio de Janeiro.
- Smith, P. B., Max-Neef, M. (2011). *Economics Unmasked - From power and greed to compassion and the common good*. Green Books, Devon.
- Spangenberg, J. (2001). *Sustainable development: from catchwords to benchmarks and operational concepts*. *Sustainable Solutions - Developing Products and Services for the Future*. Greenleaf Publishing, Sheffield.
- Thackara, J. (2005). *In the Bubble: Designing in a complex world*. The MIT Press, Cambridge.
- UN, U.N. (1987). *Our Common Future*, Chapter 2: Towards Sustainable Development.
- Veiga, I., Almendra, R. (2014). *Social Design Principles and Practices*. *Proceedings of DRS 2014, Umea - Sweden*, 572-583.
- Walker, S., Dorsa, E. (2001). Making design work—Sustainability, Product Design and Social Equity. *J. Sustainable Product Design*, 1, 41–48.

Co-production of knowledge for social participation and advocacy: cross-fertilizing perspectives of territorial intelligence and spatial justice

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Abstract

The aim of this paper is to explore, by means of the case studies of two socio-environmental-territorial conflicts (in Mexico City and in Huelva urban area in Spain), the role of knowledge co-production processes in citizen participation and advocacy. In the case of Mexico City, the local government imposed the megaproject “Chapultepec Cultural Corridor (CCC)”, on the public area of the metropolis. The project consisted of a new landscape solution for the traffic-congested Avenida Chapultepec in the form of a 1.3km linear park. This was planned to include raised walkways, water features, shade-giving plants, commercial premises, and public areas and activities, as well as a reorganisation of traffic with separate lanes for buses, pedestrians and cyclists. From very different backgrounds, citizens organized an informed debate and a public consultation that blocked the project in an unprecedented way. Most of the voters considered the project either unnecessary or against the residents’ interests. On the other hand, the Spanish case relates to the on going citizen mobilization process against industrial corporations and local, regional and national authorities. This is with regard to the environmental damage to the Estuary of the River Tinto due to the illegal industrial dumping of phosphate waste into the river and a number of overflow pools. This dumping is supposed to have serious effects on public health (abnormally high cancer rates) and the biodiversity of a protected natural area. The case analysis is approached from both the current perspectives of Territorial Intelligence (TI) and from Spatial Justice perspectives (SJ). The IT approach studies the collaborative processes of the co-construction of territorial knowledge in the framework of sociological transitions, the role of the ICT in these practices and its outcomes regarding citizens’ empowerment and territorial government. On the other hand, SJ contributions deal with the spatial dimension of economic, social, political, and cultural oppression and its implications in terms of violence and lack of citizens’ empowerment. The review of these conflicts from both perspectives highlights formal and informal strategies and the appropriation of tools by social groups in the advocacy and the mobilizing group, as well as skills building within socio-environmental conflicts. The communication explores the context, scope, characteristics, knowledge management features, potentialities and limits of these strategies. Both experiences show the way in which citizen participatory mobilizations bring about diverse capacity building processes that increase citizens’ general socio-ecological awareness and foster their political empowerment.

Keywords: Socio-environmental-territorial Conflicts. Spatial Justice, Territorial Intelligence, Knowledge Management, Citizen Participation.

One, two, three, many! or...? Mapping of the controversy over the Swedish West Coast shrimp

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Abstract

'Controversy mapping' can provide insights about issues related to actors, their networking, and governance where the interpretation of science is at stake. In turn, these insights can be useful for advocacy processes and collective problem-solving. In order to illustrate this statement a case study was conducted for the North Sea prawn (*Pandalus borealis*) in the West Coast of Sweden which was the main subject of a controversy that started in 2014 and ended in October 2015 with a Marine Stewardship Council labeling for the contested prawn. We used a method from the scientific humanities, 'controversy mapping', following the methodology suggested by Venturini (2010) and Latour (2012). The method enabled us to trace statements, literatures, and actors involved in the shrimp controversy. By assembling these elements over time, we were able to describe the process of the controversy and identify the networks that 'wrestled' over the scientific interpretation of the (same) data on shrimp population size along the Swedish West Coast. By using network visualisation and analysis software, the case study shows the extension of the network of actors that were part of the controversy, their roles, influence, perspectives and relationships. The material gathered on the controversy was subsequently analysed from the perspective of the production and consumption system of the shrimp. It shows how advocacy actors build alliances with selected product chain actors in order to gather momentum for change. Based on the findings from this research it is possible to suggest that controversy study can help the product chain actors understand their production and consumption system better and provide a basis for product chain roundtables for conflict resolution and problem solving.

Keywords: ecolabelling, wildlife, controversy, *pandalus borealis*, Sweden

1. Introduction – the shrimp controversy as it evolved

In February 2014, news about the local shrimps made unsettling reading in the newspapers in Gothenburg and other cities on the Swedish West coast. It made waves also into national news. The West coast shrimp, elsewhere known as the deep-sea prawn (*Pandalus borealis*), fished in the Skagerrak, Kattegat and the Atlantic, had received a 'red light' in the 2014 edition of the WWF Sweden consumer fish guide. Opinions multiplied and propagated through the news, on blogs, twitter, etc.

To understand the agitation, one needs to know that people in Gothenburg and on the Swedish West coast take their seafood very seriously. Shrimp sandwiches and shrimp binging ('räkfrossa') are iconic examples of local food culture. Gothenburg is sometimes referred to as the *city of the shrimp*. What is special about the local shrimp is that it is wild-caught, usually at night, and cooked on board in salty water to be sold on the market in the morning. Unsold shrimps at the end of the day become ingredient for cooking and salads.

WWF's arguments for the warning were presented in the media, not only by the person responsible for marine and fishing issues, but also by the organization's director and other officials. The arguments for the red light included the halving of the shrimp stock in the last 5 years, weak management and inadequate controlling, according to Håkan Wirtén, director of WWF Sweden (Göteborg Posten, 2014).

Later that year, other events increased the controversy. For example, in June the control authority was able to catch on film a vessel illegally dumping shrimp in the middle of the sea, one of the practices WWF highlighted as justifying the red-lighting. This measure was the result of a new control strategy that had been issued by the Swedish Agency for Marine and Water Management (Havs- och Vattenmyndigheten, HaV) and the Coast guard (Kustbevakningen), partly in response to the issues raised by WWF (Havs- och Vattenmyndigheten & Kustbevakningen, 2014). Despite these efforts to improve fishery management, WWF again red-lighted the shrimp in the 2015 version of their consumer guide.

In April 2015, a new announcement, this time coming from the academic institution affiliated to the international conservation organization, the International Union for the Conservation of Nature (IUCN), added a new element to the discussion. Artdatabanken, the Swedish institutional node of IUCN 'red-listed' the *Pandalus borealis* under the category 'Near Threatened', although it could have been classified as 'Vulnerable' given the reduction in the biomass since 2005 according to their report. However, the seasonal cycles of the shrimps led Artdatabanken to stay with 'Near Threatened' for the time being. This classification was based on an analysis of the biomass of the stock between 2005 and 2014 showing a decrease around 30-50% (Artdatabanken 2015). This apparently supported WWF's warnings in 2014 and 2015.

However, those opposing the consumer guide classification claimed the concerns by WWF were not real since the European Commission, through the International Council for the Exploration of the Sea (ICES), had increased the 'Total Allowable Catch' (TAC) for the *Pandalus borealis* in the areas corresponding to the Skagerrak and Kattegat fisheries in 2013 (Søvik & Thangstad 2013). The ICES is an organization providing yearly advice to the European Commission authority on fishing regarding the amount of catch to be allowed for different species. Their advice is based on input from different working groups composed of scientists from different countries and organizations. In 2014 and 2015, the ICES advice on total allowable catch for *Pandalus borealis* in the West Coast waters increased significantly from 6000 tons max. in 2014, to 10.900 tons in 2015 and 21.500 tons in 2016 (ICES 2013, 2014, 2015). These numbers were used by those opposing WWF warnings to contradict them in the press.

However, in November 2015, the local shrimp was 'ecolabelled'. The Marine Stewardship Council and the Gothenburg's Fish Auction announced that the Skagerrak, Kattegat and the Norwegian Deep fisheries for *Pandalus borealis* were now certified under the Marine Stewardship Council principles and criteria for sustainable fishing under its version 1.1 (DNV-GL 2015). Both the red light and the redlist were still in effect, so, this certification was awarded under specific observation to be reviewed in 2016.

Figure 1. Timeline of the controversy.

1.1. Our aim

The complexity around sustainability issues is worth studying in their entirety — the series of events, the many different positions, the tensions between different actors, their respective

approaches and understandings evidence this complexity. Our primary motive is the exploratory testing of Actor-Network-Theory and its tools for mapping controversies since these provide the means for comprehensive descriptions of sustainability problems in society without reducing them to simplicity. A second reason is an exploration of the extent to which the tools and concepts of our home discipline, Industrial Ecology and Environmental Systems Analysis, are relevant to a controversy. We imagined that, for example, there could be references to Life Cycle Assessment, which is often used for ecolabelling. Alternately, there could be LCA studies describing shrimp fishing techniques or fisheries management.

Once the controversy mapping is done, we will discuss what kind of practical applications are feasible. We hope to find ways in which the 'controversy mapping' method can inform the governance and management of product chains.

1.2. Theoretical background

Controversy Mapping is a tool developed to illustrate the concepts and ideas behind Actor-Network-Theory. This approach aims at providing insights on how to trace associations between both human and non-human actors (Latour 2005). The ANT approach is used when one wants to understand how these interact to produce a social result.

Mapping controversies provides a new perspective about the social—instead of looking into matters of fact, it focuses on *matters of concern* as key realms for social construction (Latour 2005, Venturini 2012). Matters of concern are unfinished issues under construction by many actors that interact through different devices. On the other hand, matters of fact are disputes that have been settled using scientific devices and that are no longer subject of questioning. Controversies reflect issues that are being discussed, that have not been settled yet because the different acting entities are still deciding where to go and who to mix with.

One of the key concepts used in Actor-Network-Theory is *translation*. According to Latour and Callon (1981), such a process comprises all the actions by which an entity they call actor gains the right to represent someone/something else; it is the process that turns the *I* into the *we*. Such actions include the most diverse mechanisms, ranging from violence to subtle acts of persuasion with science.

Translation can be described as a process with four stages (Callon 1984):

- **Problematization**: the main actor defines a problem and a network of other actors that are related to the scientific and technological challenge. S/he also establishes how these actors would be benefited by solving it, making it necessary for them to follow the scientists' advice or, more accurately, indicate what associations are needed to overcome the situation at hand.
- **Interessement**: this phase is defined as "[...] the group of actions by which an entity [...] attempts to impose and stabilize the identity of the other actors it defines through its problematization. Different devices are used to implement these actions." (p. 204).
- **Enrolment**: in this stage, the proving or discarding of the hypotheses the actors made about each other tests their interessement. The enrolment depends on many factors that need to be included in the negotiations for bringing the actors to become what they are supposed to be.
- **Mobilisation**: this step refers to how well the represented actors will follow what their 'representatives' have expressed. It also refers to the mechanisms by which the representatives are decided, elected or self-appointed, which affect how well the represented will follow. It depends on how well equivalences are established in order to successfully communicate the will of the represented to other actors.

As a result of the controversy, the different stages of translation are altered and a new translation is built. Once the process of translation is completed, it starts to be controverted, which according to Callon means that "the representativity of the spokesman is questioned, discussed, negotiated, rejected, etc." (p. 211). And so, it continues.

1.2. Controversy-related research in Industrial Ecology

Research seems to be limited, and in the few publications 'controvers*' is found, it appears as a general term, often for something the authors notes or speculates on in their studies. Only two publications can be said to explore a controversy in order to discuss methodologies in the Industrial Ecology field, more specifically in relation to life cycle assessment: the use of wastewater sludge on farmland (Bengtsson & Tillman 2004) and nanosilver (Boholm & Arvidsson 2013). In both studies, a limited controversy mapping is carried out, focusing on systematic analysis of viewpoints without going into constellations of actor-networks. It is concluded in both studies that the LCA methodology is insufficient and that there is a need to acknowledge value-laden issues in addition to facts (Bengtsson & Tillman 2004) and that its impact assessment methods cover many but not all matters of concern, e.g. public health and bacterial resistance in relation to nanosilver. Both studies can be said to be attempts at understanding the capacity of LCA methodology in a social controversy. Our intention here is different: how 'controversy mapping' as a methodology can inform the governance and management of product chains.

2. Methods – Controversy mapping and linking it to a product chain framework

We follow the approach to controversy mapping described by Venturini (2010) and Latour (2012). Some steps were added to allow for (1) the analysis of the presence of life cycle-related work in the controversy and (2) an analysis of the controversy from a product chain perspective.

2.1. Starting points

Controversy mapping is a tool developed to apply Actor-Network-Theory to socio-technical debates. Its objective is to facilitate observation and description of issues related to technology, science and politics in such a way that their complexity is not threatened by pre-existing frameworks, perspectives or methods. For this, a set of principles for controversy cartography are stated (Venturini 2010):

"You shall not restrain your observation to any single theory or methodology; you shall observe from as many viewpoints as possible; [and] you shall listen to actors' voices more than to your own presumptions." (p. 260).

Second-degree objectivity is a key concept. Instead of looking for agreements (matters of fact), second-degree objectivity looks for disagreements, or, in other words, for multiplicity of views about a specific object (matters of concern) (Venturini 2012). This allows an openness to a myriad of views, but it also requires the ability to give each view its 'proper' place on the map. This depends on three elements:

- **representativeness:** how many actors subscribe to a viewpoint,
- **influence:** position of the actors subscribing to the viewpoints or if they are 'obligatory passage points', and
- **interest:** diversity of actors and arguments related to the topic.

Controversy maps also need to exhibit *traceability* and *aggregability*. Traceability refers to the possibility to move backwards in the translation process in order to retrieve the complexity of the controversy and understand how the final representation conveys it. Aggregability aims at simplifying the amount of data gathered in such a way that it summarizes the complexity of the controversy. The abundance of digital tools and media today enables the building of maps that are traceable and aggregated from a wide range of sources: search engines to search the web; emails and other sources of data that are not findable through search engines (e.g. chats, teleconferences); offline digital files shared via offline devices. Although the digital world seems to be omnipresent, it is not. Great quantities of information are available in digital form, but large communities are not yet part of this sphere and still have key roles in controversies, which needs to be acknowledged by the researcher.

2.2. Procedure

Venturini (2010) and Latour (2012) provided guidelines for tracing controversies in the digital era through a series of steps:

1. **From statements to literature:** this translates into mapping the supporting references for controversial affirmations.
2. **From literature to actors:** these references come from different actors that are connected to other actors in intricate network(s).
3. **From actors to networks:** this refers to identifying the different relations that connect the actors observed in the controversy, how these connections appear and disappear.
4. **From networks to cosmos:** here the cartographer looks for the motivation behind the actors, the desire behind their behaviour, the meaning of their actions.
5. **From cosmos to cosmopolitics:** this step refers to the observation and description of how different meanings in the controversy prevail or fail.

We follow this approach to address the controversy at hand. However, some adjustments were made in order to accommodate to the information available and particular dynamics of this debate. To begin with, we added a preparatory stage, from media to statements, following a suggestion from Latour (2015). Then we stop the analysis at step 4 as it closes the descriptive part of the methodology. Instead, we added our own layer to the analysis, in order to evaluate how the controversy played out in the 'product chain' (see figure 2).

Figure 2. Procedure for the controversy mapping. Findings from the different steps are laid out along the product chain for the shrimp. Literatures referred to in the controversy (step 2) are related to LCA literature on shrimp fishing.

Once the empirical data was collected through the methods of controversy mapping, tools for analysis and visualization were used. We carried out social network analysis following the approach of Easley & Kleinberg (2010) and we used the Gephi software for visualizations. To analyse the relatedness of the controversy literatures and the LCA literatures on shrimp fishing, we used CitNetExplorer.

2.3. Data collection and coding

The first step to grasp a controversy is to carefully listen to *floating statements* and see who is involved in them and what are they based on. A natural place to start listening is the media, newspapers, radio, television and blogs. Our mapping started with identifying keywords, searching the internet and also setting alerts for news or blog posts in search engines. We selected the following:

Hållbart räkfiske (sustainable shrimp fishing)	Shrimp fishing sweden
Nordhavsräkan (Northsea prawn)	Sustainable fishing sweden
Räkfiske sverige (shrimp fishing Sweden)	Västkusträkan (West coast shrimp)

These alerts were set up from early October to early November in 2015.

Once the main sources of information were detected, the actors in each source were identified. It is important to point out that there were actors mentioned in the media without any statement specifically assigned to them while other actors explicitly stated their viewpoint. For the analysis,

only the second group was considered.

Following this, their statements were documented in a database, coded and categorized, resulting in 13 categories.

After identification of viewpoints, the inquiry moved towards more 'solid' places. Such places consist of the literature and references used by actors to support their perspectives. First, a list of the directly quoted documents was created. Then, each documents available was reviewed to identify further references. This collection, which we here call the controversy literatures, is what gets related to the LCA literature on crustacean fishing.

3. Results

3.1. From media to viewpoints - step 0

In total, 129 articles were identified in the web and screened for statements, resulting in 262 viewpoints being recorded in our database. In total, 169 actors were identified. 65 of these made a total of 80 explicit statements in media, thus became the main focus of the analysis. The remaining 104 were mentioned but with no statements attached to them. Since statements are the departing point for the mapping controversy tool, only the first group can be considered.

We used 12 field to describe each statement in our database (table 1). Each field characterises the collected statements in relation to the steps of the analytical procedure (figure 2), thereby enabling map-making throughout the procedure. All statements were also coded and categorized (table 2).

Table 1. Database fields used for recording and documenting viewpoints in the controversy. For each entry in the database, a maximum of 3 viewpoints were identified.

Field	Definition
Source	Link to the article
Media	Name of the outlet
Date	Date the article was first posted
Actor	Human or non-human
Type	Animal, artifact, individual, institution, organization, project, regulation or report
Influence	Defined as how big the audience an actor has: low, low-medium, medium-high, high.
Sector	Academia, fishermen, government, NGO, private
Statements	Explicit viewpoint assigned to each actor in the different sources they are mentioned.
Viewpoints 1/2/3	Coded positions (3 max.)
Literatures	References cited by the actors
Product chain position	Where is the actor located in the shrimp product chain: context, fishing, retail and use.
Link to the product chain organization	Whether the actor is directly or indirectly connected to the product chain organization

Table 2. Coding categories for the viewpoints.

Code	Explanation
ActionSustSHRMP	Action needed and taken to make shrimp fishing sustainable
ConcernBrandSHRMP	Concern about brand
ConcernOriginSHRMP	Concern about origin of the shrimp
ConcernPractSHRMP	Concern about the fishing practices
NOTConsumWWFOK	Consumer guide by WWF is NOT relevant
ConsumWWFOK	Consumer guide by WWF is relevant
EconomyoverEnvironment	Economy is more relevant than environment
LawICES	ICES is the 'law'
RedlistSHRMP	Shrimp should be redlisted
NOTRedlistSHRMP	Shrimp should not be redlisted
StopSHRMP	Stop eating west coast shrimp
EnoughSHRMP	There is enough shrimp to fish
SustSHRMP	There is sustainable shrimp

The mapping starts with looking at the representativeness and influence for each viewpoint (figure 3). This done by relating each viewpoint to the number of actors behind it and to gauge the size of each actor's audience⁵, respectively. The mapping of interest is done by looking at the diversity of actor types behind each statement (figure 4).

Figure 3 shows that some viewpoints have greater representation than others and that the dispute has opened the opportunity for actors to express opinions on many matters at hand. For example, here, there are two viewpoints with more actors behind them than others, one that the WWF consumer guide is relevant (ConsumWWFOK 45%) and the other the opposite, that it is not relevant (NOTConsumWWFOK 42%). This means that one position claims the WWF guide to be relevant for decision-making and should be taken seriously, while the other is that actors find it confusing and lacking a robust background, rendering it useless for purchasing decisions. Next comes the position expressing concern about the fishing practices for the West coast shrimp (ConcernPractSHRMP 34%), while its opposite viewpoint (SustSHRMP) only has 9% of the actors behind it.

⁵ Influence is measured here in terms of the size of the audience an actor can reach. Individuals with no institutional/organisational representation were ranked 1 since the size of their sphere of influence is modest; individuals associated with academia and private organisations were ranked 2; individuals from local government, companies and other organisations were ranked 3 and organisations and government officials from national/international level and public figures were ranked 4.

In order to calculate the level of influence for each viewpoint (VP), the number of times it (VP_i) is mentioned by actor j is multiplied by the influence of the actor (IA_j) and added. As a result each viewpoint obtained a score, allowing us to rank them.

Not all actors have the same power, and the viewpoints they support come across differently to their audiences (figure 3, right side). When looking at the viewpoints through the lens of actors influence, other viewpoints come to the fore as the most prominent ones. Viewpoints expressing concern about the origin of the consumed shrimp (ConcernOriginSHRMP) and the practices for fishing (ConcernPractSHRMP) come from more influential actors. Following these two is another set of opposing viewpoints, one that the Swedish shrimp should be redlisted (RedlistSHRMP) and the other that redlisting is too extreme an action (NOTRedlistSHRMP). With regard to the most represented viewpoints (left side figure 3), one can see that the view that the WWF consumer guide is relevant is supported by more influential actors than the opposite.

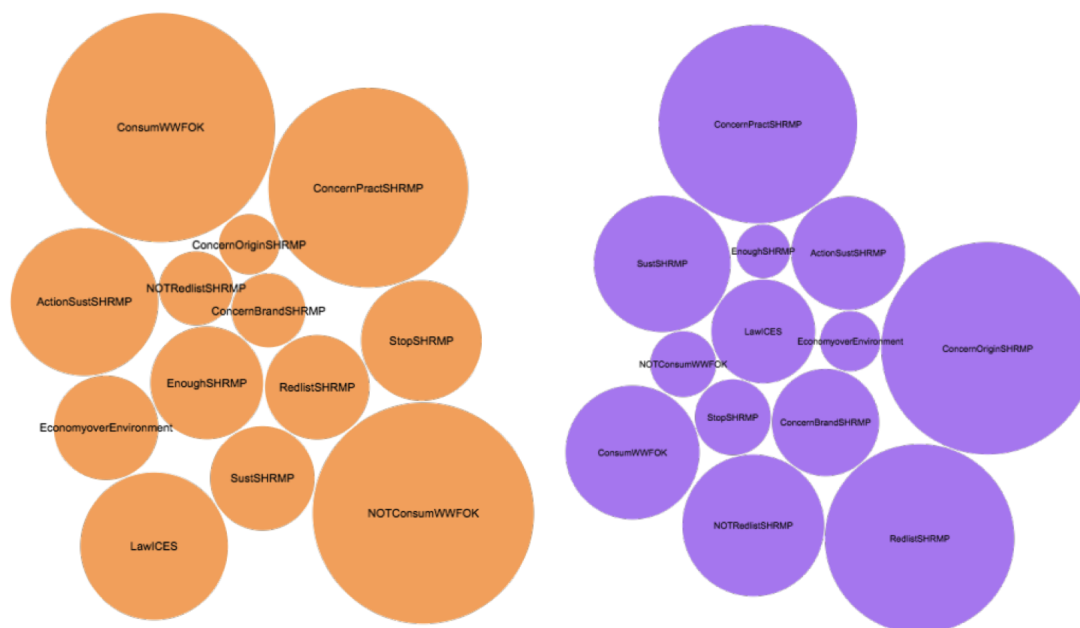


Figure 3. Viewpoints according to representativeness (right) and influence (left). Size of circle is proportional to the numbers of actors behind a viewpoint (right) and the size of the audience for each viewpoint (left).

The reason for looking at diversity behind viewpoints is to identify which views are more mainstream and which are the more lonely voices that tend to disagree with the majority (Venturini 2012). Figure 4 shows that there is only one viewpoints is represented by all types of actors and in all sectors—it is the viewpoint that highlights the relevance of WWF's consumer guide (ConsumerWWFOK). Another two viewpoints also have a broad base: concerns about the practices around shrimp fishing (ConcernPracticesSHRMP) are raised by all types of actors (figure 4 left side) and the opinion about red listing of the shrimp is raised in all sectors of society (figure 4 right side). Other perspectives with narrower representation not to be forgotten are 'economic aspects are more important than environmental', 'concern about the origin of shrimp', 'the need for actions towards sustainable fishing', 'concern about the impact on Gothenburg's brand', 'the preeminence of law over consumer guides due to the scientific basis' and 'the call for stopping shrimp consumption'.

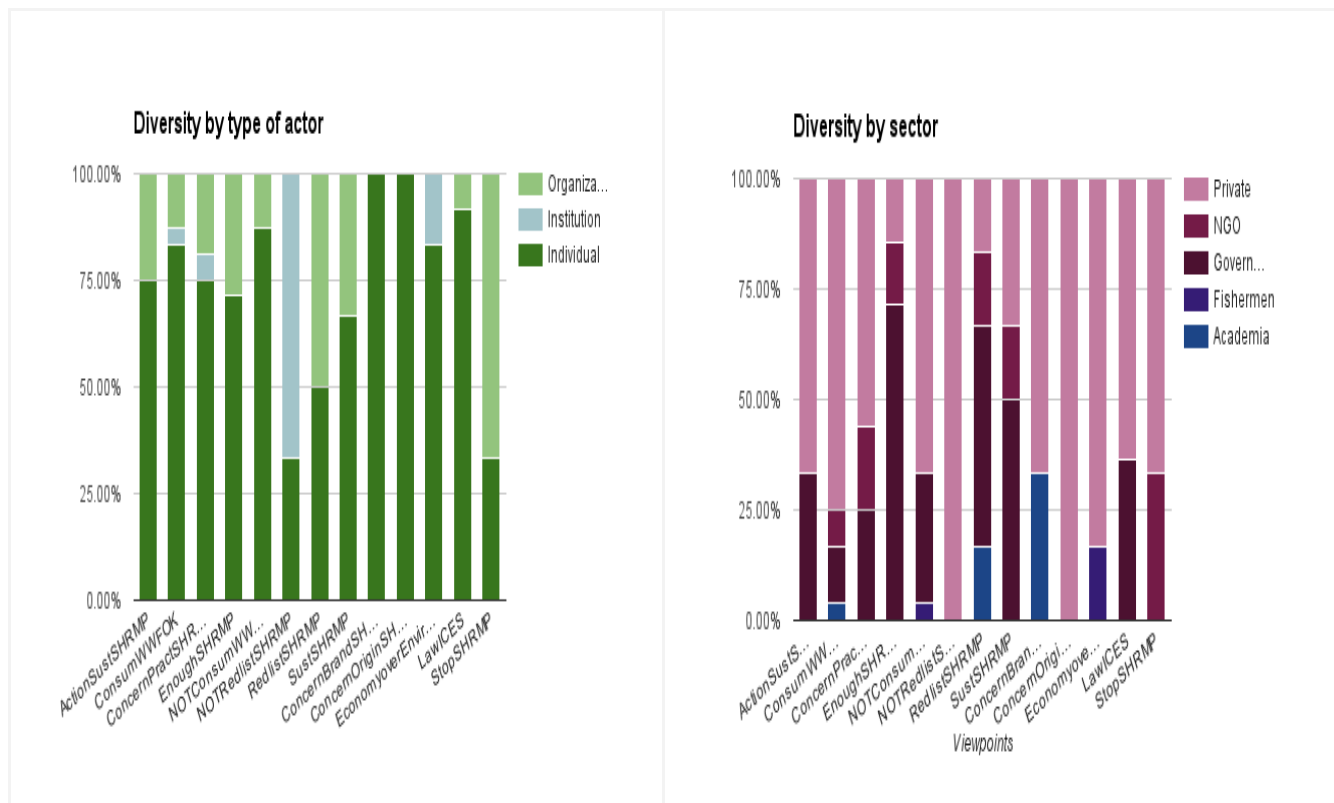


Figure 4. Diversity of interests behind each viewpoint.

3.2. From statements to literatures - step 1

The literatures that are called upon by the actors to support their views are identified. In turn, this will lead to the identification of other networks invoked via the literatures.

A core group of references were identified (table 3). These include voluntary standards for fishing, regulation at national and international level, scientific reports on the state of marine resources and projects to improve fishing practices.

Table 3. Core literatures in the controversy, used by actors to support their views.

HaVs control strategy	ICES report 2013
KRAV procedures	Motivation for trawling ban in Kosterhavet
Quota regulation	WWF fiskguiden
Red list Artdatabanken	Fishermen's Union's assessment (Not available)
Nordic Choice Hotels guide (Not available)	WWF-FRV project on selective gear (Not available)
MSC certification for Sweden Skagerrak, Kattegat and Norwegian Deep-cold water prawn	

In figure 5, we map the literature against the viewpoints (figure 5). It points out two documents as the main protagonists. These documents are the ICES report 2013 (Ulmestrand et al 2013) and the WWF consumer guide on fish (WWF 2015).

After these two, the Nordic Choice Hotels purchasing guide and the WWF-FRV project report on selective gear for shrimp fishing are the next prominent reports. Less cited sources are the assessment conducted by the fishermen's union, mentioned by one of its members, and the quota regulation established by the European Union, enforced by Havs- och vattenmyndigheten in

Sweden. Also in this third group is the certification documents developed by DNV to support the MSC-labelling process started by the Gothenburg's Fish Auction.

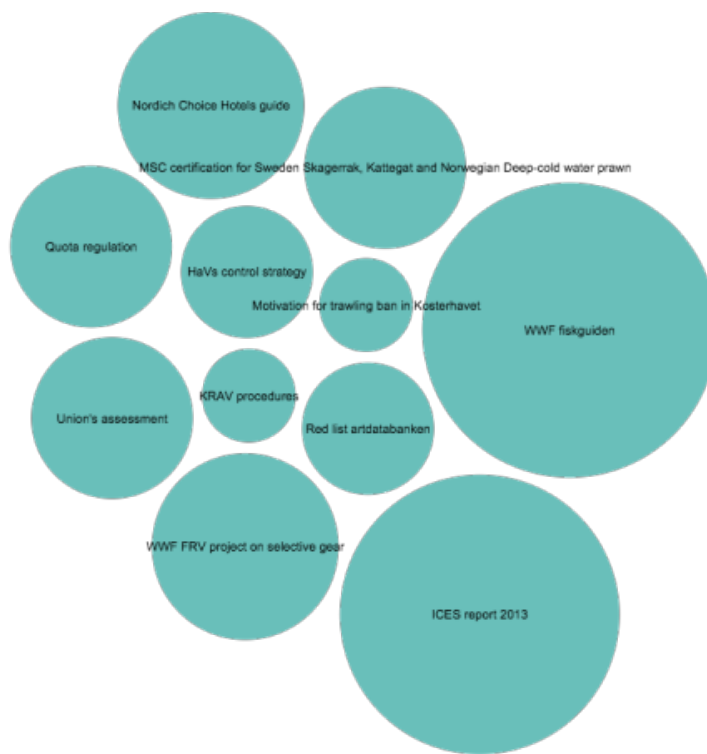


Figure 5. Literatures by the number of viewpoints referencing them.

Most of the arguments and viewpoints presented in the controversy are supported by technical reports that are mainly based on secondary information that has gone through different interpretation processes by the actors producing them and the actors quoting them. This leads to a transformation of the intended message by the original authors. How the information plays out in the discussion depends on who the actors are, their interests and the role they play in the debate. This becomes evident with the manner the ICES report 2013 is quoted by both sides in the controversy regarding the relevance of WWF's warning.

As suggested by Venturini (2010) and Latour (2012), we also traced the second-order literatures to obtain a wider picture of the network of supporters to the viewpoints. The identification of second-order literatures allowed us to make several observations. First, there are different levels of support in terms of number of reference for this group. Documents such as the ICES report from 2013 and the MSC certificate for the Swedish *Pandalus borealis* fishery make use of a great number of references. In contrast, literatures such as the WWF consumer guide, the quota regulation document from the Havs- och Vattenmyndigheten and the KRAV standards do not reference any documents. Artdatabanken's 2015 Redlist includes a small list of references. If this information is analysed from the perspective of viewpoints, figure 6 is obtained.

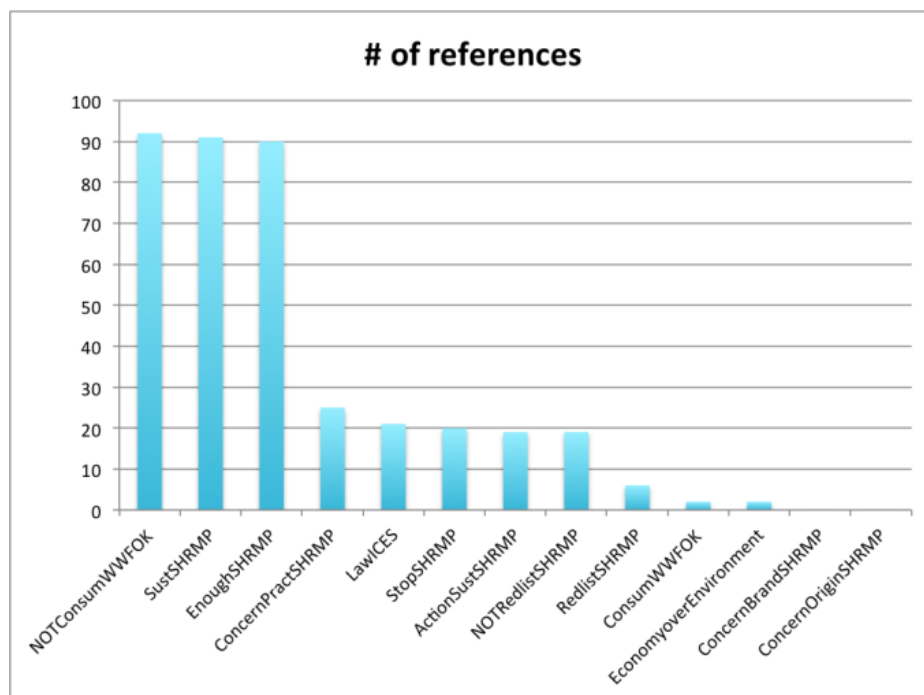


Figure 6. Number of references behind each viewpoint

Figure 6 shows that views stating that there is no problem with the *Pandalus borealis* have the greatest support in terms of number of invoked references, whereas support to the WWF consumer guide warnings is considerably smaller, with few references behind it. Other viewpoints, such as those expressing concern over the origin of the shrimp, the role of the shrimp as a brand for Gothenburg or the relevance of economics over environmental concerns are in the same situation.

Another dimension of the analysis of these literatures refers to what kind of support they provide to the different viewpoints. The ICES 2013 report is based on technical reports created by its working groups on different topics (19). The MSC certificate is supported by a large number (71) of references that include technical reports by ICES and other scientific bodies, peer-reviewed articles and regulatory documents. Artdatabanken's 2015 Redlist is also based in similar documents, and also includes the ICES reports in its reference list.

It becomes clear that the viewpoints claiming that the alarm raised by WWF is inaccurate have the most references supporting them. The supporting literature consists of technical reports, regulatory documents, and peer-reviewed publications.

There seems to be no apparent correlation between robustness of the sources and invocation by actors. A well-supported literature such as the ICES report 2013 and a weakly supported report such as the WWF fish guide are equally used by the different actors.

Another conclusion is that the traceability of sources is not evenly distributed among literatures and this seems not to affect the trust by the audiences. What was found in the case of WWF fish guide was that we were not able to access the sources for the guide, not even when asking directly. In contrast, all the documents behind literature for the ICES report 2013, the MSC certification and the Red List are openly listed. The unavailability to references raises questions about accountability and transparency of instruments such as WWF's fish guide.

3.3. From literatures to actors - step 2

The identification of actors involved in the controversy is based on an analysis of both the statements and the literatures behind the statements.

If the analysis were restricted to only actors making explicit statements in the media, several types of actors would disappear, and only individuals, institutions, organizations and reports would remain. We identified ten types of actors.

1. Animal. Here, the North Sea prawn, with its particular (biologic) life cycle.
2. Artifacts. Here, mainly trawling technology. In Skagerrak, demersal trawling (trawling close to the seafloor) is used with nets that can discriminate shrimp by size.
3. Individuals. Many individuals are often representatives of macro-actors and play a role in translation. We identified 75 individuals from different sectors, with different levels of influence, and therefore with different roles in the controversy.
4. Institutions. Here, informal yet established social arrangements, such as the 'market', 'demand' or 'consumers'. In media, around 10 such institutions were mentioned. Although they were assigned a viewpoint by the media, it is very difficult to assess what these institutions stand for.
5. Organizations. Formally established organizations, e.g. WWF, ICES, Havs- och Vattenmyndigheten, etc. These are considered to have agency on their own. Organizations have individuals that speak on their behalf. When such people speak as representatives, their voices are heard by a larger audience than the one directly addressed.
6. Place. Controversies often have a geographic dimension. Here, it takes place on the Swedish West coast, more specifically in the ports where shrimp is landed and the marine areas where fishing is controlled. Places explicit in the media were Kosterhavets National Park and small harbors on the coast.
7. Projects. Only one project was mentioned in the media as part of the controversy. It is considered a type of actor since it is a collection of ideas, individuals, organizations and resources of its own. It is not uncommon to hear individuals present themselves as belonging to a project instead of an organization.
8. Region. Also regions are considered as actors since they are summoned by spokespeople when stating a viewpoint. Here, at least three countries are involved, and several municipalities and cities.
9. Regulation. Laws, regulations or rules are also considered as actors since they influence the behavior of other actors and are, in turn, affected by the decisions of other actors. They are protagonists in this controversy since they affect the sustainability of fishing activities. Identified regulations include the quota system for fishing defined by the EU, rules on landing and certification rules.
10. Reports. Key devices to 'translate' information, knowledge to different audiences. Prominent protagonist reports here are the annual WWF consumer guide to sustainable fishing and the annual ICES report on shrimp.

A simple analysis (figure 7) of the actors present in the controversy shows that:

- Individuals (39%) were the main protagonist of the different media pieces on the controversy followed by organizations (23%) and animals (10%). Other elements like technology, regulations and report were also present but not mentioned as frequently as the others.
- Private actors were most present (57%) in the media, followed by government (27%) and non-governmental organizations (17%). Academia was quoted only in very few places (5%).
- Of all the actors in the media, 35% were classified as having medium-high influence and 14% as having high influence. Common actors with low to medium influence represented only 33% of the mentions in media.

Based on this, we remark that influential individuals from private sector shaped the public debate by being consulted by media outlets, while less influential actors had less space in these outlets to express their viewpoints. And, although academia is key in a science-related controversy, it was poorly represented in published media.

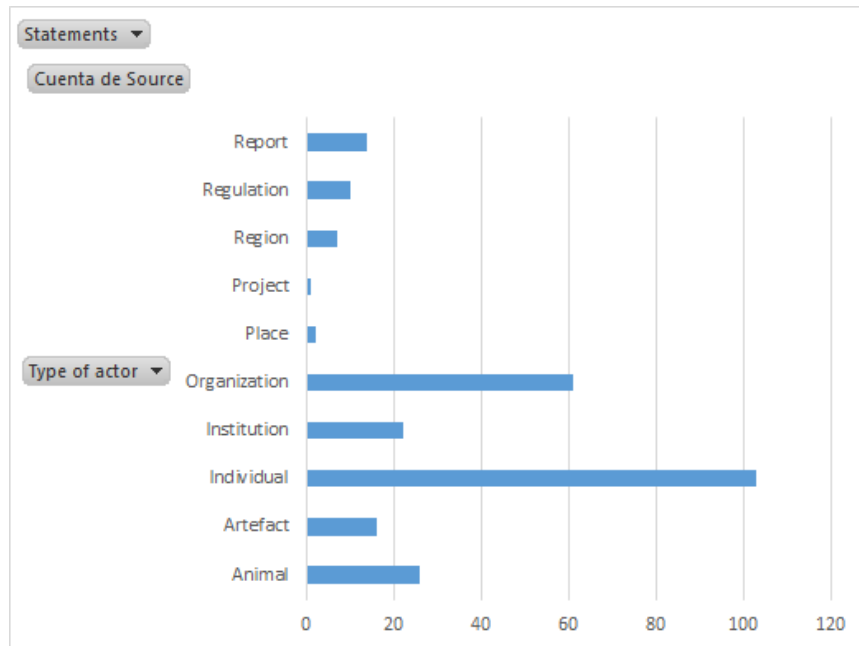


Figure 7. Number of mentions of different types of actor in the media.

3.4. From actors to networks - step 3

Connections between actors need to be identified. Actors can be connected to other actors via shared viewpoints and literatures. We looked at the actor-networks emerging through shared viewpoints (figure 8) and through the literatures (figure 9).

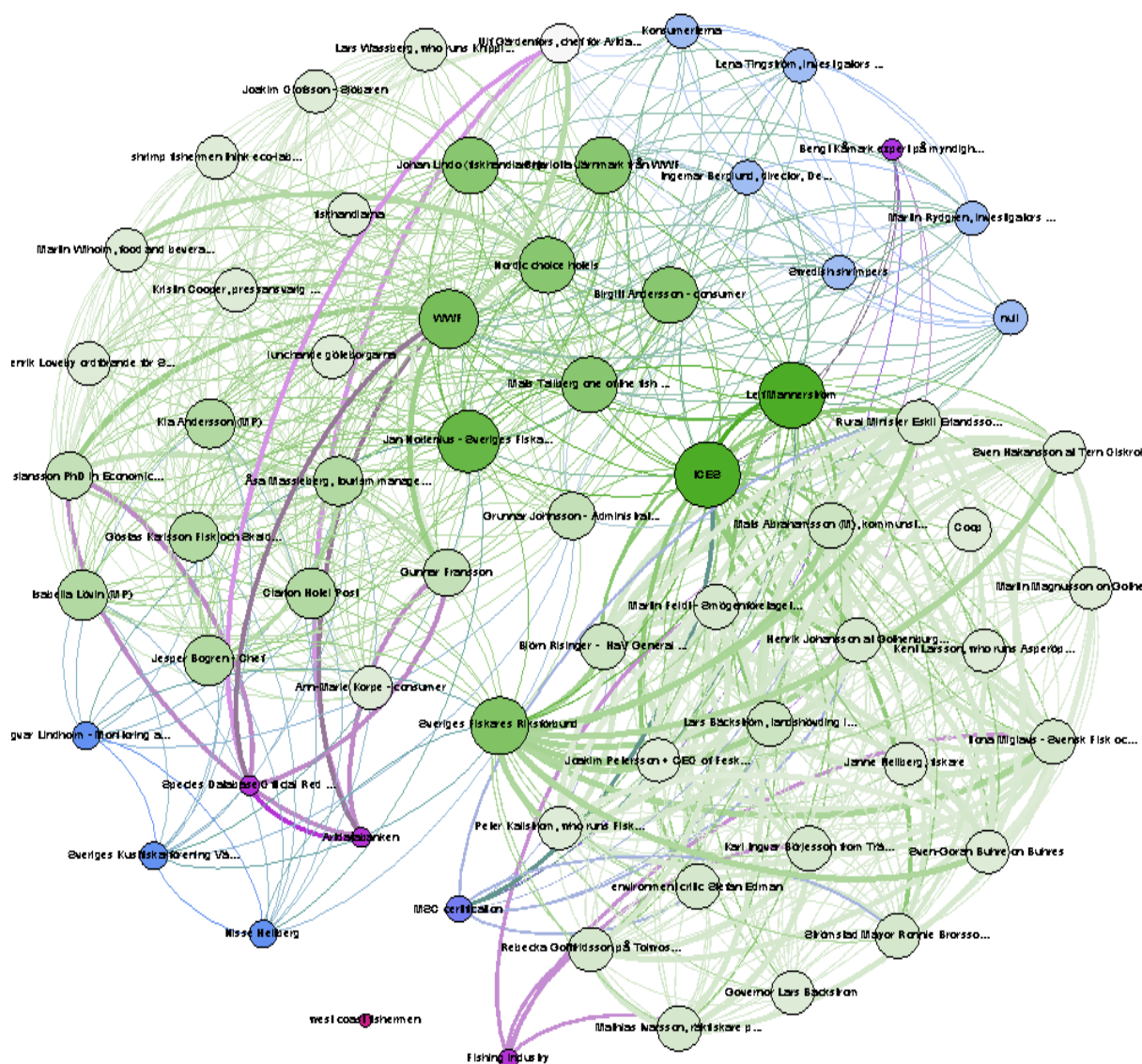


Figure 9. Visualization of actors connected through viewpoints. The actors (nodes) share between 0 and 40 connections, i.e. an actor do not share any viewpoint with any other actor or up to 40 different actors. Colours and circle size to accentuate the connectedness of actors, where deep green show the most connected actors and purple the 'lonelier voices'. The spatialization algorithms were Fruchterman Reingold (25.000, 10, 10) for untangling the random initial layout. (Better resolution graphs are available in our blog about the controversy at <https://unravellingthenet.wordpress.com>).

Two clusters appear from the network analysis in figure 9. One centers around WWF's perspective on shrimp fishing on the Swedish West Coast (left). It includes mainly private individuals and organizations. The other (right) revolves around ICES, the fishermen's organization and the public figure Leif Mannerström (a celebrity chef). There, one also finds the government, public figures and fishermen actors.

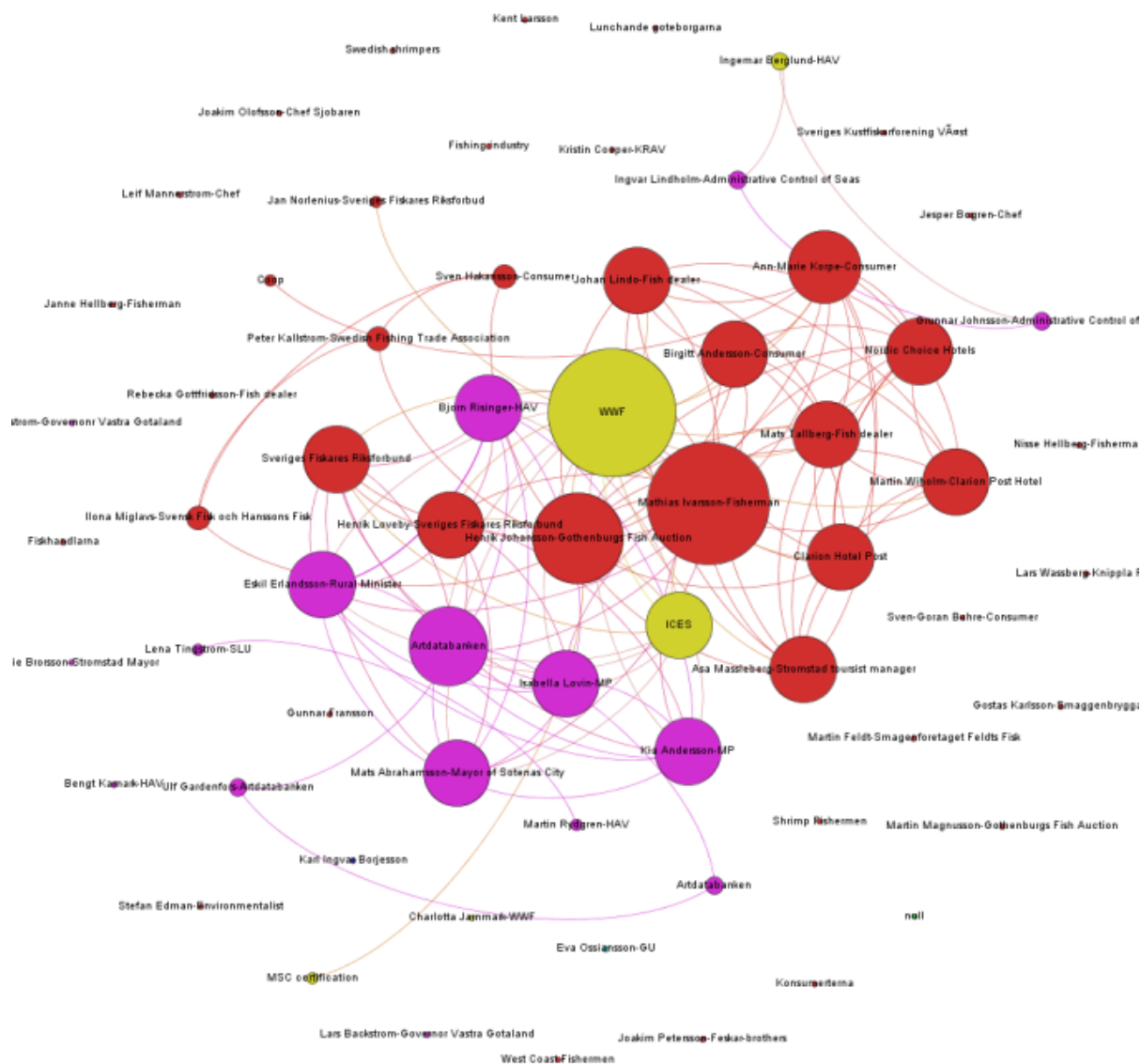


Figure 10. Map of actors connected through literatures. At most, two actors share 20 references, while some do not share any. The colours represent the sector each actor comes from: private (red), governmental (pink), NGO (yellow). The larger the circle, the greater the number shared literature references. (Better resolution graphs are available in our blog about the controversy at <https://unravellingthenet.wordpress.com>).

Two groups appear in figure 10, one with a tight network of links and another one floating around without connections. In the first group, two actors show the highest level of degree centrality: WWF and fisherman Matthias Ivarsson. In the second group are the actors whose statements and literatures are not used by any other actor.

Based on the network analyses we could identify two opposing sides in the controversy. The actor-networks on each side called upon a supporting actor-network through the literatures. This results in that people in science and knowledge networks, with their institutions and resources were called upon in a specific issue they were not aware of. Moreover, we see that the opposing ‘camps’ use the same sources—this suggests to us different interpretation of those sources.

3.5. From networks to cosmos - step 4

The last step in controversy mapping is to understand the ideologies behind the statements,

arguments and connections. Ideologies are expressed through the meaning actors attach to these elements (Venturini 2010). Such meaning can only be suggested as it is not explicitly revealed in the literature or through the interviews.

In this controversy, two pairs of opposing viewpoints came to the fore: the reliability (or not) of WWF's warning and the sustainability (or not) of shrimp fishing on Sweden's West coast.

The first dispute touches upon different elements, for example, how much legitimacy could a non-governmental organization have to provide consumers advice on what to buy or not. Put differently, how robust are the conclusions of WWF's report compared to sources used by the government. On another level, this dispute addresses the role of authority based on scientific facts in society.

Another dispute, the controversy about the actual sustainability of shrimp fishing in the west coast of Sweden gets connected to topics of culture, livelihoods and the traceability of products. Some actors express the importance of knowing where such a relevant product comes from; others assume that the system works and shrimp is thus fished sustainably. The meaning of their statements and their associations could be attached to their trust in different institutions or not. Their cosmos is that we as consumers, on the one hand, have a responsibility to make informed choices to guarantee the sustainability of much appreciated products and on the other, are the ones that transfer that responsibility to the institutions build by society.

In sum, several 'cosmos' can be suggested in this particular controversy:

- 'Authority to affect consumers decision can only come from governmental institutions' vs. 'civil society organizations and non-governmental organizations play a key role in decision making at the societal level'.
- Scientific knowledge is the legitimate source of knowledge and advice.
- 'Stewardship of natural resources is a responsibility of citizens' vs. 'stewardship is a responsibility of institutions'.

3.6. Presence of life cycle thinking in the controversy

Research publications on shrimp, life cycle assessment and Kattegat/Skagerrak were identified through searching Web of Science, Scopus and Google Scholar. The search results were filtered by looking for articles addressing only wild catch of shrimp or prawns from a life cycle perspective. Asian studies were excluded since they are not geographically relevant here. Finally, in order to be able to use the bibliometrics software CitNetExplorer, only records available in Web of Science were used. This rendered around 20 articles on crustacean LCA.

Correspondingly, the controversy literatures were also searched in Web of Science. This showed that only around 25 publications (out of 100) could be found since many of the controversy texts were technical reports and regulatory documents. We reviewed the technical reports for references but these were again other technical reports not in Web of Science.

To establish the links between controversy text and LCA texts, CitNetExplorer software visualizes connections as citation networks over time (figure 11).

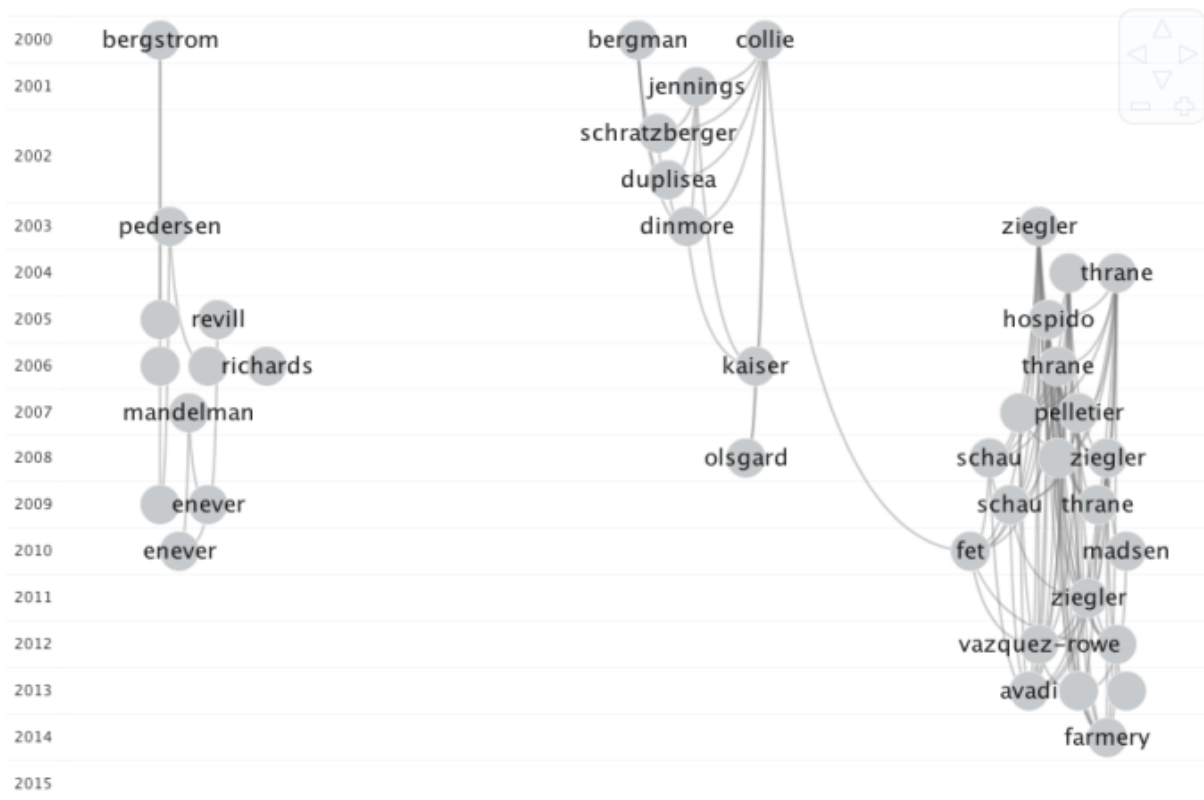


Figure 11. Citation networks. At the top are the oldest publications or cited documents, the lines represent citations and at the bottom are the citing articles. Three groups are identified. The two on the left are publications related the controversy's viewpoints. On the far right is the group of publications with an LCA approach. Between groups 1 and 2 are no connections but between group 2 and 3 appears a first connection at this scale between Collie et al (2000) and Fet et al (2010).

Analysing the graphics in figure 11 in greater detail, more connections between group 2 and 3 appear. We find three connection, between Collie et al (2000) and Fet et al (2010), Collie et al (2000) and Langlois et al (2011), and between Collie et al (2000), Kaiser et al (2012) and Farmery et al (2015).

We can see that the LCA literature has benefited from the literature used to support the viewpoints in the controversy, not the other way around. This is noteworthy since a large number of LCA publications are contemporary or even preceded some of the articles used in the controversy.

With regard to the controversy, the LCA-related literatures have not been considered in the publications used to support the different viewpoints. Instead, the peer-reviewed publications used in the controversy were later used in LCA publications on shrimp and wild-caught seafood. In sum, the LCA research is not involved in the controversy.

3.7. The controversy over the shrimp product chain

Viewpoints and their actor-networks were placed within the framework of the shrimp product chain, a simple model of the production and consumption system for the West coast shrimp. We divided the immediate product chain into fishing, retail and use, and included also surrounding actors (government, NGO, etc).

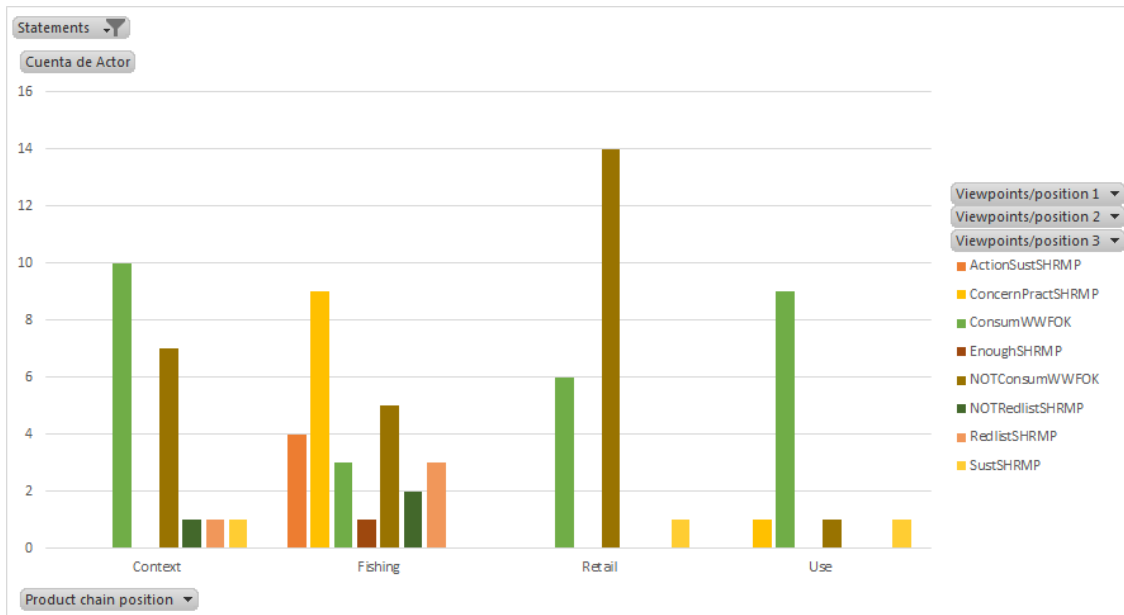


Figure 12. Viewpoints per stage of the shrimp product chain.

Figure 12 shows that actors in the retail step are the most skeptical about WWF’s warning, whereas the users are more supportive of the warning. The fishing stage exhibits the most diverse viewpoints. Among surrounding actors, opposing viewpoints are found on the reliability of WWF’s warning.

The notion of a simple product chain perspective is present in the public debate since actors from the different stages are present. However, when looking at the distribution of the different actors, we found that the best represented stage of the product chain was ‘fishing’ (57% of the actors). Given the fact that the controversy revolved around the practices in this step, it could be expected to be well represented in the media. Retail and users were represented on equal levels, but surrounding actors were present to a greater extent and had more chances to express their views than the former two. In terms of a production and consumption system, the controversy is played out as a debate engaging mainly the production system, not the consumption system.

4. Analysis and discussion

Following the Controversy Mapping method, we have attempted presenting as much information as possible in a way that tries to minimise our room for interpretation. Using all the maps and graphs presented, we move forward to analyse how different aspects of the controversy affect the environmental sustainability of our main protagonist, the Swedish West Coast shrimp.

4.1. Attempting to understand the controversy

What started out as an apparent controversy around the sustainability of shrimp fishing turned out to be a controversy centering on the legitimacy of one actor’s call to stop consumption of shrimp from a particular stock. Nested within this dispute is a smaller controversy, one on whether or not there are enough shrimp in the sea. Going back to Callon (1984), we see that the matters of concern in this controversy are more about the legitimacy of advice given by an actor or the “scientific knowledge” behind it, and less about the sustainability of shrimp fishing practices.

If the main dispute revolved around WWF’s legitimacy for red-lighting the Swedish West coast shrimp, even louder voices from the government and industry (e.g. Agricultural Minister Eskil Erlandsson or celebrity chef Leif Mannerström) argued about the accuracy of redlisting the shrimp by actors such as Artdatabanken, affiliated with IUCN. Views related to red-lighting/redlisting support or doubt if shrimp is in danger, and refer to evidence or lack thereof concerning the state of

the stock. It seems thus that organizations and public figures are more concerned about science and evidence-based viewpoints than regular individuals.

Another finding is that the sustainability discussion focused on one stage of the product chain, fishing. Both WWF's warning and Artdatabanken questioning pointed to problems during the fishing phase of the product chain. The situation of the stock, the lack of control and the poor management practices all happen in that stage. However, some interviewed actors also pointed out other problems in the product chain, such as the peeling process that might not follow sustainability principles as the ones required for the fishing stage. This results in a bounded understanding of the sustainability of the shrimp. Although the aim of actions such as the red-lighting from WWF aims at affecting practices in one stage of the chain by influencing other part, it misses the opportunity to achieve a life cycle perspective.

Nonetheless, the product chain perspective is visible in the controversy since some of the downstream participants, actors such as retailers and consumers, intervene in the discussion even though they seem disconnected from the fishing phase. By entering the controversy, they provide perspectives that otherwise might not have been consulted for the sustainability of the Swedish west coast shrimp.

Mapping the controversy over the product chain provided an understanding relating to the identification of surrounding actors indirectly affect the functioning of the product chain. Such actors include media, governmental and non-governmental organizations, and also influential individuals. These actors exert their influence on consumers, producers and distributors, through different devices. Media which includes traditional outlets such as newspapers, radio and television provide a platform for proponents of different viewpoints but media can also manipulate the amount of exposure a particular perspective gets which in turn affects perception of audiences. Governments intervene the product chain through regulation and enforcement strategies as ways to force a specific outcome onto the different stages in the chain. They also define the price indirectly through the quota regulation, the permits for vessels, etc. Finally non-governmental organizations are also part of the context of the product chain by playing different roles, including fiscalization.

However, during data collection, some interviewees pointed to that relevant actors were absent in the media, e.g shrimp peeling companies or distributors different from Gothenburg Fish Auction. Media itself then must be viewed as an actor in the controversy since it decides who has a worthy perspective and who doesn't.

The translation process going on in this controversy revolves around the sustainability of *Pandalus borealis* fishing in Swedish waters. It started with the warning from WWF, asking if shrimp fishing was sustainable in this particular area in 2013. As mentioned, this is the first step in a translation process (Callon 1984). The question had been asked continuously since 2000 by WWF, and in order to obtain an answer, they designed a methodology based on particular approaches, presented as their consumer guide. In this way, WWF set the problem and fulfilled the stage of problematization.

The second stage, interessement, is about making other actors interested in their project. WWF's approach aims at engaging consumers and retailers to stop buying species under red light classification. They also need to engage scientists to provide the scientific basis for their guide. Media is also relevant for reaching out to target audiences.

Alas, the WWF guide for 2016 was not published in February as usual so we don't know the verdict for the shrimp. Currently, the shrimp is both red-lighted, redlisted yet sold with a Marine Stewardship Council ecolabel. This is still a very open controversy.

4.2. Our experiences with the Controversy Mapping method

Working with controversy mapping has been very interesting — it defied our simplified notions about the controversy through the maps that captured all statements and actors and their relative position. The method itself is both time-consuming and efficient at the same time: the tagging and coding of the material takes time, but with a database in place, analytical graphs could be put

together with relative ease. Interpretation of the multi-faceted graphs can be challenging, yet inspiring and exciting as they helped us see actors related to each other in novel ways, for example, related through shared literatures. With more experience, we could have had more fields in our database enabling further analysis (e.g. development of controversy of time) and more developed visualizations. Here, we settled for Gephi, but on the 'Controversy mapping' resource page at Science Po, 13 more tools are suggested.

A *public* controversy is necessary for access to statements. However, the controversy itself may also lead to cautious actors. Some interviewees preferred not talking about past and contested events. Moreover, not all environmental issues turn into controversies. The shrimp debate was less heated in Norway and Denmark than in Sweden, in particular in and around Göteborg — the humble shrimp is certainly a matter of great concern in 'city of the shrimp' thereby announcing a *cultural* dimension to the controversy. The Norwegian press referred to the 'acute situation' in Sweden, where prices sank with 50% and demand plummeted, while prices only sank with 10% in Norway during the same period. Actors in the Norwegian industry and authorities were also reported to respond quickly, seeking solutions as to avoid the Swedish situation (Stavanger Aftenblad 2014).

5. Conclusions

Controversy mapping helped isolating the issue(s) at heart of the controversy. A quick look to the media indicated the discussion to be about the sustainability of shrimp fishing on the Sweden's west coast, however that was not the issue. Using the mapping methodologies, we found the real matter of concern being the legitimacy of certain actors' strategies for improving sustainability. The method also allowed us to evaluate the significance of 'scientific knowledge' in shaping opinions. What we discovered is that people rarely look for it to back their opinions. Instead, many turned to reputation and 'good-will' for reference.

In this controversy, we noted that the opposing 'camps' used the same information but in different, suggestion different interpretation of it. This could in itself warrant further research on this controversy, but we identify some dimensions where alternative interpretation are possible: 1/ different timeframes when analysing shrimp statistics, 2/ stock & reproduction dynamics incl. recruitment, 3/ things that affect reproduction dynamics, such as illegal practices, 4/ stock vs population.

Mapping this controversy over the shrimp product chain enabled understanding of how different how different parts of the chain interact. What started with the publication of a consumer guide turned into a controversy in which production actors and actors surrounding the product chain were the most engaged.

References

Primary sources

Artdatabanken. (2015). Artfakta — Pandalus borealis. Accessed 25 December 2015: <http://artfakta.artdatabanken.se/taxon/217819>

Göteborgs-Posten, 2014. Rött ljus för Nordhavsräkan. Feb 4, 2014. (Red light for the North Sea shrimp)

Havs- och Vattenmyndigheten & Kustbevakningen, 2014. Regeringsuppdrag — Kontrollstrategi för det svenska räkfisket. Karlskrona.

ICES (2013). ICES Advice on fishing opportunities, catch, and effort Greater North Sea Ecoregion, Book 6, 6.3.17 Northern shrimp (*Pandalus borealis*) in Divisions IIIa and IVa East (Skagerrak, Northern North Sea in the Norwegian Deep). International Council for the Exploration of the Sea, Copenhagen, Denmark.

ICES (2014). ICES Advice on fishing opportunities, catch, and effort Greater North Sea Ecoregion, Book 6, 6.3.17 Northern shrimp (*Pandalus borealis*) in Divisions IIIa and IVa East (Skagerrak,

Northern North Sea in the Norwegian Deep). International Council for the Exploration of the Sea, Copenhagen, Denmark.

ICES (2015). ICES Advice on fishing opportunities, catch, and effort Greater North Sea Ecoregion . Book 6, 6.3.17 Northern shrimp (*Pandalus borealis*) in Divisions IIIa and IVa East (Skagerrak, Northern North Sea in the Norwegian Deep). International Council for the Exploration of the Sea, Copenhagen, Denmark.

MSC - DNV-GL 2015 (2 October 2015). MSC - Fishery Certificate. Accessed 27 December 2015: https://www.msc.org/track-a-fishery/fisheries-in-the-program/certified/north-east-atlantic/sweden-skagerrak-and-the-norwegian-deep-cold-water-prawn/assessment-downloads-folder/20151015_CERT_PRA426.pdf

Stavanger Aftenblad, 2014. Røkkerist kan redde reka fra boikott. 4 December 2014. (A Røkke 'shaker sieve' could save the shrimp from boycott).

Søvik, G., & Thangstad, T., 2013. NAFO/ICES PANDALUS ASSESSMENT GROUP MEETING–SEPTEMBER 2013.

WWF 2014. WWFs konsumentguide för fisk och skaldjur 2014. <http://www.wwf.se/press/pressrum/pressmeddelanden/1550885-ww-fs-fiskguide-2014-rtt-ljus-fr-vstkustrka-och-stenbitsrom>

WWF 2015. WWFs konsumentguide för fisk och skaldjur 2015. <http://www.wwf.se/vrt-arbete/hav-och-fiske/ww-fs-fiskguide/1243694-ww-fs-fiskguide-nr-du-ska-kpa-miljvnlig-fisk>

Secondary sources

Bengtsson, Magnus, and Anne-Marie Tillman, 2004. Actors and interpretations in an environmental controversy: the Swedish debate on sewage sludge use in agriculture. *Resources, Conservation and Recycling*, 42: 65–82.

Boholm, Max, and Rickard Arvidsson (2014). Controversy over antibacterial silver: implications for environmental and sustainability assessments. *Journal of Cleaner Production*, 68: 135–143.

Callon, Michel, 1984. Some elements of a sociology of translation: domestication of the scallops and the fishermen of St Brieuc Bay. *The Sociological Review*, 32.S1: 196-233.

Latour, Bruno, 2005. *Reassembling the social: An introduction to Actor Network Theory*. Oxford University Press, Oxford, UK.

Latour, Bruno. *Mapping controversies: syllabus 2012-2013*. MediaLab, Science Po, Paris. Retrieved from www.medialab-dev.sciences-po.fr October 15, 2015.

Callon, Michel, and Bruno Latour, 1981. Unscrewing the big Leviathan: how actors macro-structure reality and how sociologists help them to do so. In Karin Knorr-Cetina and Cicourel, Aaron Victor, eds. *Advances in social theory and methodology: toward an integration of micro-and macro-sociologies*. Routledge, pp. 277-303.

Venturini, Tommaso, 2010. Diving in magma: How to explore controversies with actor-network theory. *Public Understanding of Science* 19.3: 258-273.

Creative Practices Around the Production of Cork

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Abstract

Cork, as a natural product provided by the bark of the cork oak tree, is an important staple of the Portuguese economy and important to Portuguese culture. It is a sustainable product with a positive ecological footprint, from harvesting to industrial production, with the advantage of creating a local economic model through regional labour activity and distribution. Within the balance between nature-human-economy to create a sustainable system, cork production in Portugal represents a human and social dimension. By focusing on that dimension and by creating an awareness of the cultural and social impact of the activity and by re-appraising the meaning of the material within the culture, the study reframes a consideration of the actual place of labour and production. The human, geophysical, historical, social, economic, ecological and cultural aspects of the place are observed as regards their relation to work or labour in that physical space. A pilot study is being developed in the village of Azaruja in the district of Évora, Portugal. In this small locality, cork is very important in terms of the relationships between the physical subsistence of their residents and the local natural resources, because it structures the place in its cultural, social and economical dimensions. This paper outlines the theoretical foundations, the process and the outcomes of the participatory ecodesign project titled *Creative Practices Around the Production of Cork* which was initiated by a Portuguese artist/design researcher and developed further through the collaboration with the other two authors, one a Portuguese visual artist/researcher and the other a Turkish fashion designer/theorist. The investigation focuses on questions that expand the notion of place for artists and designers, filtered through the lenses of manual labourers in order to understand their physical, social, cultural and economic relationship with the environment. To create the process of interaction with the place and the people, a creative collaborative dynamic is developed between the authors with their range of artistic sensibilities and the local population. To adopt a holistic notion of sustainability and cultural identity a process of investigation is designated to: (1) analyse, test and interpret - through the dissemination of life stories, visual representation of the place and the creation of cork objects - the importance of culture related to the labour activity of a local natural resource that determines and structures the region; (2) to give public recognition to those involved, taking into account their sense of belonging to the place and in order to show the value of their sustainable labour activities related to local natural resources; (3) to contribute to the knowledge of the place and to its dynamism through an aesthetic approach to labour activities. With reference to fields of knowledge such as anthropology, the social arts and sustainable design, a practice-based research is conducted with collaborative and participatory design methods to create an open model of interaction which involves local people in the realization of the project. Outcomes of this research will be presented in the paper as a survey analysis with theoretical conclusions.

Keywords: Cork Production; Social Sustainability; Material Culture; Social Arts and Design; Co-design, Social Innovation

1. Introduction

The project entitled *Creative Practices Around the Production of Cork* is a transdisciplinary research focused on the design discipline, which is conducted by three researchers - two Portuguese visual artists, António Gorgel Pinto from the Research Centre for Architecture, Urbanism and Design (CIAUD) at the Faculty of Architecture, University of Lisbon (FAUL), and

Paula Reaes Pinto from Art History Centre and Artistic Research (CHAIA) at the University of Évora, and from Research Centre for Architecture, Urbanism and Design (CIAUD) at the Faculty of Architecture, University of Lisbon (FAUL), whose research focuses on the sphere of social design, and Turkish fashion designer, theorist Şölen Kipöz, from the Izmir University of Economics (IUE), who has developed her theoretical and creative work in the field of ethical, social and sustainable fashion design and the transfusions and interactions between fashion, design and contemporary art. The research was initiated by Paula Reaes Pinto as a part of her post PhD studies at FAUL. The idea has emerged due to her interest in the village of Azaruja, which she found relevant to her research in the field of public art and participatory design, sustained by an integrated view of place connecting it with humane, geographical, biophysical, economic, political, social, cultural, historical and ecological dimensions in its locality. This perspective is focused on the relation between labour activities along with the local and natural resources that are expressed in the territory. Within the territory investigation process, this researcher decided to expand the project into a team of researchers including the other authors of this paper, considering that they all share common interests in the sphere of socially engaged art and design (Reaes Pinto, 2013: 24).

The study is based on a consideration of the local place formulated around cork labour activity which represents the social and humane dimension of sustainability. Within this frame, the humane, geophysical, historical, social, economic, ecological and cultural aspects of the place are observed primarily as they are related to the workforce or labour activities in that place. The place plays a key role in the study, because it is a way of learning about the relations of local people amongst themselves and within their environment (Reaes Pinto, 2013: 30).

Azaruja is a village located in the Alentejo region in the south of Portugal, and belongs to the district of Évora - a city located about twenty kilometers from Évora. Since its founding, in the second half of the eighteenth century, with the establishment of cork factories by British and Catalan companies, Azaruja has become the main "cork center" of Alentejo. By the 60s when the "cork crisis" and emigration occurred, the Alentejo village began to lose its population and its importance in the cork processing industry. Currently, there remains a large planted area from which comes some of the best Portuguese cork, some associated industrial units, and a great cultural heritage for generations of the inhabitants of Azaruja.

The aim of the study is to analyse the concepts of social sustainability and social innovation through design as a key feature of community resilience. Correspondingly the value and meaning of cork in relation to its labour activities in the village of Azaruja constitutes a field study for the research. By adopting a method of action research which involves two parts: (1) in the first part, field trips to cork forests and factories, visits to local industrial units, and to the cork industry professionals in their labour activities, in personal interviews with the locals and representatives of stakeholders - contacts made with the chairman of Parish Council, factory owners and workers, the retired people to be found on village streets - to be able to observe and collect information on their biographical stories, the processes and means of cork production from the stripping of trees up to the processing of the product; (2) the state of the art in relation to the local community, as well as the organisation of workshops and creative meetings between researchers, workers and their families, which are conducted by the use of different artistic media and by using co-creation and co-design methods. These workshops, which aimed at creating awareness of the richness and value of local culture, along with the sense of dignity and solidarity of the community members, played a key role in fostering social innovation through creative practices, in which craft skills and the knowledge of design merged. In the paper all the stages of these implementations have been clearly illustrated with their limitations and possibilities. Finally, the further study, which is already planned, will be the development of a design local object with the use of cork, simultaneously utilitarian and symbolic, resulting from the collaboration between a group of local people together with the three authors of the research. This last phase is not covered in the paper because it is a work in progress.

2. Methods

2.1. A Model for Social Sustainability

If sustainability is the measure of resilience and capacity of a system to repair itself when it is damaged (Tonkinwise, 2008: 380), the three components of the human, economic and environmental aspects of the sustainable system are equally important. If we consider that we live in an artificial ecology surrounded by man-made things, it is the responsibility of humans to make this world habitable by creating a balance between the needs of humans, environment and the economic system. If the design is another means of artificial ecology which we, humans, and other living species of the ecosystem survive in, the ultimate responsibility of the designer would be to create a habitable world through design. As Manzini puts: “A habitable world in which human beings not merely survive but also expand their cultural and spiritual possibilities” (Manzini, 1995: 220).

The cultural and spiritual possibilities refer to the social dimension of sustainability which can be rendered as the social conditions of human beings who generate and who use the artificial, as well as the social impact of all the implementations in creating a sustainable design culture. The quality of our lives is very much connected to our natural resources and to our means of material culture as well as to our economic means of survival. Thus, the generation of the social aspect of sustainability and the creation of natural well-being and economic development are equally important. McKenzie (2004: 12) gives a definition of social sustainability as: “a life-enhancing condition within communities, and a process within communities that can achieve that condition”. The indicators of this condition would cover a wide range of features from equity in terms of accessing services, intergenerational relations, cultural integration, participatory citizenship, a strong social cohesion, community responsibility and action for the common good of the society to enhance the “social capital”. Social capital is a public good shared by a number of individuals, refers to the idea that social bonds and social norms play an important part in sustainable livelihoods (Padovan in Andersen and Turker, 2006: 65-85).

Within the field of the production of cork which is both a natural and financial capital in Portugal, regional cork labour activities represent a community-based sustainable model which has been established through continuity and community resilience. It has been indicated that the capacity of production has reduced through the years like all the local production models – according to the chairman of the Parish Council of the Azaruja village in 20 years the number of companies has been reduced from 24 to 5, and social and economic conditions have changed due to political decisions and global market requirements. However, a sustainable model of the know-how of cork production, from harvesting and stripping to cutting, cooking and production of objects from cork, as well as recycling the production waste has not changed for years. Under these conditions this study seeks to show how a society based on regional cork production in Portugal represents a resilient community whose members develop personal and collective capacities that respond to and influence change, sustain and renew the community, and develop new trajectories for the communities’ future (Magis, 2010: 402).

Socially sustainable communities are equitable, diverse, connected, democratic and provide a good quality of life to members (McKenzie, 2004: 18). Understanding the role of design in creating and maintaining sustainability for the social good of these communities is becoming important. Social good is becoming a key driver for design with the rise of social design with more social needs and values are brought into the field of design bringing an ethical dimension to design (Schwarz and Krabbendam, 2013: 12). Dimensions of the social sustainability of cork production labour society as which makes for a resilient community can be discussed as follows.

2.1.1. Equity

Equity refers to equal access to and distribution of society’s benefits and costs, and social justice for all economic and social groups, as well as equality within and between generations (Haq, 1999; Magis and Shinn, 2009; Polese and Stren, 2000 in Magis, 2010: 412). Equal and open access of services requires a shared ownership as “common” which refers to the creation of a pooled community resource, owned by no-one, but used by all (Hardin, 1968; Ostrom, 1990; Goldman,

1998 in Padovan, 2006: 70).

Sustainable development that relies on a commitment to equity with future generations requires intra and intergenerational equity (Weiss, 1992: 1). While the intra generational condition of ensuring equitable access to resources occurs within the current generation, intergenerational equity refers passing the resources that they themselves had inherited to the next generation. Manzini (1995 in Buchanan: 234) referred that the role of designers should be directed not only to present generations but also to future ones with the possibility of leaving them an inhabitable world. According to Weiss, intergenerational equity states that all generations have an equal place in relation to the natural system, and that there is no basis for preferring past, present or future generations in relation to the system (Weiss, 1992: 20). So, as well as we are a part of the natural ecosystem we are a part of a heritage in transmitted in between generations.

The knowledge and experience of cork production inherited in Portugal dates back to the 18th century with the systematic cultivation of cork forests. The know-how of cork through all its processes has come down to us today by passing through different generations. Even the objects made out of cork survived traditionally as a part of Portuguese material culture.

2.1.2. Localism & Crafts

The use of local knowledge in developing hand made cork products of time-tested and durable designs has naturally produced a sustainable and slow model of production which is also dependent on the life cycle and harvesting process of cultivated cork trees. In contrast to the fast commercial global model of harvesting in other industries, the pace of cork production is in tune with natural cycles; it takes 35 years to grow a cork tree and stripping can only be done every 9 years time in order to safeguard the health of the trees.

Due to the use of *tacit knowledge* which is inherited in this geography, to appropriate the process of cork production and the design of the cork products into the global industrial systems is quite difficult. The knowledge, which refers to the idea of “knowing more than we can tell” by Polanyi is defined as “an art which cannot be specified in detail, cannot be transmitted by prescription, since no prescription for it exists. It can be passed on only by example from master to apprentice. This restricts the range of diffusion to that of personal contacts, and we find accordingly that craftsmanship tends to survive in closely circumscribed local traditions” (Polanyi, 1958: 52 quoted from Decrochers, 2001 in Kipöz, 2015). This kind of knowledge opens a path for a sustainable design epistemology which is shaped by the use of crafts, but more importantly it refers to an accumulation of a wisdom which is transferred in between different generations (Kipöz, 2015:120).

The local and traditional knowledge as well as community members’ experience and understanding of the community confer on them has an important role in the community’s well-being (Berkes et al., 2003; Gunderson and Pritchard, 2002 in Magis, 2010: 405) The Portuguese cork industry also implies a glocal model which adopts the idea of “think globally and act locally” where local becomes a site of resistance against global culture. According to Clark the utilization of localized physical and social resources can provide an alternative to standardization, centralization and moreover to identical products imposed by the global system. This gives rise to a kind of local economy as “distributed economy” where the global is comprised of a network of local systems (Clark, 2008: 430). In addition to this, as Hall referred, strong local institutions and infrastructures creates relations of trust based on face to face contact, and these kind of productive communities historically rooted in a particular place illustrates a strong sense of local pride and attachment (Hall, 1992: 319 quoting Robbins in Clark, 2008: 432).

2.1.3. Collective Memory

A productive community generates its resilience through knowing and re-producing their collective memory with a sense of belonging and attachment to community values. Against to the erosion of cultural and collective memory due to lack of intergenerational equity and to the cultural prejudices of the global system, local communities develop a kind of collaborative action in the form of solidarity and social responsibility. Solidarity refers to union arising from common

responsibilities and interests between the members of the community. For Manzini, within the designer's ethical conduct, responsibility and solidarity are directed not only to present generations but also to future ones (Manzini in Buchanan, 1995: 234). Expanding solidarity among generations and promoting intergenerational solidarity through building partnerships between youth and elderly people, ensures the transfer of knowledge and culture forward through meaningful exchanges among persons of all age groups (Cruz-Saco and Zelenev, 2010: 10). This can be facilitated through recreational activities which could bring people from different generations together. In developing creative practices in cork production, craft skills and design of cork products could be transformed into contemporary works of do-it-yourself practices (Kipöz, 2013:3) and or a co-creative collaborative design practices in which participants could have a more active role within the system, as illustrated in the following parts of the article.

Finally, addressing the idea of dignity in building the collective memory in relation to social sustainability and community resilience would preserve and create a defense against the fragility of members' social, economic and cultural conditions. For design, the defense of dignity begins with the recognition of the subjects to whom work is addressed in the public sphere (Dilnot, 2008: 188). Bonsiepe referred to the public domain as the third design virtue in the future through which socially devastating effects of unrestricted private interests have to counterbalanced by public interests in any democratic society (Bonsiepe, 1997: 107 quoted in Dilnot, 2008: 188). Hence the sense of pride and dignity would come from the recognition of the labour force of cork workers in the public sphere, and would be transformed into a value to be socially shared and transmitted on intra and intergenerational levels.

2.2. The Creative Process and Project Development

Design is a practice that involves various protagonists and different methods in various social contexts. These are factors that inform each other and can result in different possibilities of participation and interaction between the designer and the user. Bearing in mind that there is always a relationship between the parties involved in the design process, the concept of participation is something that is at the root of the design culture. Overall, design is developed in two different frames, on the one hand it is an "abstract" logic in which experts in areas such as urban planning, architecture and design, apply their knowledge without the direct involvement of the stakeholders, on the other hand it is a "concrete" form of understanding that encompasses empirical experiences (Lee, 2006: 2).

Under the project in development in Azaruja, the practice used has sought the engagement of a greater number of representatives from the local culture, in particular through the participation of people from different generations, which play the role of empirical designers. Despite not dominating the methods and creative methodologies used by experts of design and visual arts, the majority of those involved have vast knowledge about the cork tradition and all that it involves. In this way, it is hoped that the researchers' collaboration with a volunteer group in Azaruja results in the production of both useful and meaningful content, both for local culture and for society in general.

In this context, it should be noted the concept of co-design, which brings together various practices of contemporary design, such as participatory design, meta-design, social design, among other ways involving the participation of users in the design project. The presence of the various stakeholders in the problem's perception and context is important in order to obtain more effective results. It "is a commitment regarding inclusion and power" that proceeds differently in relation to the creation and production of the dominant agents, which are based on a hierarchy that determines and enforces what users supposedly require. Co-design is a logic that "is at the core of a more democratic, open and porous design process and is finding expression in the business and not-for-profit sectors" (Fuad-Luke, 2009: 147).

It was used an empathetic approach as a methodology of interaction and co-design, whose aesthetic is anchored on the paradigm of listening and talking to the local people. After it has been explained what we wanted to do they were encouraged to participate in the project. They were given voice by means of the life stories that they recounted. The development of the project

is being built on the intersubjective vulnerability, since the whole process only exists with the collaboration of the local inhabitants.

2.2.1. Listening to the Other

The non-hierarchical knowledge was valued in this project by sharing the personal experience of each collaborator through listening and trying to understand them. “The predisposition to listen to and, as a consequence, the relational character of the project, has been extended to areas of knowledge extrinsic to art, to be understood in a comprehensive manner and transverse to life itself” (Reaes Pinto, 2013: 371). The approach of listening to the Other was inspired by the concept of enlightened listening, addressed by the philosopher David Levin (1989: 223), which is based on mutual listening, in the case of this project, between the artists, designers and the participants, stimulating inter-knowledge between both (Figure 1). The theory of the philosopher Gemma Fiumara (1995: 19) is also considered as it contests the rationalist discourse authority of the western culture which doesn't give space to listening to the Other. On the contrary, Fiumara defends the processes of listening, anchored on non-hierarchy of cultures, as a way to build knowledge, aiming to equilibrate the speech. Creating an open dialogue to create an equilibrium among members of society and between the members and people outside of the community has a key role within the principle of equity in regards to social sustainability.

As collaboration practices use an ethical approach and principles of reciprocity for giving voice to the difference, weakening the author autonomy, it is considered that the artistic project is developed through the interdependent relationship of all the actors involved. In this way, collaboration is a strategy of the authors that uses intersubjectivity as its medium, involving openness, responsibility, respect and confidence. This notion of collaboration is associated with the concept of *connected knowing*, which was an expression used, for the first time, in the study “Women's Way of Knowledge”, by Mary Belenky, Blythe McVicker de Clichy, Nancy Rule Goldberg and Jill MattuckTarule, published in 1986. *Connected knowing* is developed on the subjective belief that the most credible knowledge comes from personal experience and not from an imposition established. Dialog is the ground of knowledge, through which each participant, sharing his own experience, try to learn from the knowledge of others, by means of an empathic approach. Thus, shared knowledge is learned through the perspective of another person. (Belenky; Clichy; Bygolberg; Tarule, 1986: 112-113).



Figure 2. Mutual listening between the artists/designers and the participants.

2.2.2. Fieldwork Methodology

The *Creative Practices Around the Production of Cork* are “focused on co-design, supported by an integrated perspective of the place, understood in its complexity – combining human, biophysical, geographical, economic, political, social, cultural, historical and ecological aspects that largely characterize local life experiences”. Another important point of this “investigation reframes a consideration of place organized around labour as the core concept” (Reaes Pinto, 2013: 229, 231).

Regarding the methods used, in all the project development phases, the research used the methodologies of fieldwork and interaction design, demanding periods of residence. The fieldwork functioned both as a participatory design methodology and as an art practice, not being a scientific experiment. The methodology of fieldwork, which has been characterised, briefly, by constant dynamic interactions between the researchers and the local inhabitants, their activities and the places where they work, stay or study, also has a relation with what is called research-action, in the way that it is a methodology that “makes the actor researcher, and vice-versa, and leads the action for research purposes. Its starting point is particular, since it bases its dynamic on the action, and considers the actors not as passive objects of research, but as participants”. This is an unbroken process which affects all the research (Guerra, 2000: 53).

The singularity of action research is centred on intentional interaction between research and action. Thus, “the knowledge is produced in direct confrontation with the real, trying to transform it, and social knowledge is produced collectively by social actors deconstructing the role of “expert” normally assigned to (investigator)” (Guerra, 2000: 75). This social knowledge produced collectively becomes a way of re-constructing collective memory within the community. The experience of working on the ground can personally change the investigator, as he is exposed to the repercussions of context (Augé; Colleyn, 2004: 79). As a matter of fact we were always enhanced by the experience of the several approaches conducted so far within the community of Azaruja through direct and participatory observation and by a survey of the place through audio, video, and photographic records (Figure 2).

The work was developed from various site visits, during which the authors were creating bonds of familiarity with the population. This direct observation is a case of participant observation, in so far as it results from the permanence of the researcher in the locale, “who attends the largest number of sites as possible in the social context in this study, and has a constant presence in the greatest number of activities possible that occur there, being in a permanent conversation with people that belong there” (Costa, 1986: 137).



Figure 2. Direct observation and survey of the place through audio, video, and photographic records.

2.2.3. Biographical Dimension

So far visits have been made to some local factories operating in cork processing for different purposes, but all of them only work at the level of cork preparation. Among other businesses and activities more or less related to cork, there were visits to a small family cutlery factory with a great tradition in the region. The extraction of cork from the trees was also observed, meeting the workers and getting to know their tasks. Two very early morning visits were made to Serra d'Ossa, which are the surrounding mountains of Azaruja, to observe this seasonal work. The activity must be done in summer in very hot temperatures to peel off the cork more easily and without damage to the tree.

Also important was dialogue with local inhabitants including the Chairman of the Parish Council of Azaruja and with retired cork workers. All of these site visits are marked by a constant relational character, especially through the recording of life stories. According to the anthropologist Daniel Bertaux (1997: 94) "biographical accounts make visible the social element in its multiple sides rather than being a mere reflex of disconnected abstract structures - the social element emerges as an armour made of living experiences." These experiences that took place stimulated the development of the creative process.

The biographical dimension of the project, based on the collecting of Azaruja's residents' life stories, was related, essentially, with our belief that this is the more direct methodology to communicate the realities, either distinct as collective, of these people (Reaes Pinto, 2013: 352-353). The anthropologist Adolfo YanezCasal (1997: 87-88) states that the importance given to life and to the experience of each one tell us about "the humanist profile, plurality and diversity of real individuals living there and of the multiple cultural manifestations led by people; biography allow us to discover the links of a personal story with a social macro-history" (Reaes Pinto, 2013: 353 quoting Casal, 1997: 87-88).

The biographical dimension cannot be dissociated from the relational context, that in the *Creative Practices Around the Production of Cork* case focused on the dynamic originated by the interaction, always in mutation, between the researchers and Azaruja's inhabitants. Characterised by distance and proximity, this interaction is denominated by anthropologist Susana Durão (1997: 176) as "intermediate space". Distance marks the beginning of a relation between the investigator[s] and the Other, proximity is being constructed through dialogue that is dissolving distance [and create a place of intimacy] between researcher[s] and local people of Azaruja, with the multiple sharing of complicity (Casal, 1997: 94 e Schneider, 2006: 16). In this sense and in the context of the project concerned, interaction resulted in a real contribution to the creation of ties and mutual learning between investigator[s] and Azaruja's participants, as well as a means of facilitating the inclusion of local inhabitants in the later stage of co-creation of one or more symbolic and utilitarian objects.

2.2.4. The Project Workshops and Future Steps

Some workshops with the youth population were also organized, in particular in the field of photography and assemblage. On the photography sessions the idea was to represent the Azaruja landscape, and over the assemblage activity the objective was to experiment with different cork materials. At the same time the participants were invited to think about Azaruja's culture and particularly about the cork tradition.

The photography workshop occurred in the summer vacation. The youngsters started taking pictures using the pinhole process, followed by the use of 35mm and digital cameras. After the safari in and around Azaruja, taking pictures with different machines, the workshop continued in the local primary school where it was improvised a laboratory for developing the pictures. The last workshop activity was related to enhancing the images using Photoshop (Figure 3).



Figure 3. Photography workshop.

Early in 2016, before the assemblage workshop took place, some educational sessions at the same school were also organized in school hours during which some retired cork workers from Azaruja were invited to be interviewed and share their stories of working life with children. This has been very effective way of generating intergenerational equity and intergenerational solidarity among the members of the community. Some of the kids in the class were the same that were part of the photography summer activities. During this period the workshop in the sphere of assemblage was promoted and organized involving, the same children, at the same place. This was followed by the assemblage activities, which were part of a game specially designed for the purpose in question, namely a card game in which each card has some specific information about cork and all that is concerned with its environment.

In this context, each child picked up a card with a paragraph and some keywords about the labour activity, or what is associated to it, aiming the production of a cork assemblage work. At the end, some of the kids painted some parts of their works (Figure 4). All of these initiatives were intended as creative strategies for the plastic involvement of young people with cork and other derived materials, as well as raising awareness of the richness of the environment where they live. It is important that they respect the mutual learning between all generations as a means of intergenerational solidarity and responsibility and that they understand and use creativity as a means of knowledge and development. In the course of all approaches, some videos were shot as a way to document the entire process.



Figure 4. Assemblage workshop.

After the involvement with the community and the collection of data through dialogue, as well as the videos and works produced in the workshops, an event to show every intervention was organized, which occurred in a centenary local association, well-known in Azaruja for its recreational and cultural activities. The people involved and represented in every activity were invited to attend the tribute, which was based on a snack with some regional products in order to promote the interaction between people, as well as to stimulate a reflection and dialogue on the issues surrounding the cork and Azaruja's culture. This symbolic moment was also important to explain the concept of the project, the main objectives, as well as the set of actions that would follow later to those present.

It is also planned to develop the design of one or more utilitarian cork objects of Azaruja's material culture, through the use of contemporary industrial processes of Cork transformation. In this process, along with authors of the research, a group of young people from a local association and several adults, including some cork industry pensioners will be included. The outputs of the Co-design process will be executed as prototypes of the design object(s). This part of the co-creative workshop series would allow us to observe the continuity of the material culture, the intergenerational relations around these objects, and be able to generate possible outcomes as an outcome of crafts and design culture for the future.

3. Results and Discussion

3.1. The Project Symbolic Role and Visual Communication

Co-design is a design hybrid stream that combines different artistic practices, as well as other fields of knowledge, for the benefit of society. It is a culture of design whose practice focuses on the development of ideas, objects and functions, imbued with meaning, based on collaborative processes open to participation of users and non users, even if the contribution made by any participants it is not always constructive. The dialogical form, in creating a culture which listening is equally important to speaking is crucial for the development of this kind of social innovation by design. In this context, in addition to the critical and creative skills, it is important that the expert designer develops his dialogic ability, so that he can interact and optimize the co-design process. The dialogical method should not be used as a tool to control the co-design project, but to stimulate it and maintain it open (Manzini, 2015: 53, 67).

An important aspect in the practice of social design is its dissemination to stimulate society's thinking on social issues. In this context, there are various ways that usually give visibility to co-

design projects, among which are the mapping of social phenomena, the creation of communication contents, sociological research by collecting life histories and the construction of real or fictional representations. With regard to mapping social phenomena of a particular place or community, the aim is not only the representation of events in space, but also the creation of a reflection tool for the development of the place itself. The creation of media content of the actions occurred is also important, since without this kind of representation, the impact on both the community engaged and on the rest of society would be significantly reduced. The communication resulting from content creation is also relevant because it informs the creative process of collaboration. With regard to the sociological and anthropological research through the collection of life stories, this is an important tool because it enables the transmission of significant personal and collective experiences to the community. Finally, the construction of real or fictional representations is another possibility to spread co-design projects, which results from the projection of a social innovation image to be further discussed among all participants. This approach begins with the definition of a scenario where their motivations are identified and taken up, followed by the development of a detailed strategy with the necessary actions to achieve the conceived idea (Manzini, 2015: 122-132).

In the social engaged art practice currently underway in the village of Azaruja, the visual communication of all project phases is a central element for the whole dynamic being developed. Whether on denotative or connotative terms, the multiple site interventions aim to inform the project itself, as well as its participants, in order to stimulate all the co-design process. The creation of symbolic visual content allowed the participants' achievement of transforming the "tacit knowledge" inherited in their crafts skills of making cork into potential art and design skills, to be rendered visible for other external observers. This visibility has a key role for their dignity and social solidarity in regard to their local culture.

This art and design practice focused on solving problems and simultaneously with a strongly symbolic character, enhances the visual arts vocation for the perception on the many issues that affect the common good. It is the combination of two sensibilities that usually occur independently, notably the ethical and aesthetic senses, whose combination enhances a particular dimension for the interpretation and communication of critical and constructive perspectives in the benefit of society. At the same time "this type of sensory knowledge, subject to reflection and reproduction, produces a fundamental effect for the development of intersubjectivity" (Gorgel Pinto, 2015: 87).

3.2. Limitations and Possibilities of Co-Design Process

One of the limitations of the site visits to Azaruja and its surroundings has been the lack of financial support. Apart from the expenses of the trips between Azaruja and Lisbon – a distance of 280 km - this kind of project requires sufficient time for long-stays, which includes accommodation.

During the meetings in the factories, we faced with a particular problem about interview recording due to the noise produced by the machines. In relation to the dialogues with local people, although through interviews we could provide extensive information and insight about the way the local people think, they could be much more focused.

Within the photography workshop with youngsters, as we could not show, immediately, part of the output of the images they produced right away, we didn't have their feedback. However they were very interested and very collaborative in the workshop.

Regarding the interviews with elderly people at the local primary school, the results were more descriptive in regards to the processes of their cork labor activities, rather than those related to the telling of their life-stories. For further studies interviews could be re-formulated in a more interpretative way.

The methodology of interaction based on an empathic approach used in this research was one of the strengths of the field work, as a means of bringing the researchers and the local people of Azaruja together, building ties between them and involving them in the collaboration process of the project. This also allowed us to understand their social reality in-depth; to appropriate the life stories told by local people as raw material for the development of the project; to share life

experiences and learn from the biographical knowledge of each one, facilitating the reflection and creative production of knowledge. Another possibility lies in the understanding of the interconnection of the diverse aspects of life with all the routines and activities of social life in Azaruja through a holistic approach, to help us understand the processes, the places and the people involved in cork production. It was, therefore, necessary to make regular visits and stays at the largest possible number of places and engage in an ongoing dialogue with the people involved (Costa, 1986: 137).

In relation to the educational sessions, the strengths are the intergenerational learning, the respect for the richness of the place where they live and the understanding of the creativity as a means of knowledge and progress. The participants embraced the workshops enthusiastically. The elderly people who went to the local primary school to share their experience as cork workers were proudly speaking of their experiences and the children hearing them - some of them were their grandsons and granddaughters - were made aware of their value. Dynamic interaction was created amongst all the people involved - the teacher, the children, the retired cork workers and us (researchers). The interaction and participation based on dialogue were fruitful both for bringing people together and for preparing children for the make-up and structure of the workshops.

With respect to the exhibition, the importance of its results must be underlined - local people, namely the collaborators of the project, were there. They were very proud of the project as it values the culture of Azaruja and includes local participants in its development. Another possibility achieved was the formation of a local team for the development of a co-design project. In addition to this we also must emphasize the involvement of the residents of Azaruja in preparing the local traditional foods for the event.

4. Conclusions

In this paper, the creative potential of labour practices in Portuguese culture is examined within the frame of social sustainability. An environmentally sound material, cork, has been considered as a paradigm of sustainable culture in Portugal not only for its ecological footprints and economic value but also due to its social and cultural capacity to create resilient communities. The labour activities around cork represent the social and human dimension of sustainability upon which the study focuses. In the first part of the paper, the framework of social sustainability is examined through the concepts of equity in terms of access to services, participatory social system and intra and intergenerational levels; a realization of the value of local culture and local crafts such as the skill of cork workmanship against the imposition of global culture; and the importance of dignity and solidarity to create a collective memory. In the second part, the field study conducted in the region of Azaruja in the form of the action research through co-creative workshops with the residents and cork labourers of the place. Here the collaboration between professional designers/ artists such as the authors of the research and people who have an extensive knowledge of cork is achieved through reciprocal listening to stimulate non-hierarchical inter-knowledge which equilibrate the speech and dialogue as a means of social equity. In this frame questioning the authorship and deconstructing the role of expert created an open, respectful, responsible and trustful relationship between parties.

The study also challenged the epistemology of creativity - creative practices, transforming the tacit knowledge which is inherited in the local know-how of cork, into a non-hierarchical and connected knowledge through the participatory process. Reconsideration of the place of labour activity within its locality, in which social knowledge is regenerated for the reproduction of collective memory. In particular the photography workshop with children of cork workers allowed the participants to re-identify the place with a sense of belonging and attachment. A dialectic relationship between distance and proximity in regard to the relation between the researcher and the cork worker, has been the driving force of this collaboration. However in these relations the distances are dissolved through the non-hierarchical dialogue between parties. Apart from the dialogue between researchers and the workers, it was observed that the communication between the members of the community which refers to intra-generational equity, and dialogue between different generations of the members which refers to intergenerational equity has been enhanced through the

workshops. The next stage of the fieldwork which is not included in this paper due to time limitations is planned to be the creation and production of a prototype of the design object(s) through the use of cork, which will be developed through a series of collaborative sessions amongst stakeholders. This stage will play a key role in merging the craft skills of local people with the design knowledge and experience of the designers. Finally, with more contributors expected to join the project, from different fields of design and from different cultures, a collaborative co-creative model will be implemented in a transdisciplinary manner.

References

- Augé, M. (2004). O Terreno in Marc Augé & Jean-Paul Colleyn. *A Antropologia*. Edições 70, Lisboa.
- Belenky, M.; Clinchy, B.; Goldberger, N.; Tarule, J. (1996). Basic Books, New York.
- Bertaux, D. (1997). Suportes teóricos e epistemológicos do método biográfico in *Trabalho de Campo, Ethnologia, nova série*, no 6, pp. 87-104.
- Casal, A. (1997). Suportes teóricos e epistemológicos do método biográfico in *Trabalho de Campo, Ethnologia, nova série*, no 6 – 8, pp. 87-104.
- Clark, H. (2008). Slow+Fashion - an Oxymoron - or a Promise for the Future...? *Fashion Theory*, vol. 12, issue.4, pp. 427–446. Berg Publishers.
- Costa, A. F. (1986). A Pesquisa de Terreno em Sociologia in *Metodologia das Ciências Sociais*, Edições Afrontamento, Porto, pp. 129-148.
- Cruz-Saco, M. (2010). Intergenerational Solidarity. In *Intergenerational Solidarity Strengthening Economic and Social Ties*, edited by Maria Amparo Cruz Saco and, Sergei Zelenev, Palgrave Macmillan US.
- Desrochers, P. (2001). Geographical Proximity and the Transmission of Tacit Knowledge. *The Review of Austrian Economics*, 14:1, 25–46, Kluwer Academic Pub., The Netherlands.
- Dilnot, C. (2009). Ethics in Design: 10 Questions in *Design Studies: A Reader*. Edited by Clark, H., Brody, D. pp. 180-190. Berg publishers.
- Durão, S. (1997). Itinerários Sensíveis do campo: duas experiências pessoais na construção de etnografias in *Trabalho de Campo, Ethnologia, nova série*, no 6 – 8, p. 147-162.
- Fiumara, G. (1995). *The Other Side of Language. A Philosophy of Listening*. Routledge, New York.
- Fuad-Luke, A. (2009). *Design Activism: beautiful strangeness for a sustainable world*. EarthScan, London.
- Gorgel Pinto, A. (2015). Machine for the Emancipation of Creativity: Art Project in the Neighbourhood of Estrada Militar do Alto da Damaia. *IJASOS- International E-Journal of Advances in Social Sciences*, Vol. I, Issue 2, August 2015, 81-88.
- Guerra, S. (200). Action-Research - To think of the world, do we need to distance ourselves from it or dive into it?, Original Title: Investigação-Ação – Para Pensar o Mundo Temos de nos Distanciar ou de Mergulhar Nele? in *Fundamentos e Processos de Uma Sociologia de Ação. O Planeamento em Ciências Sociais*, pp. 53-75.
- Kipöz, Ş. (2013). Slow Fashion Ethics: Re-production of Memory through Deconstruction, 10th European Academy of Design Conference - Crafting the Future, Gothenburg, <http://www.trippus.se/eventus/userfiles/67186.pdf> (accessed 15.04.2016).
- Kipöz, Ş. (2015). Intergenerational Sustainability and Transferring the Female Wisdom. Original Title: Kuşaklararası Sürdürülebilirlik ve Dişil Bilgiğin Aktarımı. In *Sustainable Fashion- original title: Sürdürülebilir moda*, edited by Şölen Kipöz, 113-123. Yeni İnsan Yayınevi, İstanbul.

- Kristen, M. (2010). Community Resilience: An Indicator of Social Sustainability. *Society & Natural Resources*. <http://dx.doi.org/10.1080/08941920903305674> (accessed 15.04.2016).
- Levin, D. (1989). *The Listening-Self: Personal Growth, Social Change and the Closure of Metaphysics*. Routledge, Minnesota.
- Manzini, E. (1995). Prometheus of the Everyday. In *Discovering Design: Explorations in Design studies*. Edited by Margolin, V., Buchanan, R., pp.219-243. The University of Chicago Press.
- Manzini, E. (2015). *Design, When everybody Designs: An introduction to Design for Social innovation*. MIT Press; translated by Rachel Coad.
- McKenzie, S. (2004). *Social Sustainability: Towards Some Definitions*. Hawke Research Institute. Working Paper Series. No 27., University of South Australia Magill, South Australia, <http://www.hawkecentre.unisa.edu.au/institute/> (accessed 15.04.2016).
- Padovan, D. (2006). Social Capital, Lifestyles and Consumption Patterns. *Proceedings: Perspectives on Radical Changes to Sustainable Consumption and Production (SCP)*. Edited by Maj Munch Andersen (RISØ) and Arnold Tukker (TNO), Sustainable Consumption Research Exchanges (SCORE).
- Reaes Pinto, P. (2013). *Uma visão integrada do lugar na arte pública através do design participativo: a relação entre as actividades laborais e os recursos naturais locais nas práticas de interacção com populações periféricas* (Unpublished doctoral dissertation). Faculdade de Arquitectura da Universidade de Lisboa, Lisboa.
- Schneider, Arnd, Wright Christopher (2006). *The Challenge of Practice in Contemporary Art and Anthropology in Contemporary Art*. Berg Publishers, New York.
- Schwarz, M., Krabbendam, D. (2013). *Sustainist Design Guide*. BISPUBLISHERS. Amsterdam.
- Tonkinwise, C. (2008). Ethics and Sustainability. In *Design Dictionary: Perspectives on Design Terminology*. Edited by Erlhoff, M. and Marshall, T. Birkhäuser Verlag, Basel.
- Weiss, E.B. (1992). In *Fairness to Future Generations and Sustainable Development. Conference on Human Rights. Public Finance and The Development Process*.

Mainstreaming Sustainability in the Housing Sector: a New Approach to an established process

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Abstract

The operation of the Australian residential sector is currently inhibiting and preventing the mainstreaming of sustainability in the construction of new homes. The established approach to housing construction in the Australian market applies a traditional design and construct approach, which has been industrialised, to mass-produce new homes. This approach has evolved an oligopoly of housing providers that limits the incorporation of sustainability for new homes under this traditional old world design and construct approach to housing delivery. For innovation and sustainability to achieve real change within this sector, a new perspective and approach is required to drive innovation and adoption of sustainability in new homes to minimise the long-term environmental, social and economic repercussions that could burden current and future generations in Australia. This research has investigated and identified a new framework that utilises a consumption-based demand and supply model to identify the key stakeholders that have the power to drive societal change for increased adoption of sustainability in new homes. Utilising semi-structured interviews of major Volume Building housing providers in Australia the consumption-based demand and supply model has been tested and verified. For the first time the research will provide an innovative re-examination of demand stakeholders' roles and expose untapped market power to drive change and eliminate the 'blame game' currently restricting broad scale adoption of sustainability in new homes.

Keywords: Australia, sustainability, innovation, residential construction

1. Introduction

Currently in Australia, energy efficient and sustainability features in new houses are often characterised as overly expensive additional extras due to limited consumer demand, in an industry characterized by large-scale standardized new home production. In this \$31 billion industry, 180,000 new homes are built each year (HIA, 2014; Australian Bureau of Statistics, 2014), if broad-scale sustainability adoption in new housing is not implemented the environmental, social and economic repercussions will burden current and future generations in Australia.

Present legal and practice approaches in the residential building sector to increase the level of energy efficiency and sustainability in new homes is ineffective and causing considerable level of distrust by consumers of new home providers and subsequent disengagement through the supply chain. The consumer is often the scapegoat for sustainability's poor adoption, blamed for a lack of interest, and unwillingness to pay by stakeholders in the construction supply chain (Pitt & Sherry, 2014). Given consumers' limited knowledge of the residential building process in general and sustainability in particular; the ability of consumers to know of and ask for sustainability initiatives is constrained and consequently is perceived as a lack of awareness and interest in sustainability. However, this paper advocates that we are examining the problem from the wrong perspective.

The traditionally perceived supply-led volume-building sector model can be argued to actually inhibit sustainability. Therefore, examining the industry through a different lens can identify a new model that reflects the actual, current Australian practice, the roles, relationship and power interactions of all stakeholders and identify who and how sustainability can be mainstreamed in the residential sector. Australia's current residential building practice is dominated by large scale

Volume Builder providers, like Metricon, Simmonds, J.G. King, who act as an oligopoly due to their behavior, organisational characteristics and interactions with consumers (Dalton et al. 2013; Coiacetto, 2006). Volume builders, in effect, dictate to consumers what they want, how they want it and do this by providing limited choice to maximise efficiencies of scale and profits (Reardon, 2013). To the supply chain they wield substantial power. The housing production model means the Volume Builder dictates price, quality and quantity and may be the only source of work for a contractor/subcontractor/supplier. Consequently, if cost-effective energy efficiency and sustainability solutions were integrated into mainstream new house production, substantially more consumers would demand these features reducing energy and water consumption and increasing sustainability in their homes.

This research investigates whether the current and old world approach to residential housing provision in Australia, the Design and Construct approach, actually reflects the current market and whether a new perspective and approach exploring the sector with a new lens will identify alternative frameworks on how sustainability and innovation can be integrated into the sector to enable the mainstreaming of sustainability in the new home sector.

2. Method

The research approach utilised a three stage method. First, examining the literature; second, an analysis of the housing sector through analytical experience, and finally through a survey comprising interviews with Volume Builders in the Australian residential housing sector.

The first stage of the research focuses on ascertaining the “Old” perspective. This analyses the literature on volume home building in the Australian residential sector. The analysis’ focus is on the structural processes and relationships between stakeholders. This analysis also provides a context from which the “New” can emerge when considered from the authors’ analytical experience of the Australian housing sector and what and how the sector is currently operating.

The research’s second stage examines what is currently happening in practice, in the Australian home volume builder sector. The explanation of current practice relies on analytical experience of the authors within the sector identifying how current practice relates to the literature’s “Old” perspectives of how the volume builder sector operates.

Finally, the research uses semi-structured interviews with Volume Builders that include process mapping (Harry et al. 2005) where participants are asked to graphically depict and describe their organisations, roles and responsibilities; contractual, product and customer relationships; and the flow of information and power associations. This shows, on analysis, the various structural relationships in their procurement models and identifies how innovation and change are enabled through the current mechanisms operating in the residential housing industry. This paper is from a research project in progress. Consequently, the model is explained using four revelatory case studies (Yin, 1994) representative of different types of mainstream, Australia-wide Volume Builders.

The first participant is classified as a top tier ‘Community’ Volume Builder where they develop whole communities with integrated housing products, hereafter referred to as VB1. The second, is a second tier community Volume Builder who predominately focuses on house and land packaged provisions and multi-unit developments as an integrated housing product, predominantly sold off the plan, hereafter known as VB2. The third is a smaller scale Volume Builder that is a franchisee of a major Volume Builder group that provides single houses for individual land parcels, hereafter referred to as VB3. Finally, the last participant is a smaller Volume Builder which operates as a franchise (VB4) who specialises in sustainable dwellings described their key drivers and inhibitors in mainstreaming sustainability in their building process. VB4 is an interesting case, because they were a traditional style, small town master builder. However, when the town suddenly underwent substantial growth (mining town – the opening of a new mine and lots of new housing required), the Volume Builders arrived in town. VB4 found themselves without work, so in order to differentiate themselves to win work they began incorporating sustainability initiatives as standard

into their homes. This was very successful in their region and they have subsequently expanded Australia-wide with their housing/business model.

3. Results

3.1 The 'Old' Perspective of Volume Builders in the Australian Market

The extant understanding of the residential housing sector has relied on commonly understood procurement approaches conceptualised within the construction management theory. This theory identifies essentially four main approaches (although there are sub-variants and other methods as noted by Love, 2002). The four approaches comprise:

1. Traditional;
2. Design and Construct;
3. Project Management; and
4. Management Contracting (Wilkinson & Schofield, 2003).

The procurement research and literature mainly focus on the commercial sector, with commercial construction managers who participate in the construction process. Predominately, this research is focused on the supply-side (Love et. al., 1998) with stakeholder interactions also focused on supply-side stakeholders, namely material suppliers, manufacturers, trades, and product delivery (O'Brien et al. 2004). When considering the procurement in the residential context there are two main approaches commonly apply in the Australian environment; first, the Traditional approach, and, second, the Design and Construct (D&C) approach.

The Traditional approach is where a housing consumer (home purchaser) approaches an architect with a requirement and asks them to draw up plans and provide them a dwelling. The architect then engages other professional consultants and manages the building contractor. However, all the contractual relationships with these stakeholders are all directly with the housing consumer (Figure 1). However, given the risk and responsibility rests with the housing consumer this has been fraught with issues over the years, which in the Australian environment has provided the opportunity of an alternative procurement process – the Design and Construct approach shown in Figure 2.

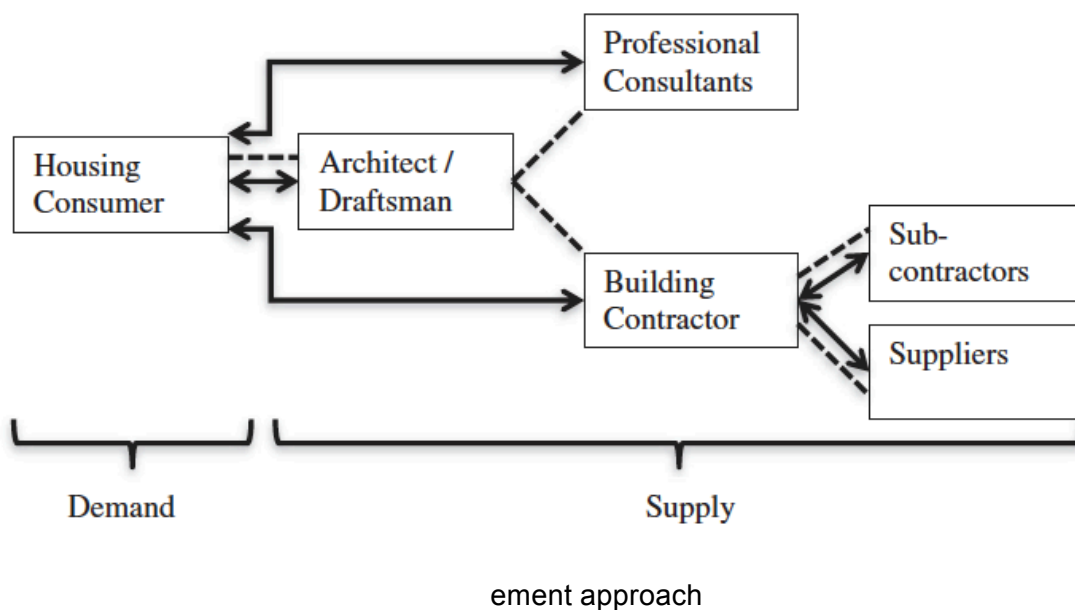


Figure 1. The traditional residential construction procurement

Source: Warren-Myers and Heywood (2016) Figure 1.

The Design and Construct (D&C) approach, from the housing consumers' perspective, provides a 'one-stop-shop', one contract with the risk predominately lying with the D&C contractor and essentially a guaranteed product or result at the end. This approach in Australia has been industrialised, creating a process of mass production, as a result this has become the main approach to home building. Procurement theory, in this approach when related to the residential construction sector identifies the Volume Builders as part of the supply-side whereby the homebuyer is still considered the housing consumer and end-user with demand still generated by them. D&C provides a single point of contact between the supply-side and the consumer with design (architects or draftsmen) either provided in-house or outsourced (Figure 2). There may be varying degrees of contact between the consumer and the designer.

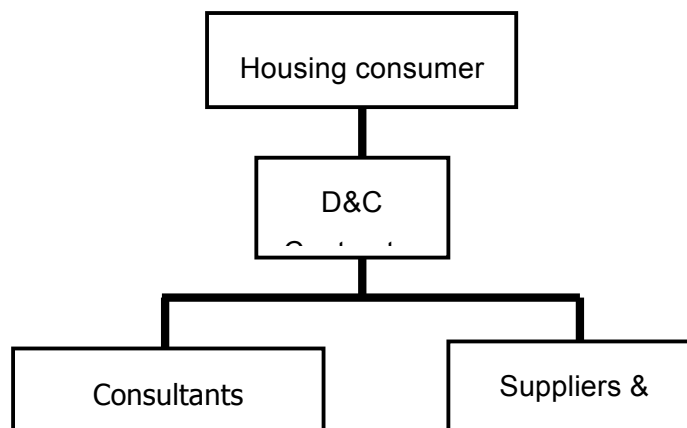


Figure 2. Design and Construct Approach

Source: Authors

Variations of residential D&C range from small contractors meeting localised demand (the traditional 'Master Builder' model) to large state or national business (Volume Builders) meeting consumer demand across several geographic regions. Volume Builders' main housing activity is detached homes equating to 70% of all dwellings built annually, with semi-detached houses (9%) and multi-units (21%) accounting for the rest (HIA, 2015). The large Volume Builders have become dominant, volume suppliers of housing across Australia, with, for instance, one of Australia's largest builders, BGC, in the 2014/2015 financial year starting 4,413 new detached homes in Western Australia alone (HIA, 2015). Over a ten year period the top 100 builders accounted for between 37% - 41% of all new housing (Dalton et al., 2011a; Dowling, 2005), whilst the top 20 volume builders' share was typically between 56% - 61% and the top 5 accounted for 40% of the top 20's share and this is increasing over time (Dalton et al. 2011a). Taken together, these characteristics point towards an oligopoly operating (Coiacetto, 2006), despite the plethora of small to micro-firms in the sector. Oligopolic behaviour is evident in the Volume Builder's ability to tell housing consumers what they want, how they want it and they do this by providing limited choices to maximise efficiencies of scale and profits (Reardon, 2013). In Australia though, this is subtly disguised as marketing a 'lifestyle', as evidenced by trends in various additional features that have been offered over time.

Typically, buying from Volume Builders does two things. One, it reflects Volume Builders' dominant competitive strategy which is to create a standard set of plans, often containing attractive 'features', with some choice in materials, finishes and options enticing consumers to build with them, whilst providing what appears to a wealth of options (Barlow, 2003, p. 92; Dalton et al., 2011b). Two, is to give infrequent purchasers with limited knowledge of residential construction processes, a sense of empowerment while guiding them in their choices of dwelling, features,

finishes and certainty of the price and product to be delivered (Barlow et al. 2003; Dalton et al., 2011b). These houses can be built as 'speculative' houses often as 'display homes' ahead of customer purchase or in response to customer orders (Dalton et al., 2011b).

Consequently, the literature has established the procurement process and the industrialised approach to volume building in Australia. However, this theory and approach has limitations in implementing sustainability and innovation. Currently, in Australia, new homes are to meet a minimum 6 star design rating under the Nationwide House Energy Rating Scheme (NaTHERS). This legislation to have minimum standards for energy efficiency has been in place since 1998 when the National Greenhouse Strategy was agreed by the Australian Government and all States and Territories. It was not till 2003 that the Building Code of Australia incorporated minimum energy efficiency standards for new homes; at first minimum of 4 stars, increased in 2006 to 5 stars and later in 2010 to 6 stars (NaTHERS Administrative and Governance Arrangements, 2015). However, Burke (2011) and Jewell (2015) exposed that the industry fails to deliver quality more sustainably and affordably, which, when examined in conjunction with a report by Pitt & Sherry (2014), exposed the current building practices in relation to the NaTHERS minimum requirements for new homes. Pitt & Sherry (2014) identified the environmental performance of Australian new dwelling construction is in disarray; stemming from a residential Energy Star rating system executed with poor accountability, a culture of corner-cutting, lack of independent verification, a disengaged supply chain, finger pointing and blame for inaction and poor delivery between stakeholders, limited information for consumers, and poor and problematic assessment and rating systems. There is a problem with how housing provision is currently achieved, and even legislation is not having a substantial impact on the sector achieving more sustainable housing. Consequently, perhaps the literature does not accurately reflecting current practice and as a result mechanisms put in place are not encouraging or targeting the right stakeholders who can enable change to create a more sustainable built environment.

3.2 Understanding the actual market: identifying the “New”

Current practice in the Australian residential market for the provision of new homes is dominated by organisations mass production of dwellings. The approaches vary slightly by type of product and production of the product, with community developers like Mirvac, Villawood, Stockland and Australand; to major project homebuilders like Metricon, Simmonds, Burbank and Henley Homes; to medium sized mass-produced home builders like Hotondo, Cavalier Homes, Now Homes, Pivot Homes. The relationship of these major players (collectively, Volume Builders) in regards to their interactions with the users (homebuyers) and their contractors, material suppliers and sub-contractors is not accurately reflected in the traditional supply-led procurement theory, but appear to be an industrialised approach to Design and Construct procurement approach.

The Australian Volume Builder's current practice of dwelling construction is shown in Figure 3, which highlights the industrialised Design and Construct approach's variance from the theoretical approach (changes discussed in Dowling 2004; London et al. 2001). As established in 3.1, Volume Builders are usually considered part of the supply of housing products procured by consumers, as shown in Figure 3. However, when exploring Volume Builders' relationships and interactions with other stakeholders suggests that the supply and demand relationships are otherwise. Their size and market dominance means they can dictate to both consumers and the other supply chain stakeholders (up to 108 trades and suppliers exist in this supply chain (Dalton, et al., 2011b, Tables 3 to 9)), their needs, requirements and to an extent price commanding cost efficiency, quality and timely delivery. The power relationship is established in the quantity and size of financial contracts with their supply chain which are not for a single house, but for 100s or 1,000s of homes. Consequently, for the trades and the suppliers (some of the many small businesses noted above), this contract maybe their sole business. As a result, the requirement to perform in terms of cost, quality and time is imperative to maintaining their contracts. The Volume Builders also have a power position in choosing suppliers and trades, with a few notable exceptions where some products, like Colorbond metal roofing material, have sole or limited suppliers. Innovation and implementation coming from the supply side is limited and the upwards push is often met with

substantial limitations particularly in the aspect of knowledge transfer (Thorpe et al., 2009).

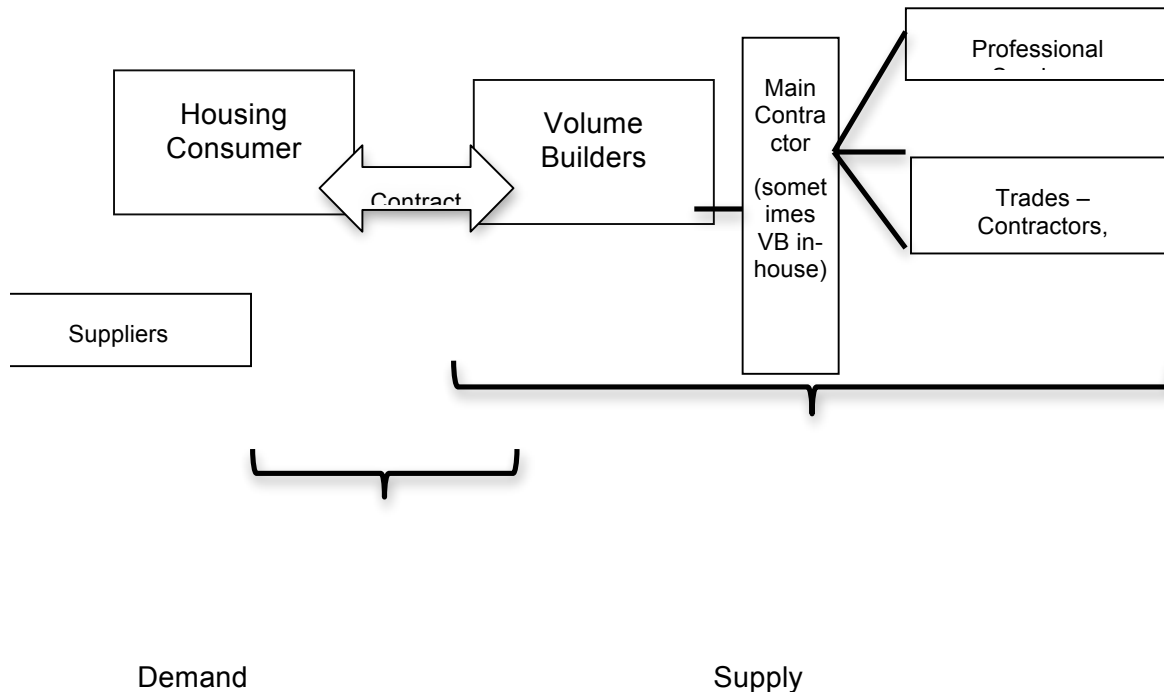


Figure 3. Australian Volume Builders' Current Practice

Source: Warren-Myers and Heywood (2016) Figure 3 Current Practice

The established view of the Volume Building sector as a Design and Construct process with the demand isolated to the home purchaser and the Volume Builder as part of the supply chain has, to date, been ineffectual for mainstreaming sustainable new housing, despite legislation requiring a 6 star NaTHERS rating. Issues in the certification of new homes were discussed in detail in the Pitt and Sherry Report (2014), however, when they examined stakeholders' opinions, as to why these issues occurred it was clear that a 'blame game' was occurring. The blame focuses on the consumer, who interestingly enough was not included as a stakeholder in the study. Catch-cries of 'little or no interest from consumers', 'not a priority' and 'not willing to pay' come from the planners, builders, designers, product suppliers and agents. Fundamentally, the Australian consumer is held to blame for the lack of development of more sustainable and resilient housing. Consumer theory also suggests the home purchaser is to blame, because an informed consumer can create demand to which the supply chain will then respond. However, for the consumer to have an effect this requires breadth (consumption creation and distribution) and intensity (volume, quality and frequency) of engagement to create the value and empowerment (Labrecque et al., 2014). In contrast, the home purchaser as a consumer of housing, is firstly and generally not knowledgeable about the building process, hence the choice of a Volume Builder; sustainability is not functional knowledge hence they do not know what to ask for; purchase of a house is generally a once-off activity for an individual in their lifetime; in relation to the volume builder they are only one of many customers and generally not a repeat customer. Consequently, the home purchaser's ability to create and drive demand for sustainability products in the residential housing market is very limited, despite the underpinning consumer theory.

3.3 Identifying the “New” to mainstream change

The case study participants interviewed exhibited approaches to home building consistent with the analysis in 3.2. They all agreed on the relationship between the consumer and volume builder; and the relationships between the volume builder and the construction procurement stakeholders. They agreed that while the consumers sought out their business, they (the Volume Builders) had ultimate control of the dwelling development, with contracts with various suppliers and contractors utilised to build more than one dwelling. Their supply side contracts were large and significant. However, an aspect that emerged was their role as more of a demand-side actor, rather than a supply-side stakeholder. This was established through participants drawing their understanding of how their organisation operates and their relationship with the housing consumer and the construction procurement activities. All participants identified the housing consumer as the user of the product. However, they were not the only actor on the demand-side, as all four Volume Builder participants clearly identified themselves as being, essentially, the client in the process, whilst the consumer was their customer as the end-user seeking a finalised product/package in the form of a completed dwelling. This contrasts with usual theory that the housing consumer is essentially both the user and the client (see for example Boyd & Chinyio, 2006; Love, 2002; Wilkinson & Schofield, 2003). This research supports Tombesi’s (2006) classification that the housing consumer is the Volume Builder’s customer and is the end user, choosing a ‘known’ product from a selection which only indirectly affects supply products through preference selection.

So contrary to the “old” Design and Construct theory and even 3.2’s current approach where Volume Builders are viewed as part of the supply chain; the volume builders interviewed here identified, in the current Australian residential building process, themselves as the actual client, and consequently, are considered a demand-side stakeholder rather than a supply-side actor. Clients are the initiators of the project (Atkin and Flanagan, 1995). Tombesi (2006) concurs that clients ‘prescribe the program, set the characteristics and define the ideal traits of what is yet to be produced’ (pp. 277). This is supported in the evidence. VB1 clearly identifies this role for themselves in the development, designing and production of their homes. They saw themselves as initiators; they clearly define the programme and traits of the development and homes that they produce. VB1 and VB2 have minimal options allowable beyond colour option selections within a prescribed palette, which align with a profile of choices throughout the dwelling. VB3 and VB4, due to how they operate within the sector as providers of individual houses, provide more options and choice to the consumer, however, “the purchaser doesn’t deal with the contractors, we deal with the contractors.” When asked how their organisation operates VB2, VB3 and VB4 drew themselves centrally as the main central actor with the consumer and the construction procurement supply chain. VB2 as a community builder noted in Figure 4 that the housing consumer has no interaction with anyone else in the building process apart from themselves; their only relationship and interaction is with the Volume Builder.

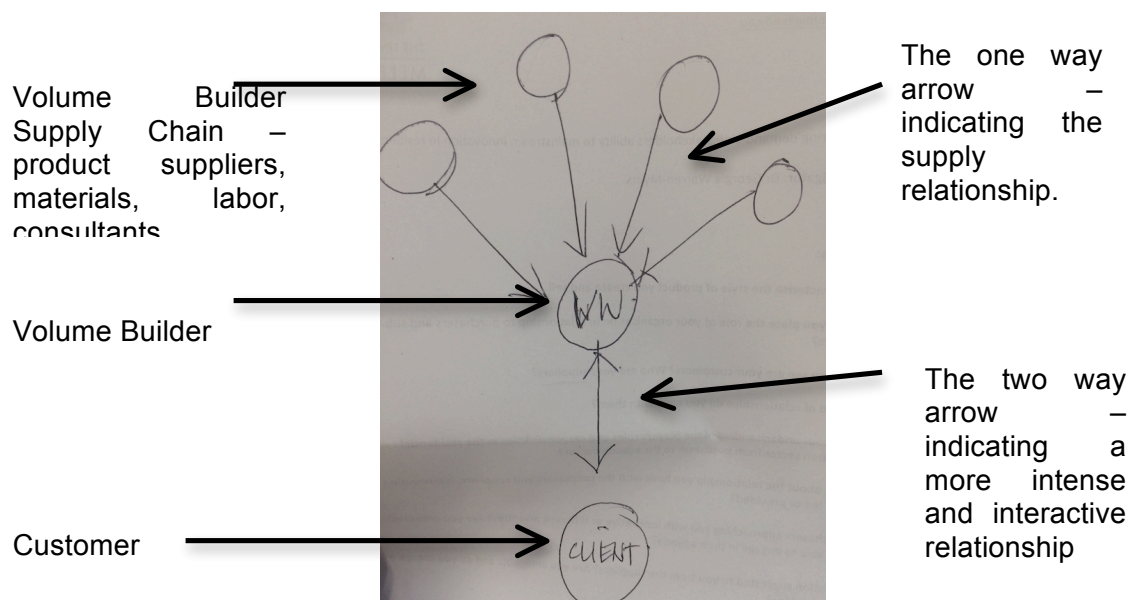


Figure 4. Volume Builder 2's Process Map

VB3 drew a similar style chart, see Figure 5, however, as a result of the franchise structure, the overall process was more complex. By elaborating on the relationships, it clearly identifies the role of relationships between the Volume Builder and various stakeholders in the construction procurement activities. Head office's main provisions were, for example plans, building systems and national marketing and main supplier arrangements. Then there are the specific contracts that are based on Australia-wide national supply providers – mostly focused on materials and products. Then the franchisee has their own contracts with local trades and suppliers, where the contracts are still significant in a small market, however, are substantially smaller than those in the national supply chain. The relationship between the VB3 and these supply-side stakeholders is characterised by large contracts for multiple dwellings, all centrally involving their organisation as the central and pivotal stakeholder in the process. Clearly identifying a separation between the housing consumer and the construction procurement activity stakeholders.

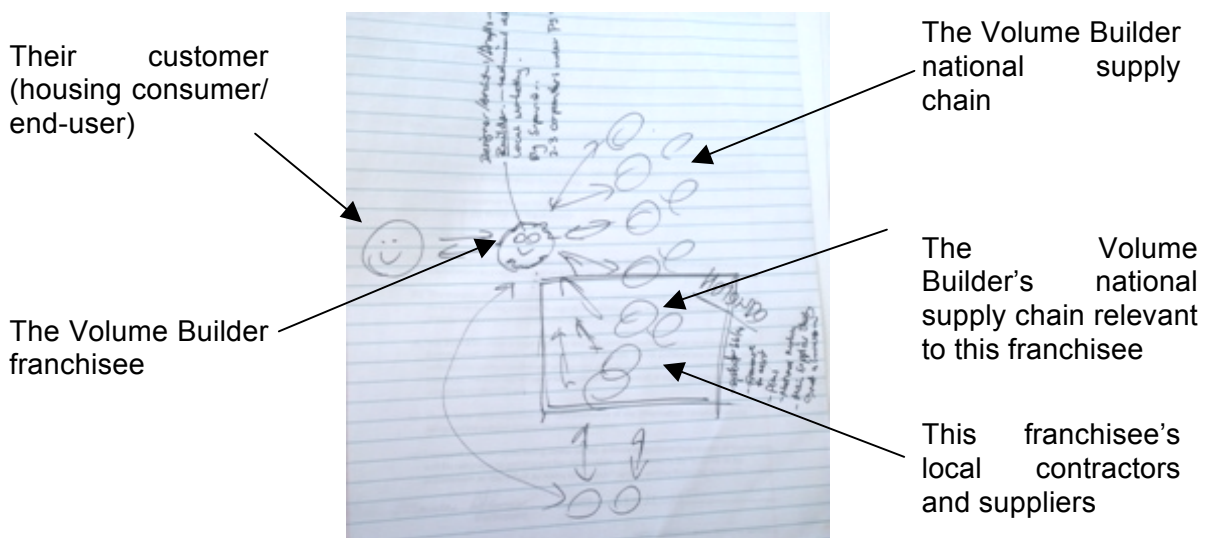


Figure 5. Volume Builder 3's process map

All participants clearly commented that they, the Volume Builder, their perception was they were the driver in the relationships, be it with the housing consumer (the customer), or with construction procurement stakeholders; although all had slightly varying structures around what occurred in-house (by the Volume Builder) versus what was sought from the construction procurement stakeholders. The Volume Builders clarified this by having internal parameters of what the contractors and suppliers were required to meet in terms of cost, quality and time. It was noted on several occasions that cost was not always the pivotal decision criteria, but often time (and historic record of timely provision) would be a factor and, importantly, quality. VB2 noted that it was also not necessarily the quality of the product as finished, but its longer-term maintenance and resilience in use, because cheaper products often had higher maintenance costs or required replacement within warranty periods.

In their relationships with the housing consumer, VB1 and VB2 were clear providers of products that cannot be altered or modified by the consumer. These two Volume Builders dictate down to the colour scheme what the consumer receives, in doing so, they still want to appeal to the customer, to gain their buy in and to do this they use techniques like marketing of a particular lifestyle to sell their product. Telling the consumer what they want, how they want it and creating a level of demand by marketing this lifestyle. However, both Volume Builders indicated they were informed by consumer tendencies, preferences and suggestions in any project and considered this for future projects. Consequently, consumers can only suggest and indicate what they want by knowing what it is they need or want. As a result sustainability considerations are inhibited because consumers are generally uninformed and don't know how or what to ask for in this context; this then inhibits the Volume Builders' project cycle from incorporating sustainability. VB2 also indicated the importance of ensuring what they developed aligned with consumer demand and interest, and also looked for 'features' that would entice homeowners to purchase that they didn't necessarily know or want, an example provided here was technology in the home. It is clear from these Volume Builders' interaction with housing consumers is mostly a one-way relationship, with the Volume Builders providing whilst consumers either purchase or not. So the power in the relationship remains with the Volume Builder, who acts essentially as a client, deciding on what should or shouldn't be incorporated, whilst the housing consumer is essentially their customer. This infers the Volume Builder acts as a demand-side stakeholder, clearly creating the demand for a product which is then provided by the supply chain of contractors and suppliers.

VB3 and VB4 as housing-only providers also gave greater ability to modify and adapt the product. However, standard protocol is to provide a standard set of plans, with standardised elevations, materials and features. This package will often come with a range of standard 'options', that the customer may choose, essentially making the housing consumer perceive there are options and choices. However, these choices are carefully crafted by the Volume Builder in a standardised way. Unique or individual modifications or changes cost a considerable amount, discouraging consumers from making adjustments. Even in the relationships' exploration with VB3 and VB4 it was still apparent that housing consumers were guided by the Volume Builders' provision and the power, although appearing to be more flexible compared to the community builders (VB1 & VB2), they limit the options available to provisions based on their ability to maintain cost efficiency and that achieve buyer interest and choice, consequently, the power remains with the Volume Builder. Both indicated they would consider changes or suggestions, however, it was not necessarily they would deliver, often in pricing and analysing the implications they would present to the housing consumer the cost implications and 'guide' them as to whether this was an option or not. The proliferation of Volume Builders has commodified the building process. Housing consumers have played a major role in this growth through demanding a process that provides certainty over product, brand security, ease of building process, control on costs and risk placed on the provider rather than the consumer.

When viewed from a power dynamics perspective founded in the oligopolic industry structure and the Volume Builders' substantial financial and contractual power with supply chain stakeholders, Volume Builders shift from a stakeholder on the supply-side to a key demand-side stakeholder. There they actually operate as a sophisticated 'client' in the supply chain in their procurement of construction products and services. Consumer demand theory supports this analysis (European Commission, 2012), where the Volume Builder as a key demand-side stakeholder will and does have the opportunity to drive change, in this case the ability to mainstream sustainability into the volume housing sector. Therefore, the research proposes that both the homebuyer and the Volume Builders are demand-side stakeholders; with the homebuyer being the ultimate housing consumer or user (Figure 6).

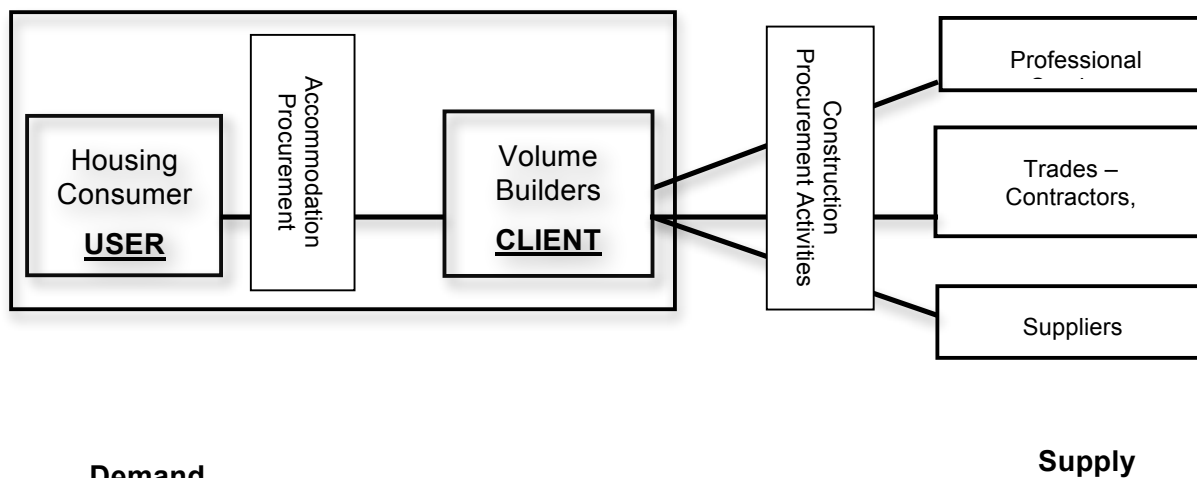


Figure 6. A framework for demand and supply players and relationships

Source: Warren-Myers and Heywood (2016) Figure 4.

This makes the housing consumer (user) not the only actor in the ‘Demand’ phase of residential building as shown in the framework above. In usual construction procurement models the consumer/user is the client. However, in the case of the current residential building process, the results show the client is actually the Volume Builder creating the demand with the contractual, financial and physical relationships with the supply chain made up in-house or external professional services (architect, planner, engineers, assessors), builders, sub-contractors and material suppliers. Due to the nature of this supply chain and the way in which the Volume Builders do not have singular contracts for one house, but agreements for mass-producing multiple homes this creates a much broader and larger demand component. The Volume Builder’s market size really means they are the essential ‘consumer’ and the one who controls the building process, as they can dictate to the supply what they want and how they want it. Consequently, under consumer theory (EU, 2012) they are empowered, they have the ability to be knowledgeable or bring in the knowledge, consequently they can drive the market for change given the right motivators – financial and marketing edge (identify signalling). As a result the need for increased sustainability can be driven by the Volume Builders as they are empowered with the ability to be knowledgeable or to bring the knowledge to drive market change, given the right motivators – financial and marketing edges. This was demonstrated by VB4 who, in a highly competitive market, found their marketing edge by differentiating through offering a more sustainable product. They approached their suppliers and contractors and indicated what they wanted to do and were able to negotiate excellent rates which meant that costs of moving to a more sustainable product did not demonstrate significant additional costs. Their existing relationships and contractual agreements meant that VB4 were able to bring sustainability innovation into the new home building process, and due to the collective approach of the demand side (in conjunction with their own consumer demand), VB4 provided the mechanism to drive the change. The common perception of Volume Builders in the sector is mass production, minimal cost, high profits, which makes it challenging to encourage changing their approach. However, as demonstrated by VB4 to gain a competitive edge over competitors’ sustainability innovations provided the ability to attract more consumers to their products, whilst providing “houses that look like, feel like those provided by the other builders, but are more energy efficient” (VB4).

Given consumers’ limited knowledge of the residential building process and sustainability opportunities in new homes; the ability of consumers to know and ask for sustainability initiatives is constrained and consequently perceived as lacking awareness and interest in sustainability. However, because housing consumers do lack knowledge in the building process generally and will often follow a default option when presented with new home building choices, if sustainability

initiatives and information are not provided by the Volume Builder in the process, how can they be informed and empowered to utilise their choice. Consequently, if the sustainability is offered by a Volume Builder as part of the package, change and market edge can be achieved by the Volume Builder attaining new customers, which in itself directs consumer choice and creating better outcomes. Consequently, in the new home building process sustainability demand can be driven by a collective approach by the demand side both the Volume Builder in providing initial and the consumer engaging in the product offered, this new understanding of the role of the Volume Builder can consequently provide the mechanism to drive the change. The relationship between marketing and presenting oneself as being a socially conscious organisation is a point of difference and achieves a competitive edge when applied in the context of presenting housing consumers with the opportunity to economically build a more sustainable home. Consequently, this research approaches the 'demand' side of the residential building process by considering the Volume Builder and housing consumer (user) as parties in the Demand side of the equation; which can then challenge old thinking and drive change through the sector to provide a more sustainable built environment.

4. Conclusion

This research focuses on the broad scale practice in the residential property industry which is dominated by Volume Builders in Australia. Innovation in the residential property sector is either, incremental – channelled indirectly from homebuyers' preference for products, or mainstream in response to mandatory requirements and legislation. However, to engage in sustainability's incorporation into housing's mass production, a new perspective is needed to examine the key stakeholders that can enable and drive change through the supply chain, whilst engaging the end-user, the housing consumer, in the process to create latent demand. This involves understanding the roles of key demand drivers in the residential property sector and how that different perspective can create levers to drive sustainability as innovation in the sector.

This paper established that the "Old" theory and approach to Australian residential building process comprises a variant of the Design and Construct procurement. This is utilised generally across the industry from the small contractors meeting localised demand to large state or national businesses (Volume Builders) operating across several geographic regions. Innovation in this model, theoretically, can originate from consumer demand but more realistically is dependent on the contractor in this case the Volume Builder, or to a lesser extent their design consultants. This is indicative of engagement in innovation within the construction sector which commonly focuses on supply-side initiatives with relatively limited evidence in the construction literature examining the consumer and client perspectives. Sustainability inclusion is inhibited in this model and the consumer bears the brunt of the lack of implementation and blame for lack of engagement in the sustainability agenda. However, how can an uninformed consumer know what to ask for in terms of sustainability to create that demand, when they themselves are generally foreign to the building process per se. The current approach to housing provision in Australia is structured so that while uninformed consumers can navigate the complex process of building a new home, they are ultimately guided by the Volume Builder.

The approach to new housing has proven problematic in mainstreaming sustainability in new housing through lack of provision on one side and lack of engagement on the other. However, if viewed with a new and different lens, opportunities can be identified where sustainability and innovation can be integrated into the system that drives change in products available to end users and down the supply chain. The re-examination of the roles, responsibilities and relationships between primarily the housing consumer, the volume builder and the supply chain contractors and suppliers, points to a more complex framework than the simple commoditised Design and Construct approach. The new framework, identifying the Volume Builder as an integral and important demand-side stakeholder, that commands power with both the end user (the housing consumer) and the supply chain means change can be channelled and directed by the Volume Builder. Consequently, recognising this important power relationship may be the key to drive change and innovation long-term within the sector. The suggested "New" model for the relationships in new housing, may tap into unharnessed market power through the

recognition of the ultimate demand stakeholder and engage the industry in broad-scale change, innovation and mainstreaming of sustainability in new homes.

References

- Atkin, B. & Flanagan, R. (1995) *Improving Value for Money in Construction*, London: Royal Institution of Chartered Surveyors.
- Australian Bureau of Statistics (2014) *Building Approvals: Australia* (Cat. No. 8731.0; Table 21 Value of Dwelling Units Approved: Australia: New Houses), accessed www.abs.gov.au on 18/11/2015.
- Barlow, J., Childerhouse, P., Gann, D., Hong-Minh, S., Naim, M. & Ozaki, R. (2003) Choice and delivery in housebuilding: lessons from Japan for UK housebuilders, *Building Research and Information*, 31(2), pp. 134-45.
- Boyd, D. & Chinyio, E., (2006) *Understanding the Construction Client*, Blackwell Publishing Ltd., Oxford.
- Coiacetto, E. (2006) Real estate development industry structure: Is it competitive and why? *Urban Research Program, Research Paper, 10*.
- Dalton, T., Chhetri, P., Corcoran, J., Groenhart, L. & Horne, R. (2011a) *Understanding the patterns, characteristics and trends in the housing sector labour force in Australia*, AHURI Positioning Paper No.142. Melbourne: Australian Housing and Urban Research Institute.
- Dalton, T., Wakefield, R. & Horne, R. (2011b) *Australian suburban house building: industry organisation, practices and constraints*, AHURI Positioning Paper No.142. Melbourne: Australian Housing and Urban Research Institute.
- Dowling, R. (2005) 'Residential Building in Australia, 1993-2003', *Urban Policy and Research*, 23(4), pp. 447-464.
- European Commission, (2012) A European Consumer Agenda - Boosting confidence and growth, Communication from the Commission to the European Parliament, The Council, The Economic and Social Committee and the Committee of the Regions, May 2012, accessed 16/11/2015 http://ec.europa.eu/consumers/eu_consumer.../consumer_agenda_2012_en.pdf
- Harry, B., Sturges, K. M., & Klingner, J. K. (2005). Mapping the process: An exemplar of process and challenge in grounded theory analysis. *Educational researcher*, 34(2), 3-13.
- HIA (2014) *HIA Housing Forecasts* November 2014, accessed www.hia.com.au on 20/2/2015.
- HIA (2015) *Housing 100 2014/15*, Housing Industry Association Economics, Campbell, ACT.
- Labrecque, L. I., vor dem Esche, J., Mathwick, C., Novak, T. P., & Hofacker, C. F. (2015). The Evolution of Consumer Empowerment in the Social Media ERA: A Critical Review. In *Ideas in Marketing: Finding the New and Polishing the Old* (pp. 582-582). Springer International Publishing.
- London, K. A., & Kenley, R. (2001). An industrial organization economic supply chain approach for the construction industry: a review. *Construction Management & Economics*, 19(8), 777-788.
- Love, P. E. (2002), Influence of project type and procurement method on rework costs in building construction projects. *Journal of Construction Engineering and Management*, 128(1), pp. 18-29.
- Love, P. E., Skitmore, M., & Earl, G. (1998), Selecting a suitable procurement method for a building project. *Construction Management & Economics*, 16(2), pp. 221-233.
- NaTHERS Administrative and Governance Arrangements (2015) *Nationwide House Energy Rating Scheme (NatHERS): Administrative and Governance Arrangements, August 2015*, Report August 2015, accessed 13th April 2016 from <http://www.nathers.gov.au/sites/prod.nathers.gov.au/files/files/Admin-governance-arrangements-August%202015.pdf>.

- O'Brien, W. J., London, K., & Vrijhoef, R. (2004). Construction supply chain modeling: A research review and interdisciplinary research agenda. *ICFAI Journal of Operations Management*, 3, 64–84.
- Pitt & Sherry. (2014). National energy efficiency building project. Adelaide: produced by Pitt & Sherry for Department of State Development – Government of South Australia.
- Reardon, C. (2013), Buying a home off the plan, in *Your Home*, accessed <http://www.yourhome.gov.au/> on 20/2/2015.
- Thorpe, D., Ryan, N., & Charles, M. B. (2009). Innovation and small residential builders: An Australian study. *Construction Innovation: Information, Process, Management*, 9, 184–200.
- Tombesi, P. (2006), Good thinking and poor value: on the socialization of knowledge in construction. *Building Research & Information*, 34(3), pp. 272-286.
- Warren-Myers, G. & Heywood, C. (2016) Investigating demand side stakeholders ability to mainstream sustainability in residential property, *Pacific Rim Property Research Journal (2016)*, 1-17.
- Wilkinson, S. & Schofield, R. (2003) 'Procurement systems for construction projects', in *Management in the New Zealand construction industry*, Chapter 21, Pearson Education, Auckland, pp. 239-249.
- Yin, R. (1994) *Case study research: Design and methods*, 2nd ed., Sage Publications, Thousand Oaks, CA.

The influence of public participation on industrial wastewater management in Thailand

Tiraprapa Ratanachoti and Pauline Deutz

Abstract

This study examines the influence of local communities on the governance of industrial wastewater in Thailand. Wastewater is one of the most severe environmental problems in urbanised and industrialised areas in Thailand because of inadequate wastewater treatment facilities and poorly enforced regulations. Whilst studies in other contexts have indicated the influence of the opinion of local communities on companies' environmental practice, this has not been studied in Thailand. Previous studies of public participation in Thailand, however, indicate that the importance officially attached to it is not reflected in practice. This project investigates public participation related to industrial wastewater management, in Thailand, asking the questions: 1. To what extent do the public think there is a problem with wastewater management? 2. How do the public engage with companies? 3. To what extent are companies' environmental practices influenced by the view of the public? A questionnaire survey was carried out in two rural provinces (Ayutthaya and Khonkean) with a total of approximately 200 respondents from communities in industrial areas. Additionally, 12 interviews were carried out with government officers, company and NGO representatives. Results indicate that the public are concerned about water quality locally and nationally in Thailand, whilst suggesting that standards of environmental practices vary between companies. The view of the public in local government decision making is represented via elected village leaders. Village leaders also provide information on environmental issues to the community via public meetings. The interviews indicated that government and company representatives thought public participation is an important factor in environmental management. However, the NGO suggested that public engagement such as opening the company for visits are mostly effective in protecting the image of the company, rather than influencing practices. Thus although there can be a harmonious relationship between companies and their local communities, it is difficult to gauge the practical influence of public participation on company environmental behaviour. In this project, the brewing industry in Thailand may be an example of "good practice" for public participation on industrial wastewater management. However, wastewater is still a problem and managing it needs cooperation between government, companies, and also the public.

Keywords: Public participation, industrial wastewater, industrial wastewater management

Revolution from the inside. How Grassroots Political Party Activism Changed Scottish Government Energy Policy

Iain Black

Abstract

As part of the whole systems approach required, national governments represent a key constituency that must be influenced if irreversible climate change is to be avoided. However, many governments, including those in countries producing the largest amount of ghg equivalent pollution (by volume and per capita) continue to resist setting scientifically appropriate carbon pollution reduction targets or set them but fail to meet them, partly through contradictory energy policy decisions. Evidence is therefore required on how to influence government policy and in particular energy policy. This paper aims to examine how political party structures can be used to affect pro-environmental policy making. It examines how a grassroots campaigning organization, affiliated to the party in power in Scotland, the Scottish National Party (SNP), was credited with changing government energy policy. Participant observation was conducted from June to October 2015 within "SMAUG" (SNP Members Against Unconventional Gas) an informal, internal group whose goal was to obtain a moratorium on underground coal gasification (UCG), a particularly damaging form of carbon fuel extraction. The small size of its management group and its open leadership style enabled the researcher to collect data by attending all meetings and had access to all social media channels, emails, planning documents and press releases. The findings show how the organization's strategy involved co-opting party structures and mechanisms coupled with a community assets based social marketing approach to build pressure on key decision makers. It used marketing concepts such as branding, targeting and positioning and employed a range of social and traditional media channels to propagate its message. The campaign focused on persuading two key audiences, the Energy Minister and party members who would vote on a resolution calling for the moratorium at its annual conference. A resolution SMAUG member's had been involved in drafting. To build support, expertise and pressure, it actively recruited party members (gathering 1776 Facebook likes and over 200 members) and branches and developed links with the wider anti-unconventional gas movement. It positioned itself on two dimensions-appealing to party values (specifically that the existing policy was an anomaly to its traditions of progressive environmentally concerned politics) and positioning itself against a multinational company and with local communities under threat from UCG. In this way it largely avoided alienating itself from other party members and its hierarchy. This positioning was achieved through managing its messages on social media and through press releases reported in national print and broadcast media. The media were receptive to the group's releases as they could be used to support their story on the inconsistencies between the SNP's position on climate change and its current UCG policy. By taking this internal position and tapping into wider political tensions, it put significant pressure on the party and was credited as having been instrumental in a moratorium being announced a week before the conference. Hence this research shows how democratic routes to influencing climate change policy can work but doing so requires mobilizing wider support and leveraging party political concerns.

Keywords: Social Movements, Sustainable Development, Social narratives

Identifying stakeholders in a structured way - A basis for developing sustainable energy business models for cities

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Abstract

In the last decades, the topics of energy savings and renewable energies have created changes at the international, national, regional and local levels. These changes mostly occurred in the political, technological, and social spheres. Among local stakeholders, cities play an essential role by coordinating transitions towards sustainable energy systems, and encouraging (renewable) energy providers to re-think and eventually re-design their business models (Ostwalder and Pigneur, 2010). However, an essential step in this process is often undervalued and conducted with bias: the identification of stakeholders and their present and future roles (Reed et al., 2009). Also, traditional client-centred approaches are commonly followed and these are being obsolete in the energy sector since today clients can also produce or store energy which converts them into energy suppliers. The conducted research tests a part of the Supply Chain-Oriented Procedure for Identifying Stakeholders (SCOPIS) that addresses the bias of stakeholder identification by placing the product at the centre of the analysis (Fritz, 2016). This is applied in the case of an Austrian city located in Styria, which is in transition towards sustainable business models for energy supply. In this case, the procedure is tested from a service perspective (energy supply). SCOPIS includes firstly a literature review to identify stakeholders and their roles in scientific literature. Secondly, the results of this literature form the base of a "Supply Chain Diagram" where energy (electricity, gas and heat) is at the centre, and all local, regional, national and international stakeholders that supply/use energy, or may influence a change in the system, are represented. Thirdly, the feedback of 3 participants is collected in bilateral meetings (project coordinators and researcher). The diagram is then updated and used to stimulate a focus group discussion with the local Biogas and Heat producer, the municipal utility, the regional energy provider, and the project partners from two universities. Some resistance was observed at the beginning due to the placement of energy at the centre of the diagram instead of the client. But once the process was understood, a fruitful exchange took place which validated, enhanced and slightly contradicted the initial findings from the literature review and the bilateral meetings. Additionally, it was challenging not only to think about individual business models but to identify synergies in organising regional business models that create value for all market partners. The overall result is a diagram that depicts the stakeholders in the studied city that should be addressed to build a sustainable energy business model. With the use of a structured process and triangulation of methods, the common problem of bias in stakeholder identification is avoided. The use of the SCOPIS procedure from a service perspective can be recommended for similar research since no major obstacles were encountered. One difference to be noted compared to the original procedure built on the case of a global product, is that identifying stakeholders on a local level (e.g. city) does not require large-scale research methods like an online survey since all important stakeholders are easy to reach.

Keywords: Energy, smart-city, stakeholder identification, business model

References

- Fritz, M.M.C., 2016. A supply chain-oriented procedure for identifying stakeholders (working paper).
Osterwalder, A., Pigneur, Y., 2010. Business Model Generation. Wiley and Sons, New Jersey.
Reed, M.S., Graves, A., Dandy, N., Posthumus, H., Hubacek, K., Morris, J., Prell, C., Quinn, C.H., Stringer, L.C., 2009. Who's in and why? A typology of stakeholder analysis methods for natural resource management. *Journal of Environmental Management*, 90, 1933–1949. doi:10.1016/j.jenvman.2009.01.001

Towards Citizen Empowerment in Czechia: An Interurban Comparison of Grassroots Mobilizations in Post-democratic times⁶

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Abstract

Since the late 2000s, cities across Czechia have seen an unprecedented dissemination of urban grassroots mobilizations that critically address the flaws of neoliberal spatial production and municipal governments' failure to ensure urban development that is environment friendly, just and democratic. Citizens' efforts to assert their right to participate in urban planning and to critically engage in urban affairs have been met with various challenges which can be ascribed to a combination of global and local factors. This paper examines how Czech urban grassroots respond to governments' post-democratic tendency to neutralize its citizens' political agenda in order to defend its logic of power and wealth redistribution in the context of a Czech political culture and the remaining socialist legacy. This context manifests itself through unresponsive, corrupt and overly bureaucratized public authorities, clientelism, passive civil society, and the low legitimacy of political activism. Acknowledging that citizens engaging in urban conflicts are sometimes confined to the same defence mechanisms as those employed by governments protecting the status quo, this paper explores the potential for contemporary urban grassroots initiatives to move beyond this vicious cycle of mutual alienation, animosity, distrust and repudiation between citizens and local authorities. Using research concerning self-organized groups in seven Czech cities, five Bohemian and two Moravian, conducted between March 2014 and April 2016, this paper explores how Czech urban grassroots experience the challenges they encounter during their mobilizations around issues of spatial production, and what coping strategies they use in response. The paper comes to the conclusion that the same strategies can empower citizen emancipation, as well as perpetuate the political culture that contributes to the persistence of a closed political opportunity structure for citizen participation. While empowerment mostly occurs in conflicts of city-wide scale, perpetuation of the status-quo stems from first-hand solutions in conflicts of any scale.

Keywords: post-democracy, spatial production, grassroots mobilizations, urban conflicts, citizen empowerment

1. Introduction

Citizen participation in urban development, and urban conflicts in general, receive relatively little attention by Czech academia. This could be attributed to the scarceness of citizen mobilizations related to spatial production during the initial conditions of the post-socialist transformation, a consequence of Czechia's deficient political culture and underdeveloped civil society (Skalník, 2009), the unpopularity of political activism (Císař, 2008; Kňapová, 2013), and the distorted relationship to planning practices following the negative experience of central planning (Hoffman 1994; Maier 1998). Aside from the more practically orientated studies on public participation projects (Klápšřová and Klápšřě, 2010), two interesting exceptions are the work of Horak (2007) on conflicts in post-communist Prague over preservation and development in the historic core, and the

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planning of the main road network; and Durnová's (2015) study of the controversy over the mass-scale rebuilding of the railroad station in Brno.

By pointing to a profound mutual alienation, animosity, distrust, and repudiation, the studies of both Horak and Durnová depict features that seem to be characteristic of the interaction between activists and local authorities in the Czech capital and the Moravian metropolis. Horak (2007) uses the self-invented concept of a "dynamic of mutual delegitimation" to describe the situation in which opponents mutually reject each other not only in terms of the substance of their conflicting visions, but also in terms of the very ability of the opposition "to act as constructive participants in the policymaking process" (2007: 122). Durnová (2015) on the other hand uses discourses to explain policies and related conflicts in her analyses of the emotional experiences' effects on the opposition's communication regarding controversial issues. In her case this is "the highly charged language" of mutually alienated Brno residents and experts, who go so far as to call each other names in their conflict over Brno's railroad station. Both authors bring strong empirical evidence of the defence mechanisms the contemporary "democratic" order in Czechia uses in accounting for the concerns of the citizens, whose demands challenge what Wilson and Swyngedouw (2014: 3) call "the exclusive, oligarchic, and consensual governance of an alliance of professional economic, political and technocratic elites determined to defend the neoliberal order by any means necessary."

This paper contributes to the debate on citizen participation in urban planning in Czechia by examining the challenges that the Czech urban grassroots encounter during their mobilizations around issues of spatial production, and analyses the emancipatory potential of the way insurgent citizens cope with them. The research is based on extensive qualitative data collected in seven Czech cities, five Bohemian and two Moravian, between March 2014 and April 2016. Pointing to the global crisis of the hegemonic economic order and power relations, the paper introduces Czech urban governance and planning with reference to Rancière's (1999) concept of post-democracy, pointing out the democratic order's tendency to neutralize the political agenda of the demos, i.e. the people to whom it has falsely ascribed power, and thereby becoming a depoliticized servant of the global market and its logic of wealth (and power) redistribution. Furthermore, the paper takes into account local specifics stemming from Czechia's post-socialist transformation and the remaining socialist features, which according to Sýkora and Bouzarovski (2012) keep influencing local social practices and institutions.

The results of this research suggest that the "dynamics of mutual delegitimation", as well as relationships charged with negative emotions are far from extinct even outside of Prague and Brno. In many cities, this vicious cycle contributes to the persistence of a closed political opportunity structure for citizen participation. The late 2000s have nonetheless demarked an important turning point in terms of unprecedented dissemination of new urban grassroots initiatives across the country, which attempt to assert their right to participate in urban planning and critically engage in urban affairs. What needs to be answered is whether these mobilizations contribute to citizen empowerment, or to the persistence of the status quo.

In the following section citizen participation in Czech urban development will be contextualized within the frameworks of global processes and relations, as well as local influences. In the methodological part, the research methods, case studies and the self-organized groups featured in them, will be introduced. The analytical part will introduce the challenges citizens experience in their engagement, and will analyse the emancipatory potential of the ways in which citizens cope with them.

1.1 Citizen participation in post-democratic times

Upon abandoning really existing socialism in November 1989, people in former Czechoslovakia hoped that “a combination of liberal democracy and an orientation towards Western Europe would function as an automatic springboard to wealth, prosperity, transparency and the rapid development of all branches of society” (Skalník, 2009: 240). However, for Rancière (1999) “the idea that democracy ensures in one go political forms of justice and economic forms of production of wealth, as well as setting up interests and optimizing gains for all”, further legitimized by “the bankruptcy of the so-called totalitarian states”, is paradoxical (Rancière, 1999: 95). His concept of post-democracy points to the fact that just like other social orders, liberal democracy also has a hierarchy, in which a certain part of the society has no part in both decision-making nor the wealth-redistribution, and its demands and concerns are therefore rebuffed (ibid). The idea of democracy as a power of equal people is therefore contradictory. Moreover, as Blühdorn (2014) notes, even if ideal ‘genuine’ democracy existed, its meaning would not be static, but always in flux, reconfigured and redefined. Czechoslovaks nonetheless adopted liberal democracy as a given, as some kind of panacea to all their post-socialist ills (Skalník 2009), along with liberal capitalism as its ally.

In 1989, Czechoslovaks were little aware of the ongoing global transformation of capitalism towards its current neoliberal form, and the skyrocketing social inequalities it was about to bring. Contrariwise, a quick achievement of compatibility with neoliberal accumulation regimes was strongly supported by the first post-socialist governments, whose desire for economic prosperity soon overshadowed the country’s social and environmental objectives (Cooper and Morpeth, 1999; Jehlička and Kostecký, 1995), and this had vast implications for the socio-spatial restructuring of Czech cities (Sýkora and Bouzarovski, 2012). By facilitating the neoliberal instrumentalisation of urban politics and planning, Czech governments emulated the same urban model that protects the global hegemonic order whereby elites enrich themselves by impoverishing others, and that people are protesting against worldwide (see Brenner et al., 2012; Harvey, 2012; Gualini et al., 2015; Swyngedouw, 2014).

The problems of the neoliberal city became blatantly exposed by the global economic crisis in the late 2000s, eventually forcing increasing numbers of Czech citizens to gradually abandon their passive attitude towards public affairs, and leading to the formation of new citizen initiatives (Pixová and Sládek, 2016). Especially after 2010, urban grassroots activism started to spread to other Czech cities. With the exception of the squatters’ activities in Prague (Pixová and Novák, 2016), their mobilizations have not been comparable to movements like the Spanish Indignados, Occupy Wall Street, the U.S. “Right to the City” alliance, or other mass protests against displacement, controversial development projects, discrimination, etc. that exist in cities worldwide (see Brenner et al., 2012; Harvey, 2012; Swyngedouw, 2014). Instead of addressing the capitalist hegemony over spatial production, the prevailing tendency of the Czech urban grassroots has been to address the undemocratic nature of urban politics, embodied by corruption, non-transparency, uncommunicativeness, and unsustainable development.

Due to the assumption that these flaws can be tackled through the inclusion of citizens into urban planning, it has become fashionable to talk about “participation” as a new kind of panacea to the ills of the post-democratic city. What the Czech urban grassroots fail to see is the political economy behind post-democracy, and that in the globalizing context, which Pacchi and Pasqui (2015: 79) ascribe with “political and institutional fragmentation, pluralization and individualization of social problems, and absence of the traditional vehicles of social demand”, public discussion about city development is difficult worldwide (ibid). It remains embedded in the existing dominant order of market-led processes and development priorities, which cities worldwide are destroyed by to begin with, and excludes those who do not fit into the consensual endorsement of capitalist social relations (Gualini et al., 2015). Even participatory approaches therefore disavow a large part of the society and deny its equal share of power and rights. What kind of participation the Czech urban grassroots actually want to pursue is, therefore, unclear.

1.2 Mobilizations amidst post-socialist urban “revolution”

In general, the Czech urban grassroots avoid organizing mass demonstrations and rallies. With the exception of the squatters' scene in Prague, they practically never employ strategies outside of the legal frameworks established by the local model of representative democracy and its standard bureaucratic procedures. Non-violence is always a priority, which according to Jacobsson (2015: 14) might be a legacy of pacifist dissidents such as Václav Havel, and their understanding of civil society as something ethical, rather than political. Along with Saxonberg, she also pointed out that “engaging in classical contentious politics makes sense for those living in countries with a strong state and an established society”, while in the countries of Central and Eastern Europe, where states tend to be weak and unresponsive, and societies generally weak, it might make sense for the grassroots to choose other types of strategies, such as engaging in service provision or professional advocacy (Jacobsson and Saxonberg, 2013: 2).

In Czechia, whose politics are characterized by statism, citizen passivity, and a robust crisis of trust (Müller, 2005), the state is not weak. It is however quite unresponsive, with power restrained to leaders of political parties, who limit their interdependence with citizens to quadrennial elections. Society, on the other hand, is still quite weak and reluctant to engage in civilian life (Skalník, 2009). In combination with capitalism and the business opportunities it provides, this post-communist “heritage” evolved into a vicious cycle of non-transparent politics, clientelism, and corruption (Müller, 2005; Smith, 2010; Naxera, 2015). Similar to other countries in post-communist Europe, these factors pose a significant challenge to citizens' ability to influence spatial production in places where they live (Jacobsson, 2015).

1.2.1. Land-abuse planning entrenchment

In order to address citizen participation in urban development, we need to shift from the state level to the municipal one. In Czechia, previously Czechoslovakia, autonomous municipal governments were established as part of the post-socialist reform of the public administration system, whose aim was to decentralize political power and shift many of the state's responsibilities, including its property, to the local level. Local authorities democratically elected in municipal elections were granted new rights and responsibilities, such as managing municipal budgets, or administering municipal assets, land-use development and planning. They also had to deal with reforming local government financing, which during the unstable and fluid conditions of the early post-socialist transformation underwent frequent and radical changes (Blažek, 2002), causing unstable municipal budgets. At the same time, municipal positions of power also provided opportunities to pursue various vested interests and create local clientelistic networks, which in many cities hindered governments' from becoming transparent to the public (see Horak, 2007).

In these conditions, land-use plans became a tool that facilitated the interests and priorities of the ruling leaders, not dissimilar to the rigid, technocratic and directive land-use plans abused for forty years by the Communist Party in order to carry out the obligations centrally prescribed by five-year plans. The general hope, that planning would become democratized, open to the public, and more friendly to the environment, was therefore in vain (Hoffman 1994). Moreover, Czech society in the early 1990s tended to view land-use planning as a useless relic of the past era, hindering an adequate and timely adaptation to new socio-economic conditions. However, as Maier (1998) noted, conditions for a decentralized public administration, a market economy, and real-estate developmental soon proved land-use planning as necessary and useful, which led to the entrenchment of the insufficiently reformed practice inherited from the past era.

This uncommunicative and technocratic approach to urban planning soon proved useful and practical in the promotion of growth-oriented development. This further entrenched the abuse of planning for ill-advised spatial production and the pursuit of different vested interests. This

approach has proven destructive for growing cities, where capital investment is not strategically regulated (it is however subject to excessive bureaucratic and technocratic regulations), as well as cities in decline, which attempt to instigate growth through further suburbanization, neglecting areas affected by disinvestment. Furthermore, many cities instigated massive privatizations of their assets, frequently in a non-transparent way and regardless of the assets' future use. Many municipalities have thus kept very little property at their disposal, ending up in vulnerable positions from which control and strategic decision-making over their area of jurisdiction is hard to exercise.

1.2.2. Voices without the right to be heard

It comes without surprise that the combination of radical and time-compressed urban restructuring of post-socialist cities and the above described flaws of urban governance have resulted in many cases of controversial urban development and conflicts between local authorities and citizens. Nonetheless, the development of contemporary forms of grassroots mobilizations has not been fast and easy, and still continues.

Despite the weakness of Czech civil society and its totalitarian past, individuals and groups have attempted to influence controversial cases of spatial production since the 1980s. As shown by Horak (2007) in his case study of Prague, many of the first activists operating in the new "democratic" context were continuators of the Czechoslovak environmental movement, whose mobilizations against the deteriorating living conditions under the communist regime eventually led to the Velvet Revolution in November 1989 (Císař, 2008; Jehlička and Kostecký, 1995). Activists soon discovered that the authorities' unresponsive and deceptive attitude outlasted the regime change. Under the new conditions, socialist legacies were reshaped into a deficient political culture, which saw elections as the only legitimate or appropriate form of citizen engagement (Skalník, 2009; Kňapová, 2013). The societal atmosphere was further affected when environmental and human rights' concerns were sidelined during the governments' main transformation efforts under the leadership of the Czech Prime Minister Václav Klaus between 1992 and 1997. Klaus's perception of certain forms of activism as extremism, and a danger to the country's smooth transition to capitalism, significantly contributed to the marginalization of political activism in Czech politics and its overall discourse (Císař, 2008: 96). It also fits into Hauser's (2010) observation of the tendency for post-communist societies to perceive people's emancipation as a potential danger that connotes their negative experience with the "people's democracy" under the previous regime.

However, towards the end of the century the political opportunity structure for political activism eventually started opening up. This was mainly due to the processes of Czechia's accession into the EU, which places strong emphasis on the "Partnership Principle" among institutions and citizens (Císař, 2008). The first experiments with participatory planning occurred as part of the principles of sustainable development included in the United Nations' Agenda 21 plan, applied in Czechia, for example, by The National Healthy Cities Network. Other significant steps forward in terms of citizen participation, at least formally, came about in 2004 with Czechia's ratification of two important international conventions: The European Landscape Convention, and the United Nations' Aarhus Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters.

Despite this empowerment of a citizen's right to participate in planning and decision-making concerning their living environment, citizen engagement in public affairs has remained marginal and controversial to date. Participative projects that some cities have been experimenting with have not brought any helpful or significant outcomes. They are rarely well-conducted, tend to serve utilitarian purposes, and are often abused. As such they are frustrating for everybody involved. Politicians, planners, and even some citizens are consequently inclined to see them as useless, untrustworthy and unreliable, or even unrepresentative and undemocratic as they are attended

predominantly by the most active citizens. On top of that, negative experience with participatory projects tends to be used as a way to legitimize the authorities' aversion to public inclusion in planning and decision-making processes, and avoid acknowledging a citizen's right to participate in urban affairs as such. As a result, grassroots initiatives, which critically address spatial production in cities, have to deal with many institutionally and socially entrenched challenges, sometimes also with limitations to their own conduct and attitude. These challenges will be detailed in the analytical section, along with an assessment of the strategies that mobilized citizens employ in coping with them as regards their potential to empower the citizen's role in spatial production.

2. Methods

With the intention of moving beyond the spatially limited perspective offered by research that only focuses on the capital city and a few major metropolises, the research of citizen participation in urban planning in Czechia was performed in five Bohemian and two Moravian cities. Between March 2014 and May 2016, case studies of self-organized groups were performed in the following cities:

- Czechia's two biggest cities: Prague (1.2 million) – the country's capital; and Brno (377 thousand) – a Moravian metropolis
- two cities with a population of around 93 thousand: České Budějovice, a South Bohemian metropolis; and Hradec Králové, an East Bohemian metropolis
- three medium-sized cities with a population of around 45 - 50 thousand: Jihlava, a metropolis in the Highlands Region; Jablonec nad Nisou – a North Bohemian city in the Jizera Mountains; and Prostějov – a city in the Olomouc region

Cities were selected with the intention of obtaining diversity in terms of size and location, and with regard to ongoing citizen mobilizations around contentious spatial production. Since the research is mainly based on qualitative methods, an important selection criterion also included the presence of communicative gatekeepers, i.e. persons willing to facilitate or mediate the researchers' access to the field settings and the participant subjects. One city is one researchers' home town, and was selected due to her familiarity with its environment. Prague represents a special case, as both researchers are based there and have conducted related research projects as well as participant observation since the late 2000s.

The main sources of qualitative data are 62 semi-structured interviews conducted in the selected cities. Out of the interviewees, 50 were representatives of urban grassroots initiatives engaged in local affairs related to urban development, 21 were politicians (15 politicians were former "activists"), and 18 were city planners or architects (3 were municipal administrators). Some interviewees' roles overlapped, and in some cases their role changed over the course of the research. Further in the text the term "participant" is used when referring to the representatives of grassroots initiatives, whereas other roles are specified. Most interviews were collected individually and recorded. 3 interviews were expert interviews, 4 interviews were conducted via Skype, 3 were in written form, and 1 was borrowed from other research. Interviews with participants were transcribed in a selective protocol (Mason, 2002), and based on open coding divided into two thematic groups; (1) challenges experienced by the participants in civic engagement, and (2) strategies used by participants to overcome these challenges. In further axial coding, challenges were identified as arising from (a) low legitimacy of political activism, (b) the attitude of the bureaucracy and local authorities, and (c) the passive attitude of other citizens.

A majority of the participants had middle-class status and university education. While participants were not queried about their age, most of them were in their thirties or forties, however, they also included several retired participants and one teenager. For most participants, it was typical to adhere to centrist or moderate-left politics, although some participants wrongly conceive of themselves as apolitical due to their rejection of conventional politics. In practice, this usually implies their adherence to centrism. As regards the gender distribution, 44 males and 18 females were interviewed.

The self-organized groups differed from each-other in terms of the character of their activities, issues they dealt with, number of participating citizens, number of contested issues, or level of cooperation with other groups and individuals, in addition to other details which could not all be listed here. The main controversies followed during the research project were:

- **Prostějov:** controversies around the demolition of old barracks and the non-transparent sale of the KaS cultural centre
- **Jablonec nad Nisou:** protests against suburbanization and urban ring construction
- **Jihlava:** referendum preparations against a large garbage disposal plant and protests against a highway bridge
- **České Budějovice:** protests against anti-flood protection and the associated destruction of a park surrounding the Malše River
- **Hradec Králové:** protests against the Černigov hotel demolition and construction of new shopping centres
- **Brno:** developments affecting the Vegetable Market and Lesná neighbourhood, controversies around the rebuilding of the railroad station
- **Prague:** preservation of Nákladové nádraží Žižkov freight station, controversies around Libeňský Bridge reconstruction / removal, referendums in Prague 7 and Prague 10 against the construction of overpriced city halls, citizen mobilizations against the deterioration of the city centre (Pixová and Sládek, 2016), mobilizations of the squatters' scene (Pixová and Novák, 2016)
- mobilizations around new land-use plans in Prague, Brno, Hradec Králové, Jihlava and Jablonec nad Nisou

Research is further based on numerous informal interviews, and participant observation of grassroots initiatives and their activities, such as public land-use plan presentations, negotiations with politicians, council meetings, participatory projects, demonstrations, happenings and other events organized for the public. Secondary sources consist of relevant printed materials and websites, published journalistic interviews, articles and reports. Secondary sources were analysed using the same codes as those employed for transcribed interviews, with special attention paid to the way citizen mobilizations are presented by mainstream media.

3. Results

In the theoretical part the context in which Czech urban grassroots operate was introduced. This context poses significant challenges to citizen mobilizations, and has further implications for the strategies that engaged citizens employ in order to influence spatial production in their cities. In this section, a synthesis of the challenges as experienced by the groups and individuals participating in the case studies, and of the strategies the participants employ in coping with them, is provided. Consequently, the ways in which strategies are employed by the participants will be analysed in relation to their potential to further contribute to citizen emancipation in Czechia. The challenges are divided into the following three groups:

3.1 Low legitimacy of political activism

“You know how it works. There are a few loud people, who come up with something, some problem. And then a few other sympathizers who join up with them. And then there is the silent majority. And then there are people who might agree with you, but they don't make themselves heard. Usually, the normal people are happy that the object [old barracks] is getting demolished”.
(politician from Prostějov)

Almost all the participants think that activism in Czechia has a negative label and is associated with the pressure tactics of radical environmentalists and interest groups without a political mandate. They also think that because of it, civic engagement outside of elections tends to be

perceived as useless, redundant, and inappropriate. One participant from Prostějov labelled himself as a lunatic, mentioning that, in the eyes of the general society, activists are lunatics who engage in hopeless activities without any prospect of success, and are wasting their time. From the perspective of the politicians from Prostějov, civic engagement in public affairs usually represents only a small group of biased citizens who do not represent the majority and complicate the agenda of the local authorities. One participant from Hradec Králové, although civically engaged himself, labelled other self-organized groups as chronic complainers with laughable concerns. Another participant from Brno agrees with Václav Klaus that activists, unlike local governments, are not able to be held accountable for their involvement in public affairs' administration.

Coping strategies: The study's participants deal with the low legitimacy of political activism by careful self-censorship of their own activities and by building an image of orderly citizens, who use their ability to assert their civil rights in a way that is beneficial to the community. With the exception of the participants recruited from the Prague squatter scene, all the other self-organized groups researched in the case studies place emphasis on working within legal frameworks, on transparency concerning their activities and goals, and on tactful and moderate communication. Some of them emphasize their professional background in particular fields, most frequently their training in architecture and law, sometimes also referring to their experience abroad, often used to legitimize their critique of Czech political culture. They also tend to refuse to be labelled as "political activists", which in their view decreases the credibility, legitimacy and "rationality" of their activities. Many of the participants have solved this bias by abandoning their "activist" role and by running as candidates for public office. At some point, 23 of the participants have opted for this solution, out of which 18 have succeeded in becoming municipal councillors, or even mayors and vice-mayors.

3.2 Bureaucracy and the attitude of local authorities

*"At that time, the city hall was, like, extremely undemocratic, anti-citizen, and they despised the voters terribly. Which is why in 2006 *ódeeska* [ODS - Civic Democratic Party] was successfully ousted from power, because it was just really disgusting what they were doing, the way they simply despised any of their opponents' opinions and made fun of them. And for municipal money, for our tax money, they printed only one-sided demagoguery, they gave absolutely no space for discussion". (participant from Brno)*

Most of the participants tend to see the Czech public administration as overly bureaucratized, technocratic, uncommunicative, while also arrogant and manipulative in promoting its policies and achievements. Local authorities are not very forthcoming in terms of sharing information and documents, they dwell on bureaucratic and technocratic details in their communication with the public, and sometimes take purposeful malicious steps in order to manipulate public opinion and discourage citizen engagement. The participant from Hradec Králové also sees a big challenge in the way governments make documents and information related to their decision-making hard to access; their websites are not easy to navigate, and core information is often lost between paragraphs and hyperlinks. One participant in Jablonec nad Nisou complained about council meetings taking place at 9 a.m., due to which citizens must take time off work in order to bring their opinions and objections in front of the council. Another participant from Prostějov complained that his right to speak at the assembly had been repeatedly denied by the council with reference to unlawful regulations imposed by the local government. On top of that, several participants have complained about local authorities frequently exceeding legally determined deadlines to respond to citizen enquiries and claims, to deal with their petitions, etc. and sometimes not responding at all.

Another challenge is politicians' entrenched style of communication with the public. The participant from Jablonec nad Nisou commented on politicians' rigid resistance to new information,

perspectives, methods, attitudes, solutions, etc. Aside from the fact that they might be defending vested interests, she also believes that politicians feel threatened by being exposed to things they are not familiar with – they either find exploring new unknown terrains challenging and unsafe, or more frequently, their resistance stems from their personal pride, lack of self-reflexivity, and their exclusive claim to act as arbiters of what is right and wrong. The participants from Jihlava and Jablonec nad Nisou believe that councillors often make uninformed decisions. Not only is their expertise limited in terms of encompassing all areas of decision-making, but often they are also loaded with too many documents which they do not read, either intentionally or due to a lack of time.

Coping strategies: At this point, Czechia has a strong body of NGOs that provide legal advice and counselling to citizens engaging in public affairs. Many of the participants have relatively good knowledge of relevant law, or their relevant parts, especially the Act 128/2000 on Municipalities, the Act 114/1992 on the Conservation of Nature and Landscape, and the Act 106/1999 on Free Access to Information. They do not hesitate to use this knowledge when denied information, or when fighting off other injustices. As a result, participants tend to respond to the technocratic bureaucracy of the local authorities with the same attitude. In order to defend their case, they present councillors with various peer reviews, expert opinions, alternative designs, schemes, projects, assessments and measurements. In their effort to reverse the local barracks' demolition, participants in Prostějov presented local council with a whole range of documents that prove the building's suitability for reconstruction and creative conversion solutions. Frequently, it is also argued by the occurrence of protected species in areas destined for insensitive interventions, such as the corn crane in the suburbs of Jablonec nad Nisou, or the Eurasian golden oriole and the spotted flycatcher along the Malše River in České Budějovice. In Prague, the demolition of an architecturally valuable freight station building was averted by activists' long-term endeavour to have it declared a historical landmark. In cases where public authorities contradict the participants' legally based or professionally grounded argumentation, participants frequently forward official complaints to superior governing bodies, or take legal steps against decision-makers.

Other strategies that participants use are aimed at increasing the accountability of councillors for their decisions and overall demeanour. They push local governments to make organizational changes, e.g. making all their documents easy to access online, or council meetings more accessible to the public. In many cities, activists have already pushed council meetings to be transmitted online. The participants in Jablonec nad Nisou have lobbied, although not successfully, for meetings to take place in the afternoon, and to have a particular time set for citizen input. They also publicly expose decision-makers via media and social networks. For example, participants in České Budějovice put short videos of councillors and activists giving speeches on YouTube, and extensively communicate their case to the local media. Another popular strategy, which was encountered in Prague and České Budějovice, is to encourage citizens to collectively attend council meetings, sometimes with banners, in order to visualize their protest and public demand regarding particular issues.

It is also popular to lobby individual politicians, and to cooperate more closely with those who are well-disposed to the citizen concerns, which is most typically the opposition, or councillors recruited from activist circles, the Green Party, and the Pirate Party. The aim is to provide politicians with complex information about the case. One of the participants in Jihlava even personally drove almost all councillors, one by one, or two by two, to a valley threatened by the construction of a highway bridge, familiarizing them with the potential damage of their consent to the land-use plan that authorizes its construction. In Jablonec nad Nisou, participants invited politicians for a commented tour led by environmentalists through forest meadows threatened by the city's suburbanization. Another participant from Jihlava organized a professional seminar with expert lecturers about land-use planning for local authorities in order to justify her critique of the city's new land-use plan. Another strategy that participants often employ is to infiltrate local government advisory boards and committees, typically through their connections with

associated councillors, where they hope to influence not only particular decisions and bring in needed expertise, but also reverse entrenched modus operandi, and a politician's reluctance to open discussion.

3.3 Other citizens' passive attitude

"We circulated around the people here, asking if they agree with us, and if they'd sign it [the petition] for us. [...] And all of them were like 'yes', they know the connections and so on. But when we needed them to participate more actively, not only [by signing a petition] next to their fences, there was no response. Those above will do whatever they want anyway. If that is the way everybody thinks, then they might as well be getting away with murder" (participant from České Budějovice).

One of the main limitations of grassroots mobilizations in Czechia is the predominantly passive attitude of the general society towards public affairs, and towards their own citizenship. The participant from České Budějovice was very critical of the passivity of her neighbours, whose engagement in saving the very surroundings of their neighbourhood has been limited to signing a petition and fatalistically lamenting the irreversible injustices. The participant in Jablonec nad Nisou showed disappointment not only with the general population in the city, but also with other self-organized groups, who have their own activist agenda yet do not actively participate in forwarding issues that do not directly concern them. He himself admitted that he does not actively help other groups, mainly because his personal time has already been exhausted engaging in his own struggle. In Prostějov, participants attributed their reluctance to organize a demonstration to their fear that not enough people would show up, and this small crowd would misrepresent their demands. Despite the lack of trust in Czech society, some of the participants remonstrated about other citizens' naive trust in political representation, stemming from their ignorance and lack of education. The participants from Brno and Hradec Králové blame the lack of civic engagement on the system of public education, where knowledge and skills related to citizenship are not taught, and as a result citizens do not know the law, their rights, or where to look for information and how to defend their interests. They also mentioned people's fear of punishment, which might take either a classical legal form, accusing citizens of breaking law, or a personal form. Due to the complicated networks of local relationships and political influence, citizen engagement might result in the loss of public contracts, employment, favourable leases of municipal property, bureaucratic obstructions affecting businesses, or problems with placing children into public schools, etc. But on the most basic level, citizens are mainly afraid of being confronted with verbal aggression or public embarrassment.

Coping strategies: The participants often felt that the political culture in Czechia needs to be improved by engaging and interesting the citizen more in public affairs. For that to be achieved, some of the participants have displayed a great effort in educating citizens and drawing their attention to contested issues. They provide citizens with information regarding particular cases through printed materials, the internet, or public events. In order to attract bigger crowds, they organize attractive events that are peaceful and seemingly apolitical, such as cycling events known as Critical Mass, street festivals, picnics, etc. In Prostějov, the research participants had a successful idea to promote their protest against the planned demolition of the municipal ballroom by organizing an outdoor dancing event right on the main square, in the middle of winter ball season. By engaging in some of these activities, active citizens to a certain extent substitute services that should be provided by the public administration. For example, participants in České Budějovice repeatedly insisted that local authorities organize an information meeting regarding the planned flood-protection project, in which all the phases, impacts, as well as alternative solutions of the project would be discussed with the public. Since the authorities did not meet this demand, participants organized the meeting themselves.

4. Discussion

As regards the strategies used by the participants in response to various challenges posed by a deficient Czech political culture, the intention is not to assess their success, nor the factors that contributed to this success in terms of achieving a participant's particular objective. With reference to Rancière's concept of post-democracy, the intention is to analyse whether participants use them in ways that empower citizen emancipation, or in ways that perpetuate the status quo. We also compare the occurrence of the different forms in an interurban context.

Empowering forms of citizen participation are ways of employing particular strategies that are not purely purpose-built, exceed a citizen's self-interested goals, contribute to community building, empower citizen enfranchisement, and liberate a citizen's relationship to public space, public affairs, and the community. Examples of such forms are grassroots initiatives that provide other citizens with balanced unbiased information about contested issues, disseminate a comprehensive perspective of a given locality, include all social groups and account for their needs, empower citizens to make their own informed opinions and encourage them to engage in public affairs.

Examples of such initiatives were found in Jablonec nad Nisou, where the participant demonstrated a tireless effort in connecting local civic associations and their hitherto fragmented interests, and in using this network to advocate for improvements to the city's new land-use plan. Progressive forms were also those of the participants initiating referendums in Prague, Brno and Jihlava, which mobilized large numbers of citizens. In Prague and Brno, referendums consequently resulted in participants' successful candidacy to local governments. Other examples include citizen empowerment through the liberation of their relationship to public space and fellow citizens, e.g. in Prostějov, by organizing a protest dance event on the main square, or in the Lesná neighbourhood in Brno, where a new communitarian identity resulted from residents having taken over a playground threatened by the development of parking garages. By far the most successful, but also most contested emancipatory project, was the opening of an autonomous cultural centre, Klinika, by squatters in Prague, which completely transformed the discourse regarding citizen empowerment in Czechia (see Pixová and Novák, 2016).

Perpetuation of the status quo is caused by citizens employing potentially empowering strategies in a utilitarian, purpose-built or abusive way. Exclusive interest groups or individuals employ them to achieve or enforce particular goals, which are disconnected from the local community and oblivious to the wider socio-spatial context. Instead of empowering local citizenship, they impeach other opinions, or disavow and deny citizen rights to other social groups or particular individuals. As such, they do not contribute to the development of civil society, citizen participation, and overall political culture in Czechia.

An illustrative example of the status quo perpetuation was found in Hradec Králové, where the professional background of one of the participants was used to legitimize his petition initiative, in which he valued only signatures from other experts, and belittled the signatures of lay people. According to him, lay people should have no say in areas where they lack expertise. On the other hand, while belittling lay people's concerns, such as their protests against felling trees, he also criticized other purpose-built civic associations and their regressive protest methods, such as groups obstructing construction on their neighbour's parcel. During the research, such an association was encountered in Jihlava, created by local elites to fight off construction in front of their residences. Other examples were found in public discussion regarding the Libeňský Bridge in Prague, or the student conference about the future of the City of Jihlava, where intolerant and racist speeches against the homeless and Roma people of some of the disputants were not addressed through the events' poor moderation.

Table 1. Examples of empowering citizen participation in studied urban conflicts

City	Conflicts	Strategies with empowering effect
Prostějov	controversies around the demolition of old barracks and the non-transparent sale of the KaS cultural centre	protest dance on the main square
		roundtable discussions for citizens
Jablonec nad Nísou	land-use plan enabling suburbanization and urban ring construction	coalescence of local civic associations
		educational activities for citizens
Jihlava	protest against a large garbage disposal plant and a highway bridge in the Sasov valley	referendum organization
		cultural program in the valley
České Budějovice	protests against anti-flood protection threatening to destroy a park surrounding the Malše River	informational meetings and entertaining events for local residents
Hradec Králové	protests against the Černigov hotel demolition and construction of new shopping centres	ad hoc cooperation of civic associations
Brno	developments affecting the Vegetable Market and Lesná neighbourhood, controversies around the rebuilding of the rail-road station	coalescence of local civic association
		residents' taking over a playground threatened by development
		referendum organization
		educational and informational events for citizens
Praha	preservation of Nákladové nádraží Žižkov freight station, controversies around Libeňský bridge reconstruction / removal, protests against the construction of overpriced city halls in Prague 7 and Prague 10, citizens' mobilizations against the deterioration of the city centre, mobilizations of the squatters' scene	organization of referendums in Prague 7 and Prague 10
		ad hoc city-wide cooperation of civic associations
		educational and informational events for citizens
		coalescence of civic associations in the city centre
		opening of the autonomous cultural centre, <i>Klinika</i> , by local squatters

Empowering or not? Our research also recorded initiatives with conflicting attitudes; among protesters against anti-flood protection in České Budějovice, a segment of the participants engaged in organizing informational meetings for the public, and used a whole range of technical and hydrological documents in order to prove the unsuitability and potential dangers of the municipally enforced project for the adjacent community. At the same time, they condemned the allegedly purpose-built activities of another group which managed to temporarily hinder the project's implementation by initiating an administrative procedure regarding the occurrence of endangered bird species, therefore failing to acknowledge that the endangered bird species might be other citizens' genuine concern.

Interurban comparison: As regards interurban differences in relation to empowering citizen participation, large cities are by far ahead of the smaller ones. Emancipatory attitude usually stems from citizen education, international experience, and sources of inspiration, which naturally concentrate in bigger cities. Interestingly, Brno, although several times smaller than Prague, seems to be the most developed in the country in terms of its civil society. This could be ascribed to Brno's favourable concentration of educated and creative citizenry within a much more spatially confined area, in which mutual inspiration, exchange of expertise, networking and cooperation can be fostered more easily. Prague, on the other hand, features much bolder emancipation among the

local community recruited from local alternative scenes. The few examples of empowerment encountered in smaller cities were typically initiated by participants with experience from bigger cities and from abroad. In smaller cities, a bigger tendency towards nimbysism was recorded, especially among family house owners.

5. Conclusions

The aim of this paper is to contribute to the debate about urban grassroots mobilization concerned with spatial production in selected cities in Czechia. The intention was to find out whether the strategies employed by citizens engaging in urban affairs contribute to citizen empowerment, or whether they perpetuate the deficient political culture which they are responding to. It was discovered that the same strategies can both perpetuate as well as overcome the status quo, depending on the way citizens use them. Empowerment occurs significantly more in conflicts of citywide scale. Proponents of empowering participation are often inspired from abroad, and display experience and perspective that exceeds the local scale. Perpetuation of the status quo on the other hand occurs in conflicts of any scale. It can result from first-hand solutions employed by citizens frustrated with arrogant and bureaucratic authorities, or from the abuse of potentially empowering tools by particular self-interested groups. Such conflicts significantly contribute to the delegitimization of citizen participation in Czech urban politics, as well as to the persisting tendency towards animosity between citizens and local authorities. What should be seen as vital to the further empowerment of Czech civil society, and citizen emancipation, is the obvious increase of engaged citizens successfully running as candidates in municipal elections, driven by their endeavour to improve Czech political culture and to ensure a more environmentally friendly, democratic and just spatial production from positions of power. Whether or not these efforts will be successful will nonetheless unfold in the future.

References

- Blažek, J., 2002. Local government finances in the Czech Republic as a framework for local development: 12 years of trial and error approach. *Acta Universitatis Carolinae - Geographica*, 307(2), 157 - 173.
- Blühdorn, I., 2014. Post-Ecologist Governmentality, Post-Democracy, Post-Politics and the Politics of Unsustainability, in Wilson, J. and Swyngedouw, E. (Eds.), *The Post-Political and its Discontents. Spaces of Depoliticisation, Spectres of Radical Politics*. Edinburgh University Press. Edinburgh, pp.146 - 166.
- Brenner, N., Marcuse, P., Mayer, M. (Eds.), 2012. *Cities for people, not for profit. Critical Urban Theory and the Right to the City*. 1st ed. Routledge, London.
- Císař, O., 2008. *Politický aktivismus v České Republice. Sociální hnutí a občanská společnost v období transformace a evropeizace*, 1st ed. CDK, Brno.
- Cooper, C., Morpeth, N., 1998. The impact of tourism on residential experience in Central-eastern Europe: the development of a new legitimation crisis in the Czech Republic. *Urban Studies*, 35(12), 2253 - 2275.
- Durnová, A., 2015. Planning Through Emotions: Political Lessons from the Controversy Between 'Fat Cats' and 'Stupid Activists' over Rebuilding Brno Railroad Station, in: Gualini, E. (Ed.), *Planning and Conflict: Critical Perspectives on Contentious Urban Developments*, Routledge, New York, pp. 259 - 278.
- Gualini, E., Mourato, J. M., Allegra, M. (Eds.), 2015. *Conflict in the City*, 1st ed. Jovis, Berlin.
- Harvey, D., 2012, *Rebel Cities*, 1st ed. Verso, New York.
- Hauser, M., 2010. Depolitizace a soumrak liberální demokracie, in: Bělohradský V. et al., *Kritika depolitizovaného rozumu*, Grimmus: Všeň, pp. 97 – 109.

- Hoffman, L., 1994. After the fall: crisis and renewal in urban planning in the Czech Republic. *International Journal of Urban and Regional Research*, 18(4), 691 - 702.
- Horak, M., 2007. *Governing the Post-Communist City: Institutions and Democratic Development in Prague*, 1st. ed. University of Toronto Press, Toronto.
- Jacobsson, K., Saxonberg, S. (Eds.), 2013. *Beyond NGO-ization. The Development of Social Movements in Central and Eastern Europe*. Ashgate: Farnham.
- Jacobsson, K., 2015. *Urban Grassroots Movements in Central and Eastern Europe*, 1st ed., Ashgate, Farnham.
- Jehlička, P., Kostecký, T., 1995. Czechoslovak Greens in a post-Communist society, in: Richardson, D. and Rootes, C. (Eds.), *The Green Challenge*. Routledge, London.
- Klápšřová, E., Klápšřě, P., 2010. Public participation in response to some problems of regional planning in the Czech Republic. *Journal of Landscape Studies*, 3, 105 – 113.
- Kňapová, K., 2013. The coverage of the June 2011 transportation union strike on Czech Television. *Mediální Studia*, 1, 93 - 107.
- Maier, K., 1998. Czech planning in transition: Assets and deficiencies. *International Planning Studies*, 3(3), 351 - 365.
- Mason, J., 2002. Organizing and indexing qualitative data, in: Mason J., *Qualitative researching*, SAGE, London, pp. 147 – 172.
- Müller, K., 2005. Koncept občanské společnosti, lobbování a veřejný zájem. Příčiny, podoby a důsledky demokratického deficitu v České republice. *Sociální Studia*, 1, 111 – 128.
- Naxera, V., 2015. "Corruption Perception In The Czech Republic," *Politics in Central Europe*, 11(1).
- Pixová, M., Sládek, J., in print. Touristification and awakening civil society in post-socialist Prague, in: Colomb, C., Novy, J. (Eds.). *Protest and Resistance in the City*. Routledge, London.
- Pixová, M., Novák, A., 2016. Prague post-1989. Boom, decline, and renaissance," *Baltic Worlds*, 2, 34 – 45.
- Rancière, J., 1999. *Disagreement: Politics and Philosophy*, 1st. ed. University of Minnesota Press, Minneapolis.
- Skalník, P., 2009. Political Anthropology of the Postcommunist Czech Republic: Local-National and Rural-Urban Scenes, in: Kürti, L., Skalník, P. (Eds.), *Postsocialist Europe. Anthropological Perspectives from Home*. Berghahn Books, Oxford, pp. 227-251.
- Smith, M., 2010. Perceived corruption, distributive justice, and the legitimacy of the system of social stratification in the Czech Republic. *Communist and Post-Communist Studies*, 43(4), 439 – 451.
- Sýkora, L., Bouzarovski, S., 2012. Multiple transformations: conceptualising post-communist urban transition. *Urban Studies*, 49(1), 41 – 58.
- Swyngedouw, E., 2014. Urban Insurgencies' and the Re-politicization of the Unequal City, in: Miraftab, F., Salo, K., Wilson, D. (Eds.), *Cities and Inequalities in a Global and Transnational World*. Routledge, New York, pp. 173 – 188.
- Wilson, J., Swyngedouw, E. (Eds.), 2014. *The Post-Political and its Discontents. Spaces of Depoliticisation, Spectres of Radical Politics*. Edinburgh University Press, Edinburgh.

The Regional Hydrographical Councils as consultative bodies of the water administration in Portugal . But who is being consulted by whom?

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Abstract

The idea that public participation is expected to improve water governance , and a requisite for its sustainability, has been present for decades in international statements (e.g. Dublin conference in 1992), and more recently in international legal frameworks (e.g. Water Framework Directive , 2000) and the Portuguese Water Law (2005). This law decentralized water administration in 8 regions and created a Regional Hydrographical Council for each of them . These consulting bodies are considered to be one important way through which public participation was enacted. They were composed by members of the regional and central administration, water users and the civil society (NGO's among others). These bodies were in action from 2009 to 2012. In this paper we wish to understand their role in water governance, and whether they brought valued added to water policy making. Having this aim in mind we selected three Hydrographical Councils , from the region of Tejo, Alentejo and Algarve. The methodology comprised document analysis, such as an analysis of the meetings' minutes, various reports and water plans, and some exploratory face-to-face interviews to complement these data. The analysis clearly reveals a gap between the presence of the State and the other societal sectors. The state actors not only are the most numerous (more than half of the council's members) as are the ones defining the meeting's agenda and contributing with most of information. The participation of the techno-scientific sector was also considerable, as it was that of the economic actors. In contrast, the participation of environmental NGO's was very weak. Based on our findings, we considered that the Regional Hydrographical Councils constituted an important moment and space where people and institutions linked to water management could meet and communicate. These moments were highly appreciated and generated social learning considered valuable for the sustainable management of the resource. However the council was, apparently, not so much a consulting body as a recipient of the State's information. In our view this is not necessarily a consequence of the State's agenda to "avoid", "ignore" or "devalue" public participation but rather the consequence of the lack of competencies in the organisation of this type of meetings (e.g. its extreme formality is in contradiction with public participation), the reduced time allocated to these meetings as well as the lack of human and financial resources dedicated to its operation and the follow up of its decisions. Nonetheless, the fact that the Regional Hydrographical Councils were deactivated in 2012 is a clear sign that public participation is not a priority and its potential, for the sustainable development of the resource, is not yet clearly understood (or desired).

Stakeholders, Processes and Power – setting assessment space for knowledge brokerage

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Abstract

Knowledge brokerage (KB) is a concept usually associated with the promotion of knowledge sharing and transference as a way of breaking down barriers that disturb, or impede interaction, healthy communication and collaboration among multiple stakeholders and types of knowledge. Previous research work developed by the authors on knowledge brokerage developed a set of KB criteria to enable a systematic analysis in strategic environmental and sustainability assessment of the extent to which these assessment instruments could be used as platforms for enabling KB. It was found that such criteria could be used to define the necessary conditions of an assessment space to perform a KB function. The role of KB would be in stimulating stakeholders' engagement through learning-oriented processes and responsibility sharing in more active participative models of governance, enabling a step beyond knowledge transference and sharing. This presentation addresses challenges at the policy level for enabling dialogues in science-policy contexts and the need to create assessment space to facilitate the learning, sharing and creation of knowledge(s). A range of case studies, along with a model analytical framework for understanding how assessment can facilitate knowledge, will be provided as the focus for the analysis and presentation. It will be argued that stakeholders, processes and power are three core elements necessary to create opportunity space for participation, knowledge sharing and learning, which could be provided through more innovative and proactive application of strategic environmental and sustainability assessment. Summary: Knowledge brokerage and the creation of an 'assessment space' can facilitate a proactive approach to the application of participatory strategic environmental and sustainability assessment at the policy level.

Keywords: Strategic environmental assessment; knowledge brokerage; participation; stakeholders, power

Erosion Perceptions, Beliefs and the Sustainability of coastal areas: an individual or collective endeavour?

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Abstract

Coastal erosion (CE) is a phenomenon that has undergone a conceptual evolution. Nowadays, it is considered a physical and social process that is scientifically studied, quantified, and technically mitigated. It may also be approached by following the individual/collective perceptions of coastal communities. Risk and vulnerability associated with CE may also be addressed by considering different aspects that require a differentiated and trans-disciplinary analysis. A gap regarding the social perception of CE in Portuguese coastal communities was detected in the literature review. Therefore, the initial questions and aim of this study are, as follows: to research the social perceptions of CE and to understand how they impact public decisions/participation aimed at mitigating CE. The purpose of this research, supported by a hypothetical-deductive-approach, is exploratory and followed a multiple-case study strategy. The study was conducted using a mixed methodological paradigm (qualitative and quantitative). The Paramos/Espinho and Costa-da-Caparica cases, which differ environmentally, geographically and socioeconomically, were selected. Social and environmental vulnerability indicators were determined through the Analytical-Hierarchy-Process. These indicators were used to structure/draft the exploratory interviews and a questionnaire. These were applied to three categories of stakeholders: politicians/decision-makers, presidents of recreational associations and fishermen/inhabitants; all chosen by convenience sampling. The interviews identified both the historical and current perception of CE, as well as the public-institutional interaction within the scope of the planned/executed interventions targeting the mitigation of this problem. The questionnaire also revealed memories of damaging events, recognition of the causes of CE and sea encroachment, identification of risk perception, and understanding of the feedback about the strategies developed for mitigating erosion. The results showed that the perception of CE was derived from constructed experience and social memory. For the participants, the erosion «issue» is a serious daily problem. They identified risks and mentioned natural causes that are magnified by both climate change and human causes. Disengagement of the state through inefficient decision-making, inadequate construction and maintenance of defence structures, and through their laxness regarding building new constructions were all mentioned as significant examples of human causes. Participants highlighted the authorities' lack of sensitivity towards traditional knowledge and their lack of will to welcome/integrate the contribution participants' experience could make. The main contribution of this work resides in the empirically based development of a model for the social perception of CE, by positioning vulnerability in the context of CE. The perceived vulnerability/risk was deemed to result not only from CE, but also from a variable and dynamic context-specific framework, and from internal/external factors that were identified.

Keywords: Coastal erosion, social perception of risk, public participation, sustainability and social inclusion

1. Introduction

The problem of coastal erosion is becoming more acute in Europe, with pressure situations and more or less severe erosion processes along the entire coastline (Anthony et al., 2013)

where about 70 million people in EU countries (16% of the population) live in coastal areas (EuroSION, 2004). These are, surely, the most threatened communities due to their vulnerability to the sea, coastal erosion and flooding. Although these issues have merited considerable international attention in recent years, in Portugal, literature is still scarce or inexistent (Almeida, 2015). This research, therefore, intends to contribute towards broadening our knowledge about the perception of coastal risks, by studying two coastal populations that correspond to some of the most critical areas in Portugal, via both their vulnerability, and the urban pressure they have been subjected to.

The environmental and social aspects of coastal erosion

The coastline is a valuable biophysical support and, today, it became the target for mounting pressure from anthropic activities: from growing urbanisation, to sediment extraction for civil construction and the intensive use of natural shorelines for recreational and tourism purpose. All these activities have had a serious negative impact, environmentally and socially speaking (Gomes, 2007). At the same time, coastal areas are subjected to physical processes resulting from storm surges and waves, thereby making coastal erosion a natural process through which the coastline adapts to tidal variations, energy levels imposed by undulation and ocean currents, the transport of sediments, the existing topography and the rise in sea level due to global warming (Dias, 2005).

Although coastal communities have always had to adapt to the dynamics of coastal areas, due knowledge of the social aspects that are affected by erosion has not accompanied this adaptation, nor has knowledge of the social perceptions of risk. This gap has become rather pertinent, particularly when taking into account the current era of limited budgets, economic hardship and difficult decisions regarding resource allocation.

Past coastal interventions directed at mitigating the risk of erosion and coastal flooding took place in direct response to social wishes and were expressed through the political system of public works, following legislation and protocols designed to be applied in the wake of high-intensity coastal incidents (Falk and Crouse, 1988). Nowadays, decision-makers are increasingly aware that the robustness of public policies directed at this problem depends upon a holistic understanding of the coastal environment. Quite apart from the environmental and economic aspects, such an understanding must include human values: people's preferences, culture and traditional knowledge, i.e., human dimensions.

This terminology, "human dimensions", refers to knowing how and why human beings assign relevance to the feeling of belonging to a place, value natural resources, intend that they be managed, and in what way humans affect or are affected by decisions about the management of natural resources (Loomis and Paterson, 2013). Research on these aspects seeks to understand the human characteristics in order to understand how to incorporate that knowledge into the planning and management of coastal areas (Lertzman, 2009). This research encompasses a variety of ideas and practices, including: (i) cultural, social and economic values of individuals; (ii) individual and social behaviour; (iii) demographics; (iv) legal and institutional frameworks; (v) communication and education); and (vi) decision-making processes in coastal management (Decker et al., 2001).

With regard to reducing vulnerability to coastal risks and supporting resilient communities, more strategies for adapting to this problem have been created (IPCC, 2007) and, as a result of extreme environmental events, a social movement seems to be emerging that shows there is the will to participate and collaborate in coastal area management programmes. Traditional knowledge about coastal environmental phenomena, as well as their impact on the coastline, has been enriched throughout the years by the experience of communities that have resided in risk-prone coastal areas for decades, as well as by all the information available online and now in their possession. These facts, according to Delicado, et al. (2012) allow and justify the option of adding the public's voice to specialist opinions.

Anthropic factors vs. coastal erosion in Portugal

This erosion stems from several natural factors but also from human action over the territory. Over recent centuries, anthropic activities in the country have become as important as natural factors (through the amplification or minimisation of their effects) in modelling the seashore, and have contributed to the transgressive behaviour of the coastline. The consequences of this regime in the evolution of coastal areas are reflected in the flooding of riverine plains, the sanding-up of lagoons and estuaries, and in coastal erosion, as exemplified in Figure 1.



Figure 1. Sea impact on the Portuguese coast. (A) and (B) Beach zone and frontal dune area at Costa da Caparica; (C) Espinho beach, a week after artificial replenishment of sand (17/06/2011).

Demographic imbalance and the density of urban construction have accentuated vulnerability factors along the Portuguese coastline. The concentration of population along the coastline reinforces the vulnerability of said population (social vulnerability) to the risk of coastal erosion. Indeed, some 1,300,000 people are estimated to be exposed to the rise in sea levels and oceanic surges, due to their being located at the edge of the shoreline and because, in some cases, urban zonings are located below the average sea level (Craveiro et al., 2012).

The vulnerability of coastal areas, as a concept, generally applies to the combined study of the physical, social, economic and political components that influence said system when it is threatened by a specific event, as well as its ability to mitigate such threats and recover, should the event come to pass (Almeida, 2015). As such, evaluating said vulnerability is crucial from the standpoint of present and future integrated management of coastal areas, making it essential to consider matching adverse factors and interests, so that the development model for these areas does not jeopardise future generations' use of resources. Moreover, the need to establish a balance and to promote integrated management in coastal areas implies the integration of scientific and traditional knowledge alike in matters pertaining to territorial planning, and to the definition of regional and local strategies for sustainability.

The importance of social perception and knowledge of the causes/effects of coastal erosion

Studying coastal erosion and its impact on society has evolved from a purely scientific effort to a matter of immediate importance in the political, social, economic and moral spheres (Hulme, 2009). Humans' relationship with the coastline, itself being perceived as a social phenomenon, as indeed it is, was constructed individually and collectively over time, with varying degrees of conflict.

These social actors, who claim the right to location and the defence of their history and

popular culture, are being increasingly confronted with the phenomenon of erosion, with (sometimes contradictory) scientific reports and results, with remarkable reports and individual/collective perceptions of a seemingly unsolvable problem.

The importance of knowing and understanding the causes and effects of the environmental impact in coastal areas, as well as adequate information about potential intervention, is imperative when under the lens of coastal vulnerability. Such perception may be rooted in: (i) how fragile the coastline is, in the light of system changes and natural cycles, (ii) the significance of environmental impacts and risks, and (iii) the relative importance of evaluating such impacts as grounds for policymaking (Almeida, 2015). Measuring the environmental impacts and responses, alongside human responses to change, in this triple confluence, and rendering such an evaluation possible, requires the use of indicators that are selected in consonance with the objective of fulfilling all specific, social and environmental criteria necessary for the study.

Humans and the environment are mutually dependent on one another. Environmental risks will eventually translate into risks for humans due to their dependency on natural resources and, in turn, the environment is susceptible to situations and impacts of both natural and anthropic origin. Understanding this bi-directional relationship implies that reinforcement measures targeting global vulnerability, as well as the inclusion of strategies for mitigation and risk/catastrophe analysis should be part of the integrated and sustainable management of coastal areas. This should also contemplate aspects derived from both human and natural systems, as well as the applicable risks.

As far as coastal systems are concerned, vulnerability and risk are, indeed, about the relationship between people and the environment, and between the physical environment and socio-political structures that frame the settings people live in. Thus, the concept of vulnerability is a fundamentally ecologic and political one, which integrates not only economic and political power but also the environment (and its transformational power), and the biophysically and socially produced risk. Vulnerability is, thus, a unifying factor in the relationship between humans, the environment, social forces and institutions, and cultural values. Therefore, knowing and understanding the causes and effects of coastal erosion is inextricable from the general economic and political conditions that are very specific and that dominate a certain location. Studying vulnerability should, therefore, happen from a joint, location-centred perspective, as can be observed in Figure 2, wherein the many referenced elements cause and condition the vulnerability of specific locations and their inhabitants, upon interaction.

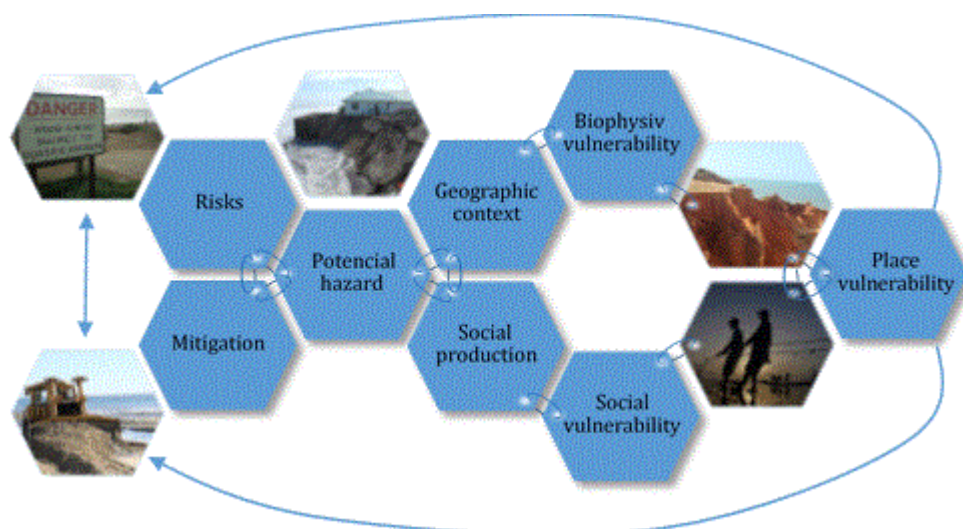


Figure 2. Conceptual model of Hazards of Place vulnerability

The existence of relationships between risk, mitigation actions (responses and adjustments), and location vulnerability is evident (Cutter, 1996), be it biophysical or social. From that

perspective, an increase in mitigation actions may signify a decrease in risk and, consequently, of location vulnerability. On the other hand, risk may increase since if there are changes in the geographical context or in social production, they may lead (respectively) to an increased biophysical and social vulnerability, as well as location vulnerability. This process may also be triggered by an increase in potential danger, which may be both a consequence of and a contributory factor to an increase or decrease in the degree of vulnerability (Marandola and Hogan, 2004). Considering that, vulnerability is socially produced, and risk is consequently not uniformly distributed across the social spectrum. This raises the question of whether or not all individuals occupying coastal areas are equally vulnerable to the impacts of erosion, and whether they are aware of it. Through what has been laid out thus far, high degrees of vulnerability reflect a lack of adequate adaptation and, therefore, low resilience. Vulnerability is, therefore, explicitly connected to matters of sustainability, to the environment, the dangers and risks, and to the structure and organisation of society. This, in turn, connects the principles, values, and legitimate interests of citizens, with their need to be safeguarded by the State, in a social reality that changes by the very hand of collective life, over time. Matters such as social justice, social learning, genuine public participation and adequate dispersion of knowledge about both, the causes and effects of coastal erosion, as well as the mitigation strategies to be developed, are paramount to the sustenance of political and public trust. With regard to underlining the importance of the latter, it must be said that public participation, which translates into co-management, requires shared responsibilities between governmental institutions and citizens. Highlighting a process such as this one (bottom up) implies the active intervention of all stakeholders in the decision-making process and is only meaningful if properly explained.

Setting the gap and the research questions

Coastal erosion of the Portuguese coastline constitute a real problem with serious social and environmental consequences that frequently require diverse intervention. These interventions range from building or repairing coastal defense works, to the artificial strengthening of beaches, or to more conflict-prone action such as the relocation of communities residing in areas considered to be at risk. This situation becomes all the more problematic when said interventions take place in areas where the social impact of coastal erosion is unknown, or in communities that perceive the risk in a very particular way due to its integration in their everyday life.

A gap regarding the social perception of CE among Portuguese coastal communities was detected in the literature review. Thus, the lack of awareness regarding the social impact of coastal erosion and the associated risk to these communities provided the opportunity for research that aims to make an innovative contribution to perceptions and beliefs about coastal erosion, and the sustainability of coastal areas.

Therefore, the initial questions are as follows:

RQ1: How do coastal communities perceive and evaluate the risk of coastal erosion and how do they act in regard to that?

RQ2: How does the social perception of the risk of coastal erosion affect public participation and inclusion in the decision-making processes regarding environmental issues?

To sum up, the phenomenon under analysis in its three dimensions – (i) the social impact of coastal erosion in human communities along the coast; (ii) the impact of anthropic pressure on the coastal zone; and (iii) the social perception of risk – expressed by the gap – is the research opportunity itself, i.e., the unawareness of the social perceptions about the risk of coastal erosion. We also seek to understand how those perceptions influence public participation in the decision-making processes concerning social/environmental issues.

2. Methods

Research on the perception of risk and social vulnerabilities was conducted in two Portuguese coastal communities, in different locations (Figure 3), namely: in Paramos/Espinho (Northern region) and in Costa da Caparica (Centre/South). Both locations are former fishing villages that became tourist destinations, and are considered to be extremely vulnerable to coastal erosion with high rates of shoreline recession in recent decades. In both of them, tourism and urban pressure brought about the need to protect the shoreline with rigid defence structures. Groin-fields were built during the 60s and 70s, creating conditions for greater human occupation and pressure, while at the same time amplifying the shoreline recession downstream (Craveiro et al., 2012).



Figure 3. Portuguese geographic localization of Paramos/Espinho and Costa da Caparica

The results of this paper are based on two methodologies. On the one hand, a qualitative methodology based on 18 semi-structured interviews conducted in the two areas under study between September 2013 and July 2014 was used. For each case-study, a group of regional institutions in charge of managing these territories was selected (Regional Hydrographic Administrations, boards of protected areas, port administrations, Civil Protection), along with local institutions (city councils, parish councils), Environmental NGOs, as well as people with direct interests in the coastline (associations of residents and local entrepreneurs, tour operators, owners of sea-front restaurants), and those who depend on the coast for their livelihood or whose identity is strongly bound up in it (fishermen, surfers). On the other hand, with the objective of obtaining opinions that are representative of the population of all areas, we used a quantitative approach that comprised a survey carried out on a representative sample of both locations (N=100), in July 2014.

We collected both qualitative and quantitative data given that this approach is highly appropriate for sustainability research (Flick 2006; Bryman 2001).

The objective of these two approaches was to glean the public's perception of coastal risks and vulnerability of the "natural" coastline, what they knew about coastal mitigation interventions and how they evaluated both them and the actions taken by the institutions responsible for them. It was also to find out their involvement and participation in decision-making processes, and also their perspectives on the future of the coastline, namely regarding financing solutions and alternatives for territory management.

3. Results

The problem of coastal erosion is not only a question of keeping a register of extreme events that are more or less distant from the present generation, but it is more to do with ensuring the

safety of urban communities that need an increasing density of engineering works to protect people and property from the advancing sea. And it is not so much the problem of rising sea levels or the possibility of overtopping coastal events, but much more the problem of urbanized land progressing towards the sea, the expansion of urban land use and other human occupations, and the increasing artificiality of the land in this land-sea interface.

Variation rate in soil occupation

Studying the variation in soil occupation in Espinho and in the area of Costa da Caparica over two decades, with recourse to the Geographical Information Systems (GIS), has shown a big growth in urban areas towards the sea in this period of time. This growth consequently increased anthropic pressure on the coastline, thus elevating the level of risk in those areas where the population either wants to establish itself, or has no desire to leave. In Costa da Caparica, houses - for first or second homes - hotels, restaurants, campsites, have been built increasingly closer to the coastline. This has changed the costal landscape from a small fishing community to a high-density urbanized area, whereas in Paramos/Espinho, a cluster of the old fishing community remains in the dunes, near the seashore.

Three levels of risk/vulnerability were identified – minor, medium and major – with direct and proportional relation to anthropic pressure, marked in Figures 4 and 5, which schematizes the variation rate in soil occupation in Paramos/Espinho and in Costa da Caparica respectively.

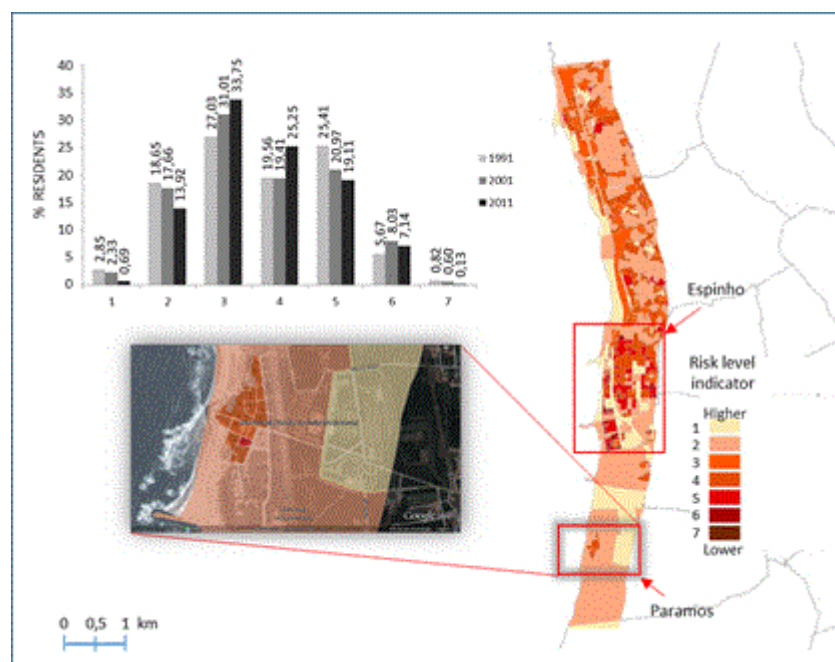


Figure 4. Land cover and risk level in the area of Paramos/Espinho.

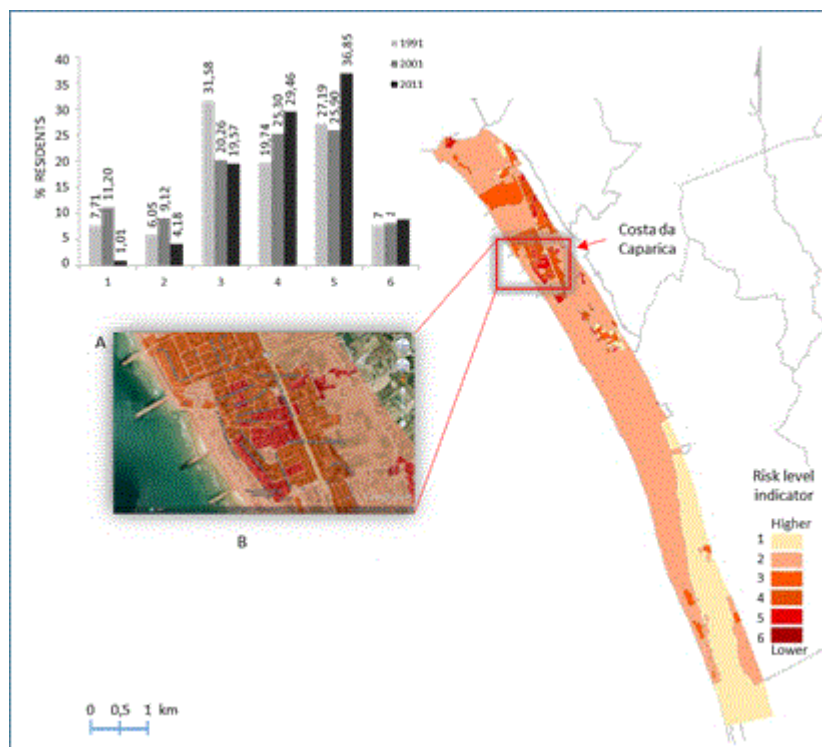


Figure 5. Land cover and risk level in the area of Costa da Caparica.

Both case studies also reveal to what extent the risk of coastal erosion may coincide with social stratification. The areas most subject to coastal erosion processes are where the older population is concentrated, where there are lower levels of education, greater economic dependence and, therefore, more vulnerability

Marine transgression perceptions and its relation to coastal erosion increasing

In order to enable good coastal management, the population must be involved in it, which is why it is fundamental to understand how the public faces coastal risks, namely the public's perception of the risks of erosion and its respective causes.

The results of the survey reveal that most respondents attest to an increasing advance of the sea over the land, which they attribute to coastal erosion. This is often acknowledged not metrically but through points of reference, which have been submerged by the sea, over time.

- *Houses retreated, there were people who lived nearer the front, then they went farther and farther back* (Paramos/Espinho resident).
- *There was another chapel (...) which was swallowed by the sea* (Paramos/Espinho resident).

According to the data gathered, beach recession, highlighted in Figure 6, is more significant for the respondents from Costa da Caparica (500m) than for those in Paramos/Espinho (30m).

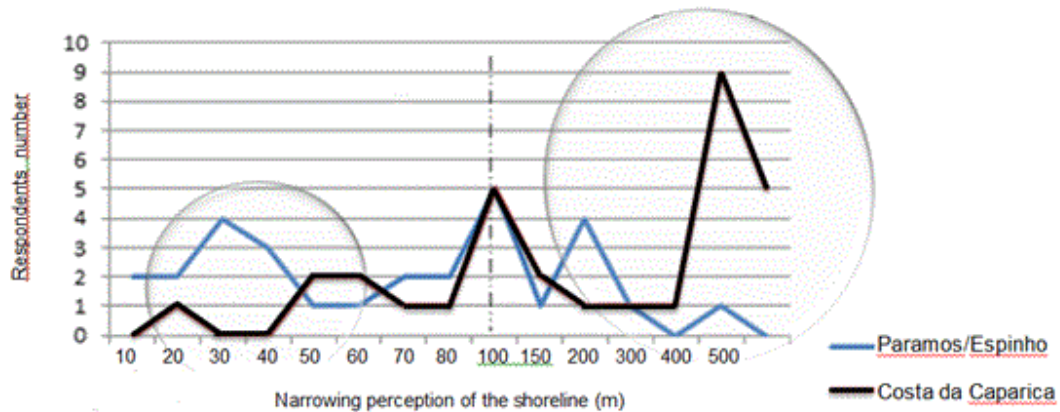


Figure 6. Perception of narrowing of the shoreline (30/40 years span).

To 44% of respondents, erosion has natural causes (winds, tides, rise in the average sea level, climate change). 17.5% consider it to be the consequence of anthropic activity (urbanization of the coastline, ports, dams, sand extraction).

Risk perception and causes of coastal erosion

Perception analysis was carried out to ascertain what the main threats affecting the coast in Paramos/Espinho and Costa da Caparica are perceived to be. With a view to understanding the main management priorities, as indicated by the interviewed stakeholders, we need to consider perceptions regarding the scope, intensity and frequency of risks in terms of how they affect activities and uses, infrastructures and environmental resources.

Results of the survey reveal that most respondents rate the risk of coastal erosion as serious or very serious, mainly in Costa da Caparica, where more than 75% consider it to be a serious problem that will “worsen in the future” (Figure 7).

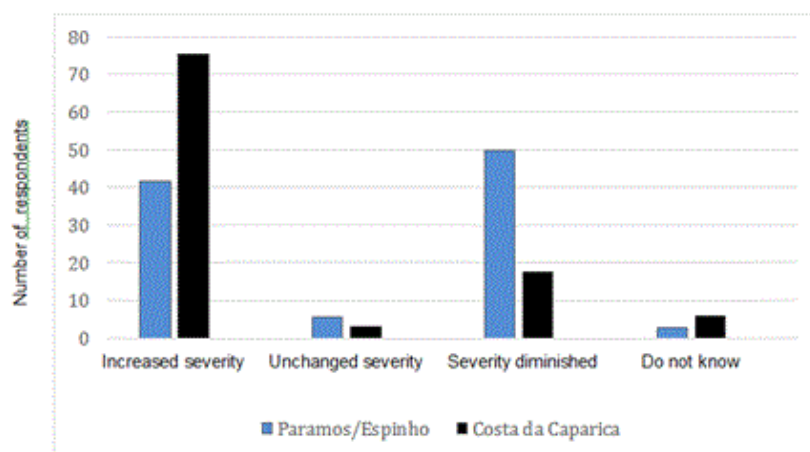


Figure 7. Perception of coastal erosion severity and sea advance.

The two main threats identified by interviewees were storm surges and urban encroachment in the near shore area. Beaches were perceived to be the most threatened element, since they are very vulnerable to storm surges and the endemic problem of erosion and flash floods. There is also an economic impact on businesses (beach licensees and services) in terms of lost earnings when a beach is damaged or rendered unusable. A similar issue concerning the problems encountered by

inshore fishing communities was also mentioned. This is how some interviewees explain matters:

- *The houses have been retreating, there were people who lived farther forward, then retreated, retreated because of the strength of the sea's waves.*
- *There were no groins. 46 years ago I got married in the chapel, and to reach the sea I had to walk a lot, that's true, now the sea is already here and there is almost no sand, just rocks..*

As for the causes of coastal erosion Figure 8 shows the stakeholders' general impressions (from Paramos/Espinho and Costa da Caparica).

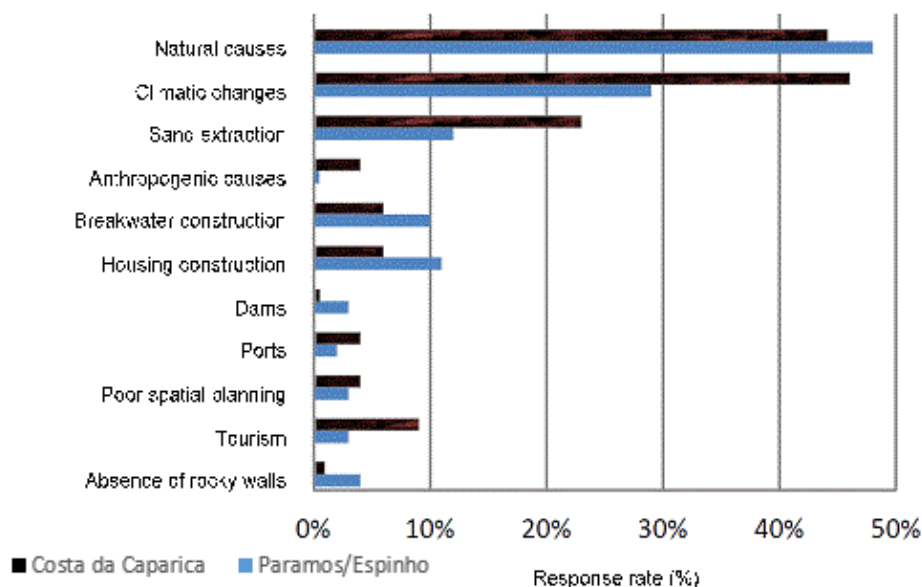


Figure 8. Coastal erosion causes.

Most consider the main causes to be natural and distant phenomena such as climate change. The only anthropogenic causes assigned more relevance is sand extraction, mentioned mostly by respondents from Costa da Caparica.

Perception of both the CE risk and the effectiveness of coastal defence works

The survey results show that the participants of the two areas considered it important that the coastline remains where it is, with the respondents of Paramos/Espinho being the ones who consider it most important that the coast remains unchanged (Figure 9). Over 90% agree or strongly agree that the coast has to be protected "at all costs".

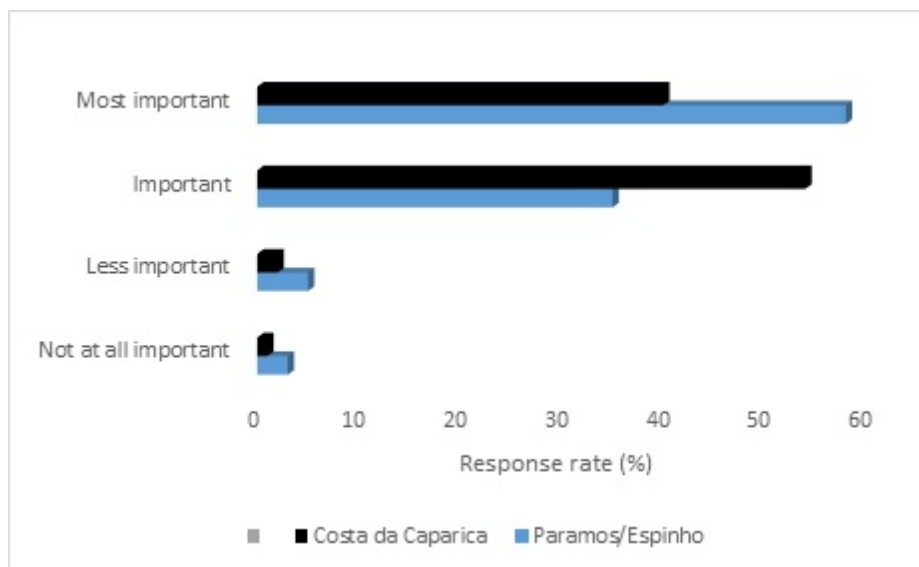


Figure 9. The importance to maintain the coast unchanged (%).

As for the perceived effectiveness of coastal defence construction (Figure 10), hard defences such as groins and concrete seawalls are seen as the most effective. This is probably because, in most cases, artificial beach strengthening with the addition of sand must be repeated periodically, becoming not only a recurring expense, but also a solution that is perceived as temporary and not very durable.

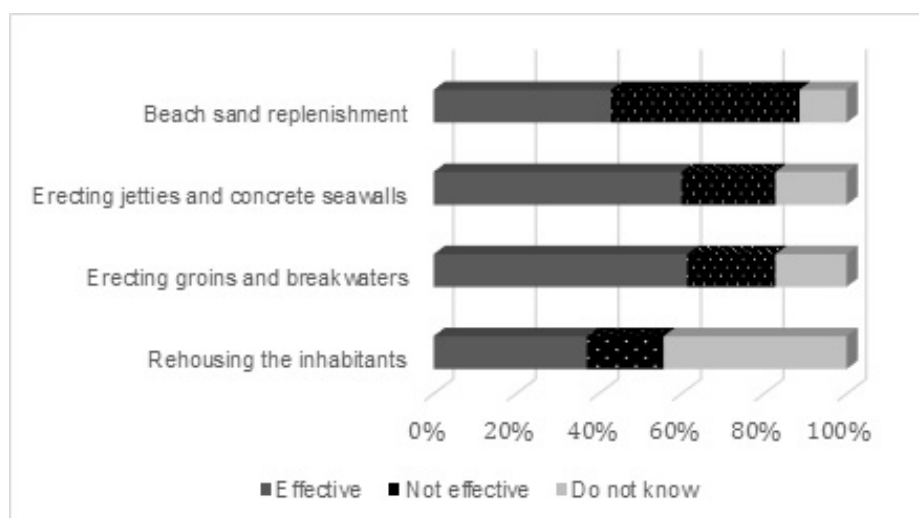


Figure 10. Stakeholders' perceptions regarding the effectiveness of coastal defense interventions.

Concerning the alternative of relocating buildings and re-housing populations at risk, it has become clear that neither community (Paramos/Espinho and Costa da Caparica) is keen on this solution.

However, while recognizing the need for hard interventions such as groins and jetties, the communities' stakeholders recognize their negative impact on the coast, particularly towards the south, often mentioning the loss of sediment and a decrease in beach sand in the southern areas near hard engineering coastal interventions. In Costa da Caparica, particularly, the coastal protection works are viewed negatively, especially regarding the jetties and other fixed infrastructures, despite the occasional protection they provide.

Public participation

According to the survey, the levels of participation in public discussions on coastal problems are extremely low. Fewer than 5% of the respondents have participated in any way in meetings that precede decision making on coastal management. Although worrying, the figure of 5% is not surprising. If on the one hand, and with regard to the decision-making process about the management of the territory, the institutional stakeholders complain that there is no culture of participation among the population, on the other, it is also true that the authorities seem to do no more than what is strictly necessary (and prescribed by law) to involve citizens in these processes.

Respondents, particularly those in Costa da Caparica, had very pessimistic expectations regarding the importance of public participation in the decision processes concerning coastal management (Figure 11). While in Caparica, around 75% consider public interventions are ineffective, fewer than 45% in Paramos/Espinho share the same opinion. However a small percentage (11% average) maintained a more optimistic view, noting that the area would gain some benefits from their participation in municipal meetings about coastal interventions, to inform and raise awareness among the locals.

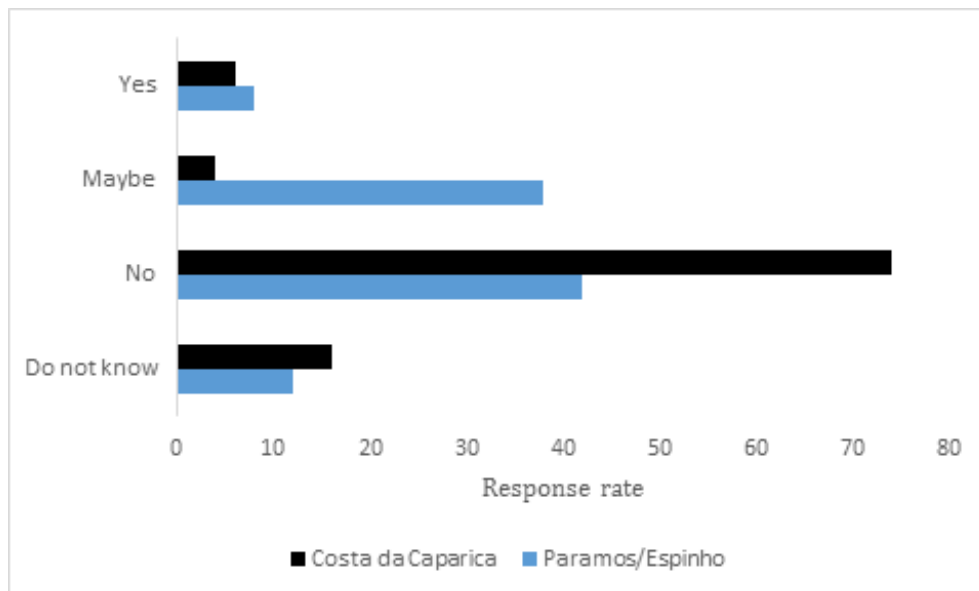


Figure 11. Stakeholders' perception of the importance of public involvement with regard to responsible coastal management by policy makers.

Following the appointment of a representative acting on behalf of the community and other public stakeholders, analysis of the interviews clearly showed the importance attached to the participation of citizens in local administration. However, the impact of a selected representative attending meetings of the municipal executive where plans of territorial management and intervention in at-risk areas are presented and discussed is classified as low, or ineffective. This marginalization of fisherman's opinion was often referred, by the participants, as a "social exclusion".

Framework of social vulnerability in the context of the coastal erosion phenomenon

A contribution arising from this research is the development of a contextual erosion vulnerability framework presented in Figure 12. This framework advances the work of O'Brien et al. (2007), and acknowledges the variety of factors which coalesce to construct a dynamic and fluid state of vulnerability. Vulnerability is determined by biophysical and socio-economic processes on global, national, regional and local-scales (Almeida, 2015), and this is a key feature of the contextual erosion vulnerability framework. The contextual vulnerability framework aims to contribute to a

scenario of vulnerability to coastal erosion that considers the physical (environmental), social, political and economic factors identified in both Paramos/Espinho and Costa da Caparica.

There are a number of factors that contribute to coastal vulnerability, and in order to evaluate it, it is necessary to define criteria and indicators of vulnerability, such as those that have been selected and studied in this research. The vulnerability assessments often refer to the study of a physical phenomenon that has an impact on coastal erosion, they address local and global manifestations and calculate the impacts that will occur in future scenarios. However, the degree of vulnerability is neither static nor does it progress at a steady rate. It exists along a continuum of greater/lesser vulnerability dependent on time circumstances and social perceptions.

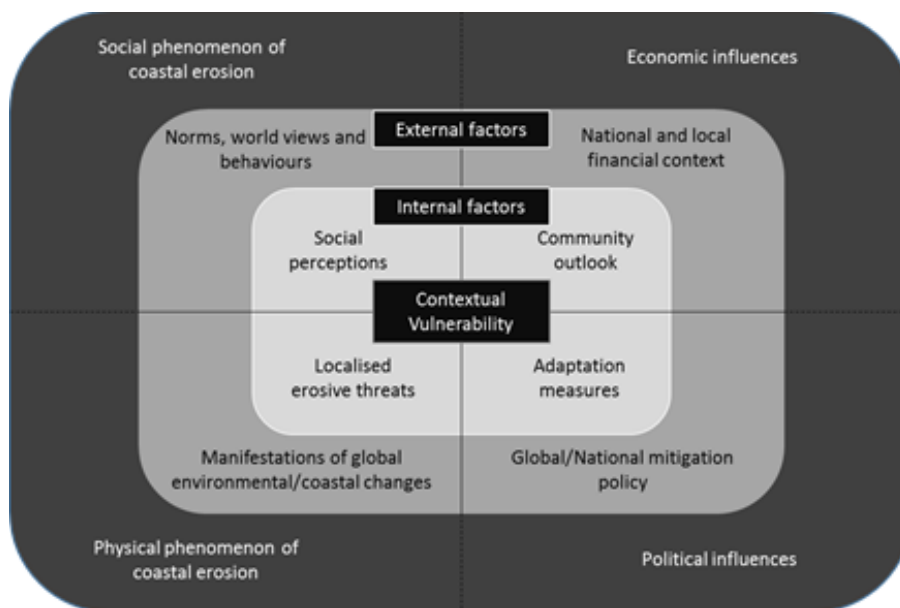


Figure 12. Framework of social vulnerability in the context of the coastal erosion phenomenon.

The contextual erosion vulnerability model presented in Figure 12 recognises the importance of the social phenomenon of coastal erosion, which will be constructed individually and collectively. The way the erosive phenomenon changes the coast, its impacts, and how the communities' vulnerability is perceived will contribute to actions and behaviours, including the relative vulnerability and the stakeholders' demand-side perceptions of coastal erosion issues.

4. Discussion

The factors which influence sustainability in coastal management comprise social, economic, institutional, biophysical and legal conditions. The clear trends of continued human migration to the coast and major growth in coastal tourism, has resulted in escalating investment in coastal locations. The Portuguese coast is experiencing severe erosion and loss of beachfront; processes which are expected to become worse with climate change impacts. These additional alterations are beginning to show at a time when financing for conventional coastal protection is no longer guaranteed at scales of investment that are likely to be required if coastlines are to be maintained in the future (Schmidt et al., 2013).

The two case studies are characterized by their exposure to coastal erosion. They show extreme situations of fragility not only regarding present or past overtopping coastal events, but also regarding the rate of coastline retreat, with the evolution of urbanization and the densification of human activities. In Espinho, for example, in some areas the coastline retreated an average

of 6.93 meters per year between 1970 and 2002 and in extreme events recorded in the past (between the years 1895 and 1907) almost 1/3 of the oldest part of Espinho were irrevocably submerged by the sea (INAG, 2000). In turn, from the late nineteenth century, the Costa da Caparica area evidences situations of coastline retreat in excess of 500 meters, even reaching 1 km of beach loss in some parts (Ferreira, 2006). In both case studies, some of these events were recalled by the elderly who still live either in Paramos or Costa da Caparica. Despite the perceived risk and the coastal changes caused by erosion, and despite the existence of problems regarding the hard coastal defence works such as groins and breakwaters, the individuals continue to live in the areas threatened by erosion.

In both case studies, the socio-economic characterization of populations living in these areas illustrates a correspondence between the areas most affected by ecological and social stratification, which potentially exacerbates the vulnerability of populations exposed to environmental risk situations, such as coastal erosion (Pires, et al., 2010).

The findings also show that the communities' normal coping range was exceeded (Smit and Wandel, 2006) when the rate and magnitude of the coastal retreat increased, and when incremental adjustments such as the local protection of individual properties and relocation proved insufficient to avoid loss. In both Paramos/Espinho and Costa da Caparica, as community functions were perceived to be under threat (despite the hard coastal defences and coastal management interventions) and relocation was not a viable option, a social limit to further adjustments had been reached. The impact of the erosion was a 'real world indicator' that triggered an adaptive response; a finding corroborated in other studies (Dannevig et al., 2013). The erosion issue entered a collective system of meaning; it became not only a problem for property owners but also a threat to both communities and their way of life.

The perception of a common risk to coastal zones, the impacts of extreme weather events and coastal retreat, may contribute to the development of a stronger sense of community and may thus better prepare coastal populations to respond and adapt (Manzo and Perkins, 2006; Schmidt et al., 2012). But to achieve an adaptive governance approach, consistent trust between the different institutions dealing with coastal issues, as well as between them and the range of interested stakeholders, has to be brokered (Almeida, 2015).

Coastal erosion management strategies have social and political implications (Cooper and McKenna, 2008). Decisions regarding coastal management activities should be based on the best available science, but should also take into consideration stakeholder perspectives (Ariza et al., 2014). Stakeholders may have conflicting views about coastal erosion management strategies. Optimal policy decisions require the resolution of any conflicts that arise between coastal protection and development, environmental and nature conservation, and social traditions (Ariza et al., 2014 and Striegnitz, 2006). To this end, coordinated participation of different stakeholders on many primary beach management issues is needed as part of effective management practices (Schmidt et al., 2013). In addition, such participatory processes are crucial for truly sustainable outcomes (Schmidt et al., 2013; Almeida, 2015).

Public participation traditions in coastal management differ considerably across Europe, and varies from well-institutionalised participatory mechanisms involving stakeholders in coastal planning (Soma and Vatn, 2009), to clear and communicative public policies about interventions for mitigation and protection (Filatova et al., 2011), and to several experiences involving the implementation of more effective and localised adaptive governance mechanisms for coastal zones (Milligan et al., 2009; Schmidt et al., 2013).

Other research has shown that it is vital that local communities be genuinely involved and, indeed, actively explore issues such as sense of place or cultural identity (Adger et al., 2009). The process may be slow but, in time, a broader understanding and a more unified vision about the future of the coast can be achieved. Our results also indicate disbelief, discouragement and distrust on the part of all social actors with regard to participating, to being heard and being recognised as partners by the political powers in their various governmental settings. However, despite current low participation levels and the inability to influence decisions (as perceived by the public), both in Paramos/Espinho and Costa da Caparica, there is still a general willingness to intervene.

However, this is subject to an appreciation of sincerity and policy reliability on the part of all government entities responsible for managing the coastline.

In both locations, fishermen are a key-group. From what was observed in the stakeholder interviews, socially rooted and respected communities of fishermen, well represented by local fishing associations, can be important partners in building community ties. Similar findings were also achieved in the work of Schmidt (2013) and Almeida (2015).

The participants highlighted the authorities' insensitivity to traditional knowledge, and their lack of will to welcome/integrate the contribution of the participants' experience. Thus, to overcome these issues, as stated in the Aarhus Convention (1984), it is very important that relevant data be made available and easy to interpret. To make informed decisions, the participants need to have access to a range of information concerning different issues and perspectives (Bulkeley, 2000). Although information from stakeholders is very valuable, helping to bridge the gaps between expert and local knowledge, and collating and combining these different types of data and information in the case studies proved very difficult and time consuming (Dietz, et al., 2003). It is, therefore, essential to put in place a procedure to deal with this challenge from the beginning of the process. Coastal management is a long-term process (Webler et al., 2001) and it is important that there is co-ordination and flexibility among the many actors involved in coastal management, Government agencies, NGOs, businesses, research institutes and coastal communities (Almeida, 2015). All need to work together, with public participation providing input. However, public participation can only work if it has a co-ordinated structure, and that must be built up.

5. Conclusions

Extreme coastal events that adversely affect littoral communities with abundant and traumatic experiences are becoming more frequent. With each situation, citizens and leaders acquire knowledge of effective, as well as ineffective, adaptations that could help anticipate and reduce future impacts and also enhance future responses and recovery efforts. This body of knowledge forms a portion of the respective communities' social memory. While the actual memories were not lost, an inability to integrate critical knowledge of past coastal erosion into future plans and development rendered communities less resilient. It is important to work in close cooperation with actors and managers in order to fine-tune research on coastal erosion and coastal protection with social demands and fears.

The case study has shown that the technical knowledge is not a good enough fit to find robust solutions that satisfy both social needs and technical requirements. The complexity of coastal erosion risks requires that we go beyond the existing assessment frameworks and the role of the experts needs to be reformulated. This process should open up the debate to local stakeholders.

The case studies have shown that there is a strong awareness of widespread coastal erosion, and acknowledges that this problem is often exacerbated by inappropriate human infrastructure (including that intended for "coastal defence") and development too close to the shoreline with a significant demographic pressure on the coast; Engineering works in some port areas have been mentioned as contributing to accelerated erosion of the adjacent shoreline because the works did not adequately account for coastal dynamics and processes. Extraction of sand is another stated factor that can lead to coastal erosion.

The surveys point clearly to an underlying perception of coastal risks and the possible impacts of phenomena such as climate change. A disconnect between the "top" and the "bottom" of coastal management decision-making processes was also identified. This leads to general suspicion and miscommunication between local stakeholders and the institutions in charge of coastal management. This has proved to be one of the main obstacles to the involvement of local stakeholders in coastal issues, as we have seen from previous studies and from our evidence.

Unfortunately, this issue it is not easy to transcend. The complexity of coastal erosion risks necessitates going beyond the existing assessment frameworks, where the majoritarian role of the experts needs to be reformulated. The management of erosion cannot be the prerogative of experts, but rather it has to include a diversity of perspectives that conforms to the socio-

economic-environmental system under study. Experts certainly have a relevant and indispensable role, but their role within the integrated assessment processes should be rethought. They can act as advisors both to the administration and to the social stakeholders, to explain and warn against the environmental impacts, the uncertainties that affect the projects and the alternative options that could be taken into account in decision-making processes. This role is essential if it is performed with high scientific rigour, is fully transparent, and outlines the uncertainties for each alternative.

Through this study, we have found signs that point to an essential common objective for tackling coastal change: a strong disposition to engage in adaptive management approaches – provided there is a genuine desire for compromise on the part of authorities from Planning and Coastal Management – and it is possible, at least in the most threatened communities facing economic and coastal insecurity, to establish a constructive dialogue. Social groups with strong local roots, such as fishermen, often act as key elements of any future strategy of collective adaptation, because of their status and recognized environmental knowledge as perceived by coastal communities.

Technicians and those responsible for coastal defence interventions assure the perspective of technology (top down) but they lack the bottom up vision, which is what the shell fishermen of Costa da Caparica can provide with their specific knowledge of the context. They mentioned the profound transformation of the clam picking sites. Or the fishermen who reported that while the beaches are losing sand, "islands" of sand at a depth of 20m wide have appeared on the Tagus River. Even if some of these facts and perceptions result from a concept powered by the imagination, they have to be investigated before any coastal engineering intervention. Probably, in many of these perceptions, only those who have lived in the place for some time and who can, therefore, make a longitudinal comparison (i.e., over time) are the ones who really know and detect changes in the coastal zone. This is a bottom up input in the major engineering works (hard), generally not seen by public authorities in charge of coastline management as a strategic trend. If the perceptions of local residents are not adequately considered, it can hinder coastal interventions. The success of coastal defence interventions in mitigating the erosion problem could be impeded, as they are interventions focused on a point in time, and do not contemplate the changing environment over decades. This could be obviated if the people had been heeded prior to interventions in the coastal areas

Schmidt et al. (2013) argue that to achieve adaptive coastal governance, there are components that must be developed. Through the case studies of Paramos/Espinho and Costa da Caparica, it is possible to conclude that to build trust, a common vision and joint goals, there needs to be a common understanding between competent scientists and technicians, and well-informed community acceptance. However, trust-building depends on a participatory learning process which enables decisions and encourages investment in coast and communities. So, another component of the process is dialogue about future financial support that includes knowledge sharing and trust, and also takes into account the social justice dimension. Moreover, and to address the results of Schmidt (2013) and Almeida (2015), a final feature concerns the need for policy clarity and strong political will for coastal management, with agencies and governments revealing their capacity to pay heed and to respond.

Understanding how coastal communities perceive vulnerability and erosion contributes to the development of future actions that address locals' understanding of engineering works and interventions along the coastal areas subject to coastal erosion. To achieve a desired compromise on the part of authorities from Planning and Coastal Management and public participation, and the emergence of new behaviours, a model addressing a contextual erosion vulnerability framework was elaborated. This model contributes to a more holistic understanding of the vulnerability of littoral communities to coastal erosion. Importantly, the model can be transferred to other contexts. It clearly recognises the importance of spatial scale, along with social, political, economic and physical (environmental) factors in constructing vulnerability, and identifies the importance of understanding these contributory factors when assessing vulnerability. It must be emphasized that vulnerability to coastal erosion is not the result of climatic manifestations and impacts alone. While the physical manifestations will differ on local-scales, with some communities and places experiencing more adverse weather/sea erosive events than others, vulnerability is not detached

from the wider social, economic and political environment in which the littoral communities exist.

References

- Aarhus Convention, 1984. <http://www.unece.org/env/pp/treatytext.html> (accessed 14.02.2015).
- Adger, W.N., Lorenzoni, I., O'Brien, K.L., 2009. Adaptation now, in: W.N. Adger, I. Lorenzoni, K.L. O'Brien (Eds.), *Adapting to Climate Change: Thresholds, Values, Governance*. Cambridge University Press, Cambridge, pp. 1–22.
- Almeida, I.D., 2015. Dinâmicas sociais para a Sustentabilidade em zonas costeiras vulneráveis à erosão: os casos de Paramos e da Costa da Caparica. Tese de Doutoramento em Sociologia e Sustentabilidade Urbana, do Território e do Ambiente, Universidade Nova de Lisboa, Lisboa.
- Anthony E.J, Sabatier F., 2013. France. In: Pranzini E, Williams AT (eds) *Coastal erosion and protection in Europe*. Routledge/Earthscan, London, pp 227–253
- Ariza, E., Lindeman, K.C., Mozumder, P., Suman, D.O., (2014). Beach management in Florida: assessing stakeholder perceptions on governance, *Ocean Coastal Management*, 96, 82–93.
- Brown, B., Perkins, D.D., Brown, G., 2003. Place attachment in a revitalizing neighborhood: individual and block levels of analysis *J. Environ. Psychol.*, 23, 259–271.
- Bryman, A., 2001. *Quantitative data analysis with SPSS*. Routledge. UK
- Bulkeley, H., 2000. Common knowledge? Public understanding of climate change in Newcastle, Australia. *Public Understanding of Science*, 9, 313–333.
- Censos, 2011. Censos - Portal PORDATA. <http://www.pordata.pt/Portugal> (accessed 14.09.11).
- Cooper, J.A.G., McKenna, J., 2008. Social justice in coastal erosion management: the temporal and spatial dimensions, *Geoforum*, 39, 294–306.
- Craveiro, J.L., Antunes, O., Freire, P., Oliveira, F., Almeida, I.D., Sancho, F., 2012. Comunidades urbanas na orla costeira: a metodologia multicritério AHP (Analytic Hierarchy Process) para a construção de um índice de vulnerabilidade social face à acção marítima, in: *Actas do 2º Congresso Ibero Americano de responsabilidade social*. ISEG, Lisboa.
- Cutter, S. L., 1996. Vulnerability to environmental hazards. *Progress in Human Geography*, 20, 4, 529-539.
- Dannevig, H., Hovelsrud, G.K., Husabø I.A., 2013. Driving the agenda for climate change adaptation in Norwegian municipalities. *Environment and Planning C: Government and Policy*, 31, 490–505.
- Decker, D.J., Brown, T.L., Siemer, W.F., 2001. *Human dimensions of wildlife management in North America*. The Wildlife Society, Bethesda.
- Delicado, A., Schmidt, L., Guerreiro, S., Gomes, C., 2012. Pescadores, conhecimento local e mudanças costeiras no litoral Português. *Revista da Gestão Costeira Integrada*, 12(4), 437-451.
- Dias, J.A. (2005). *Evolução da Zona Costeira Portuguesa: Forçamentos Antrópicos e Naturais*, *Encontros Científicos. Turismo, Gestão, Fiscalidade*, 1, 7-27.
- Dietz, T., Ostrom, E., Stern. P., 2003. The struggle to govern the commons. *Science* 302, pp. 1907–1912.
- EUROSION, 2004. *Living with Coastal Erosion in Europe: Sediment and Space for Sustainability*. Office for Official Publications of the European Communities. Luxembourg:
- Falk, J., Crouse, V., 1988. *Beach Management Survey: An Examination of Attitudes and Concerns of Coastal Property Owners, Resort Merchants and Realtors in Sussex County, Delaware*. Sea Grant College Program, University of Delaware, USA.
- Ferreira, J.C., 2006. *Coastal zone vulnerability and risk evaluation: A tool for decision-making (an*

- example in the Caparica Littoral - Portugal) [Special Issue]. *Journal of Coastal Research*, 39, 1590-1593.
- Filatova, T., Mulder, J.P.M., van der Veen, A., 2011. Coastal risk management: how to motivate individual economic decisions to lower flood risk? *Ocean Coastal Management*, 54(2), 164–172.
- Flick, U., 2006. *An introduction to qualitative research*, 3rd edition. Sage Publications, London.
- Freitas, J.I., 2010. *O litoral português na época contemporânea: representações, práticas e consequências. Os casos de Espinho e do Algarve (c. 1851 a c. de 1990)*. Tese Doutoramento em História Universidade de Lisboa, Lisboa.
- Gomes, F.V., 2007. A Gestão da Zona Costeira Portuguesa. *Revista da Gestão Integrada*, 7(2), 83-95.
- Hulme, M., 2009. *Why We Disagree About Climate Change – Understanding Controversy, Inaction and Opportunity*. Cambridge University Press, Cambridge.
- INAG Instituto Nacional da Água, 2010. Zona costeira: http://engizc.inag.pt/doc/ENGIZC/3_zonacosteira.pdf. (accessed 14.02.2015).
- IPCC (2007). *Climate Change 2007: Impacts, adaptation and vulnerability*, in M. Parry, O. Canziani, J., Palutikof, P, van der Linden, C., Hanson, (Eds.), *Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*. Cambridge University Press, Cambridge, UK, pp. 617–652.
- Lertzman, K., 2009. The paradigm of management, management systems, and resource stewardship. *Journal of Ethnobiology*, 29(2), 339–358.
- Loomis, D., Paterson, S.K., 2013. The human dimensions of coastal ecosystem services: managing for social values. *Ecological Indicators*. <http://dx.doi.org/10.1016/j.ecolind.2013.09.035>. (accessed 14.02.2015).
- Manzo, L.C., Perkins, D.D., 2006. Finding common ground: the importance of place attachment to community participation and planning. *Journal of Planning Literature*, 20(4), 335–350.
- Marandola Jr, E., Hogan, D.J., 2004. *Natural Hazards: o estudo geográfico dos riscos e perigos*. *Ambiente e Sociedade*, 7(2), pp. 95-110.
- Milligan, J.T., O'Riordan, T., Nicholson-Cole, S.A., Watkinson, A.R., 2009. Nature conservation for future sustainable shorelines: lessons from seeking to involve the public. *Land Use Policy*, 26, 203–213.
- O'Brien, K., Eriksen, S., Nygaard, L. P., Schjolden, A., 2007. Why different interpretations of vulnerability matter in climate change discourses. *Climate Policy*, 7, 73-88.
- Pires, I., Craveiro, J., Antunes, Ó., 2012. Artificialização do solo e Vulnerabilidade Humana em duas zonas sujeitas a processos de erosão costeira: casos de estudo da Costa-da-Caparica e Espinho (Portugal). *Revista da Gestão Costeira Integrada*, 12(3), 277-290.
- Schmidt, L., Prista, P., Saraiva, T., O'Riordan, T., Gomes, C., 2013. Adapting governance for coastal change in Portugal. *Land Use Policy*, 31, 314–325.
- Smit, B., Wandel, J., 2006. Adaptation, adaptive capacity and vulnerability. *Global Environmental Change*, 16(3), 282–292.
- Soma, K., Vatn, A., 2013. Local democracy implications for coastal-zone management: a case study in southern Norway. *Land Use Policy*, 26(3), 755–762.
- Striegnitz, M., 2006. Conflicts over coastal protection in a National Park: mediation and negotiated law making. *Land Use Policy*, 23, 26–33.
- Webler, T., Tuler, S., Krueger, R., 2001. What is a good public participation process? Five perspectives from the public. *Environmental management*, 27(3), 435–450.

Track 7d. Rethinking the Fundamentals of Economic Systems

Session 7d-03

Session 7d-09

Reflections on changing Humans-Nature-Wellbeing relationships and its implications for Economics and Development

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Abstract

The financial and climate change 'double crisis' reinforces concerns about humanity's impact on life-supporting 'planetary boundaries', thanks largely to the economic systems promoted by dominant rich nations. This paper argues that an opportunity arising from the double crisis requires ecological economics to emphasise the notion of the self, exploring the relationship between humans and nature, answering the fundamental questions of what it means to be human in the 21st century, and how the systems we have created to systematically privilege self-regarding behaviour and extrinsic (self-enhancing) values, can be transformed to promote the wellbeing of ecosystems and human communities. This inquiry defines the characteristics of the Humans-Nature-Wellbeing nexus through a broad interdisciplinary review combining insights from economics, psychology, philosophy, sustainability and deep ecology. Based on this characterization, it goes on to describe the nexus' potential contribution: (1) to the growing critique of the growth paradigm, and (2) to the rising call for sustainable human wellbeing (coupled with and ecological sustainability) to become the ultimate end of development policies.

A Macro Model of Sustainability

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Abstract

Most models in the studies of sustainability tend to have a specific focus, for instance on agriculture (agro-dynamic models), on eco-systems (environmental valuation models), on resources and energy (resource economics models). There are also more general models, e.g. thermodynamic models, multi-criteria evaluation models, and world models such as the limits-to-growth models of the Club of Rome, the models of climate changes (Stern) and a whole range of models in between. We attempt to evaluate many of them according to their orientation toward being theoretical, empirical or applied, as well as how interdisciplinary they are across nature, human and society, and how holistic they are. These models, however, say little about sustainability conditions such as 1) the carrying capacity of the earth, 2) intra-generational equity in human wellbeing, and 3) inter-generational equity in human wellbeing. In this paper we examine using our original model how to quantify these three sustainability conditions at a global level. We use existing sustainability indicators (e.g. the United Nations) together with standard data. These conditions once quantified can tell about the overall level of sustainability of the earth. Our quantification method is based on a conceptual method derived from our original model of sustainability. We call this latter a macro model of sustainability in that it is a holistic framework and looks at the earth in a top down way. The model uses a selected number of parameters to describe the functioning of the earth: thus interactions among nature, humans and human made artefacts as well as evolutions of each of them are considered and analysed. In this paper we show how to transform the conceptual method derived from this model into a practical one to quantify the three sustainability conditions. Most basic parameters of the model are the development of consumption, production, financial markets, and their interactions with the nature. Data across the different parts of the world are explored at best possible ways. We discuss how to reconcile the possibilities and shortcomings.

Environmental taxes, energy dependence and the current account

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Abstract

Improving competitiveness is one of the prime concerns for European nations, often observed through the current account balance. The European Union has emerged as a green policy leader, specifically through the EU ETS Scheme and minimum environmental taxes in European countries. Environmental taxes were introduced in the 1990s in Europe with the prospects of a double dividend, an environmental one due to lower emissions and consumption and an economic one due to lower labor taxation. Environmental taxation was introduced primarily for the economic benefits as countries were struggling with economic downturns, much like today's economic landscape across the Continent. This double dividend though is contingent on other factors, such as initial inefficiencies and the gray economy for example. Experiences across European economies have been divided and social effects have tended to ensue. Due to concerns about firm competitiveness and tax regressivity, environmental taxes have lost some popularity. This paper seeks to identify a potential alternative channel for an effect on competitiveness, through the effect of energy taxes on energy imports, thereby increasing energy security and competitiveness. The paper estimates static and dynamic panel data models for energy security and competitiveness for the EU-28 over the period 1990-2014. The results show that there is a positive effect of energy taxes on the current account balance and hence competitiveness and a negative effect on energy dependence. The result on the current account is robust to using different indicators for competitiveness and for energy taxes. Other determinants of the current account include labor productivity, past FDI and the old age dependency ratio which have a positive effect, whereas the real effective exchange rate, current FDI and the manufacturing production index have a negative effect. The results on energy dependence indicate negative effects of the price of oil, energy taxes and the real effective exchange rate, and a positive effect of GDP. Furthermore, both energy dependence and the current account balance are highly persistent which makes system GMM Bond-Blundell estimation the only reliable estimation procedure. The persistence parameter for the current account is around 0.6 and the persistence parameter for energy dependence is around 0.9. This implies that there is strong habit formation in energy dependence and that energy policies will need to be very credible and persistent themselves. In addition, due to habit formation shocks might not need to be too extreme as due to the persistence even a moderate shock's effects will persist through time, but they need to be credible which necessitates commitment over the longer run. These results are relevant for competitiveness and the broader energy policy design discourse.

Keywords: Environmental taxes, energy dependence, current account, competitiveness

Business Agglomeration and Special Districts

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Abstract

The essence of any metro area is an interplay between economic functions that the area provides to larger regional, national and global markets and the local land use patterns in which these functions create place. This work proposes an organic theory of urban development. Elinor Ostrom, presented a novel governance solution within economics theory, in recognition of the diverse way in which institutional arrangements actually operate in practice. She suggest a self imposed self-governing organization structure for common-pool. This notion earned her a nobel prize in 2009 and arguably spurred a move to develop special districts of all types for local governance. The boundaries of these special districts would constitute a rational plan theory of spatial development. The interplay between the organic growth of business agglomeration and the rational planning boundary, which special districts present, will encourage the development of business in different ways. This research evaluates the impacts of special district boudaries and the amenities that may be provided within those boundaries in fostering business growth in metro areas. A sustainability approach would ensure there is adequate integration of social, economic and environmental measures for the entrepreneurial ecosystem. Vibrancy in business centers is essential to attracting talent and companies. We seek to establish the impact of the vibrant business centers on business growth. A similar approach of considering physical characteristics of the built environment in business centers is taken by the Brookings Institute through their new focus on Innovation Districts. Our research is conducted in the 10 largest metros across the country. Our research questions are - What are the most important indicators necessary for growth in agglomerated Entrepreneurial Ecosystems? What is the impact of special district boundaries in fostering growth among various business sectors? We setup several regression models to predict growth rates for businesses by industrial sector, to isolate the relative strength of various spatial, business, and demographic characteristics as predictive factors for growth in these areas. First we spatially identify business subcenters using a standardized GIS model for job agglomeration in our study areas for 1990, 2000, 2010. This temporal analysis offers us the opportunity to identify growth over time by industrial sector and to determine the spatial patterns of business clusters and job accessibility in our study areas. Next we analyze growth among different industries in each metro area to isolate industry specific trends to determine, how various industries respond to accessibility needs of workers. Following this analysis we conduct a T-Test to understand if there is a significant difference between those job centers surrounded by a special district boundary and those without the boundary. We find that various metro areas have growth in different industrial categories based on historical precedence. The importance of quality amenities is a recent impact which affects companies differently based on age of the firm.

Keywords: Sustainability, economic development, job accessibility, equitable cities

Frameworks for Policy-Making in a Sustainable New World

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Abstract

Debates over sustainable development often contrast a sustainability path with a "business as usual" base-case. This begs a question: what is "usual"? In practice, normality is not fixed, particularly in rapidly developing economies subject to structural change and associated environmental impacts. Economic globalisation has intensified and accelerated the process of change, posing challenges for policy-makers at all levels. Thus development is a continuing process, and the paper seeks to bring into focus the underlying interactions which are inherent but often overlooked. Definition of the status quo in dynamic terms raises issues surrounding the definition of property rights and the maintenance of social capital; it also poses questions in relation to equity, in economic, geographical and generational terms. Drawing upon this analysis, the paper proposes a structural framework for development of a policy agenda to be implemented by innovative institutions. This would imply a progression starting with information and judgements, to form the basis of projections and predictions, followed up with assessments of socio-economic impacts, leading in turn to the evolution of a policy agenda with continuing feedback and adaptation. The process focuses on anticipation, and where necessary guidance, of economic change and its consequences, emphasising anticipation and avoidance of changes that may be inconsistent with sustainable development. This includes in particular a recognition of the extent of uncertainty and trade-offs. The key features of the policy-making process include the seeking of consensus, underpinned where appropriate by explicit judgements; influencing behaviour through regulatory measures, economic incentives, and cultural change; taking account of trade-offs (global, social and generational). Ultimately the approach must be holistic since human activities do not occur in isolation from their wider context.

Keywords: Policy-making, Sustainable Development, Globalisation, knowledge-transfer, consensus-building.

1. Introduction

The purpose of this paper is to explore implications of sustainable development, focusing on the tensions within the concept, and to set out the basis for development of a policy response to the challenges of sustainability in a changing world.

2. Debates Over Sustainable Development

The concept, and implications, of sustainable development have been the subject of debate for several decades. Underlying these discussions there would seem to be three axioms:

1. Change is inevitable.
2. Development is one facet of change.
3. Debate should focus on what form the change should take.

There are differing concepts of sustainable development. To some, it may have a large element of self-contradiction. For instance Redclift (1987, p.200) sees the development process as treating environmental considerations as peripheral, and, in developing countries requiring increasing control over the environment, and technological transformation of the environment. So the

development process may entail replacement of a sustainable agrarian system with an ultimately unsustainable industrial system.

This implies a tension between sustainability and concerns to improve the lot of the poor - agrarian societies have historically exhibited high degrees of inequality. Thus for instance the sustainable agricultural system of the Aztecs contrasts with the unsustainable development of present day Mexico (Redclift, 1987, pp. 108-110). Furthermore poverty may be defined in relative or absolute terms, and also depends on perceptions - do the poor feel more disadvantaged if they know they are poor?

Whether development actually increases welfare is a difficult philosophical question. Bromley (1999, p.56) argues that "there is no scientific basis to pronounce a developed economy as superior, or Pareto preferred, to one that is not developed". This presumably means superior in terms of economic welfare; but "superiority" could also denote greater power, deriving from technology, which - for example - enabled Europeans to dominate the aboriginal peoples of the Americas and Australia.

There are several factors that as a whole led inevitably to hunter-gatherers being superseded by agrarian societies, and to the eventual development of industrialisation. These are summarised by Diamond (1998) as "guns, germs and steel".

The dominance of industrialisation and urbanisation driven by technological change is not necessarily sustainable: indeed there is a danger that such development could be a dead-end. The economic optimum (narrowly defined) can lead to extinction. A stream of utility lasting for a finite time can in some circumstances have a higher present value than a lower utility stream of infinite duration; for example, if the discount rate is 5 percent per year, a stream of income of over \$130 per year for 30 years would have a higher present value than \$100 per year forever (see Neumayer, 1999, pp.212-13).

There are no guarantees that societies can avoid the existential risk associated with rational bad behaviour, disastrous values, and unsuccessful solutions (Diamond, 2005, pp.427-37). Much depends on the political, economic and social influence of institutions and on cultural values (Diamond, 2005, pp.14-15).

Thus far disaster has been avoided, or at least kept at bay. According to Lomborg, the skeptical environmentalist, "the majority of indicators show that mankind's lot has vastly improved" (Lomborg, 2001, p.4). Most of these indicators relate to measures of life expectancy, poverty, food supply, sanitation and disease. It remains to be seen whether these trends can be maintained; many commentators have expressed doubts: for instance Das (2016, p.120) observes that "the world is increasingly constrained by the scarcity of water, food and energy, as well as a changing climate ... in more extreme scenarios, the exhaustion of crucial resources will limit human activity". In effect the world is involved in a gigantic experiment.

3. Business As Usual

This experiment is often seen in terms of the effects of a deviation from a "business-as-usual" base case: but this prompts a question - what is "usual"? Normality is not fixed, particularly in rapidly developing economies subject to structural change and associated environmental impacts. The constant factor is change – improved understanding of environmental phenomena and impacts, and of new challenges.

In one sense "usual" is a concept of being frozen in time: a steady state in which all economic variables (such as population, labour force, physical wealth) remain constant. Clearly this is not how the world has ever been, but it is the basis for what might be characterised as a "conservative" perspective, with denial of, and opposition to, change.

The expression "business as usual" is normally used in another sense referring to a steady (and undisturbed) state of change in key variables. Thus for instance Cowie (1998, p.115) focuses on the rates of growth in population and energy consumption. However, even with just two variables there is clearly a potential for conflict, as population growth puts increasing pressure on energy resources subject to diminishing returns. Thus "the limitation in discussing the business-as-

usual scenario is that it depends on the current pattern of business and the business trends at the time" (Cowie, 1998, p.134).

The concept of "business-as-usual" also carries an implicit assumption with respect to control: that the situation is being managed, all relevant factors are taken into account, and that no problems that would compromise the continuation of business are being deferred into the future.

A classic instance where business as usual gave rise to unforeseen problems was the export of hazardous wastes from the Federal Republic of Germany (FRG) to the then German Democratic Republic (GDR), prior to unification (O'Neill, 2000, p.115). The GDR was hungry for hard currency, and the FRG was able to avoid problems of treatment and disposal of the wastes – for a time. After unification, the FRG had to live with the consequences, and deal with contamination in former GDR territory that became part of the FRG. The moral of this saga might be expressed as: don't be blindly led by market forces, without regard to the wider context, imagining that the status quo will persist.

4. The Dynamic Status Quo

Underlying the problem with "business-as-usual" is the ambiguity of the expression "status quo". To illustrate the point with a very a simple example, in an equation of the form

$$y_t = ax_t$$

does the status quo refer to the value of the dependent variable y at a specific point in time t , or does it refer to the relationship over time between y and the independent variable x ?

In other words, does a persistence of the status quo mean a continuation of the existing situation or an extrapolation of existing trends? If the latter, how is the trend defined? In linear terms, as described above? As a non-linear relationship? In probabilistic terms, with allowance for contingencies?

Furthermore, the continuation of trends is liable to give rise to conflicts. Indeed, this is the crux of sustainability. For instance, if water is abstracted from a river downstream of an effluent discharge, the discharge can increase within the limit of the river's absorptive capacity up to the point at which it compromises the quality of the abstracted water. Beyond that level of effluent discharge there is a conflict, and the continuation of trend increases in discharge and abstraction would be unsustainable.

The complexity of interaction between economic activity and its environmental impacts means that there are in principle multitudinous ways of defining the dynamic status quo at a given point in time. Furthermore, the scenarios generated by a particular definition can change over time. Thus, for instance, the effects of a given constant rate of population growth can differ between regions and over time, depending on other contextual variables.

Perceptions and assessments of change tend to be based on a determinate reference point, with utility and value derived from ownership (broadly defined). This is the so-called the endowment effect (Kahneman, 2011, p.290). However, if the status quo is fluid, there can be no fixed points of reference. Hence there can be little consensus on issues such as the definition of property rights, the maintenance of social capital, equity, in economic, geographical and generational terms, and equality (including race and gender).

5. Development of a Policy Agenda

In the midst of complexity, uncertainty and political conflicts the development of policies to achieve sustainability is extremely challenging. The first consideration is, by definition, existential. Sustainability is a prime instance of path-dependency, described by Taleb (2012, p.160) thus: "if a gambler has a risk of terminal blow-up ... the potential returns of his strategy ... are totally inconsequential"; put more graphically, someone driving at 250mph will never get anywhere, so that "the effective speed will be exactly zero miles per hour". So the reckless pursuit of short-term gain, without regard to the potential longer-term risks, is clearly unsustainable.

The way forward has to be a process of continuing assessment of alternatives and options. Taleb

characterises optionality in nature as "a substitute for intelligence", in which "rationality ... lies in keeping what is good and ditching what is bad" (Taleb, 2012, pp.181-82). Traditional societies have decision-making procedures characterised by Diamond (2012, p.244) as "constructive paranoia", whereby even low risks are not worth taking if there are potentially serious consequences; in everyday life remedial measures may mitigate the consequences, but severe or catastrophic environmental damage may be impossible to remedy or reverse.

So there needs to be a policy agenda emphasising anticipation and avoidance of problems, paying attention to phenomena that may appear low-risk but with potentially catastrophic consequences. What should be the foundations of this agenda?

The key elements are inclusivity and integration, in the policy agenda and in its implementation. Specifically:

Openness – notwithstanding the political and presentational difficulties - about the extent of uncertainty and the trade offs.

Policy makers' responsibility to make judgements and to secure consensus, despite inconsistency and volatility of public preferences.

Economic incentives, addressing issues such as property rights, incentives for evasion, and the regulatory framework.

A holistic approach: environmental policy cannot operate in isolation, because the environment affects, and is affected by, the functioning of economic and social systems.

The strategy depends upon a wide understanding of the options and trade-offs that arise in the development and implementation of policies. A key constraint is political acceptability: one argument put forward by some climate change deniers is that concern for sustainable development is actually a pretext for an authoritarian political agenda, and as such incompatible with democracy (see for instance Scruton, 2013).

To counter this perception it is important to refer to the so-called "Overton window", which defines the range of policy options that can be politically acceptable, in the sense that they will not jeopardise politicians' chances of re-election. Thus the key to securing sustainable development in the policy agenda is to influence the perceptions and thinking in the society that elects the politicians to office.

There are inevitably differences in priorities. There are forces that tend to promote convergence in priorities (such as economic development, globalisation and growing awareness of environmental pressures) and others tending towards divergence (such as technological change with increasing complexity of products and processes).

While much depends on perceptions and presentation, there is ultimately no substitute for an analytical approach to policy-making. This can be summarised in the following four stages:

1. What has happened and is happening now (facts).
2. What is going to happen (projections, predictions).
3. The effects of what happens (socio-economic impacts).
4. Action to be taken (political and economic decision making).

6. In Conclusion

There is a tension within the phrase "sustainable development". Some commentators go as far as to suggest that it might be an oxymoron. Certainly, the history, and pre-history, of development is a story of a human relationship with the environment. This has been characterised hubristically as taming nature; it could also be described, more temperately, as working within, or at least having regard to, the constraints imposed by the environment. Experience shows that failure to do so can have consequences, in the form of threats to health, costly remedial measures, and irreversible

damage to the ecosystems on which species, including humans, depend.

Can we continue as we are – business-as-usual? This begs the question what is usual? Not the present continuing unchanged. Possibly existing trends continuing into the future: but which trends? What if the trends in different variables are contradictory in the medium- to long-term, and so impossible to sustain simultaneously? The uncertainty implicit in these questions suggests that business-as-usual is not a viable concept except in the very short term.

The "status quo" is by definition the starting point in an analysis of a development path. However, within this expression there is a crucial ambiguity. The present situation, unchanged in all respects, is of little use as a point of reference in a dynamic context. As a dynamic concept, the status quo can be defined as a continuation of existing trends, but a conflict between trends is the essence of the sustainability problem. This implies that there cannot be points of reference to inform debates, and to develop a consensus, on development.

How then should policies be developed to promote sustainable development? The starting point must be the existential nature of sustainability. Policies can then be set within the dynamic context, stressing adaptability, and precaution in the face of threats. The policy agenda can then be based on the four key principles of openness, consensus, economic incentives and a holistic approach. In a democratic political context a sound analytical basis for policy measures is necessary, but not sufficient: there is also a need to develop a consensus around sustainability as the key objective.

References

- Bromley, D.W. (1999). *Sustaining Development: Environmental Resources in Developing Countries*. Edward Elgar, Cheltenham.
- Cowie, J. (1998). *Climate and Human Change: Disaster or Opportunity?* Parthenon Publishing, Carnforth.
- Das, S. (2016). *A Banquet of Consequences: the Reality of Our Unusually Uncertain Economic Future*. Pearson Education, Harlow.
- Diamond, J. (1998). *Guns, Germs and Steel: a Short History of Everybody for the Last 13,000 Years* Vintage, London.
- Diamond, J. (2005). *Collapse: How Societies Choose To Fail or Survive* Penguin, London.
- Diamond, J. (2012). *The World Until Yesterday: What Can We Learn From Traditional Societies?* Penguin, London.
- Kahneman, D. (2011) *Thinking, Fast and Slow*. Allen Lane, London.
- Lomborg, B. (2001). *The Skeptical Environmentalist: Measuring the Real State of the World*. Cambridge University Press, Cambridge.
- Neumayer, E. (1999). *Weak versus Strong sustainability: exploring the limits of two opposing paradigms*. Edward Elgar.
- O'Neill, K. (2000). *Waste Trading Among Rich Nations: Building a New Theory of Environmental Protection*. MIT Press Cambridge Mass.
- Redclift, M. (1987). *Sustainable Development: Exploring the Contradictions*. Routledge, London.
- Scruton, R. (2013). Identity, family, marriage: our core conservative values have been betrayed. *The Guardian* 11 May.
- Taleb, N.N. (2012) *Anti-Fragile: How to Live in a World We Don't Understand*. Penguin, London.

Industrial Policies and Sustainability in Southeast Asia: The Case of the Philippines

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Abstract

Due to its exposed geographical position, the Philippines is prone to natural disasters such as typhoons and floods. This vulnerability to calamities is even increasing in times of climate change. Therefore, it is commendable that recent development strategies—such as, e.g., the Enhanced Philippine Agenda (EPA) 21 by the Philippine Council for Sustainable Development (PCSD)—explicitly have been taking into account matters of environmental sustainability. However, it remains questionable if the Philippine state is actually capable of successfully implementing such policies and, by that, actively contributing to sustainable economic development. This is due to the fact that the Philippines generally does not exhibit the institutional framework necessary to effectively and efficiently implement industrial policies aimed at economic growth. The reasons for this are manifold and include political economy factors such as pervasive corruption, rent-seeking and the continued dominance of the landed elite. In order to explore the Philippine developmental and related environmental dilemma and its underlying problems of implementing industrial policies aimed at sustainable economic development, the proposed paper studies such policies in the Philippines utilizing a theoretical framework of institutionalist political economy and approaches to industrial policy with a focus on government–business relations. In so doing, the paper contributes to the analysis of the political economy of Philippine development and provides insights on the prospects and limits of sustainable industrial policies in the Southeast Asian context.

Keywords: Industrial Policy; Sustainable Development; Southeast Asia; Philippines; Government–Business Relations

The sustainability of economic globalization: Cultural perspectives and the ‘social robustness criterion’

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Abstract

Many policy actors, scholars, think tanks and activists have been involved in often fierce debates about the normative desirability of economic globalization. This issue remains highly contested to this day. Judgements and also evidence on the positive and negative impacts of globalization on the economy, society and ecology can be seen as statements on the sustainability of globalization. In other words: is globalization leading to a world in which people now and in the future can have a good quality of life? This paper explores the sustainability of economic globalization by analysing its ‘social robustness’. It argues that in order to be considered sustainable a process, policy or strategy needs to be (a) acceptable for a broad range of people in society and (b) inclusive of a broad range of perspectives. It employs climate change as a case which acts across the three pillars of sustainable development (people, planet and prosperity) in order to focus the debate and analysis. It contributes to the globalization literature as a whole by framing and uncovering the underlying reasons for support or opposition to globalization in a more structured and detailed way. We employ six stylized cultural perspectives (hierarchical, egalitarian, individualist, fatalist, autonomous and dynamic integrator). These are derived from theory of socio-cultural viability, or Cultural Theory, and allow us to carry out a theoretical analysis of the acceptability of economic globalization. Based on the literature review we inferred four potential effects that globalization may be perceived to have on climate change: driving climate change; mitigating climate change; strengthening adaptive capacity; and weakening adaptive capacity. Taking the fundamental bases of the cultural perspectives (a particular set of social relations and a corresponding set of cultural biases) as a starting point we logically derived how each perspective interprets and normatively judges the four potential effects. Further, we conduct a text and discourse analysis, employing reports from eight institutions that are of significance for the global governance of economic globalization and/or climate change (WTO 2013, WEF 2016, OECD 2012, UNEP 2011, COP21 2015, IPCC 2015, NCE 2014 and WorldBank 2010). The theoretical analysis finds that current trends and processes of economic globalization are considered acceptable only from one perspective (the individualist). In addition, the empirical analysis reveals a strong dominance of the individualist perspective in six out of the eight reports, and that the dominant policy discourse is not inclusive of a broad range of perspectives. To conclude, we found strong evidence that economic globalization as a process and a policy discourse is currently not socially robust and therefore not sustainable. With the results of this analysis we contribute towards a more inclusive discussion on global issues that matter in the context of a sustainable future for all. We believe that a more socially robust form of economic globalization is possible, but only if marginalized perspectives are included in the policy debates and thereby allowed to contribute to solving humanity’s most pressing issues.

Keywords: Economic globalization, perspectives method, sustainable development, social robustness, Cultural Theory

Examining the effect of market power on sustainability: adding another market failure to the sustainability discourse

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Abstract

From an economic perspective the reason for unsustainable behavior is based on the existence of externalities and missing markets or common goods. Thus, the main focus of tackling unsustainable outcomes and behavior is on internalization and to create new markets as international endeavors in the realm of greenhouse gases or climate change (UNFCCC), biodiversity (TEEB) and land degradation (ELD) illustrate. Externalities, missing markets and common goods are one form of market failure, which influence on sustainability is well studied. Other market failures, like market power, on the other hand do not enter the field of sustainability science so far. This paper introduces the impact of market power on sustainability particularly in the agri-food sector. In doing so another economic factor is added to the analysis of sustainability, making a significant contribution to the field of sustainability science. Market power is especially of importance for the agri-food sector as concentration in this sector increases. Rising concentration in the agri-food sector is accompanied by the fear of increasing prices for consumers and falling prices for farmers. Both instances may have serious implications for environmental, social as well as economic sustainability. If market power affects sustainability policy makers need to take it into account and put adequate measures in place to tackle the adverse effects on sustainability of market power. Thus, this paper discusses if and why market power should be taken into consideration as an additional economic factor influencing sustainability. In this regard an overview of sustainability and sustainability assessment as well as on market power with an focus on the agri-food sector is given. The literature review in these two areas reveals that considering market power is necessary as it can affect the social, environmental as well as economic aspect of sustainability. Therefore, it is concluded that more research in this realm is needed to further investigate the relationship, the exact manifestation of market power on sustainability and strategies to tackle negative impacts on sustainability.

Keywords: market power, sustainability, market failure

Resource productivity in the European economic sectors

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Abstract

The growing resource consumption and economic competition around the world has raised the need to promote the increase of resource efficiency in all economies. With this mind, several methodologies, such as Eurostat's Economy-Wide Material Flow Accounting, have been developed to characterize the resource consumption in different countries. Despite providing an interesting insight into which economies are more efficient, as they only look at an economy as a whole, they do not allow for concrete actions to be designed and to really identify where the problem is. There is therefore the need to develop economic sectorial analysis to identify in each economy which sectors are more productive and which need to improve. Furthermore, the comparison of the resource productivity of economic sectors across different economies also allows each country to identify which countries are more efficient. The main goal of this study is to provide a new methodology to estimate the resource productivity of economic sectors in the European Union countries and apply it to the year 2011. To quantify the flows of materials across economic sectors, a novel methodology that makes use of monetary input-output tables and material flow accounting methods is applied. It is based on the concept that economic systems are similar to metabolisms that receive materials and energy, process them, accumulate a part and release the rest either as useful outputs or wastes. To enable a wide-spread and consistent application, the methodology uses internationally available data on domestic extraction, imports, exports and domestic and imports input-output tables. Using gross value added statistics by economic sector, the resource productivity of each economic sector for each country is then computed. In total, 27 countries and 33 economic sectors per country were considered. The results show that the resource productivity of each economic sector varies greatly between the countries considered, with different countries having higher productivities in different sectors. Furthermore, it was also identified that there is almost an order of magnitude of difference between the resource productivity of the services sectors and the industrial sectors. Within the industrial sectors, the textiles and leather industry were found to have high productivities, though not as high as the fabrication of machinery, computers and transport equipment. To facilitate the identification of best cases, future work will consist on the application of this methodology from 1995 to 2011 to assess how the resource productivity has been evolving.

Keywords: Resource productivity, Material Flow Accounting, Europe, Economic sectors, Economic metabolism

Track 7e. Legal Aspects of Sustainability

Session 7e-07

Good Corporate Governance (GCG) on Infrastructure Development for Environmental Sustainability: Indonesia Perspective From Corporate Law and Environmental Law

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Abstract

National development as manifest of state responsibilities, be avow in Indonesia Constitution 1945. Since 2004, national system on development planning assigned for all sector of development. Nowadays Indonesia government declares the policy and innovation to accelerate the national strategic project of development. This policy affects too existing spatial planning, development and environmental legislation. The legislation affect when the direction on national strategic project not vow appropriate with process and mechanism on the existing legislation and need to revise or amend. In public sector, government allocated funding on national and or local budget. Hence, when the allocations for this purpose are limited, the private sector needs to be involve with direct or indirect investment mechanism. When the private sector enter into the public development project, they are procedure and process that assign on many legislation must follow. This obligation rises new issues on compliance and enforcement law system by company on Good Corporate Governance (GCG) perspective. Several legislation in which there are passages containing the procedure and process on development strategic project have been issue they include: Law No. 40 Year 2007 on Limited Liability Companies, Law No, 25 of 2004 on National Planning System, Law No. 26 of 2007 on Spatial Planning and Law No. 32 of 2009 on the Protection and Environmental Management. In Practice, differences in the perception on implementation of compliance and enforcement law system what meant by companies when the responsibility principles on GCG perspective needed when the activity of development project potential impact to pollute and destruct the environment e.g., to what extent is the company implementation responsibility principles on GCG perspective? Hence, the main question in this research is “How to regulate and integrate the GCG on infrastructure development in Indonesia to support development for environmental sustainability”. The research method used is a normative juridical, using secondary data. The data obtained were analyzed qualitatively by way of interpreting the law with comprehensive integrative methods on theoretical approach based on Indonesia law system on constitution and legislations. The results of the analysis are presented in a descriptive form. The conclusions: First, the responsibility principles on GCG in the Indonesian law already included on legislation. The main issues are interpretation and perspective of compliance law system from the company and law enforcement from the government. Secondly, integrated of GCG on infrastructure on development must consider the legislation existing that have purpose to protect the environment, this requires hard effort and commitment from the government, company and support by community participation.

Keywords: Corporate, Environment, Law, Sustainable, Infrastructure

1. Introduction

1.1. Background

Issue pertaining to infrastructure development have lately attracted developed country to aim of national development for general welfare. Indonesia define development as a process of activities that involve all aspects of the life of a society, nation, and state. In order to accomplish Indonesia's national goals, State has the obligation to protect and maintain all resource for development purposes.

The Problem of development occur when basic infrastructure such as roads, clean water, and public transportation not feasible and available. The government have main responsibility to solve this problem and make innovation such as cooperation, investment and business-to-business mechanism to provide all facilities available for all citizen without prevailing laws and hierarchy of legislation (Kelsen,1973: 134). Government play an important role to control development activity especially with potential risks to environment.

Indonesia publish new concept of development in 2004, when legislation regarding the national system of national development agree by the parliaments. The new concept considers all aspect including local government autonomy as a part of national development system. The important aspects are forming the two main document as a comprehensive of planning comprise long term development planning for 20 years and 5 years for mid-term development planning. (Law 25:2004). The idea of mid-term development planning is formulation of vision of president that should form based on the long term development planning. In practice, the difference perspective and policy from the new president affect the whole development planning system.

National development system needs a comprehensive method and approach. There is a relation "top up" and bottom up" approach between national and local development planning. As a part of national system, the local government needs to consider and refer all policy that declares as a national interest.

The existence of local development planning must be accordance to the national development planning. The practice seem not easy because the election time period between president, governor, regent, and mayor was difference, These aspect become the main problem for comprehensive development system in Indonesia for the last 10 years.

Around 2013, the "*Nawa Cita*" as a vision of President Joko Widodo and Vice President Jusuf Kalla, that merges on mid-term development plan 2015-2019, maneuver accelerating the development of infrastructure for growth. The document contain the view of strategic issues of infrastructure development include: availability of basic infrastructure, increasing the security of water, food and energy, Increased national connectivity, the development of urban mass transit, increasing the effectiveness and efficiency of infrastructure financing.

The government encourage a concept of strategic policy that oriented towards improving and accelerating infrastructure development in five years from 2014 to 2019. The policy focuses on strategic public infrastructure such as roads, dams, public transportation (high-speed train), ports, airports, and borderlines. *Nawa Cita* declare that the policy reflects a not-business-as-usual attitude that manifested in the development of the main elements, particularly infrastructure development. In the past policies regulate that development was funded with government budget. The manoeuvres policy, grounded on a more advanced view that allows public-private partnership (PPP) in infrastructure development.

The challenge for government when new policy declares, there is a lot of legislation must be revise with a set of laws and regulations that grant incentives to private parties involved in activities related to infrastructure production and development. The time period force the government focus to promote new mechanism even cut the process of licence and permit to bring in local and foreign investment schemes that developed to democratize the national economy and used for the maximum welfare of the people. In any case, physical development always needs natural resources, which principally constitute one type of development capital that can support the country's system of life. Utilizing the existing resources in a responsible way can ensure that

they are continuously available for the national development. The adoption of the principles of sustainable development in across all sectors and regions is a main prerequisite for all development activities.

There are three key issues related to for infrastructure development namely of: infrastructure, natural resources, and the environment. The “Nawa Cita” Scheme promote the main actor is the corporation especially from private sector to role. The adoption of the SDGs, the Government must prepare the supporting policies related to, among others, formulation of regulations, action plan, institutional aspects, and funding resources. It is at this point that the role of the government, the private sector, and civil society groups.

The role of corporation on the public sector development must support by the GCG perspective, namely of: transparency, accountability, responsibility, Independence, fairness, and equity. Economic development must be in synergy with legal reform. SDGs purpose and correct mistakes, and support intervention by a congruent triangular body involving the government, business people, and the civil society. There must be an equal check and balance relation to maintain the balance among the triangular power above (Ikhwansyah.2010:74). In order to balance its functions, the triangular power needs a set of norms that contain several main principles (Ikhwansyah.2010:74-75). A set of legal regulations need to promote and maximize public participation in development. This can be achieved by First, maximizing the extent to which the society can openly utilize natural resources for the fulfillment of their basic needs; Secondly granting freedom of written and verbal expression; Third, granting freedom to elect and be elected as leader/people’s representative.

Responsibility principles on GCG perspective will be the main issues when the development activity involve natural resources. Around 2006, Lapindo cases, describe how the exploration eventually lead into national disaster. Lapindo as a corporation cannot resolve and fulfil all compensation to the people and recovery the damage to environment. Finally, the government take over the compensation and inclusion on national budget (Presidential Regulation No.76:2005). There is also case of river pollution on Cikijing River in Sumedang West Java that spread in to conflict between local governments. Lately, high-speed train project from Bandung-Jakarta bring out the big controversy, because the project approves by the government before all license and permit complete by the company, and presumed the track from Bandung to Jakarta not planned before under Law No.26 of 2007 on Spatial Planning.

The sustainable national development concept should prioritize efforts to fulfil peoples’ staple needs. It must also guarantee the sustainability of the economic development and underline intergenerational rather than intergenerational equity (Mitchel, 31:1997). Indonesia is facing a number of problems implementing sustainable development that tends to prioritize the fulfilment of staple needs. Heavy reliance on natural resources to implement sustainable development has resulted in problems related to the environment and utilization of natural resources. In addition, the concept of sustainable development itself has yet to adequately understanding by the stakeholders involved.

Indonesia’s has formulated strategic environmental assessment (SEA) as implementation of sustainable environment principles with systematic analysis, thorough, and participatory to ensure that the principles has become a basic and integrated in the development of a national including policies, plans and programs. (Asdak, 2012: 15) In practice, the strategic environmental assessment must integrated in the regulation of spatial planning and national development planning that potentially impact and / or risks to the environmental. (Law 32: 2009). Government responsible to prepare a comprehensive SEA and it is will be a strategic document for every development activity in Indonesia.

Infrastructure development involves many corporation and fund from every line, based on Indonesia legal system, their need, requires planning, and must follow mechanism and requirement that mention on various legislation. This legislation have their own aim from

economic, until environmental protection and legislation that state about land right until their responsibilities to protect environment based on social function principles (Art.6 Law No.5:1960)

In general, every corporation must follow the process of compliance and enforcement law system that mention on Indonesia legislation, such as first, there must adjust and analyze every infrastructure development plan and his or her plan must be consistent with the plan of national and regional development. Secondly, follow and fulfil permit and or license mechanism and procedure on spatial planning to ensure that every location consistent with the spatial plan, the Third follow a responsibilities for every proponent to fulfil environmental impact assessment (EIA) to achieve the environmental permit, fourth, there must purpose the business permit and or license related type of business.

In practice, there are still a lot of work yet, not only by the government but also by all stakeholders. Infrastructure development in Indonesia faces synchronization of legislation issues relating to infrastructure and government policy in the implementation of a regulation. The development of infrastructure in the public interest is always constrained land acquisition, and sometimes incompatibility of activities with the development plan as well as mismatch locations with the spatial planning, this problem cause uncertainty in the investment climate in Indonesia.

Construction through the protected forest area is the controversy issue lately. The construction plan past the reservoirs for the control and conservation of water resources and the development of public transport such as trains rapidly passing through protected areas, conservation areas, the area of defense and security, agriculture land and plantations. This development today face many challenges from the public, academicians, and non-governmental organization (NGO) as predicted to alter the function of land use changes and cause increasing quality and potentially cause environment damage.

1.2. Problem Identification

The primary problems of this research are: First, how to regulate and integrated the responsibility principles within the framework of good corporate governance perspective in infrastructure development and Secondly, the extent to which the implementation of environmental protection legislation and GCG with regard to maintain environmental sustainability.

1.3. Research objective

Formulate regulation and integration model within the framework of good corporate governance perspective in infrastructure development and formulate implementation of environmental protection legislation and GCG with regard to maintain environmental sustainability

2. Methods

In this study, the research method used is a normative juridical, Research method analyse from legal perspective The main questions should be formulated in the form of normative, how should the law according to what the law ought to be (Smits., Jan. M., 2012: 41), This study uses the approach of juridical normative and empirical juridical at once as comparative. The combination of these two approaches is important, in fact, the study contains two main characteristics, namely logic and empirical observation (Babbie, Earl., 1986: 16) to obtain research data, both secondary data and primary data is obtaining. The research sites established under research needs. Overall, the data were analysed qualitatively to get a conclusion to the problems identified.

3. Results

3.1. Indonesia Economic Principles on Development

Economic development in Indonesia based on “Pancasila” as the State Ideology (Art. 33 Indonesia Constitution: 1945). In line with the vision of the national development provided in Law No 17 of 2007 on the National Long-Term Development Plan for 2005-2025, the vision of the acceleration and expansion of Indonesia’s Economic Development is “to create an independent, well-developed, equitable, and prosperous society.”

The vision for 2025 above is implemented through the following three missions, which serve as the focus on increasing value adding and expanding value chain for industrial production processes, and increasing the efficiency of the distribution network. In addition, increase the capability of the industry to access and utilize natural resources and human resources., encourage efficiency in production and improve marketing efforts to further integrate domestic markets in order to push for competitiveness and strengthen the national economy, and Push for the strengthening of the national innovation system in the areas of production, process, and marketing with a focus on the overall strengthening of sustainable global competitiveness towards an innovation-driven economy.

Economic development activities require the environment is to support capacity to be taken into consideration. They also require implementation of environmentally friendly innovations and technology. Not only will the use of green and low-carbon technology improve production process efficiency and utilization of natural resources, but it will also bring positive impacts on public health, life quality, and economic growth without any negative environmental effects

This spirit of concept to develop state of management reflected from Soekarno and Hatta as founding father, those declare legal regulations that enable the functioning of the market should gear the society towards higher levels of efficiency, legal regulations should develop good governance (of the government, businesses, and social institutions) to correct the weaknesses of the market, and legal regulations should enable conflict management and mediation, and Fourth, legal regulations should develop transparency as an effective means to prevent corruption, collusion, and nepotism.

Business activity must carefully consider legal protection for all the stakeholders involved. Every corporation must implement good corporate governance based on the prevailing law. The concept of good corporate governance (GCG) has been a center of attention in Indonesia since the 1997 economic crisis. GCG recognized by the international institutions. Definition of corporate governance as: “that blend of law, regulation and appropriate voluntary private sector practices, which enable the corporation to attract financial and human capital, perform efficiently, and thereby perpetuate itself by generating long term economic value for its shareholders, while respecting the interests of stakeholders and society as a whole” (Jusuf Anwar, 2005 :188).

3.2. GCG regulation and Policy in Indonesia

The Indonesian Government established the Governance Policy National Committee, which in 2006 issued the General Guidelines on Good Corporate Governance in Indonesia. The guidelines serve as a reference for corporations in implementing GCG, First, support the achievement of corporate sustainability through a management system that is based on the principles of transparency, accountability, responsibility, independence, fairness, and equity, Secondly, support the empowerment function and dependence in each corporate organ, Third, support shareholders, members of Boards of Commissioners and Directors in their decision-making processes and encourage them to act based on high moral values and compliance to the prevailing law, Fourth, encourage the growth of corporate social awareness of and responsibility for the preservation of particularly the nearby corporate environment, and Fifth, optimize corporate values among shareholders while taking into account other stakeholders, Sixth, develop corporate national and international competitiveness in order to improve market trust and encourage investments and sustainable national economic growth.

Considering every corporation must ensure that the following GCG principles applied in all business aspects and organizations, if all principles imply, the goal of environmental protection will automatically fulfil. There are five principles in GCG for the implementation of sustainable development, namely:

First, Transparency, maintain objectivity when running a business, a corporation must provide its stakeholders with easily understandable relevant information that its stakeholders can access and understand easily. Corporation must take initiatives to disclose information not only as required by the law, but also as required by shareholders, creditors, and other stakeholders in their decision-making processes. This obligation also mentions on Law No. 14 of 2008 on Transparency of public information.

Secondly, Accountability, corporation to be able to make their performance transparently and fairly accountable, it must be governed in a proper and measurable manner based on its interests while taking into account the interests of the shareholders and other stakeholders.

Third, Responsibility, maintain long-term business sustainability and be recognized as a good corporate citizen, a corporation must observe the prevailing law and be responsible to the society and environment. Corporate responsibility must implement principle of discretion and ensure compliance with the prevailing law as well as corporate articles of association and by laws; and a corporation must implement social responsibility by, among others, caring for the surrounding communities, preparing adequate environmental planning, and implementing it to preserve, in particular, the environment.

Fourth, Independence, proper implementation of the above GCG principles, a corporation must be managed independently to prevent its organs from dominating one another and being subjected to external intervention. The principle of independence must be implemented according to the following guidelines such as each corporate organ must avoid domination by any party and be free from certain (conflict of) interests and external influences or pressures in order to be able to make objective decisions, and each corporate organ must perform its functions and duties based on the prevailing articles of association, law, and regulations without dominating or shifting responsibility to one another, and

Fifth, Fairness and Equity, performing its activities, a corporation must always consider the interests of the shareholders and other stakeholders based on the principles of fairness and equity, of which guidelines.

Infrastructure development activity by the state or private companies as Limited (Ltd) Liability Company, as regulated in law No. 40 of 2007 on Limited Liability Company. Based on Article 1 number 1 of the Law of Limited Liability Company, hereinafter referred as the Company, is a legal entity which is a capital alliance, established under the agreement, engage in business with a capital base that is entirely divided into shares and which fulfils the requirements as regulated in this law and the implementing regulations. Lately, Form of the Company's business is growing very rapidly in Indonesia business world, as a capital company, the company could be a tool of capital accumulation. (Rudhi Prasetya, 2014: 4)

Implementation of responsibility principles mention on Law No 40 of 2007 on Limited Company as legal entity since its company founding law was authorized by the Minister of Finance, therefore the Company Limited is a subject to the law other than humans. The legislation already describe the principles of good corporate governance, including the duties and the authority of each organ of the company to manage business activities and the relationships between body/entity, further regulated in more detail in the Articles of Association. The entity of the company consists of the General Meeting of Shareholders the Board of Directors and Board of Commissioners. General Meeting of Shareholders is Company Entity has authority that not granted to the Board of Directors or Board of Commissioners within the limits as regulated in this Law and / or the articles of association. Board of Directors is Company Entity authorized, and has full responsibility for

management of the Company for the benefit of the Company, accordance with the intent and purposes of the Company and represents the Company, both in and out of court accordance with the provisions of the articles of association.

Board of Commissioners is the entity in charge of supervising the Company in general and / or specifically accordance with article of association and provide advice to the Board of Directors One of the provisions of GCG in the Limited Company Law be about social and environmental responsibility. Limited Company Law legislation declare that the company that conducting its business activities in the parts and / or related to the natural resources required to implement the Social and Environmental Responsibility; Social and Environmental Responsibility as referred to in paragraph (1) an obligation of the Company's budgeted and accounted as Company expense that the implementation are carried out with due regard to decency and fairness;

Realization of sustainable development, including through the infrastructure development, governments, and their institutions, the Company, Shareholders, Directors, Commissioners and all elements of the company and the community should obey and implement the good governance. Konraad Ginther mentions that good governance is one element of sustainable development and act to keep consistency of the implementation of sustainable development. Moreover, good governance is also expected to create a development model that is able to increase public participation (Konrad Ginther 1995: 157).

Companies that indicated not apply the GCG is a Limited (Ltd) Company that is subject to Act No. 40 of 2007. Accordance with Article 74 of that Law and Government Regulation No. 47 of 2012 every Company shall implement social and environmental responsibility. In relation to the plan for civil suit to be filed by the Ministry of Environment and Forestry, the textile companies in Rancaek can be held accountable civilly because as legal entities they are the subject of legal rights and duties independently. The problem is what if the company property is not sufficient to replace that big compensation. Law No. 40 of 2007 has set the things that is fundamental on GCG especially about the authority, rights, obligations and responsibilities of Company body (entity) and the shareholders.

3.3. GCG and Environmental Responsibility in Indonesia.

There is a possibility the company did not perform the obligation and will face sanctioned accordance with the provisions of laws and regulations. Every business and/ or activity must have risk to the society and environment, in one side is an economic benefit and also risk to environment in other side. Because of their act influence society and environment direct and indirectly, there is evolve responsibility concept from the corporation for the society. Related to it, in Indonesia recognize three terminology related to responsibility from the corporation, namely Community Development (CD), Corporate Social Responsibility (CSR) and Social and Environment Responsibility (TJSL).

Based on the CSR Guideline in Environment Sector publishes by Ministry of Environment Republic of Indonesia, there is a Relation between CD, TJSL, and CSR, namely: First, Community Development (CD) or well known as *Comdev* or community development is a process designed to create progress on economy and social condition of community through active participation, which at the end will foster initiative and independence of the community itself., Secoundly, CSR concept closely related to community development (Comdev) concept, whereas Comdev has become important part in implementation process of CSR activities. Meanwhile Social and Environment Responsibility (TJSL), as stated in Article 74, Law No. 40/2007 compliance toward existing regulation, and Third, TJSL is mandatory meaning in its implementation, company should refer to all laws and other regulations related to environmental, such as Law No.32 of 2009 on the Protection and Management of Environmental (PPLH); Law No. 18/2008 on Waste Management, Government Regulation (PP) No. 82 of 2001 on Water Pollution Control and PP No. 41/1999 on Air Pollution Control. After the company did all its TJSL; by complying all existing laws and regulations in relation with its business type, MoE as a government institution that

responsible on environmental sector, will continuously encourage the company to implement its CSR activities in environmental sector.

Focus on TJSL, In Indonesia Law No. 40 of 2007 regulate shape of corporate responsibility call Corporate Social and Environment Responsibility as a commitment from the corporation to participate in sustainable economic development to improve the quality of life and environment is beneficial, both for the company itself, the local community, and society at large. Further to operate the Company's business in the field and / or related to the natural resources required to implement the Social and Environmental Responsibility is the obligation of the Company and are budgeted and accounted for as an expense of the Company are carried out with respect to implementation of decency and fairness.

Indonesia is a modern state law based on 1945 Constitution, however there is also recognition of welfare state as a national perspective. The implementation concept of welfare state is different in every country of the meaning and extent of state intervention to the affairs of its citizens. There is practice where the state took over, in part as well as community involvement in its responsibility for matters relating to the welfare of society (Paul Spicker). Indonesia Constitution states clearly that one purpose of the State is to promote the general welfare while involving community participation. In order to realize common prosperity, resources of the State, namely land, water, and natural resources contained therein controlled by the State and used for the prosperity of the people. Further stated that under the Constitution the Economic democracy, which in every government policy should accommodate the existence of the principle of solidarity, fair efficiency, and environmentally friendly in the national economy of Indonesia.

Prosperity and welfare is one of the main goals desired by the founders of the Indonesian. Welfare interpreted as the fulfilment of basic needs and supporting infrastructures for improving their quality of life. The development concept that has been generally only emphasizes the accumulation of wealth, per capita income growth of population and other variables related to earnings. Development should not be measured by how much freedom did because without freedom of people cannot make choices that enable them to help themselves and others. Definition of freedom as something related and complementary between: First, political freedom and civil rights; Second, economic freedom, social opportunities, Third, guarantee transparency (transparency). (Amartya Sen, 2000: 14). The consequences in the application of the concept of welfare state not only affects the economic sector, but is not recognized in efforts to achieve prosperity, the environment as a unified resource has been affected by the cause of environmental degradation in support of the life of all mankind and other living form. Environmental problems in developing countries in principle rooted in population, poverty, Pollution; and policy. (Munadjat Danusaputro, 2001: 52).

Today, Sustainable Development Goals (SDGs), especially with regard to the goal in order develop quality, reliable, sustainable and resilient infrastructure, including regional and trans-border infrastructure, to support economic development and human well-being, with a focus on affordable and equitable access for all. The purpose of this direct and mandated the development of infrastructure for the mutual benefit society. In order to protect the environment due to the impact of infrastructure development, the law has an important role to ensure development in accordance with the objective of a country that aspired and control for a balance between economic interests and the protection of development impacts on the environment. Indonesia as a country has sovereignty as a fundamental feature an independent country where the state is the highest authority. The concept of the rule of law must be a paradigm in the formation of law in Indonesia.

Paradigm is important role to development succeed. "... Constellation of Group Commitments. (Kuhn: 181) This view essentially states that a worldview and commitment in society plays an important role in determining a society's understanding including its view of the law. One theory of law that developed in Indonesia in the framework of development is the development of legal theory (Kusumaatmadja: 1972). Where this theory emphasizes one, characteristic of people

who are building is a change, the law should have a role in order to process these changes occur in an orderly way. Second, the regular changes that needed by the law in terms of legislation or court decisions. Third, changes and order are the twin goals of the people who are building, and then the law becomes a tool that cannot ignored. Fourth, legal experts in the community who are building must understand the interaction of law with other factors in the development of society, especially economic factors and social. Development within the meaning changes with regard to the environmental aspects that caused by aspects of the natural and human activities. Environmental changes due to human activity in particular has come as a modifier element environment that is very worrying, especially after the heavy science and technology effectively used to exploit natural resources and build heavy industries to meet human needs, nature has drastically impaired balance. (Rasjidi, 2012: 60)

There is a difference obligation when corporate activity involves natural resources. In theory, natural resources and the ecosystem in which they exist are part of the environment (Otto Soemarwoto, 2001:27). Infrastructure development since the technology develops change the human beings function in the natural ecosystem and become the fabricated environment. (Soerjani, 1987:7). Principally, the State is responsible for protecting its people for protection by the State is a human right. The Indonesian constitution mandates that "Everyone shall be entitled to ... obtain proper and sound environment." Further stipulations on human rights formulated in the second amendment of 2000. With the inclusion of statements on human rights following the amendment, the 1945 Constitution can now have categorized as a modern constitution. (Wheare, 1975:33).

There is an explanation when the laws in Indonesia adopt different philosophical, sociological, and juridical grounds. As laws, they provide comprehensive sovereignty to regulate issues of national environmental protection and management within the global scope of the international law. In Indonesia, the prevailing international issues directly affected the formulation of the three environmental laws. They also adopt the principles mutually agreed in international conferences. First, Law of 1982 adopts the principles of human living environment adopted during the Stockholm Conference in 1972. Second, Law of 1997 adopts the principles of sustainable development resolved in the Rio de Janeiro Conference in 1992. The national legislation based on Law No. 32 of 2009, which pertains to the issue of climate change and environmental protection and management in Indonesia. .

International agreement binding legally and morally become an important source of international environmental law. Based on the Statute of the International Court of Justice (ICJ), the important thing in international law there is no rigid hierarchy in the sources of international law as well as the statement "... another question that arises is whether Article 38 para 1 creates a hierarchy of sources. It is argued that there is no rigid hierarchy, but Reviews those drafting the article intended to give an order and the actual practice of the Court may be expected to Observe the order in the which they Appear ..." (Hillier, 1998: 64). However, the judicial practice plays an important role in the application regarding the use of other sources of international law.

4. Discussion

Implementation of good corporate governance (GCG) describe in cases of river pollution on Cikijing River in Sumedang West Java. Local people have complained about river pollution on the Cikijing River and rice fields that occurred in four villages, that is Jelegong, Bojongloa, Linggar and Sukamulya village in Rancaekek Subdistrict believed caused by disposal of wastewater from industrial activities located in the Sumedang namely: PT. KHT-II, PT. ISIT, and PT. FST. Estimated of polluted land area in Rancaekek Sub district is 752 ha of the total land area of 983 ha of raw rice fields. Society complaints is pollution of surface water and groundwater that is a source of clean water for the local population. (www.menlh.go.id)

There is a losses suffered by the community. The Coalition against Waste and the Institute of

Ecology Universitas Padjadjaran calculate the valuation of economic losses and environmental impact on society and the environment. At least four villages in Rancaekek Subdistrict (2004 to 2015) reached 11, 38 billion IDR consists from a public loss of three, 34 billion and IDR an estimated of remediation cost of contaminated land recovery of 933.8 hectares amounting to 8.04 billion IDR (Kompas 5 April 2016: 14).

The government has made some persuasive efforts to solve this case, but it did not work, so we need strict enforcement of both administratively, civil and criminal. Currently lawsuit residents to the Regent Sumedang and industrial pollutants is in progress on the State Administrative Court, to cancel the permit of disposal of wastewater that believed issued without verification and supervision Ministry of Environment and Forestry is preparing a civil lawsuit (Harian Kompas 5 April 2016 : 14).

The limited responsibility be lost if the requirements of the Company as a legal entity has not been or is not fulfilled, the shareholder either directly or indirectly in bad faith take advantage of the Company for personal gain, the shareholders involved in tort committed by the Company; or the shareholders either directly or indirectly, unlawfully using the Company's assets. The responsibility characteristic Accordance with Article 97 paragraph (1) - (4) of the Limited Company Law, the board of directors is responsible for management of the company, each member of the Board of Directors must implement in good faith and full responsibility. The member is guilty or negligent carry out their duties accordance with the regulations, When Board of Directors consists of two members of the Board of Directors or more, responsibilities referred to in paragraph (3) that shall be jointly and severally for each member of the Board of Directors.

Given a long enough range of time and persuasive efforts that conducted by the Government is hard to say that only the Board of Directors responsible for against the law acts committed by the Company. Thereby, should be considered about how the whole company body run GCG accordance with legislation and the Company's Articles of Association. Under certain conditions the Board of Directors, Commissioners and shareholders can be held responsible personally as regulated in Article 3 paragraph (2), Article 97 paragraph (1) - (4), Article 104 paragraph (2) and Article 114 paragraph (1) - (4) of Law No. 40 of 2007. Seeing how the GCG implementation in infrastructure development by both state-owned and private companies, even though the regulations is good, Company's Articles of Association has been set, even guideline and SOP is complete, the successful management of the company also determined by the human credibility (Nindyo Pramono 2006 : 84-85)

Accordance with Article 114 par. (1) - (4) of the Limited Company Act The Board of Commissioners is responsible for the supervision of the Company in good faith, prudence and responsible in carrying out monitoring and providing advice to the Board of Directors for the interests of the Company and according to the intent and purpose the Company. Each member of the Board of Commissioners participate personally responsible for the losses of the Company if that member is guilty or negligent running the task. If the Board of Commissioners consists of two (two) members of the Board of Commissioners or more, jointly and severally liable that shall be jointly and severally for each member of the Board of Commissioners.

Social and Environmental Responsibility aimed at realizing sustainable economic development to improve the quality of life and environment for the benefit of the Company itself, the local community and society at large. This provision is intended to support the Company's relations are harmonious, balanced, and in accordance with the environment, values, norms, and culture of the local community, it is determined that the Company's business activities in the field and/ or related to the natural resources required to implement and Social Responsibility environment. GCG regulation has set the responsibility of shareholders, the Board of Directors and Board of Commissioners. Article 3, paragraph (1) and (2) of the Limited Company Law shareholders of company shall not be liable personally for the agreement that have been/ will be made on behalf of the Company and is not responsible for any Company's damages beyond the shares held

Indonesia has formulated strategic environmental assessment (SEA) as implementation of sustainable environment principles with systematic analysis, thorough, and participatory to ensure that the principles has become a basic and integrated in the development of a national including policies, plans and programs. (Asdak, 2012: 15) In practice, the strategic environmental assessment must integrated in the regulation of spatial planning and national development planning that potentially impact and / or risks to the environmental. (Law 32: 2009). Government responsible to prepare a comprehensive SEA and it is will be a strategic document for every development activity in Indonesia.

Infrastructure development involves many corporation and fund from every line, based on Indonesia legal system, their need, requires planning, and must follow mechanism and requirement that mention on various legislation. This legislation has their own aim from economic, until environmental protection. There is also legislation that state about land right until their responsibilities to protect environment based on social function principles.

Every individual and corporation must follow the process of compliance system that mention on Indonesia legislation. There must adjust and analyse every infrastructure development plan and their plan must consistent with the plan of national and regional development. Follow and fulfil permit and or license mechanism and procedure on spatial planning to ensure that every location consistent with the spatial plan, follow some responsibilities for every proponent to fulfil environmental impact assessment (EIA) to achieve the environmental permit, and there must purpose the business permit and or license related type of business.

Indonesia mention clearly all-entire process of compliance law system based on legislation. If there is a discrepancy with the implementation of the legislation, the possibility of imposition of sanctions may be imposed not only for individual or corporation but also to the administration of the State or government officials, especially regarding licensing unrelated with the spatial planning that has been declare by government. Today, the main problems of infrastructure development in Indonesia is the synchronization of legislation relating to infrastructure and government policy in the implementation of a regulation.

The development of infrastructure in the public interest is always constrained land acquisition, and sometimes incompatibility of activities with the development plan as well as mismatch locations with the spatial planning, this problem cause uncertainty in the investment climate in Indonesia. The other problem shown when construction of public roads that use or through the protected forest area, construction of reservoirs for the control and conservation of water resources and the development of public transport such as trains rapidly passing through protected areas, conservation areas, the area of defence and security, agriculture land and plantations. This development today faces many challenges from the public, academician, and non-governmental organization (NGO) as predicted to alter the function of land use changes and cause increasing quality and potentially cause environment damage.

Environmental aspects in the law-making process is necessary for the conception of development environment and eco-development in Indonesia and in accordance with the principles agreed in various international conferences (Silalahi, 2001: 32). Further stated that attention to environmental issues and legal arrangements evolving rapidly in accordance with the economic development, where technological advances and encourage the sector has a role in the management of natural resources of concern when managing natural resources have an impact on the environment.

Indonesia has had a variety of environmental regulations in the development of adequate infrastructure. Law No. 32 of 2009 on the Protection and Management of the Environment has provided direction for each actor to pay attention to the various business activities of the licensing requirements in the context of environmental management. Licensing as a process of becoming an important instrument in order to control an action plan to conform to the arrangements and the principle of sustainable development. Some of the licensing process which must be adopted

by any business or activity potentially impact on the environment, among others, the First, the permit to use the space based spatial planning, Secondly, the Environmental Permit, and Third, the business license.

With regard to permit utilization of space, every initiator of business activities including infrastructure must be noted that the location of the activities. Carried out in accordance with its function and designation based spatial planning that superbly set, as the environmental permit decision determined the feasibility of a business activity based on the study of environmental impact assessment (EIA) where process and procedure have been strictly regulated in Government Regulation No. 27 of 2012. In the end, a new business license granted when the government has decided that efforts / activities to be undertaken have obtained the environmental permit.

5. Conclusions

Based on the research, the conclusions are:

First, the responsibility principles on GCG arrangement in the Indonesian law already included on legislation. The main issues are interpretation and perspective responsibility principles on compliance law system from the company and law enforcement from the government. Development planning must support and goal for the public welfare in Indonesia. The harmonization of law between economic and environmental interests has become important factors. GCG on infrastructure development must consider the economic, social, and environmental pillars of sustainable development, drawn up guidelines, which refer to the relevant regulations related and implemented by all stakeholders. Corporation as infrastructure development players must abide by legislation and government policies, including the processes and procedures set out in the framework of the protection and management of legal environment, and

Secondly, Integrated of GCG on infrastructure on development must consider the legislation existing that have purpose to protect the environment, this requires hard effort and commitment from the government, company and support by community participation. Paradigm reform also have important role for towards the environment while considering the economic aspects of the business world and become the primary concern in the development of infrastructure, this requires the commitment of the State and community participation for sustainability by considering the needs of the present generation without compromising the interests of the next generations.

References

- Anwar, Jusuf (2005) Pasar Modal Sebagai Sarana Pembiayaan dan Investasi, Seri Pasar Modal 1, Alumni Bandung.
- Asdak, Chay (2012) Kajian Lingkungan Hidup Strategis: Jalan Menuju Pembangunan Berkelanjutan, Gadjah Mada University Press.
- Babbie, Earl. (1986) the Practice of Social Research, Wadsworth Publishing Co., Belmont California.
- Danusaputro, Munadjat, (2001) Hukum Lingkungan, Buku I: Umum, Putra A. Bardin, Bandung, Cetakan Ketiga.
- Ginther, Konrad – Denters, Eric, and Paul J: I.M. de Waart, (1995) Sustainable Development and Good Governance, Martinus Nijhoff Publisher Dordrecht/Boston/London.
- Hillier. Tim, Sourcebook on Public International Law, (1998) Cavendish Publishing Limited, TheGlass House, Wharton Street, London
- Johanes Ibrahim, (2006) Hukum Organisasi Perusahaan – Pola Kemitraan dan Badan Hukum, PT

Refika Aditama, Bandung 2006

Kelsen, Hans, *General Theory of Law and State*, Translated By Anders Wedberg, Russell and Russell, New York 1973.

Kiss, Alexandre and Shelton, Dinah, (2007) *Guide to International Environmental Law*, Martinus Nijhoff Publisher, Leiden/ Boston.

Kuhn, Thomas, *the Structure of Scientific Revolutions*, Second Edition, Foundations of the Unity of Science

Kusumaatmadja, Mochtar, (1972) *Pembinaan hukum dalam Rangka Pembangunan Nasional*, Binacipta.

Mitchell, Bruce, Setiawan, B, Rahmi, Dwita Hadi, (1997), *Pengelolaan Sumberdaya dan Lingkungan*, Gadjah Mada University Press.

Pramono, Nindyo, (2006), *Bunga Rampai Hukum Bisnis*, Cetakan 1 PT Citra Aditya Bandung.

Prasetya, Rudhi, (2004) *Teori dan Praktik Perseroan Terbatas*, Cetakan ke 3 Penerbit Sinar Grafika.

Rasjidi, Lili and Wyasa Putra, Ida Bagus,(2012) *Hukum Sebagai Suatu Sistem*, Fikahati Aneska.

Sen, Amartya, (2000), *Development as Freedom*, New York: Anchor Books

Silalahi, M. Daud Silalahi, (2001) *Hukum Lingkungan Dalam Sistem Penegakan Hukum Lingkungan Indonesia*, PT. Alumni.

Smits. Jan M., (2012) *the Mind and Method of the Legal Academic*, Edward Elgar Publishing Inc, Cheltenham, UK and Northampton, MA, US

Soemarwoto, Otto, (2001) *Ekologi, Lingkungan Hidup dan Pembangunan*, Djambatan.

Soerjani, Moh., Ahmad, Rofiq, Munir, Rozy (Ed), (1987) *Lingkungan: Sumberdaya Alam dan Kependudukan dalam pembangunan*, UI Press.

Spicker, Paul, *An Introduction to Social Policy*, dalam <http://www.spicker.uk/social-policy/wstate.htm>

Sunaryati Hartono, (1991) *Politik Hukum Menuju Satu Sistem Hukum Nasional*, PT Alumni Bandung.

Wheare, K.C (1975) *Modern Constitution*, Oxford University Press, London.

A Comparison of International Nitrogen Oxide Emission Regulation for the Energy Sector

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Abstract

In current discussions about air pollution, CO₂ and other important greenhouse gases are usually the primarily regarded pollutants. Nitrogen oxide (NO_x) emissions, however, seem to be a subject of the late 20th century that has been “resolved” in most parts of the world. Yet, NO_x emissions are still doing severe harm to humans and the environment in many parts of the world, for example by enforcing the formation of ground-level ozone, especially during the summer months. Succeeding the transportation sector, the energy sector is causing the second largest share of worldwide NO_x emissions. Especially in developing countries, NO_x emission abatement in fossil fueled power plants seems to be barely regarded, as the main focus is usually set on economic efficiency and the fulfilling of increasing demands. We compiled the NO_x emission regulation legislation for the energy sector of 59 countries worldwide considering policy instruments and emission limits for two exemplary installations of the energy sector. Various political instruments exist to target NO_x emission regulation, such as emission and immission limitations, technical specifications, market price based instruments (cap-and-trade or green certificate schemes), financial support programs and specific taxes. The various instruments and the political background of their implementation can have differing influences on the total emissions of a country which is investigated qualitatively in a comparative SWOT analysis taking the two most common instruments – emission and immission limits – into account. Apart from a qualitative comparison of these instruments, the impact of emission limits on national NO_x emissions is also part of our study. It will be investigated quantitatively based on the example of the development of NO_x emissions within the European Union since 1990. Our results show that based on publicly available data, a quantitative comparison of different policy instruments throughout the world is difficult. Yet we expect that the chosen kind of instrument is less important than its proper implementation and management in order to minimize NO_x emissions of the energy sector. Our analyses are of special interest for political stakeholders which decide on future political instruments or have to comply with them, especially but not only in developing countries.

Keywords: Environmental Policy, Emission Abatement, Policy Instrument, Threshold, Legislation

1. Introduction

Nitrogen oxides (NO_x) are pollutants, which cause severe harm to humans and the environment, especially due to reactions with oxygen forming ground level ozone. Furthermore “NO_x emissions contribute to acidification via formation of nitrous acid (HNO₂) and nitric acid (HNO₃), to eutrophication [...] and (in particular NO₂) to irritation and damage to respiratory organs” (UNECE, 2015). Figure 1 presents the major emitting sectors of NO_x. Succeeding ‘Transportation’, ‘Energy production and distribution’ is identified as the second largest emitting sector, causing 23% of the total NO_x emissions within the EEA-33 region (EEA: European Environment Agency). In the following we are thus focusing on this sector.

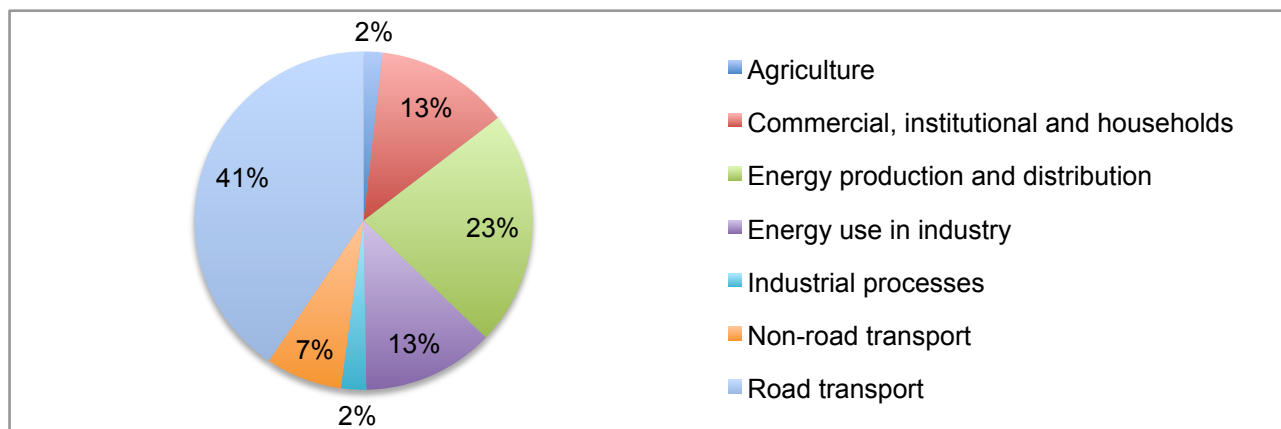


Figure 1. Share of total NO_x -emissions per sector within the EEA-33 countries in 2011. (European Environment Agency, 2014)

Various political instruments have been implemented in order to reduce NO_x emissions of the energy sector. These will be presented and analyzed in the following, aiming at providing a comparison of international legislation in order to derive key drivers for successful emission abatement. These analyses are of special interest for political stakeholders which decide on future political instruments, especially in developing countries. First of all the national regulations of 61 countries will be displayed and investigated qualitatively and quantitatively by means of two specific examples. In the second step, we analyze the emission statistics of the EU, taking the legal background and its development over the last decades into account.

2. Methods

The results of this paper are based on an extensive survey of national legislation and other legal publications of countries worldwide. In total, we gathered data of 59 countries. Most of them are industrialized or emerging countries. We expect this to be caused by the fact that many developing countries do not (yet) have regulations for NO_x emissions. It is, however, difficult to identify countries which have no NO_x emission regulation, as these countries are usually not publishing official documents. Therefore we were not able to gather data of more countries, as we could not differ between countries that do not have regulations and countries which do not publicize this information (in English language).

Existing political instruments for emission regulation will be presented in the first part of chapter 3. Their scope of application varies; they might address different fuels, technologies, industry sectors, locations or combinations thereof. Some regulations are only valid for the energy or industry sector, some for both. Sometimes other delimitations may apply. Therefore it is rather difficult to compare international legislation. Nevertheless we decided to set up a qualitative and quantitative list of national legislations, using two specific installation examples. Due to the issues mentioned above, this list, however, is neither binding, nor can we guarantee accuracy and applicability of the given values. Its goal is to provide a general overview. In some countries, regional or technical exceptions can be relevant as well as inaccuracies due to unit conversion or deviating reference oxygen concentrations. Furthermore, environmental legislation is currently in focus in many countries, thus there are many adoptions and updates and values might soon be outdated. The list provided in chapter 3.1 is based on publications prior to March 2016.

In subchapter 3.2 the development of NO_x emissions of the electricity sector over the last decades will be analyzed in regard to the modifications of EU legislation. As the availability and comparability of emission statistics in relation to international emission regulation is limited, the focus on the EU was necessary and reasonable in this case. In order to analyze the success of NO_x emission regulation we consider not only total emissions of the sector but also the development of the sector itself. In our case we analyze NO_x emissions in relation to the total amount of electricity generated from NO_x emitting fuels (activity rate), as emission limits do not influence the number and capacity of NO_x emitting installations. Finally, chapters 4 and 5 further

discuss the results of chapter 3 and provide an outlook regarding possible political developments and future research topics.

3. Results

In the following two subchapters, we will present the results of our research. The first one is providing information about the current legislation for NO_x emissions of the electricity sector in 59 countries worldwide. The second subchapter analyzes the NO_x emissions of the energy sector within the EU and the development over the last decades, while legislation became more and more stringent.

3.1 International Nitrogen Oxide Emission Regulation

Emission regulation for the electricity sector is based on various political instruments. Most countries define air quality standards, i.e. a maximum tolerable concentration of NO_x in the air, that shall be achieved everywhere in the country at any time (measurements are based on different time intervals, such as 20 minutes, hourly, daily, monthly or annual considerations). In order to achieve these quality standards, emission regulation for individual plants or installations can be based directly on emission limits. Therefore, a plant needs to prove that it will not cause an exceeding of emission limits in the surrounding area. Hence, the total emissions of the plant are relevant as well as the surrounding conditions in order to get a permission for operation. It is therefore an impact based instrument which is, however, causing severe effort, as every plant needs to be regarded separately. Furthermore it is causing higher uncertainty during the planning stage, as investors might not know if the plant is going to get a permit in the designated manner. In the following, we use the term immission regulation only for countries that use their air quality standards as described above. Air quality standards exist in most countries worldwide, even though they might use other political instruments in order to reduce NO_x emission of the electricity sector or they are currently exceeding their own limitations.

The most common way to regulate NO_x emissions of the energy sector are emission regulations. ELV (Emission Limit Values) are set for stack emissions, usually in milligram per normal cubic meter flue gas (other units such as parts per million are used as well but are less common). ELV regulations are often rather complex – they might vary for different fuels, technical configurations, installation capacities, industrial sectors, time of installation, etc. and might include various exceptions.

Another measure that is often implemented together with ELVs but also with other policy instruments are technical specifications. Within the EU, they are defined by the so called BREF (BAT Reference Documents), which contain the BAT (Best Available Techniques). These BAT are mandatory in order to ensure the most reasonable design (from a techno-economic-ecologic perspective) for new and existing installations. One example for large combustion plants (LCP) is the BREF LCP (European Commission, 2006).

Other political options to influence NO_x emissions of the electricity sector are financial support programs, specific taxes or market based instruments, such as emission trading. The results of our research regarding financial support programs were rather scarce. South Korea published information about a Low- NO_x -Burner program (Ministry of Environment ROK, 2012), whereas Canada does not support these initiatives as they might set wrong impulses and “would be inconsistent with the “polluter pays” principle” (Department of the Environment and Department of Health, 2014). We do not have detailed information about other financial support programs. This might, however, be caused by the fact that such programs are often very complex and contain more than just NO_x abatement support. Therefore, more detailed and specific research would be necessary to form a complete picture of the current international situation.

Certificate trading is an instrument, which is well known for CO₂ emissions within the EU but also in other regions of the world. Cap-and-trade markets for NO_x have been or are still implemented in some states of the US and in the Netherlands. The EU is currently working on the design and implementation of such a market, yet the existing experiences with this policy instrument are rather scarce (Carmona et al., 2010; European Commission, 2010; Könings, 2003).

Regarding taxes, Sweden provides an interesting example. Plant operators have to pay a tax per kilogram of NO_x emitted. On the other hand, there is a refund mechanism. Plant operators get a refund of the state per MWh electricity generated. Plants with low NO_x emissions but high energy output are thus given an advantage; they are called the net recipients, whereas installations with higher emissions per energy output are the net payers. The goal and biggest advantage of this instrument is to achieve the minimum reasonable emission output. A difficulty of this mechanism is the extensive control, surveillance and administration effort (Naturvårdsverket, 2006). Canada published a very similar statement regarding taxes: “A tax on air pollutant emissions would have different effects in different regional contexts, as firms chose whether to pay the tax or invest in abatement equipment, and so no emissions floor could be guaranteed. Since the quantity of emissions reductions cannot be controlled with a tax, this instrument is better suited when an incentive to continually reduce emissions is sought” (Department of the Environment and Department of Health, 2014). Thus a combination of both, emission limits and an emission tax like it is implemented in Sweden seems appropriate for countries aiming at constantly reducing NO_x emissions.

Table 1 displays the contributions of emissions from different LCP categories to the total air emissions of the considered sector. The data is from 2001; more current data was not available to the authors. Yet the goal is to provide an overview of the categories and their contribution to the total sector emissions. According to these numbers we decided to investigate international legislation based on two examples in the following. A 1000 MW coal fired boiler has been selected as first example, representing the most relevant LCP category. Furthermore, a 100 MW gas turbine shall be investigated in order to compare installations of different size and fuel. Both installations are expected to be new so that the most recent regulation applies.

Table 1. Contribution of emissions from different LCP categories to the total air emissions from IPPC installations operating in EU-15 in 2001 according to the European Pollutant Emissions Register 2001. (European Commission, 2006)

LCP category	Contribution to total emissions from IPPC installations (%)							
	SO ₂	NO _x	NH ₃	CO ₂	N ₂ O	CH ₄	PM ₁₀	CO
LCPs over 300 MW	64,6	53,4	0,5	54,4	7,6	0,2	38,1	4,4
LCPs 50 – 300 MW	3,6	6,0	N/A	5,0	21,0	0,2	2,1	2,8
Gas turbines	0,9	3,6	0,03	5,5	0,4	0,3	0,1	0,3
Stationary engines	0,3	1,2	N/A	0,1	N/A	0,05	0,2	0,03
All LCPs	69,4	64,2	0,5	65,0	29,0	0,8	40,5	7,5
N/A: No emissions reported for this category								

Table 2 sums up the results of our research. It displays the 59 countries, their main emission regulation instrument and the ELVs for the selected examples. Due to the difficulties in information gathering regarding less common policy instruments, only emission and immission limits as well as ‘no regulation’ is displayed. Examples for other political instruments have been mentioned above, yet they are usually not applied isolated but in combination with either emission or immission limits. In some cases the details of the regulations were only available in national language, thus hampering the analysis. Furthermore the technical conditions or units might vary. Especially the reference oxygen concentration might defer or might not be provided within the documents so that the given values should be considered as approximate values and not be taken for granted.

Table 2. Summary of international nitrogen oxide emission regulation

Country Name	Country Code	Emission Limits	Immission Limits	No Regulation*	Emission Limit Value (ELV) [mg/Nm ³] for a new installation		References
					100 MW gas turbine	1000 MW coal fired boiler	
Australia	AUS	x	x		N/A (state specific)	N/A (state specific)	[1]
Austria	AUT	x			50	200	[2]

Azerbaijan	AZE		x		tbd	tbd	[3]
Belgium	BEL	x			50	200	[2]
Brazil	BRA	(x)		(x) no reg. for coal	50	-	[4]
Bulgaria	BGR	x			50	200	[2]
Canada	CAN	x			depending on the power and heat output of the plant	depending on the power and heat output of the plant	[5]
Chile	CHL			x	-	-	[6], [7]
China	CHN	x			50	100	[8], [9]
Croatia	HRV	x			50	200	[2]
Cyprus	CYP	x			50	200	[2]
Czech Republic	CZE	x			50	200	[2]
Denmark	DNK	x			50	200	[2]
Estonia	EST	x			50	200	[2]
Finland	FIN	x			50	200	[2]
France	FRA	x			50	200	[2]
Germany	DEU	x			50	200	[2]
Greece	GRC	x			50	200	[2]
Hungary	HUN	x			50	200	[2]
India	IND			x	-	-	[10]
Indonesia	IDN	x			320	750	[11], [12]
Ireland	IRL	x			50	200	[2]
Israel	ISR			x	tbd	tbd	[13], [14]
Italy	ITA	x			50	200	[2]
Japan	JPN	x			70 ppm (ca. 140 mg/Nm ³)	200 ppm (ca. 400 mg/Nm ³)	[15]
Latvia	LVA	x			50	200	[2]
Lithuania	LTU	x			50	200	[2]
Luxembourg	LUX	x			50	200	[2]
Macedonia	MKD	x			50	200	[16]
Malaysia	MYS			x	-	-	[17]
Malta	MLT	x			50	200	[2]
Mexico	MEX	x			110-375 ppm (depending on the region, ca. 223-760 mg/Nm ³)	110-375 ppm (depending on the region, ca. 223-760 mg/Nm ³)	[18]
Netherlands	NLD	x			50	200	[2]
New Zealand	NZL			x	tbd	tbd	[19]
Norway	NOR			x	tbd	tbd	[20]
Pakistan	PAK	x			400	300 ng/J _{heat input} (cannot be transferred in mg/Nm ³ without additional information)	[21], [22]
Philippines	PHL	x			500	1000	[23]
Poland	POL	x			50	200	[2]
Portugal	PRT	x			50	200	[2]
Rep. of Korea	KOR	x			N/A	164	[24]
Rep. of Moldova	MDA			x	-	-	[25]
Romania	ROU	x			50	200	[2]
Russia	RUS			x	tbd	tbd	[26], [27]
Serbia	SCG	x			50	200	[28], [29]
Singapore	SGP	x			400	400	[30]
Slovakia	SVK	x			50	200	[2]
Slovenia	SVN	x			50	200	[2]
South Africa	ZAF	x			50	750	[31]
Spain	ESP	x			50	200	[2]
Sweden	SWE	x			50	200	[2]
Switzerland	CHE	x			20	250	[32]
Taiwan	TWN	x			N/A	513	[33]
Thailand	THA	x			120 ppm (ca. 243 mg/Nm ³)	350 ppm (ca. 709 mg/Nm ³)	[34]

Trinidad and Tobago	TTO	x			500	500	[35]
Turkey	TUR	x			50	500	[29], [36]
Ukraine	UKR	x			N/A	500	[37]
United Kingdom	GBR	x			50	200	[2]
United States	USA	x			N/A (ng/J _{gross output} cannot be transferred in mg/Nm ³ without additional information)	N/A (ng/J _{gross output} cannot be transferred in mg/Nm ³ without additional information)	[38]
Vietnam	VNM	x			390-910 (location dependent)	330-1200 (location dependent)	[39], [40]
Explanation:							
* These countries have general air quality standards, but no report, control or approval routines for LCP							
(x) Partly valid							
- No ELV in force (national air quality standards, however, apply accordingly)							
tbd ELV need to be defined for every plant individually in order to meet the regional air quality standards							
N/A ELV seem to be existing but are not available/accessible (e.g. due to translation difficulties)							

References:

- [1] <http://www.iea-coal.org.uk/documents/82533/9448/Australia>
- [2] <http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32010L0075&from=EN>
- [3] http://www.unece.org/fileadmin/DAM/env/epr/epr_studies/azerbaijan%20II.pdf
- [4] <http://www.mma.gov.br/port/conama/legiabre.cfm?codlegi=660>
- [5] http://www.gazette.gc.ca/gazette/html-interstitial-eng-fra.php?source_pdf=%2Frp-pr%2Fp1%2F2014%2F2014-06-07%2Fpdf%2Fg1-14823.pdf&referer=
- [6] <http://www.temasactuales.com/assets/pdf/gratis/CHLds114-02.pdf>
- [7] http://www.temasactuales.com/assets/pdf/gratis/CHLdec138_2005.pdf
- [8] <http://www.chinafaqs.org/library/chinafaqs-china-adopts-world-class-pollutant-emissions-standards-coal-power-plants>
- [9] <http://switchboard.nrdc.org/blogs/bfinamore/NRDC%20Unofficial%20English%20Summary.docx>
- [10] <http://www.iea-coal.org.uk/documents/82544/9418/India>
- [11] <http://www.iea-coal.org.uk/documents/82545/9423/Indonesia>
- [12] http://hukum.unsrat.ac.id/lh/menlh2008_21_1.pdf
- [13] <http://www.sviva.gov.il/English/Legislation/Documents/Clean%20Air%20Laws%20and%20Regulations/CleanAirLaw2008.pdf>
- [14] <http://www.sviva.gov.il/English/Legislation/Documents/Nuisances%20Laws%20and%20Regulations/AbatementOfNuisancesRegulations-AirQuality-1992.pdf>
- [15] https://www.env.go.jp/en/air/aq/air/air4_table.html
- [16] <http://airquality.moepp.gov.mk/airquality/wp-content/uploads/2015/11/10.-Rulebook-on-stationary-sources-04.10.2010-ENG.pdf>
- [17] http://www.doe.gov.my/portalv1/wp-content/uploads/2015/01/Environmental_Quality_Clean_Air_Regulations_1978_-_P.U.A_280-78.pdf
- [18] <http://siga.jalisco.gob.mx/Assets/documentos/normatividad/nom085semarnat1994.htm>
- [19] <http://www.legislation.govt.nz/regulation/public/2004/0309/latest/096be8ed80f30cda.pdf>
- [20] <http://miljodirektoratet.no/en/Legislation1/Regulations/Pollution-Regulations/Chapter-7/>
- [21] http://www.environment.gov.pk/eia_pdf/g_Legislation-NEQS.pdf
- [22] <https://www3.opic.gov/environment/eia/pakistanpower/110711%20R1V08STR-A%20-%20Part%20III.pdf>
- [23] <http://www.abernales.com/8749irr.htm>
- [24] <http://www.iea-coal.org.uk/documents/82564/7960/South%20Korea>
- [25] https://www.energy-community.org/portal/page/portal/ENC_HOME/DOCS/3872267/23B450386A075E64E053C92FA8C0F69F.PDF
- [26] <http://www.oecd.org/env/outreach/38118149.pdf>
- [27] <http://uk.practicallaw.com/6-503-2842#a249373>
- [28] https://www.energy-community.org/portal/page/portal/ENC_HOME/DOCS/3872267/23B450386A075E64E053C92FA8C0F69F.PDF
- [29] <http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32001L0080&from=EN>
- [30] <http://statutes.agc.gov.sg/aol/search/display/view.w3p;ident=77e17530-1634-4b0c-9231-f746a197cd8c;page=0;query=DocId%3A%226096db9b-ae16-418c-b8c4-521f50a2d0df%22%20Status%3Ainforce%20Depth%3A0;rec=0#Sc->
- [31] <http://www.saaqis.org.za/filedownload.aspx?fileid=885>
- [32] <https://www.admin.ch/opc/de/classified-compilation/19850321/index.html#app2>
- [33] <http://www.iea-coal.org.uk/documents/82567/9478/Taiwan>
- [34] http://www.pcd.go.th/info_serv/en_reg_std_airsnd03.html
- [35] http://ema.co.tt/docs/techServ/Draft_air_rules.pdf
- [36] http://www.tepav.org.tr/upload/files/haber/1427475571-5.Turkey___s_Compliance_with_the_Industrial_Emissions_Directive.pdf
- [37] <http://www.iea-coal.org.uk/documents/82573/7866/Ukraine>
- [38] <https://www.gpo.gov/fdsys/pkg/CFR-2011-title40-vol6/xml/CFR-2011-title40-vol6-part60.xml>
- [39] <http://www.iea-coal.org.uk/documents/82577/9444/Vietnam>
- [40] <https://www.env.go.jp/air/tech/ine/asia/vietnam/files/law/QCVN%2022-2009.pdf>

There are various differences between the regulations of specific countries, even among those using the same political instrument. The sectoral classifications for example vary – some countries distinguish between the electricity and industry sector and set up differing ELVs. Japan for example focuses on the industry sector whereas many other countries have specific regulations for electricity generating installations (in contrast to heat generating installations) within the energy sector. Some countries take technical differences (i.e. different types of turbines) into account whereas others only differ by fuel. Mexico and Thailand even distinguish between regional circumstances (in particular the ambient air quality of different regions) and define specific values for different regions.

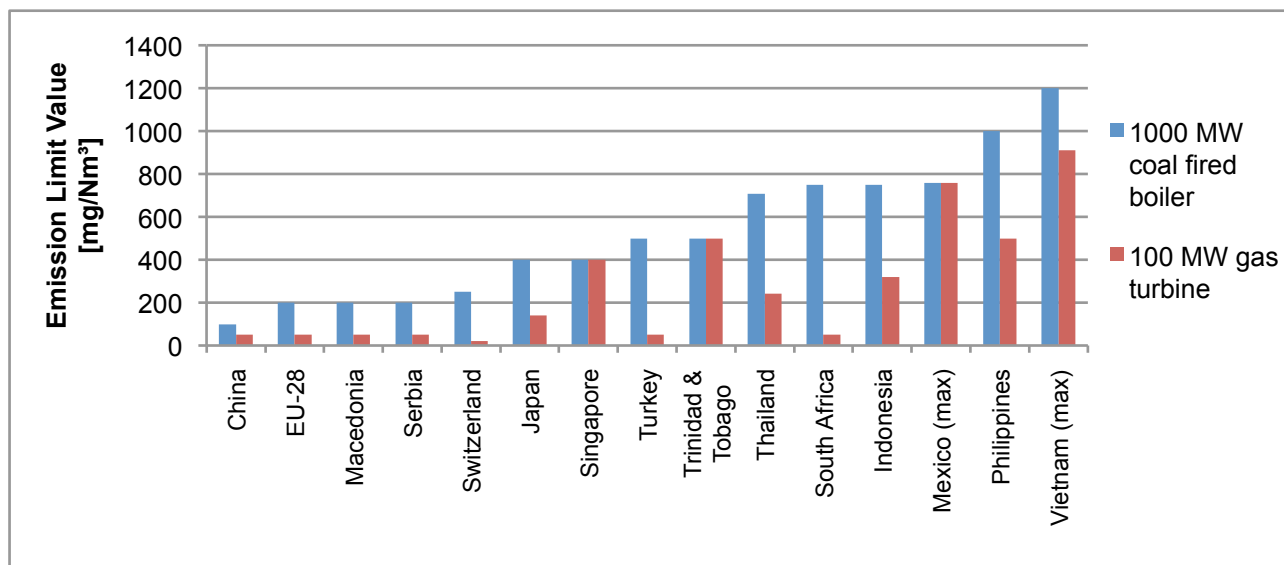


Figure 2. Comparison of international NO_x regulation for two exemplary installations. The countries with complete datasets presented in Table 2 are included; the EU member states are summarized as EU-28. If a range of ELVs is given, the maximum values have been chosen and marked with (max). (References: cf. Table 2)

Figure 2 provides a quantitative comparison of ELVs for the two exemplary installations of all countries with complete datasets. Currently China has the most stringent regulation implemented, followed by the EU-28 and the Energy Community members Serbia and Macedonia. Mexico and Vietnam tolerate very high emissions, yet they have differing ELVs depending on the location of the plant. Only the maximum value is displayed in this figure, thus the ELV might be notably lower in other parts of the country.

Even in countries without NO_x regulation there might be regulations for new plants, at least if they shall be financed by World Bank funding. The IFC (International Finance Corporation) set up emission standards for projects in countries without according legislation. More details are provided by International Finance Corporation (2008). These values are based on the WHO (World Health Organization) ambient air quality standards (World Health Organization, 2014). Depending on the type of fuel, pollutant and technology the emission limits vary. Some of them correlate with the EU standards, some are less stringent, but in general they seem to be rather challenging for plants in regions, where NO_x abatement is not yet very common.

3.2 Development of Total NO_x Emissions

In order to assess the effectiveness of environmental policy the associated emission statistics will be analyzed in the following. As mentioned in chapter 3.1, an international comparison of current national legislations is difficult due to various reasons. Even more difficult is the comparison of emission statistics, as sector definitions vary and the availability and credibility of international data is limited. Moreover the advancement and updating of national legislation is difficult to assess as even current legislation is not always available. Therefore we decided to focus on the EU for the analyses of this chapter. Consequently, the applying political instruments were the same for all countries.

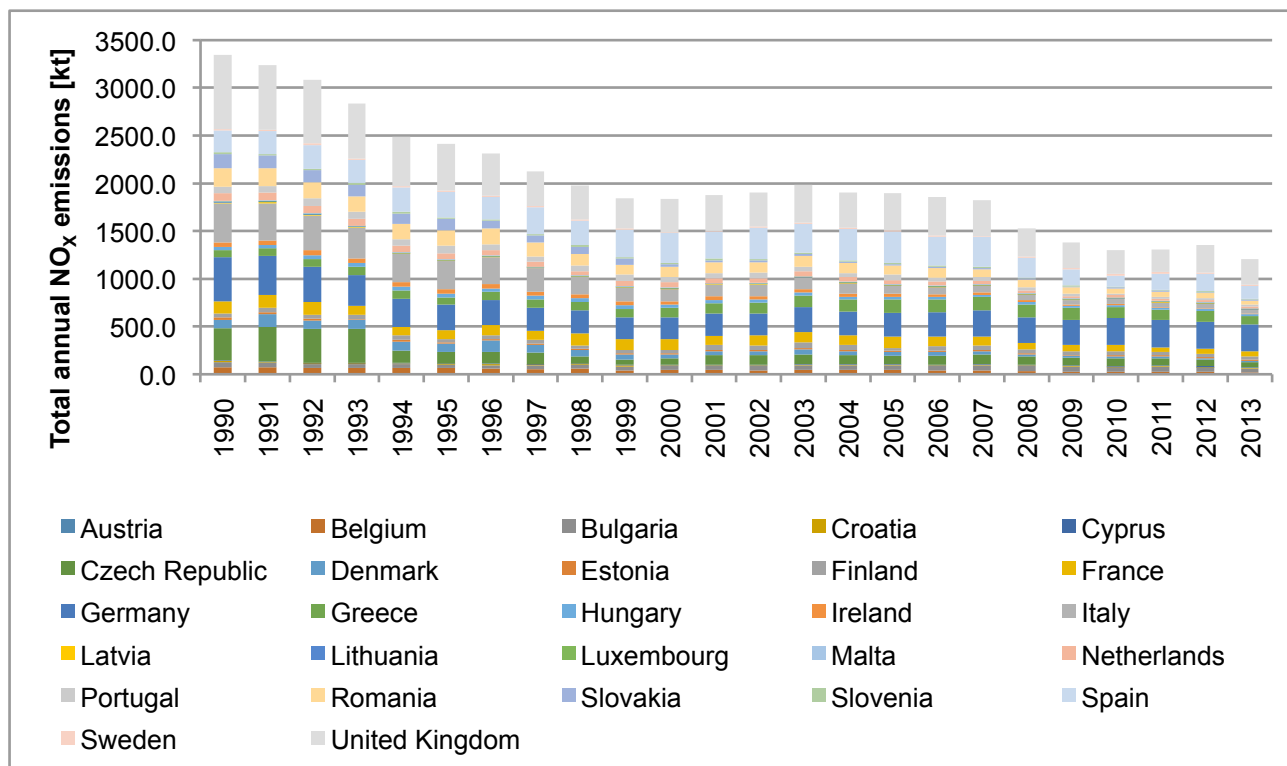


Figure 3. Total annual NO_x emissions of the electricity sector (NFR definition: Public electricity and heat production) within the EU-28 except Poland (there was no complete dataset available for Poland) between 1990 and 2013. (European Environment Agency, 2015)

Figure 3 shows an overall decline of NO_x emissions of 64% between 1990 and 2013. Between 1999 and 2007, however, the total emissions are hardly declining but even increasing slightly. In order to analyze the development, however, it is necessary to take the total amount of energy generated from NO_x emitting fuels (as a so-called activity rate) into account as well. Table 4 is providing this data for the same countries in the time span between 1990 and 2012 (2013 data was not yet available).

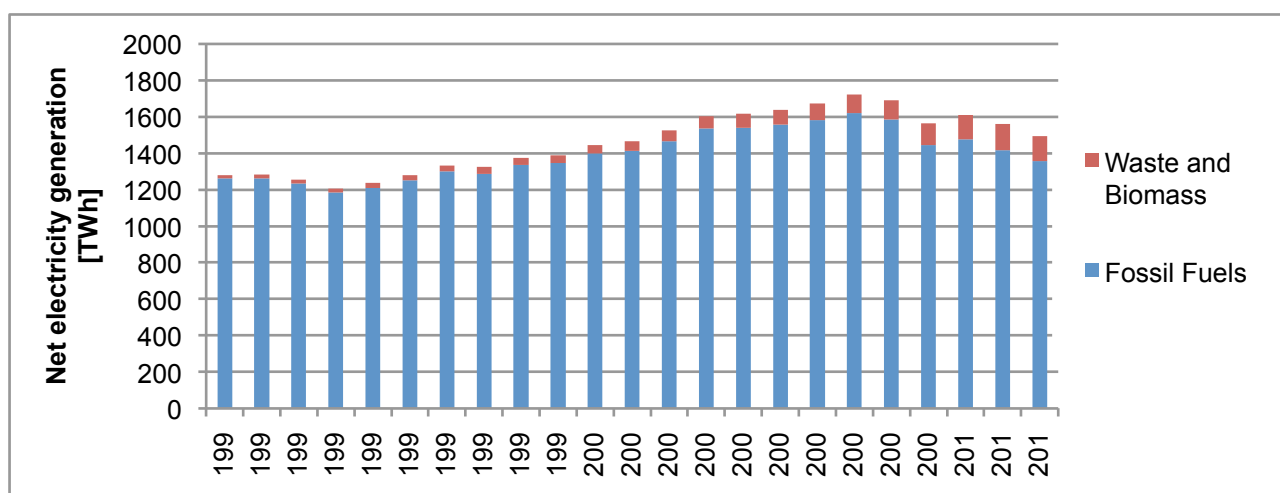


Figure 4. Annual net electricity generation from NO_x emitting fuels within the EU-28 (except Poland) between 1990 and 2012. (U.S. Energy Information Administration, 2016)

The largest increase of electricity generated from NO_x emitting fuels occurred between 1990 and 2007. Thus the time span of this increase correlates with the lowest decline in total emissions and provides therefore a possible explanation of the total emission development during this period. In order to scale the total emissions, figure 5 displays the specific NO_x emissions in kg per MWh

electricity generated from NO_x emitting fuels. It has been compiled from the data of figures 3 and 4 and shows a constant decline of specific emissions until 2010.

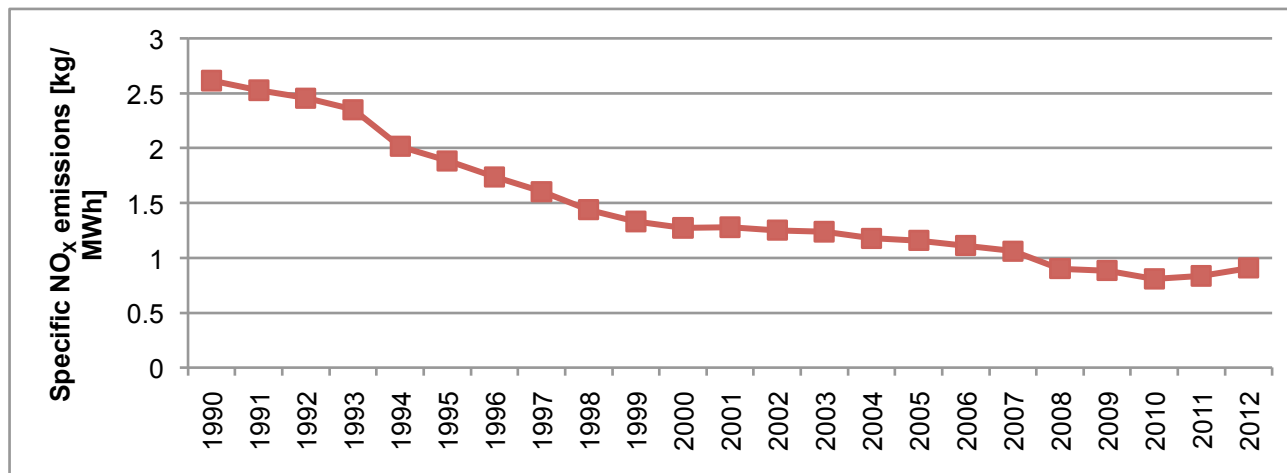


Figure 5. Specific NO_x emissions in kg per MWh electricity generated by NO_x emitting fuels within the EU-28 (except Poland) between 1990 and 2012.

In order to analyze the effectiveness of political regulation, a short overview of the developments within the EU is necessary. In 1988, the “Council Directive 88/609/EEC on the limitation of emissions of certain pollutants into the air from large combustion plants” was enacted. This directive was in force until 2001, when it was succeeded by the “Directive 2001/80/EC of the European Parliament and of the Council on the limitation of emissions of certain pollutants into the air from large combustion plants”. Its entry into force took place in November 2001 and the deadline for transposition in the EU-Member States was November 2002. The next and most recent update of regulation followed in November 2010 with the “Directive 2010/75/EU of the European Parliament and of the Council on industrial emissions (integrated pollution prevention and control)”. It came into force in January 2011 and had to be transposed in national law by the member states until January 2013. Every new EU Directive aimed at lowering total NO_x emissions of the energy sector by setting emission limits for new and existing installations. Figure 5 shows the biggest relative abatement success between 1993 and 2000. Thus it started five years after the entry into force of the 1988 Directive. Possible reasons for this observation will be further discussed in chapter 4.

4. Discussion

This chapter aims at further analyzing and discussing the results provided in chapter 3. The overview of existing political regulations provided a broad span of ELVs for the two examples displayed in figure 2. The range might be even larger if other political instruments (apart from emission regulation) could also be taken into account. It might seem surprising that China – well known for air pollution and smog issues – has the most stringent emission regulation. Yet this could be due to the fact that this country is facing the problems of air pollution every day and has a big need to reduce emissions. Furthermore they updated their NO_x emission regulations very recently whereas the regulations of other countries have been in force for many years or even decades and seem to be rather outdated (ChinaFAQs, 2012). Another critical question which cannot be investigated in more detail is the extent to which ELVs are not only set up but also met and monitored. Some countries publish penalties and fines for exceeding ELVs but nevertheless it is often unclear how strict they are handled in practice.

Table 3. SWOT-analysis of emission and immission limits as policy instruments to reduce NO_x.

	Strengths	Weaknesses
Emission limits	<ul style="list-style-type: none"> • Transparency for investors and/or plant operators • Equality and neutrality regarding regions, companies, etc. • Easy to monitor/supervise 	<ul style="list-style-type: none"> • No incentive for plant operators to lower emissions below the ELV • No adaptability regarding specific local, organizational, technical, etc. circumstances • Complex and very detailed regulation schemes if all applications shall be considered appropriately
Immission limits	<ul style="list-style-type: none"> • Consideration of local circumstances • Possibility to find individual solutions • Focus on air quality results in minimum negative influencing of humans and the environment 	<ul style="list-style-type: none"> • No incentive for plant operators to lower emissions below the permission value • High management effort • Low predictability for investors/operators • Difficulty and high effort to measure local air quality/emissions around the sites
	Opportunities	Threats
Emission limits	<ul style="list-style-type: none"> • Achieving national emissions ceilings by implementing a functioning control and penalty mechanism • Early announcement of changes in regulation enables plant operators to react on time and in a technically and economically reasonable way 	<ul style="list-style-type: none"> • Local exceeding of air quality (immission) limits, if many installations are situated nearby • No incentive to set up emitting installations outside critical regions (i.e. big cities) • Unexploited abatement potentials if ELVs are not sufficiently stringent or detailed
Immission limits	<ul style="list-style-type: none"> • Focus on achieving air quality standards throughout the country without overburdening industry and economy • Reasonable local arrangement of emitters can be achieved • Support of less developed regions 	<ul style="list-style-type: none"> • Difficulty to reliably forecast local immission from emission data • Focus might shift from abating emissions to finding the most suitable location • Unexploited abatement potentials if plants are situated in regions with good air quality

One important research question of our work is to compare different policy instruments in order to support political stakeholders. Our results show, however, that based on available data, it is hardly possible to quantitatively compare different instruments. Immission limits are very difficult to investigate as they are set up specifically for individual plants considering the surroundings. Nevertheless, we summarize our findings in table 3 which provides a qualitative overview of strengths, weaknesses, opportunities and threats of the two most common policy instruments - emission and immission limitation. Regarding other political instruments such as taxes and market-based instruments, the key characteristics have been mentioned in chapter 3.1. Due to their very limited application in practice and the missing experience it does not seem appropriate to draw further general conclusions concerning these instruments.

Regarding the results of chapter 3.2 the validity is slightly limited by the fact that the sector definitions vary between the data of figures 3 and 4 as they are based on different references. Figure 3 contains data of the sector “public electricity and heat generation” whereas figure 4 refers to “net electricity generation”. As the region and time span under investigation are rather broad, however, we expect the error caused by this issue to be acceptable. Especially as we are not aiming at achieving accurate quantitative results, but at discovering trends and overall developments.

The specific emissions per MWh electricity generated from NO_x emitting fuels in figure 5 show the largest decline starting five years after the enforcement of the 1988 Council Directive. We suppose this to be caused by the long approval and construction times of such installations as there is a time lag to be expected until the new regulations are finally met by industry. It might take even more time (depending on the details and stringency of the regulation) until existing plants have to be retrofitted with emission abatement installations. The decline of relative emissions after the successive EU directive in 2001 was a lot lower. This could lead to the assumption that this directive was less successful. On the other hand it can be expected that until 2000 the majority of plants was equipped with emission abatement installations so that even the newer regulation might have been fulfilled already and that further emission abatement became more expensive and technically more challenging. The additional emission abatement that is technically and economically feasible and arguable for plant operators is thus lower than before and leads to decreasing reduction rates. Another fact that needs to be considered is the admission of new member states to the EU. We considered the EU-28 countries (except Poland) for our

investigation, yet by 1990 only 12 countries were members of the EU. Thus we do not know if and which regulation mechanisms were installed in the remaining countries by 1990. In 2004, however, the EU consisted of 25 member states. These countries had to lower their emissions during the 1990s and early 2000s in order to fulfill European legislation and to be accepted as a member of the EU. Hence, this might be another influencing factor for the high reduction rate between 1990 and 2000.

After the implementation of the 2010 Directive, however, there was even a slight increase in relative emissions. Currently we do not have an explanation for it, yet it is only a short period of time between 2010 and 2012. It will be interesting to further investigate the development of this trend in the future.

5. Conclusions

Emission or immission regulation mechanisms for NO_x exist in many parts of the world, especially in the industrialized countries. There are five main political instruments to lower NO_x emissions of the energy sector: Emission regulation, immission regulation, technical restrictions, taxes and market-based instruments. Currently the most common instruments are emission and immission regulations often combined with technical restrictions. The amount of NO_x that may be emitted by a typical installation of the energy sector varies a lot among different countries. Our research showed that some regulations are very old and seem outdated, whereas others are not only a lot more stringent but also very complex and detailed. In developing or emerging countries the availability of NO_x emission regulation seems to be limited, even though it was difficult to gather significant data for these countries. Yet we discovered that most countries have general air quality limits, which is the first step towards actually managing emissions. Furthermore the world bank sets up its own emission guideline for projects in order to receive funding.

A quantitative comparison of emission statistics in order to analyze the effectiveness of different policy instruments is difficult as there are many influencing parameters, varying definitions of sectors, uncomplete or unavailable datasets and small samples, as some instruments are only implemented in very few countries. Nevertheless we were able to analyze the development of NO_x emissions of the electricity sector within the EU since 1990. The specific emissions (emissions per MWh electricity generated from NO_x emitting fuels) were constantly declining until 2010 with the highest reduction rate between 1993 and 2000. Between 2010 and 2012, however, they were slightly increasing again – a fact that is difficult to explain at the moment. It will therefore be interesting to further observe this issue in the future.

For future research it will moreover be interesting to analyze data of different policy instruments in order to support policy makers and political stakeholders. The main question is, if and how it will be possible to further reduce emissions in industrialized countries and if emerging countries will be able to catch up with these countries and reduce their emissions significantly. In order to achieve the goals of the COP21 agreement from Paris 2015, there is still a long way to go. Based on the qualitative comparison of two policy instruments in chapter 3.2 we think that there is no clear advantage of one or the other. More important than the chosen instrument itself seems to be its proper selection (according to the applying circumstances), its implementation and management and its interference with other political instruments. Technical restrictions might for example be a way to limit some of the disadvantages of immission limits as they can prevent very high emissions from plants in areas with good air quality.

Another interesting issue for future research is the influence of risks caused by environmental policy on long-term investment decisions. Based on currently available data, it is not possible to investigate how stable and predictable environmental policy is or was and which implications this caused. Yet we expect that it might massively influence investors in their decisions and therefore cause unexpected effects on emission statistics and the effectiveness of policy instruments.

References

Carmona, R., Fehr, M., Hinz, J., Porchet, A., 2010. Market Design for Emission Trading Schemes.

SIAM Rev. 52, 403–452.

ChinaFAQs, 2012. China Adopts World-Class Pollutant Emissions Standards for Coal Power Plants.

http://www.chinafaqs.org/files/chinainfo/China%20FAQs%20Emission%20Standards%20v1.4_0.pdf (accessed 08.04. 2016).

Department of the Environment and Department of Health, 2014. Regulatory Impact Analysis Statement. Canada Gazette Part I No. 23, Ottawa. <http://www.gazette.gc.ca/rp-pr/p1/2014/2014-06-07/pdf/g1-14823.pdf> (accessed 08.04. 2016).

European Commission, 2006. Reference Document on Best Available Techniques for Large Combustion Plants.

European Commission, 2010. Economic analysis to support an Impact Assessment of the possible establishment of EU-wide emissions trading of NO_x and/or SO₂.

European Environment Agency, 2014. Nitrogen oxide (NO_x) emissions. Indicator Assessment. <http://www.eea.europa.eu/data-and-maps/indicators/eea-32-nitrogen-oxides-nox-emissions-1/assessment.2010-08-19.0140149032-3> (accessed 08.04. 2016).

European Environment Agency, 2015. European Union emission inventory report 1990–2013 under the UNECE Convention on Long-range Transboundary Air Pollution (LRTAP). EEA Technical Report 8. <http://www.eea.europa.eu/publications/lrtap-emission-inventory-report> (accessed 08.04. 2016)

International Finance Corporation, 2008. Environmental, Health, and Safety Guidelines for Thermal Power Plants.

http://www.ifc.org/wps/wcm/connect/dfb6a60048855a21852cd76a6515bb18/FINAL_Thermal%2BPower.pdf?MOD=AJPERES&id=1323162579734 (accessed 08.04. 2016).

Könings, M., 2003. Emission trading – why State aid is involved: NO_x trading scheme. Competition Policy Newsletter 3. http://ec.europa.eu/competition/publications/cpn/2003_3_77.pdf (accessed 08.04. 2016).

Ministry of Environment ROK, 2012. Supply of low NO_x burner reduces both air pollution and fuel cost.

<http://eng.me.go.kr/eng/web/board/read.do?menuId=456&boardMasterId=522&boardId=685&boardCategoryId=> (accessed 08.04. 2016).

Naturvårdsverket, 2006. The Swedish charge on nitrogen oxides. Cost-effective emission reduction. Swedish Environmental Protection Agency, Stockholm.

U.S. Energy Information Administration, 2016. International Energy Statistics. Independent Statistics & Analysis. <http://www.eia.gov/cfapps/ipdbproject/IEDIndex3.cfm?tid=2&pid=2&aid=12> (accessed 08.04. 2016).

UNECE, 2015. Guidance document on control techniques for emissions of sulphur, nitrogen oxides, volatile organic compounds and particulate matter (including PM₁₀, PM_{2.5} and black carbon) from stationary sources ECE/EB.AIR/117.

World Health Organization, 2014. Ambient (outdoor) air quality and health. Fact sheet N°313. <http://www.who.int/mediacentre/factsheets/fs313/en/> (accessed 08.04. 2016).

Sustainable Development and Institutions: the case of property rights

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Abstract

Property rights correspond to one of the central institutions in the debate on sustainability. Nowadays, and in the case of landed property rights, this importance has been worldwide increased by the concerns on food security and climate change. In fact, the control and use of important natural resources allowed by the institution of property are crucial to food production and the mitigation of climatic changes. The paper presents the institution of property rights considering the contribution of economic theory, namely Classical Political Economists and Institutionalism perspective. The revision of literature and conceptual approach on property rights is followed by the analysis of crucial norms regarding the definition of landed property rights in the Portuguese case, providing the base to critically address this institution within the debate on sustainability.

Keywords: Sustainability, Institutions, Land, Property Rights, Law and Economics

1. Introduction

According to Hodgson, "Property is a crucial economic institution" (Hodgson, 2016: 684). The current reflection on landed property is stressed by the risks and problems faced by our societies such as food security and climatic changes. In the Portuguese case, as in other developed countries, problems of desertification and the frequency and dimension of forestry fires in recent years (including protected areas) are additional factors of risk and, thus, of increasing attention to land control and management. Therefore, the search for sustainability should include the consideration and critical approach to the institution of property, that is, the rules that shape the control of natural resources such as land. Vandana Shiva refers that "Land is inelastic. Fertile land is a very precious and very scarce resource. It needs to be protected and conserved as an asset of the farmers and as a national heritage to be passed on to future generations. [...]. Climate change and peak oil should wake us up to the consequences of destroying our local food economies. (Shiva, 2008: 39). In fact, the control and use of important natural resources allowed by the institution of property are crucial to food production and the mitigation of climatic changes. The paper presents the institution of property rights considering the contribution of economic theory, namely Classical Political Economists like Jean- Baptiste Say (1803), Thomas R. Malthus (1820), and John Stuart Mill (1848), which present land as a common heritage, and Institutionalism perspective, namely T. R. Ely (1924) and John R. Commons (1934).

2. Methods

The discussion of the main findings and results related with landed property rights is found in theoretical and secondary sources and considers a case study- the Portuguese case. In fact, and besides the revision of literature on property rights based on the history of economic thought, the paper integrates legal and juridical information (e.g., jurisprudence), which provides important elements regarding the discussion of landed property rights in Portugal. The presentation of the Portuguese case illustrates central aspects and approaches related with the institution of property such as its relative and reciprocal nature raising the possibility and importance of property rights restriction envisaging sustainability purposes.

3. Results and Discussion

3.1 Property Rights and Sustainability in Economic Thought

Classical Political Economy and previous liberal authors present the institution of property as a responsible and worthy one stressing its relative nature. The changes related with the definition of the “public interest” contribute to explain the evolution of rights limits. Responsibility can remit to different purposes – economic progress, protection of environmental values, social justice and ethics – and presents specificities in landed property.

According to Locke (1681) property rights should be founded on labor and have “natural” and “moral” limits. The former ones are imposed by nature and are, at a first moment, defined in a situation characterized by abundance:

“Nor was this appropriation of any parcel of land, by improving it, any prejudice to any other man, since there was still enough and as good left, and more than the yet unprovided could use. So that, in effect, there was never the less left for other because of his enclosure for himself” (Locke, 1823 [1681]: 118).

Moral limits derive from the capacity that every man has to care about things under his control:

“God has given us all things richly. [...]. But how far has He given it us ‘to enjoy’? As much as any one can make use of to any advantage of life before it spoils, so much he may by his labour fix a property in. Whatever is beyond this is more that this share, and belongs to others. Nothing was made by God for man to spoil or to destroy” (Idem: 117).

In Locke’s view, the introduction of money, social conventions and government, and the substitution of the state of plenty by one of scarcity, changes the natural limits but not the moral ones. These correspond to care, the abstention of prejudicial actions and should continue to inspire the social conventions that regulate property.

If labor explains the formation of the property right “at the beginning”, the conventions permit its regulation in the next phases of historic evolution. However, the principles that inspire it maintain. The moral legitimacy present in Locke’s theory of the “First Occupancy” explains most of the interest that is devoted to it (Waldron, 2006: 5).

Adam Smith’s reflection on property involves a critical approach related, namely, with inheritance laws, which according to him constitute an obstacle to the development of small property and land market. The criticism of inheritance norms is also present in the Political Economy of Say (1803), Malthus (1820) and Mill (1848) and remits to a proposal that aims to improve the institution of property in terms of economic progress, social justice and ethics.

The critical approach to the institution of property within Classical Political Economy involves a specific conception of land. In Says view, for instance, land provides a productive service – “le service productive de la terre” (Say, 1803: 410) – that gives utility to a set of natural materials. The possibility of appropriation of natural elements does not mean, however, absolute rights because, and in Say’s words:

“It is not the landowner that permits the nation to live, to walk and to breathe in his lands : it is the nation that permits the landowner to cultivate the soil, which she recognises as its owner, and does not concede to anyone in an exclusive way the enjoyment of public places, big roads, lakes and rivers” (Say, 1813: 410).

In Malthus view, land is different from the other productive resources, a “God’ gift” or “nature gift” whose surplus is explained by “that quality of earth” (Malthus, 1820).

According to Ricardo land is a resource like any other. For him the surplus, the rent, is due to the scarcity of fertile land and not to mysterious forces of nature (Ricardo, 1817).

Diversely, Mill’s criticisms of property norms, especially those of inheritance, are very strong and justified by land specificity. Responsibility and merit are the values that should inspire property, which, corresponds to “the primary and fundamental institution” and is analysed in his theory of wealth distribution. Thus, Mill’s approach goes beyond mere efficiency and includes a dimension of

social justice and ethics. The following quotations illustrate this vision:

“Even in the case of cultivated land, a man whom, though only one among millions, the law permits to hold thousands of acres as his single share, is not entitled to think that all this is given to him to use and abuse, and deal with as if it concerned nobody but himself. The rents or profits which he can obtain from it are at his sole disposal; but with regard to the land, in everything which does with it, and in everything which he abstains from doing, he is morally bound, and should whenever the case admits be legally compelled, to make his interest and pleasure consistent with the public good. The species at large still retains, of its original claim to the soil of the planet which it inhabits, as much as is compatible with the purposes for which it has parted with the remainder” (Mill, 1848: 235).

Moral references on property are present in Classical Political Economy but also in its critics and heirs. To Walras (1896), one of the Marginalists, for instance, landed property is considered in the context of Social Economics, that is, within the domain of interdependence relations, and should be founded in the persecution of social justice:

“The fact that the earth is a thing and property of human beings is something that we can understand. But why not to everyone, to all men in a collective manner? Why only to some people, to some men in an individualistic way? Why to John more than to Paul? Why to you more than to us? This is something that is for us completely impossible to understand” (Walras, 1896 : 33-34).

“Lands do not belong to all men of one generation; they belong to humanity, that is, to all of human generations [...]. In legal terms, the humanity is the owner and the present generation makes use of lands“ (Idem : 219).

Walras conceived land as humanity’s inheritance and, therefore, the norms of its appropriation (property rights) should respect the interests of future generations, a central dimension of the current concept of sustainability.

The reflection on property within a framework of interdependence and institutional relations is the theoretical ground of Institutionalism. Old Institutionalists consider norms and conventions that mediate human interactions, that is, institutions, with influence on the control of resources needed for human subsistence. According to Veblen (1898-9), Economics is the study of human behavior in its relation with material means and should explain the habits and the social norms, their origin, their nature, their institutionalization and evolution. Among them, there is property, which in Veblen’s view corresponds to the “primary institution” (Veblen, 1898-9).

In Old Institutionalism the reference to formal norms, namely law, corresponds to an important dimension in the research on land use and property. In fact, the presentation of property as an institution, that is, as a set of norms involving rights and duties remit to its social, ethical and political dimension and, thus, to the acknowledgement of its design and evolution in particular contexts, reflecting also prevailing cultural and civilizational values. In *Land Economics* Ely (1924) identifies the following analytical domains in an institutionalist approach of land: “Legal characteristics of Land” and “The Social Characteristics of Land”, which should concur to one common end: the improvement of the social conditions of living:

“Men’s relations to each other with respect to land are as fundamental as any other economic relations. In view of the importance of land in relations among men, policies and plans of land utilization should, if they do not already, converge toward one common end. That end is the improvement of the social conditions of living. It is a test or standard by which all principles and policies of land utilization should be measured” (Ely, 1924: 9-10).

“The whole movement for the conservation of natural resources expresses an extension of social control of land. In our great cities, where land has its most intensive use, social control through building codes, planning and zoning laws, sanitary regulations, is growing. This tendency finds expression in what may be called the principle of

social control: The more intensive the use of land, the more highly developed must be the social control” (Idem: 23).

The central place of the definition of “The scope of Land Economics” is occupied by “The Public Policies” of the following institutions: “Land Classification, Land Settlement, Social Control, Conservation, Land Tenure, Land Credit, land Utilization, Land Transfer, Land Taxation, Land Income, Planning, and Tenancy” (Ely, 1924: xii).

The contribution of Ely may remit to the design of a Political Economy of Land where institutions play a central role and converge to the improvement of living conditions and “the social ends of land utilization”.

The ‘social purpose’ of property is addressed also by Commons (1934), through an approach that considers property in its *correlative* and *reciprocal* nature:

“An authorized right cannot be defined without going in the circle of defining its correlative (corresponding) and exactly equivalent duty of others. One is the ‘I’ side, the other is the ‘you’ side, one the beneficial, the other the burdensome side of the identical transactions. [...]. [...] there is an equality, that is, correspondence, of one’s rights and other’s duties. But at the same time, a right cannot exist without some deduction, however great or small, by virtue of a reciprocal duty clinging to it and diminishing its possible benefits” (Commons, 1934: 131).

The notion of *reciprocity* introduces the notion of rights limits and relativity: property rights are shaped by norms, namely legal ones, which define the scope of individual decision and *duties*.

In this discussion it should also be highlighted the contributions of the School of Property Rights, starting with Coase (1960), which in 1988 mentioned that:

“When the physical facilities are scattered and owned by a vast number of people with very different interests...the establishment and administration of a private legal system would be very difficult. Those operating in these markets have to depend, therefore, on the legal system of the State” (Coase, 1988: 10, *apud* Hodgson, 2015: 691).

To Demsetz “property rights are an instrument of society and derive their significance from the fact that they help a man from those expectations which can reasonably hold in his dealings with others. These expectations find expression in the laws, customs, and mores of a society”(Demsetz, 1995 [1967]: 207). What Barzel (1997), for instance, presents as “economic property” (“the ability to enjoy a piece of property”) is the result of a state recognition, a “legal property” defining what individuals can and cannot do with things under their control.

Whereas Barzel establishes a distinction between legal rights and economic rights (“As I use the concept, property rights consist of legal rights (*de jure*) and economic rights (*de facto*” [Barzel, 2015: 719]), Hodgson’s considers that “‘the ability to enjoy’ something” is not a right. Rights, Hodgson argues, “result from institutionalized rules involving assignments of benefits” (Hodgson, 2015: 692), an approach that integrates the contribution of Old Institutionalism:

“[Property] is a relationship between people involving rights with regard to tangible or intangible assets. The exchange of property involves a minimum of not two parties but three, where the third is the state or a ‘superior authority’ (Commons, 1924: 87). These social relations involve rights, benefits and duties (Cole and Grossman, 2002; Hallowell, 1943). The basis of a right of ownership of a resource is an acknowledgement of that right by others, through mechanisms of institutional accreditation and legitimation. Property is a ‘creature of...the legal system’ (Penner, 1997: 3)” (Hodgson, 2015: 688).

This is in accordance with Hodgson previous developments on the subject:

“Individual property is not mere possession; it involves socially acknowledged and enforced rights. Individual property, therefore, is not a purely individual matter. It is not simply a relation between an individual and an object. It requires a powerful, customary and legal apparatus of recognition, adjudication and enforcement. Such legal systems make their first substantial appearance within the state apparatuses of ancient

civilization. [...]. Since that time, states have played a major role in the establishment, enforcement and adjudication of property rights” (Hodgson, 2002: 122).

The theoretical insights introduced by the schools of economic thought allow the acknowledgement of property as a central institution in economic life, corresponding to a set of norms, namely legal ones, which define the scope of action in relation with resources. The presentation of property rights in the Portuguese case illustrates this acknowledgement by considering the main legal sources that define property and landed property rights, highlighting the relative and reciprocal nature of this institution (Commons, 1934) regarding the integration of values and norms aiming the sustainability of landed property rights. The consideration of law with influence on property rights and the reference to jurisprudence cases illustrates and demonstrates the procedures and complexity involved in the practical implementation of sustainability values on land use and, therefore, on the design of landed property rights.

3.2 Property rights and sustainability: the Portuguese case

The main Portuguese legal sources that contribute to the definition of property and landed property rights are the following:

- The Portuguese Constitution;
- The Civil Code;
- Law in areas such as the environment, ecology, territory, and the Common Agricultural Policy (CAP).

In the Portuguese Constitution, the idea of rights reciprocity is found in the possibility of introducing restrictions on “fundamental rights”, a consequence of the adequacy of rights with the economic, social and political aspects of the Constitutional project. According to Portuguese constitutional law experts:

“[That] implies a narrowing of the powers scope traditionally associated to private property and an acceptance of restrictions (to the benefit of state, collectivity and other individuals) of the liberties of use, fruition and disposition” (Canotilho e Moreira, 1933: 33).

In fact, it is possible to identify some explicit and implicit constitutional restrictions to landed property right. In explicit terms, these restrictions are mainly related with the possibility of expropriation in the following situations: excessive area and land abandonment. In implicit terms, it is important to mention the restrictions that may be introduced when property right clashes with, for instance, the right of ‘environment and quality of life’ (article 66^o of the Portuguese Constitution). Regarding this aspect, the same authors refer the following:

“The environmental protection can justify restrictions to other constitutionally protected rights. Thus, for instance, the freedom to build that is commonly considered inherent to the property right, is nowadays conceived as a ‘potential freedom to build’, because it can only develop in the context of legal norms which include those of environmental protection” (Canotilho e Moreira, 1993: 348).

The Civil Code reveals the content of the property right (use, usufruct and disposition) as well as other fundamental norms that contribute to the definition of that right in terms of estate access, neighbourhood relations, abandonment and farm regulation.

The potential conflict between property right and the right to environment and quality of life remits to a central debate in Portuguese literature concerning property Law. One of the issues of this debate involves the conception of the right to ‘environment and quality of life’ as a subjective one (like property) and, therefore, the transformation of the subject of rights no longer as a person or group of persons but as the “generation”. This perspective expresses a shift from rights towards duties, that is, the “transfer of the problem from the rights arena to one of fundamental duties” (Canotilho, 2005):

“We want to stress the need to overcome the euphoria of the individualism of fundamental rights and the implementation of a community of responsibility, of

citizens and public entities regarding the ecological and environmental problems” (Canotilho, 2005: 48).

Some court cases illustrate the tension between rights and reveal the social and legal consolidation of sustainability concerns. This is the case of environmental jurisprudence Quinta do Taipal presented by Canotilho (1995), which involved a conflict between landed property right and the right to ‘environment and quality of life’. According to Canotilho, this is a “*leading case of Portuguese environmental jurisprudence*” (Canotilho, 1995, quoted in Ferreiro, 2005: 311). There were four Court Judgments produced during the five years of the case. The process opposes a private landowner and the public prosecution and envisages the defense of the preservation of a water reserve used by a particular bird specie (‘garças do Mondego’) and the ‘rights and freedom’ to produce rice in that reserve. The public prosecution and the environmental position prevailed in this case. The Supreme court decision involve aspects which remit to the relative nature of property rights and the need to preserve other important societal values and rights such as the environmental and quality of life, stressing the reciprocal nature of property rights and, therefore, its social function. The judge refers that:

“The idea of absolute and unlimited property rights, which is the result of liberal politico-economic conceptions, has been eroded by the emphasis in its social function in parallel with the evolution of political and economic systems towards more solidary forms of citizenship and institutional participation”

“The restrictions (of private and public law) to the plenty and exclusive use of landowners, contained in the article 1305^o of the Civil Code, are part of the right itself, with its normal elements. Therefore, they should not be conceived as exceptional attacks to the *dominus* absolute power”

“Some of these restrictions of private law, as those of the article 1346^o of the Civil Code, are already the result of an ecologic concern” (in Canotilho, 1995, quoted in Ferreiro, 2005: 312-313).

This court case illustrates the practical application of property law (Constitution and Civil Code) where environmental values were raised and took the lead. The decision of Quinta do Taipal case mobilized other legal diplomas, namely European Directives (e.g., Habitats and Birds Directives), as well as Portuguese Environment Law.

In fact, the regulation of land use through the law on these areas has impact on the delimitation of property rights. The Framework Environmental Law (Law n^o 19/2014, 14 April) constitutes a general normative source on environmental and ecological issues and should be considered in articulation with other legal diplomas more directed to land uses like, for instance, the diploma on territorial reserves such as the National Agricultural Reserve (Decree n^o 73/2009, 31 March). According to this diploma, the National Agricultural Reserve corresponds to a “restriction of public utility of national scope integrated in the tools of territorial management” in alignment with European and national policies and the United Nations. The Decree refers that the “end of the last century added a new dynamic and broader vision to the classical conception of land and soil. This new vision identifies several social and environmental functions of land and soil besides the traditional ones (food, fiber and wood production)” (Regulation of water cycle, Energy production, Reduction of carbon emission, Support to biodiversity, Leisure activities)⁷; the diploma refers also the “increased social concern with environmental values and the multifunctionality of farm and forest land, a precious and indispensable resource in the search for ecosystem sustainability and the preservation of the planet”⁸. The different interpretations of the Decree on National Agricultural Reserve regarding, for instance, allowances in situation of expropriation resulted in jurisprudence that points out in opposite directions. The Judgement of the Supreme Court (n^o 6/2011, 17 may), for instance, states that in expropriation situations the property under National Agricultural Reserve should be paid in accordance with the potential of construction of this land independently of

⁷ Our translation.

⁸ Idem.

different land classifications within other laws and regulations. This Judgement was changed by a more recent one (Judgment 2138/11, 7 May 2013) which states that: “Landed property integrated in National Agricultural or National Ecological Reserve [...] cannot be classified as ‘*land appropriated to construction*’ under expropriation processes”; “Even if a land, integrated in the National Agricultural Reserve, does not present agricultural potential, this does not mean that it can be considered appropriated to construction purposes”⁹ (idem). These two jurisprudence cases remit to different views of land classified within National Agricultural Reserve (and Ecological National Reserve) as well as of the law that regulates its use and compensatory allowances in expropriation situations. In this realm, and considering these Judgements, we assist to an increase of environmental and ecological values in fundamental law related with landed property rights.

Common Agricultural Policy corresponds to an important institutional framework with significant impacts on land use and the definition of property reciprocal duties. The gradual introduction of environmental values in this policy (e.g., agro-environmental measures, 1992) involve financial transferences to farmers and, therefore, some of the restrictions on property rights present a specific and voluntary nature. The reference to sustainability purposes is central in the European Regulation on Rural Development Policy (European Regulation n° 1305/2013, 17 December). It is possible to find this reference, and among others, under recitals 4, 13, 14, and 22. The recital 22 refer that “The payments under agro-environmental and climatic measures should continue to have a prominent role in the support to sustainable development of rural areas and in response to the increase demand of environmental services” (European Regulation n° 1305/2013, 17 December). The search for sustainability gives place to rules, which envisage the control of effective good practices in land use and management. The European Regulation n° 1306/2013 presents eco-conditionality regarding the financial support under Common Agricultural and Rural Development Policy related with “good farm and environmental conditions of land”. The financial support involved in this policy is managed through specific rules, including the eco-conditionality. The diploma states that conditionality aims a sustainable agriculture through the awareness of farmers, which are obliged to respect basic norms (translated by the Member States) in terms of environment, public health, animal and plant health, and the well being of animals. The same diploma refers that the conditionality implies some “administrative constraints of farmers and national administration considering the need to maintain registration, controls and sanctions, if necessary” (European Regulation n° 1306/2013).

We are dealing with European Regulation, which define the scope of landed property rights in relation with the purposes of Common Agricultural and Rural Policy. The control of good practices related with land use involved in eco-conditionality principle is related with the decoupling between production and funding introduced by CAP reform of 2003. In fact, the separation between production and the reception of financial support presents several risks, namely farmland abandonment and environmental and ecological threats. In Portugal these rules have been have been criticized by some authors (Baptista, 1993, Cunha, 2004, Rolo e Cordovil, 2014). According to Rolo and Cordovil, for instance, “[T]he application of important CAP financial resources in the form of income support without any connection with agro-forest production and its contribution to territory planning constitutes a symptom of incoherence with the mission and the goals of territorial and social cohesion” (Rolo e Cordovil, 2014: 57).

In recent research (Terres et al, 2015, ‘Farmland abandonment in Europe: identification of drivers and indicators, and development of a composite indicator of risk’), Portugal appears as one of the European countries with “higher risk of farmland abandonment” (Terres, 2015: 20), followed by Spain, Italy, Greece, Latvia, Estonia, Finland, Sweden and Ireland (idem, ibidem). The reasons to farmland abandonment are “multidimensional” and include “natural constraints, land degradation, socio-economic factors, demographic structure, and the institutional framework” (Idem: 21).

⁹ Idem.

Farmland abandonment may “[...] threaten farmland biodiversity [...] associated with anthropogenic landscape of high nature values. [...]. Besides its influence on biodiversity, land abandonment has a range of consequences for ecosystem functions and the provision of ecosystem services. [...]. This influence is often context-specific, e.g., wildfire frequency and intensity, nutrient cycling, carbon sequestration, cultural landscape values, and water balance. Moreover, food security being one of the major challenges for the future, the EU has a justified strategic interest in keeping its agricultural production potential, in view of short and long term need such as food, fiber and biomass production”(Terres et al., 2015: 21).

In Portugal, and besides ecological, socio-economic and demographic aspects, there are institutional/legal obstacles involved in land abandonment. In fact, the Constitutional restriction on property related of the ‘abandonment of the means of production’ is not translated into civil law or other more specific legal diplomas in a clear form, illustrating the difficulties and complexity involved in a concrete threat to sustainability and, therefore, undermining the importance of the institutional framework on property rights.

4. Conclusions

Institutions are fundamental in the debate on sustainability. Among the institutional aspects that should be considered in the search for more sustainable economies are property rights. Property and landed property are considered by different schools of Economic Thought. In fact, we find a reflection on land and its form of appropriation, that is, property, in Classical Political Economy and Institutionalism. The specificities of land, namely its conception as humanity’s inheritance, justify the concerns and critical analysis of the institutional dimensions involved in its appropriation, that is, property law. These critics envisage economic and moral concerns and remit to the concept of sustainability. The reference to law is central in the debate envisaging more efficient and ethic property institutions among Classical Political Economists. Old Institutionalism presents important insights in the analysis of property. The proposal of *Land Economics*, for instance, integrates the reference to public policy aims and areas related with land and property - a Political Economy of Land. The notions of correlativity and reciprocity of rights presented by Commons highlights the relative nature and the social function of property. His conception of rights as a set of correlative and reciprocal duties involves the acknowledgement of legal norms in a central way. More recently, Hodgson develops this perspective by stressing the current importance of property and its legal dimension.

The reference to landed property rights in the Portuguese case considered the main legal sources and raises some of the issues regarding a sustainable land use. The consideration of the Portuguese Constitution, the Civil Code and law on environment, territory and Common and Rural Development Policy allows the illustration of sustainability concerns regarding land use and farm activities, raising, at the same token, the complexity and problems that arrive in cases of rights conflicts (e.g., property rights and environment and quality of life). In fact, jurisprudence cases considered in the paper remit to conflicts involved in land use and the diversity of interpretations of Law related with landed rights and other fundamental rights. Territorial reserves and eco-conditionality under Common and Rural Development Policy correspond to specific situations of property rights restriction related with sustainability goals. According to recent research, Portugal is one of the European countries with more risk of farmland abandonment. Besides some fundamental aspects of CAP, such as the decoupling between financial support and productive counterparts, which may constitute a risk in this realm, the Portuguese law related with land and territory management does not offer easy and clear solutions to the problem. Thus, the institutional dimension involved in the design of property rights is central to address sustainability challenges.

References

- Baptista, F. O., 1993. La agricultura y la cuestion de la tierra en Portugal”, in Agricultura y Sociedad, n°s 68-69.
- Barzel, Yoram, 2015. What are ‘property rights’, and why do they matter? A comment on

- Hodgson's article, in Journal of Institutional Economics, vol. 11, nº4, 719-723.
- Barzel, Y., 1997. Economic Analysis of Property Rights, Cambridge University Press, Cambridge.
- Bromley, D., Hodge, I., 1990. Private property rights and presumptive policy entitlements: reconsidering the premises of rural policy, in European Review of Agricultural Economics, nº 17.
- Canotilho, J. G., 2005. O direito ao ambiente como direito subjectivo, in Stvdia Ivridica, nº 81.
- Canotilho, J. G. e Moreira, V., 1993. Constituição da República Portuguesa Anotada, Coimbra Editora, Coimbra.
- Canotilho, J. G., 1995. Protecção do Ambiente e Direito de Propriedade (crítica de Jurisprudência ambiental), Coimbra Editora, Coimbra.
- Coase, R., 1960. The problem of social cost, in Steven G. Medema, S. G. 1995 (ed.) The Legacy Of Ronald Coase in Economic Analysis, Edward Elgar.
- Cole, D. H. and Grossman, P. Z., 2002. The meaning of property rights: law versus economics?, in in Land Economics, nº 78, (3).
- Commons, J. R., 1934, 2003. Institutional Economics, its place in political economy, Transaction Publishers, New Brunswick and London.
- Cunha, A., 2004. A Política Agrícola Comum na Era da Globalização, Almedina, Lisboa.
- Demsetz, H., 1967. Towards a theory of property rights, in Medema, S. G. 1995 (ed.) The Legacy of Ronald Coase in Economic Analysis, Edward Elgar.
- Ferreiro, M. F., 2005. Economia, Agricultura e Direito de Propriedade. Dissertação de Doutoramento, ISCTE.
- Hodgson, G., 2015. Much of the 'economics of property rights' devalues property and legal rights, in Journal of Institutional Economics, vol.11, nº 4, pp.683-709.
- Hodgson, G., 2002. The evolution of institutions: an agenda for future theoretical research, in Constitutional Political Economy, nº 13.
- Locke, J., 1681, 1823, Two Treatises of Government, <http://cepa.newschool.edu.het>. (10 April, 2016)
- Mill, J. S., 1848, 1987. Principles of Political Economy, London, Augustus M. Kelley Publishers, London.
- Ricardo, D., 1817, 1989. Princípios de Economia Política e de Tributação, Fundação Calouste Gulbenkian, Lisboa.
- Rolo, J. e Cordovil, F., 2014. Rural, Agriculturas e Políticas, Animar, Lisboa.
- Say, J.-B., 1803, 1972. Cours Complet d'Économie Politique, Otto Zeller Osnabruck, Paris.
- Terres, Jean-Michel et al, 2015. Farmland abandonment in Europe: Identification of drives and indicators, and development of a composite indicator of risk, in Land Use Policy, 49, pp. 20-34.
- Tribunal da Relação de Coimbra, 2013. Expropriação. Acórdão de Uniformização de Jurisprudência. Reserva Agrícola Nacional (RAN). Solo para outros fins file://Expropriação.Acórdãodeuniformizaçãodejurisprudência.Reservaagrícolanacional(RAN).Solo20pa.webarchive
- UE, 2013. Regulamento nº 1305/2013 do Parlamento Europeu e do Conselho, de

17 de dezembro relativa ao apoio ao desenvolvimento rural pelo Fundo Agrícola de Desenvolvimento Rural (FEADER) e que revoga o Regulamento (CE) n° 1698/2005 do Conselho.

UE, 2013. Regulamento n° 1306/2013 do Parlamento Europeu e do Conselho de 17 de dezembro relativo à gestão e acompanhamento da Política Agrícola Comum e que revoga os Regulamentos (CEE) n° 165/64 (CE) n° 2799/98, (CE) n° 814/2000 (CE) n° 1290/2005 e (CE) n° 485/2008 do Conselho.

Veblen, T., 1898-9. The beginning of ownership, in American Journal of Sociology, vol.4.

Waldron, J., 2016. Property, in Stanford Encyclopedia of Philosophy,
<http://standford.edu/entries/property> (14 April 2016)

Walras, L., 1896, 1936. Études d'Économie Sociale, théorie de la répartition de la richesse sociale, Librairie de l'Université, Lausanne.

Reinventing agriculture in Brazil: Legal mechanisms to promote sustainability

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Abstract

Promoting sustainable development is one of the most crucial issues nations world wide face nowadays. Agriculture holds a very important role in fostering sustainable development. Food and feedstock, such as fiber and oil, are essential human needs and the achievement of sustainable development goals is closely linked to the adoption of sustainable farming practices. Finding a global development model which generates economic growth while being respectful of the environment and socially just, is not easy. Besides, the concept of sustainability depends on independent factors, related to economy, environment, culture and society. Thus, it is extremely ambitious to impose an unique development model to countries facing very different realities, specially for developing countries like Brazil, where most of the public policies are economic oriented, often neglectful of the environment. In Brazil, natural resources are often considered as mere production elements, fact that reflects the structure of some public policies. Through the last years, Brazilians have witnessed a major setback in environmental policies. Important environmental norms have been softened once they could represent an obstacle to economic growth. In 2012, the Forest Code was modified in order to ease some environmental constraints such as the perimeter of certain protected areas (Act 12.651/2012). In the same sense, two Bills are currently being processed by the Congress concerning the simplification of the permitting procedure of activities potentially harmful to the environment (Bill 654/2015 and Bill 3.729/2004). Moreover, regarding more specifically the agricultural policy, one of its main goals is the expansion of agribusiness, focused primarily on the export of commodities. Because of that, there are few credit programs focused on the development of small rural properties and sustainable agriculture practices. The purpose of this paper is to examine Act n. 7.794/2012 that establishes the National Policy for Agroecology and Organic Production (NPAOP), the main legal instrument specially aimed at promoting sustainable agriculture. This paper intends to analyze the range of this mechanism, if it is being implemented and if it effectively reach their goals, such as the promotion of food security and sovereignty, the sustainable use of natural resources, the conservation of natural ecosystems, the appreciation of agrobiodiversity, increase participation and decrease gender disparities. Brazil is one of the greatest producers of agricultural commodities and one of the most biologically diverse countries in the world. Hence, this study is a very important element for achieving sustainable development goals in the country. Amongst the results, this paper shows that, to reach its goals, Act n. 7.794/2012 should also include a pesticide use reduction plan and changes in OGM regulation. Besides, the efficiency of command-and-control instruments could be questionable, once some strategies adopted by farmers to circumvent the law and compensate the economic losses are revealed even more harmful than the absence of legislation. Moreover, law enforcement is often not done in an equal way, favoring the large companies. This paper concludes that it is necessary to rethink some of the existing legal instruments and its implementation methods. In addition to that, it is essential to adopt alternative mechanisms to promote sustainable agriculture, such as market instruments and bottom-up approaches, based on social experiences. To reach these results, an descriptive and exploratory analysis of Act n. 7.794/2012 was made, as well as a socio-legal research in order to examine the law in context. All the work was supported by a wide literature and legislation review.

Keywords: Brazil, sustainable agriculture, legislation, environmental law

The implementation of ‘Ecosystem Services’ within the law: a multilevel governance challenge on the example of invasive alien species related EU-legislation in Austria and Romania

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Abstract

Ecosystem Services constitute especially since the Millennium Assessment a highly discussed topic during the past decade. This is in particular valid for the literature in environmental sciences and related economic sciences. The topic gained less attention in social sciences and up to now legal scholars have hardly taken up the issue for an in-depth analysis. More-over in the legal practice the term has not played any – if at all – substantial role apart of its inclusion in soft law documents that lack concrete and effective implementation including enforcement mechanism. This paper addresses the issue of inclusion of the term ecosystem services in legislative documents with such mechanisms. From a neutral position starting it discusses the potential and pitfalls of such an inclusion in the light of the ongoing contradictory discourse about the concept with the background of its potential for inclusion into hard law in the sense of enforceable legislation. This is done by an in-depth review of existing academic literature as well as by means of a case study including also empirical research. This case study concerns the on-going assessment of the inclusion of the term ecosystem services into a binding legal act of regional integration on the example of the Regulation of the European Union (EU) on Invasive Alien species. The analysis also covers primary data derived from interviews and questionnaires completed by a wide range of stakeholders from two member states of the EU. The results provide an overview of opportunities and challenges of the inclusion of the term ecosystem services in this particular context of binding and enforceable regional integration based also on a practical example. The ongoing implementation of this EU-Regulation can provide a blueprint of similar situations of co-ordinated legislative procedures between different levels of law-making and its implementation including enforcement. These situations can occur beyond a nation or within. Similar research has not been implemented yet according to the knowledge of the authors. Therefore, the results of this contribution will provide innovative insights into an ongoing legislative procedure with binding rules on ecosystem services and useful hints for similar other prospective attempts worldwide.

Keywords: Ecosystem Services, rule of law, multilevel governance, transformation, enforcement

Conflicting interests and practical solutions: nature conservation and climate change laws on the example of Vienna/Austria

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Abstract

This paper firstly aims to provide the background in law and natural sciences related to conflicts of interest between climate change law and nature conservation law particularly with regard to different governance levels in space and time. Secondly, the paper shows some practical implications of this issue, describes a case study related to the city of Vienna/Austria and offers different solution approaches de lege lata and de lege ferenda. The work is based on an in-depth literature review and a case study in particular related to different Viennese habitat types. These habitat types are on the one hand subject of a wide range of international, supranational and subnational legal norms and have in particular to be conserved and managed within Viennese Natura 2000 sites under the Habitats Directive of the European Union. On the other hand, the city of Vienna is also subject to a geographic multi-level legal framework focusing on mitigating against and adapting to climate change. The authors will first systematically distinct the different types of Viennese Natura 2000 habitats especially according to their required legal and other governance interventions under both regimes (Climate Change and Nature Conservation). Thereon based, the authors will regarding the more anthropocentric-oriented climate change law and the more ecocentric-oriented nature conservation law argue that required management measures under both regimes can be mutually supportive or exclude each other. For the cases of exclusions, alternative current and future solutions will be discussed taking into account criteria under both types of laws such as time frame and extend of discretion within the legal prescriptions as well as their interpretation. This innovative contribution will the first time legally discuss these issues of climate change and nature conservation with an interdisciplinary focus and based on a practical example of a city embedded in a global-local governance context.

Keywords: decarbonisation, clean air, biodiversity, trade off, categorization

Theme 7 posters

Construction and demolition waste: the steps for a sustainable management in a municipality of western of São Paulo State – Brazil

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Abstract

The irregular disposal of the construction and demolition waste (CDW) which are those from construction, remodeling, repair and demolition of civil construction, is responsible for many environmental and health impacts, such as siltation of rivers, streams and lakes, and can cause the appearance and multiplication of disease vectors, which affects the life's quality of the society. In addition, the construction sector is responsible for much of the consumption of natural resources and representing a high amount of municipal waste collected in public places. In São Paulo State – Brazil, irregular depositions are common given the lack of alternatives for disposal or proper disposal. Many times, the generators discard waste on vacant land and public roads. The removal of waste illegally accumulated generates high costs for municipal coffers. Measures are being taken by the State Government to promote sustainable development in the sector; however it's slow due to lack of concrete data about construction and demolition waste situation. The correct management of these wastes can reduce the pointed problems and could become more sustainable the construction industry. In terms of management of this waste, the key step is to conduct a diagnosis that can identify and estimate the waste generation, information necessary to draw up management plans of construction and demolition waste. So, the aim of this study was to develop a diagnosis of construction and demolition waste in a municipality of western of São Paulo State, in Brazil. For this, it was estimated the amount of CDW generation; the CDW collectors/transporters; the final destination alternatives of the waste in the city; the irregular disposal areas in the city; and established proposals for improvement the waste management in the municipality. The results showed deficiency in the management of CDW as: the lack of control and planning of works, the waste of raw materials in the works, and the absence of reusing and recycling practices, in addition to disposal in irregular areas. The estimated gravimetric composition of construction and demolition waste generated in the municipality showed more than 80% are concrete and mortar and the remaining are paper, plastic, metal, etc. This shows that the largest part of the waste can be reused or recycled. The collection and transport of construction waste is also fails because no one company has control of the collected waste and knowing about its composition, damaging the development of actions and policies aimed to improve the situation. In addition, there aren't instruments and conditions to the correct disposal as a recycling center and a landfill for CDW. Therefore, the diagnosis helped raise the key issues related to this waste, identifying the agents involved in the generation, collection and disposal. So, it is expected leveraging actions with the local population to improve the environmental, social and economic quality, related to this type of solid waste.

Keywords: construction and demolition waste, diagnosis, waste management.

1. Introduction

The construction industry is one of the largest sectors of the world economy. A great number of construction, renovation and demolition activities concerning buildings, utilities, structures and roads take place around the world on a continuous basis. These activities result in huge volumes of construction and demolition waste CDW that have to be disposed of and managed, with serious financial and environmental implications (Bernardo et al., 2016).

Waste minimization and recycling are principles of the concept of sustainable development that is now globally introduced. Construction in the sense of manufacturing goods and construction

and exploitation of buildings generates a significant amount of waste. Therefore, the developing of the concept of waste management and the reverse logistics must be implemented to the construction industry (Sobotka and Czaja, 2015).

According to Vucijak et al. (2015) the main objective of solid waste management is to protect human health and the environment, and to preserve resources. The European Union (EU) sets targets for construction waste: recycling of construction and demolition waste must be increased to a minimum of 70% by weight.

In Brazil, Scremin et al. (2014) mentioned that it was collected in public places more than 112 tons/day of CDW by public cleaning companies in 2012, which represents more than half of municipal solid waste generated in the country.

To mitigate and minimize the impacts caused by the large volume and irregular disposal of CDW it was established some actions by the Federal Government. On July 5, 2002, the Environmental National Council (CONAMA) created the Resolution n. 307, which establishes guidelines, criteria and procedures for the management of construction waste in the municipalities, altered by the CONAMA's Resolutions 348/2004, 431/2011 and 448/2012. There is also the Federal Law n. 12.305/2010, which establishes the National Solid Waste Policy that contains the guidelines for the management and solid waste management in Brazil.

For this, it is extremely important the development of a diagnosis, because it can identify the data and faults in all steps of management: generation, collection/transportation, treatment, destination and final disposal of the waste. Sobotka and Czaja (2015) affirm that diagnostics attendant of the construction set evaluates, examines and can plan options of recovery from the very beginning, even at the pre-design stage. A good diagnosis of the characteristics of the material will be crucial in the matter of relevance/appropriateness of the decision about conducting recovery and the selection of its logistics processes.

Thus, the objective of this study was to develop a diagnosis about the construction and demolition waste in a municipality of western of São Paulo State – Brazil, and to propose actions to assist the sustainable management of such waste in the municipality.

2. Methods

2.1 Estimate of CDW generation in the studied municipality

The municipality studied occupies a total area of 477.99 km², with a population density of 53.78 inhabitants/km² and has an estimated population of 26,594 inhabitants according to IBGE (2015).

To estimate the generation of CDW, firstly it was identified the collectors/transporters of CDW in the municipality studied. It was raised information about the control of the collected volume, the mode how the waste is transported, if there's a waste treatment and where the waste is disposed of.

The total estimated generation of construction and demolition waste in the municipality (CDW TOTAL) in m³ was based on Equation 1.

$$\text{CDW TOTAL} = \text{CDW.C} + \text{CDW.PC} \text{ (Equation 1)}$$

CDW.C is the volume sum (m³ per month) collected by the collection and transportation companies and CDW.PC is the volume collected (m³ per month) by the public cleaning service in the city.

It was also possible to estimate the daily volume of CDW and the daily and yearly mass of CDW, in addition to the per capita generation of construction waste generated in the city. For this, it was used the CDW density as being 1.2 toneladas.m⁻³ (Ibam, 2001 apud Oliveira et al., 2011). The mass of the CDW produced annually was given by the daily mass of CDW (tons/day) multiplied by 240 (days of the year). Thus, the per capita generation of CDW was given by: annual mass of CDW/number of inhabitants of the municipality.

2.2 Estimate of the gravimetric composition of CDW in the studied municipality

The waste collections were made in September 2015 and January 2016 in the main areas of irregular disposal of the city, in order to obtain the composition of the CDW of the municipality. The sampling followed the recommendations of NBR 10007 (ABNT, 2004).

The samples were separated by waste class type and weighed to determine the gravimetric composition. The classification of waste was conducted as CONAMA's Resolutions 307/2002, 348/2004 and 431/2011.

2.3 Location of irregular disposal sites in the studied municipality

It had been done a map in GIS ArcMap 10.2® software, licensed by the Academic Group *Gestão Ambiental e Dinâmica Socioespacial (GADIS)* of UNESP – Presidente Prudente/SP, Brazil.

The database used to trace the urban area of the city, on the map of irregular disposal sites of CDW, was an ortophoto from Emplasa (2011) provided by GADIS, concerning the municipality. For the vectorization of the hydrographic system, it was used a thematic letter from IBGE (2011), in which there was a region of interest on the scale of 1:50.000.

Also, it was raised information with the municipal government about the location of irregular disposal sites. The sites were identified in through visits to ascertain the real situation of the areas and to elaborate the map of irregular disposal areas of CDW.

2.4 Proposals for improving the management CDW in the municipality

After the above surveys, it was possible to analyze and interpret the results, assisting in proposing guidelines for the preparation and implementation of actions for the proper handling and management of construction and demolition waste.

3. Results and Discussion

3.1 Estimate of the CDW generation

It was identified that there are two private companies in the municipality that perform the collect/transport of CDW from construction, repairing, accretion, or expansion activities, and there are three private companies that perform constructions in the city, which are the major CDW generators. In the neighborhoods, it was observed small generators doing repairing or accretion works. In addition, the Public Administration also performs the collect/transport of the waste disposed in public places.

Thus, the estimated generation of CDW in the municipality was based on the movement of waste done by the two private companies and by the Public Administration.

However, it was not possible to estimate the generation of CDW based on the movement of waste that occurs by the Public Administration, because as the city makes the disposal of CDW in unauthorized areas, it was not provided this information.

So, the estimate was based only on the charge collected by the private companies, called collectors A and B. The estimated generation of CDW TOTAL was 420 m³/month. This corresponds to 19.38 tonnes of CDW per day. The rate of per capita generation estimated of CDW was 0.17 tonnes/person/year.

Moreover, it can't fail to point out that the estimated amount determined in this study should be higher to that obtained, because it weren't considered the waste collection made by the Public Administration and, probably, the amount of waste collected/transported by the private companies may be higher than reported, because no one has a control of the waste movement.

The determination of the generated CDW was difficult. First of all, the construction companies until now are not conscious to record and report the qualitative and quantitative characteristics of

the generated waste and, therefore, they are unable to provide accurate data. For the time being, the only way for estimating the generated quantities of CDW is through the use of relevant data of collectors.

In this way, the lack of data regarding the collect of CDW by the Public Administration, in a small city can be significant, according to the availability of vacant sites that favor the irregular disposal of any type of waste. In the field work, it was observed that in the city there are many activities of reform, with small generators, that will probably leave the waste in their driveways or make disposal at a closer wasteland. Furthermore, it was observed that in the studied municipality there are missing monitoring instruments and conditions for making environmentally correct disposal, as ecopoints, for example.

Bernardo et al. (2015) related that the CDW generation per capita may have in fact very different values depending on the country. In their work the amount of CDW in Lisbon – Portugal was 954 tonnes per day (0.60 tonnes/person/year). And the CDW generation in Tehran – Iran was estimated to be 4.64 kg per capita per day (1,11 tonnes/person/year), a higher value than those typical of developed countries, like the USA, where daily CDW generation per capita was around 0.77 kg (0,18 tonnes/person/year). These values show that the rate generation can vary according to each country, based on culture, economic development, and education. Besides, this discrepancy between countries can also be the unreliability of official data on CDW generation as happened in the municipality studied.

3.2 Estimate of the gravimetric composition of CDW

Until recently, the CDW generated in the city, that were collected and transported by the private companies and by the municipal government, were disposed in a main disposal site, considered irregular in terms of environmental impacts. However, currently, this area was surrounded, preventing the entry of trucks or other means to dispose a large volume of waste, since the area doesn't possess environmental licensing for the activity. Even with the surrounded of the area and the covering/burning of most of the residues, it was possible to perform the first collection of CDW samples on the site for the gravimetric composition determination of the CDW in the city.

For the second collection of CDW samples, it was not possible to collect in the above mentioned site because there was no more waste in the area. So, through conversations with the CDW generators and the private enterprises of collect/transport of CDW it was possible to identify other unauthorized area, where they are being made the disposal of CDW, while the CDW Municipal Landfill, under construction, is not released.

The results of the determination of gravimetric composition are in Figure 1; the Area 1 is concerning the area visited in September 2015 and the Area 2 is concerning the area visited in January 2016.

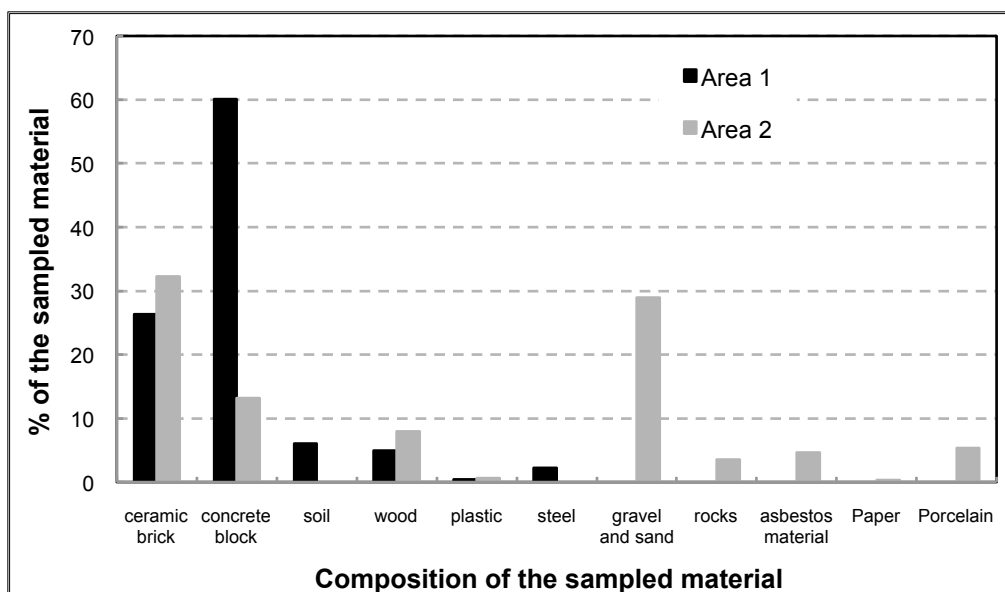


Figure 1. Gravimetric composition estimated of CDW in the municipality studied.

The sampling in the Area 1 showed that the main material founded was concrete block (60.09%), followed by the ceramic bricks (26.36%) and soil (6%). All of these wastes are classified as Class A, representing 92.45% of the total collected. The remaining sample (7.55%) was Class B materials, with the wood as the main waste found. If there was a proper management and sustainable management in the municipality, these sampled materials could be reused or recycled which could reduce the consumption of natural resources for the production of these materials, and the economic, social and environmental problems of their improper disposal.

The sampling in the Area 2 showed that the main material founded was ceramic brick (32.27%), followed by the other Class A materials, such as gravel and sand, concrete block, porcelain and rocks. Also it was found materials Class B (11.12%), Class C (0.97%) and Class D (4.63%). The amount of Class D material was relevant due to its dangerousness, which can cause problems to health. It was expected more control and segregation of these materials by the agents involved in the generation and in the collect and disposal.

The sampling in the Area 2 was closer to the reality when compared to other studies, such as Lima and Cabral (2013) who made the characterization and classification of the CDW in Fortaleza – Brazil, obtaining 93.40% of CDW classified as Class A; 6.40% as Class B; 0.020% Class C; and 0.20% Class D.

In Shanghai – China, Ding and Xiao (2014) affirm that approximately 13.71 million tons of CDW was generated in 2012, of which more than 80% of this CDW was concrete, bricks and blocks, which proves that material waste generated in Shanghai is fairly high and much of this waste is predictable and recyclable. However, it is reported that only about 10% waste had been recycled and the remainder was disposed in landfills in this area. These enormous quantities of CDW, if recycled, would be economically and environmentally beneficial to this city.

About the appropriate treatment and destinations of the waste, as previously mentioned the CDW found in greater quantity in the municipality were the class A, that should be segregate reused, recycled or sent to a landfill waste class A for storage of materials for future use.

The CDW class B, present in reasonable quantities in the two samples, is also material subject to reuse, recycling or referral to temporary storage areas.

The CDW Classes C and D were found in much smaller amounts when compared to the Class A. The CDW Class D are considered hazardous and when isn't destined according to the specific technical requirements, cause the contamination of the place where it was deposited, besides can cause damage to health. The CDW Class C should also be destined according to specific technical standards.

However, none of these destinations is made in the municipality. The generators don't have the habit of reuse materials in the constructions and often unaware the CDW recycling technologies and the requirements of the legislation regarding the adequate disposal. In addition, the municipality doesn't have an area for triaging and overflow, or a landfill waste Class A. So all the CDW collected in the municipality, both by the public cleaning as by the private companies, are disposed in irregular areas.

As occurred in the present study, Fatta et al. (2003) observed that in Greece there was the absence of a network for the collection and utilization of the materials contained in the CDW generated. The limited actions are fragmental and dependent on the willingness of the responsible people for the construction. Some quantities end up to landfills, while the major quantities are disposed of either in uncontrolled sites or in other inappropriate sites.

Besides, Ding and Xiao (2014) say that it must be admitted that dealing with CDW to protect the environment in Shanghai is one of the most difficult public problems. Current obstacles for recycling CDW include low disposal fees, high transportation costs and lack of confidence on the recycled products to the contractors.

Whereas, based on analysis of this study, at least a half of the total accumulation of CDW, including the waste concrete, steel, part of the bricks and blocks, could be recycled and reused as new construction materials. Therefore, some relevant measures and regulatory support taken by the government may overcome the current obstacles and establish a recycling society later.

3.3 Location of irregular disposal sites

The irregular disposals of CDW cause a number of problems, such as the proliferation of vectors of diseases, soil contamination, clogging urban drainage elements, particle dispersion and dust formation, increment in public spending on cleaning these areas and the acceleration of the urban landscape deterioration.

The Figure 2 shows the irregular disposal areas of CDW in the studied municipality.

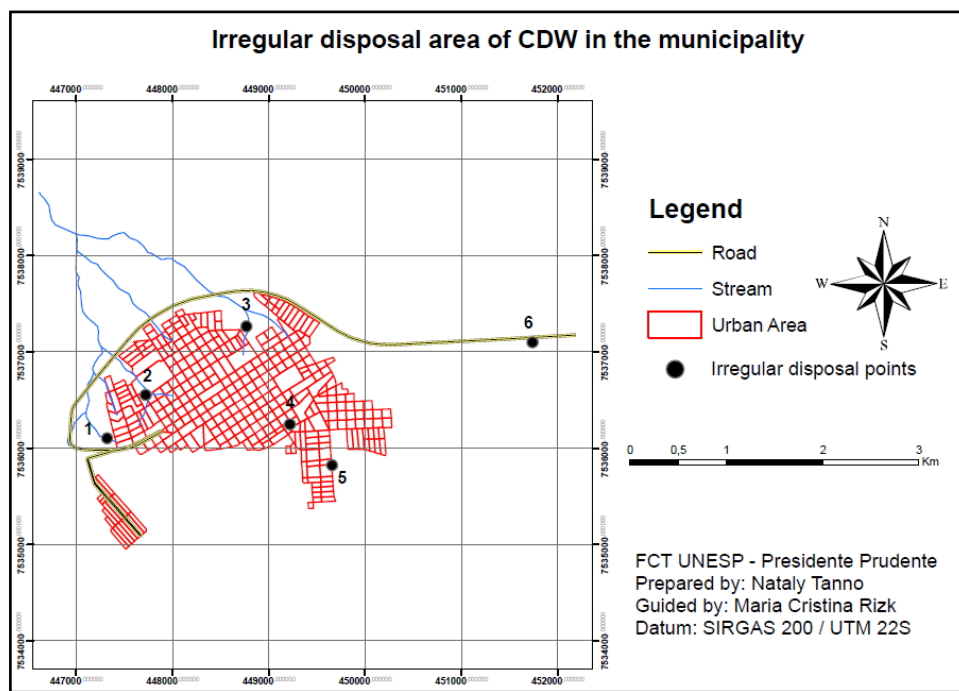


Figure 2. Irregular disposal areas of CDW in the municipality studied.

Firstly, it is observed that there aren't irregular discharges points in downtown. The irregular sites are in remote areas of the urban perimeter. There haven't wastelands in downtown that could

serve as irregular deposits, and in this region of the city the public cleaning service always collect the waste to avoid the landscape degradation.

In the point 1 of irregular disposal, it was found beyond the CDW, household waste and green waste (tree pruning, branches, leaves). Tessaro et al. (2012) report that in all irregular deposition points, observed in theirs study in Pelotas – Brazil, it was found household waste, green waste and copious waste, in addition to the CDW. Such occurrences are common in CDW deposition areas, because they attract other types of waste, exacerbating the impacts already caused. This situation should arouse in the public managers a stiff supervision and higher request for the CDW managers accomplish theirs role.

In addition, the points 1, 2 and 3 are very close to streams and sources, which can cause its degradation and contamination, by the irregular deposit of the waste. Also, it can cause or intensify floods in the region and proliferating vectors of sanitary importance, causing unhealthy conditions for the population in the vicinity.

The point 4 is close to a residential complex, which can affects the local population through improper sanitary conditions caused by the not controlled disposal of the CDW, in the open air. However, this population, not conscious, helps to worsen the situation on site launching copious waste, such as sofas and furniture waste, besides household waste. This potentiates the serious public health problem that occurs currently in Brazil, which are diseases caused by the *Aedes Aegypti* mosquito (dengue, zika virus and chikungunya fever).

Sampaio et. al (2009) highlights especially the recycling of civil construction rubble as one of the jointly promoting actions for reducing dengue incidence in the municipality of Rio de Janeiro – Brazil. Disposal this rubble in the open air (at squares, commons, and vacant lots), or even in open dumpsters, help in the combination of this material, as they encourage disposal of the most varied types of objects in these deposits, either by passers-by or by the neighboring population. This fact, when in extended rainfall periods, inevitably contributes to the proliferation of vectors and consequential disease, among which dengue.

The point 5 is located at the beginning of a rural road. The local is attractive to this illegal practice of irregular disposal of the CDW, because it's distant of downtown, where there is little movement of vehicles and people and enough space to release the CDW. This practice prejudices the soil, causing erosion and contamination, and damaging the landscape.

The point 6 is the biggest irregular discharge area of CDW in the municipality. It's completely degraded and there wasn't only CDW in the area, but also household waste and many furniture remains. The local showed bad odors, because of the presence of organic wastes in decomposition process, which was attracting pests such as rats, cockroach, among others. In addition, this area has around a native vegetation with twisted trunks of trees, part of this vegetation has been removed or damaged, prejudicing all the flora and fauna found there. The CDW irregular disposal site is frequently contaminated with unpermitted substances, due the residues Class D (hazardous); without vegetation, the soil becomes fragile, suffer erosion, and the contaminants can reach the groundwater.

The municipal government aware of this problem began in August 2015 the construction of a landfill where it will be disposed of the inert waste Class II-B and the CDW Class A.

According to the project of the landfill, made by the municipal government, the landfill will have a daily capacity of 11 m³. This value was set through meetings between the private companies of collect/transport and the Municipal Department of the Environment, to estimate the amount collected daily. The value is close to the raised in this study (15 m³ per day). However, stands out that there isn't information about the quantitate of CDW that is removed by the public cleaning service in the uneven locations scattered around the urban area, which are usually constituted by waste generated by small generator.

3.4 Proposals for improving the CDW management

It was observed in this study that the lack of information records from the CDW collectors hinders decision making in the dimensioning of the landfill and in its useful life determination. As reported, the amount to be disposed of at the landfill can be much higher than the estimated amount. This fact would undermine the landfill operation and would increase the public budget spending for the site maintenance, besides reducing the useful life of the landfill. So, it must be implemented by the collect/transport companies, a waste transport control register, that will allow to know the real data about the amount the collected waste, waste characteristics and the final destination. Moreover, the irregular discharges made by the collect/transport companies would be greatly reduced or zero, since the register could be a tool of provision control of CDW and could be monitored.

By the gravimetric analysis of the composition of the CDW in the municipality, it was verified that more than 80% is Class A, which can be reused or recycled. Thus, it's proposed the waste recovery in order to return materials to the production cycle.

Bernardo et al. (2015) related that besides the significant amount of waste produced, the impending high financial impact stimulates the identification of sustainable construction and demolition technologies for the recovery of reusable flows and the creation of suitable recycling networks for CDW management. This motivates the need for an integrated optimization of the entire CDW network, viewed as a closed-loop supply chain that includes reverse flows for recovery, reuse and recycling of materials.

Another proposal is the implementation of a recycling plant for CDW at the landfill, since it's being built the landfill for the inert waste class II-B and the CDW Class A and because in the region there aren't municipalities with an area of triage and overflowing or with a recycling plant for CDW Class A. Thus, the municipal government would hasn't expenses on the purchase of other land. The mainly necessary machinery for the recycling plant for CDW are: vibrating feeder, impact crusher, belt conveyor, vibrating screen, anti-dust system, and spout transfer. It's known that also there would be many public spending with the recycling plant for CDW, but the municipal government could use the material produced in its own maintenance activities, such paving and municipal infrastructure.

Also, it was verified that there aren't points for CDW collection in the city for the small generators, so it's proposed to setup ecocenters in strategic places around the municipality, preventing the small generators to deposit CDW in public places such as sidewalks, vacant lots, valley bottoms, etc.

Based in the irregular disposal areas appointed in the map, it is recommended that the installation of the ecocenters is done in all neighborhoods, close to the irregular disposal points. Regions where the concentrated population is low-income deserve attention for irregular disposal and the installation of ecocenters, because of the CDW generators of these areas generally don't invest in hiring private companies to collect their CDW with proper destination due to costs, discarding irregularly the waste.

Melo et al. (2011) detected in Lisbon – Portugal that the CDW flows, both through the collection system implemented by municipalities and through voluntary and free delivery at ecocenters, are much less when compared to the load movements estimated from CDW collection and transportation companies. This seems to suggest that the infrastructure available to facilitate CDW flows, especially those coming from small remodeling jobs, is not appropriate or even insufficient for the purpose, from the viewpoint of both the spatial distribution and the quantity of delivery points.

Simultaneously with these actions, it must be ended up all critical irregular disposal areas of CDW and developing projects of degraded areas recovering for improving the urban and environmental quality, due that the existence of these areas can be attractive to more waste disposal.

Thus, it's also important that environmental awareness is promoted in relation to CDW. Environmental education campaigns could reveal the reuse possibilities, the economic potential obtained by recycling, in addition to threats to public health and the environment. All this

actions must be followed by supervision, with the population adherence with the commitment to the correct waste destination.

4. Conclusions

With the development of this research, it was possible to note a number of remaining gaps in management of the CDW in the municipality studied; there are demand for reverse logistics services, infrastructure, and especially human and financial resources to change the reality of the city.

About the estimated CDW generated in the municipality, the lack of control was observed between the collect/transport companies. No company has registers of collected amount and information about the composition of the collected waste. The lack of information undermines the development of actions and policies aimed at improving the situation.

The areas of irregular disposal in the city are a reality that requires many actions of both the municipal government as the population. There are serious problems of degradation and contamination of soil and water, public health problems with the proliferation of vectors that transmit diseases, and deterioration problems in the city's landscape. Great quantities of waste were found in these areas, so it's necessary to reuse and recycle the waste, being these the main actions to be executed.

The diagnosis developed in this municipality helped raise the key issues related to this waste, identifying the agents involved in the management steps, providing guidelines to achieve the goals and make sustainable management. So, it is expected leveraging actions with the local population to improve the environmental, social and economic quality, related to this type of solid waste.

References

- ABNT – Associação Brasileira de Normas Técnicas, 2004. NBR 10007: Amostragem de resíduos: procedimento. Rio de Janeiro, Brasil.
- Bernardo, M., Gomes, M. C., Brito, J., 2016. Demolition waste generation for development of a regional management chain model. *Waste Management*, v. 49, pp. 156-169.
- Brasil. Conselho Nacional do Meio Ambiente, 2002. Resolução n. 307, de 5 de julho de 2002. Estabelece diretrizes, critérios e procedimentos para a gestão dos resíduos da construção civil. *Diário Oficial da União*.
- Brasil. Conselho Nacional do Meio Ambiente, 2004. Resolução n. 348, de 17 de agosto de 2004. Altera a Resolução n. 307, de 5 de julho de 2002, do Conselho Nacional do Meio Ambiente, incluindo o amianto na classe de resíduos perigosos. *Diário Oficial da União*.
- Brasil. Conselho Nacional do Meio Ambiente, 2011. Resolução n. 431, de 24 de maio de 2011. Altera o art. 3º. da Resolução n. 307, de 5 de julho de 2002, do Conselho Nacional do Meio Ambiente, estabelecendo nova classificação para o gesso. *Diário Oficial da União*.
- Brasil. Conselho nacional do Meio Ambiente, 2012. Resolução n. 448, de 18 de janeiro de 2012. Altera os arts. 2º, 4º, 5º, 6º, 8º, 9º, 10 e 11 da Resolução nº 307, de 5 de julho de 2002, do Conselho Nacional do Meio Ambiente. *Diário Oficial da União*.
- Brasil. Lei n. 12.305 de 02 de Agosto de 2010, 2010. Institui a Política Nacional de Resíduos Sólidos; altera a Lei n. 9.605, de 12 de fevereiro de 1998; e dá outras providências. *Diário Oficial da União*.
- Ding, T., Xiao, J., 2014 Estimation of building-related construction and demolition waste in Shanghai. *Waste Management*, v. 34, pp. 2327–2334.
- Emplasa – Empresa Paulista de Planejamento Metropolitano S.A., 2011. Ortophoto.
- Fatta, D., Papadopoulou, A., Avramikos, E., Sgourou, E., Moustakas, K., Kourmoussis, F., Mentzias A., Loizidou, M., 2003. Generation and management of construction and demolition waste in

Greece – an existing challenge. *Resources, Conservation and Recycling*, v. 40, n.1, pp. 81-91.

IBGE – Instituto Brasileiro de Geografia e Estatística., 2011. Biblioteca. <http://biblioteca.ibge.gov.br/index.php/biblioteca-catalogo?view=detalhes&id=6303> (accessed 02.02.2016).

IBGE – Instituto Brasileiro de Geografia e Estatística, 2015. Diretoria de Pesquisas - DPE - Coordenação de População e Indicadores Sociais – COPIS. <http://cidades.ibge.gov.br/xtras/perfil.php?codmun=353920> (accessed 13.04.2016).

Lima, A. S., Cabral, A. E. B., 2013. Caracterização e classificação dos resíduos de construção civil da cidade de Fortaleza (CE). *Engenharia Sanitária e Ambiental*, v. 18, n. 2, pp. 169-176.

Melo, A. B., Gonçalves, A. F., Martins, I. M., 2011. Construction and demolition waste generation and management in Lisbon (Portugal). *Resources, Conservation and Recycling*, v. 55, n. 12, pp. 1252-1264.

Oliveira, M. E. D., Sales, R. J. M., Oliveira, L. A. S., Cabral, A. E. B., 2011 Diagnóstico da geração e da composição dos RCD de Fortaleza/CE. *Engenharia Sanitária e Ambiental*, v. 16, n. 3, pp. 219-224.

Sampaio, A. M. M., Kligerman, D. C., Ferreira Junior, S., 2009. Dengue, related to rubble and building construction in Brazil. *Waste Management*, v. 29, pp. 2867-2873.

Sobotka, A., Czaja, J., 2015. Analysis of the Factors Stimulating and Conditioning Application of Reverse Logistics in Construction. *Procedia Engineering*, v. 122, pp. 11-18.

Scremin, L. B., Castilhos Junior, A. B., Rocha, J. C., 2014. Sistema de apoio ao gerenciamento de resíduos de construção e demolição para municípios de pequeno porte. *Engenharia Sanitária e Ambiental*, v. 19, n. 2, pp. 203-206.

Tessaro, A. B., Sa, J. S., Scremin, L. B., 2012. Quantificação e classificação dos resíduos procedentes da construção civil e demolição no município de Pelotas, RS. *Ambiente Construído*, v. 12, n. 2, pp. 121-130.

Vucijak, B., Kurtagic, S. M., Silajdzic, I., 2015. Multicriteria decision making in selecting best solid waste management scenario: a municipal case study from Bosnia and Herzegovina. *Journal of Cleaner Production*, In press.

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Development of value-added products from biomass

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Abstract

Plastics are extensively used throughout the world, and its production increases on average 10% per year. Worldwide between 500 billion to 1 trillion plastic bags are consumed annually. The generation of packaging waste plastics represents 67% of the waste generated. This plastic waste has a high impact on household waste in Portugal reaching 25% of total waste generated. Although the image of "living nature", Azores are not immune to this environmental problem. The growing concerns of consumers with respect, environmental issues stimulate the demand for biodegradable resources, which can reduce the reliance on synthetic packaging. Packaging made from petrochemicals, polyesters, polyamides, etc., have been abused by their high strength and flexibility, corrosion resistance and lower processing costs. However, with the global oil crisis to worsen, it is necessary to find alternatives to reduce dependence on society of these compounds. It is necessary to find new materials, recyclable and non-polluting, and ways to ensure sustainable development through productive alternatives "environmentally friendly". The existence of environmental legislation applied to finished products is increasing, so, environmental acceptance is the mark of the XXI century. Composite materials obtained from plants reinforced with vegetable fibers (biocomposites) are a promising alternative to glass fibers, the low cost of raw materials, recyclability and use of renewable resources, representing a potential source of income. Natural fibers have proved their effectiveness in various sectors of the economy, namely at construction, transport, etc., and include, among others, the fibers of abaca stem or stem; flax and hemp fibers; from sisal fiber sheets; coconut shell fibers, etc. Currently, it is under study the development of biocomposites materials from natural fibers existing alien plants, such as the conteira (*Hedychium gardnerianum*), an invasive plant that threatens increasingly, biodiversity and survival of endemic plants of the region. The conteira growing rapidly multiplies easily and has no predators, which facilitates the full use of large amounts of these plants in the processing of products, idea never before implemented in the Azores. However, they were recently presented at the 2nd International Conference on Natural Fibers (ICNF) 2015, first manufactured objects resulting from a suitable drying process conteira sheets, with application of compressive forces (Fig.1). This process allows said leaves acquire a higher strength, as well as to obtain the final shape of the proposed object.

Keywords: Biomass, natural fibers, *Hedychium gardnerianum*, manufactured objects, compressive forces.



Figure 1. Small dish obtained from a suitable drying process of conteira sheets

Authors' Index

The index is organized by surname, first name, and respective track(s) where the paper was presented.

Names and tracks in bold refer to the 1st author

A

A Rahman, Azman; Poster
Aall, Carlo; 3ac-05
Abdul Hadi, Abdul Samad; 4b-06
Abdul Hadi, Abdul Samad; Poster
Agaton, Casper; 3b-05, Poster
Agostinho, António; Poster
Aguar, Francisca; Poster
Agus, Cahyono; 2a-06, 2b-01
Ahn, SungHee; 0A-05
Ahvenharju, Sanna; 6d-01
Aiesha, Rosita; Poster
Akiyama, Tomohiro; 1a-08, 1b-02, 1b-04, 1c-07
Albach, Dulce; 5d-01
Albiach Branco, Evandro; 1b-07
Albuquerque, Cristina; 7a-01
Alcoforado, Elidomar; 7a-06
Alencar, Marcelo; 3ac-02
Alexanderson, Ingrid; 0D-06
Allahyari, Mohammad Sadegh; 2b-07
Almeida, Cecilia; 5a-06
Almeida, Isabel; 5a-08, 7c-07
Almendra, Rita; Poster
Aloise, Pedro; Poster
Alonso-Almeida, Mar; 5a-06
Alves Da Motta Sobrinho, Maurício; Poster
Alves, Jorge Lino; 5d-01
Alwy, Alawiya; 5f-04
Amaral, Filomena; 0D-05
Amasawa, Eri; 1c-07
Amin, Latifah; 6ab7b-01
Amorim, Roberto; Poster (2)
Andrade, Celio; 3b-01, 5e-05, Poster
Andrade, Francisco; 0A-09
Andrade, Inês; 4a-08
Andrade, Monica; 1b-07
Andreazzi, Marcia; Poster (2)
Antunes, Paula; 2a-02, 5d-05, 6d-06
Anunu, Colleen; 5f-06
Aoyagi, Midori; 6d-01
Araújo, Ana Rita; 1b-01
Arham, Ahmad Firdhaus; 6ab7b-01
Arjmandi, Reza; 1b-04, 1b-07
Arnold, Marlen; 5a-01, 5a-04

Arroja, Luis; 2a-08,2b-01, 5d-01
Aschemann, Ralf; 7a-06
Aspen, Dina; 0A-09
Assefa, Zelalem; 0D-06
Assoumou, Edi; 6d-01
Avelino, Flor; 5c-02, 5c-03
Avellan-Zumbado, Maria Jose; 2a-08
Axon, Stephen; 5c-07, Poster
Azeiteiro, Ulisses; 1c-02, 1c-03, 3ac-05
Azizinezhad, Reza; 1b-04, 1b-07

B

Babicki, Dominica; 7a-05
Bacelar Nicolau, Leonor; 3ac-05
Bacelar Nicolau, Paula; 3ac-05
Bagur-Femenías, Llorenç; 5a-06
Baptista Amaral, Márcio; 5a-08
Baranzelli, Claudia; 2a-08
Barata, Eduardo; 3b-04, 6d-01
Barbosa, Juliana; 1b-01, 3b-08
Barnes, Clare; 2a-08
Barrass, Robert; 7d-03
Barrico, Lurdes; 4a-05
Barrie, Jack; 5c-03
Barros, Margarida; 4b-02, 5a-04
Batelaan, Okke; 2a-08
Battenfeld, Dirk; 6d-06
Bauli, Mariana; 1b-07
Baumann, Henrikke; 7c-03
Baumgartner, Rupert J.; 3b-01, 3b-04, 5a-03, 5a-09, 5d-05, 7c-07
Baxter, Helen; 5e-09
Beasy, Kim; 6d-07
Beça, Pedro; 1b-02, 3ac-05, Poster
Becker, Sara; 1c-02
Becker, William; 2a-08
Beduschi, Liviam; 1b-07
Beja da Costa, Ana; 0D-08
Bek, David; 5f-04
Bell, Simon; 1c-02, 5a-08
Benbrahim, Sara; 0C-04
Benites Lázaro, Lira Luz; Poster
Bennett, Ruth; 5f-06
Bento, Nuno; 5c-06
Bento, Paulo; 5a-08
Bento, Sofia; 7c-07
Bergamasco, Rosangela; 1a-08
Berlan, Amanda; 5f-03
Bernardes, Cristina; Poster
Bernardo, Maria; 3b-09
Beumer, Carijn; 7d-09
Bialostocka, Olga; 6c-04
Biely, Katharina; 7d-09
Bina, Olivia; 7d-03
Birchall, Jeff; 5a-01
Birkin, Frank; 0A-01

Black, Iain; 6d-07, **7c-04**, Poster
Bolis, Ivan; **5c-02**
Bollmann, Alexander; 1c-02
Boni Aristizábal, Alejandra; 1c-07
Boo, Eva; Poster
Börjeson, Natasja; **5f-06**
Bos, Joannette J.; 6ab7b-07
Boström, Magnus; 5f-06
Brandli, Luciana; Poster
Brás, Oriana; 7c-07
Brazão, Ana; 2c-04
Breda, Maria; **Poster (2)**
Brent, Alan; 3b-08, 4b-04, 5c-09
Breun, Patrick; 7e-07
Brissos, João; 3ac-02
Brito, Graca; 3ac-02, **4a-08**
Brunoro, Claudio; 5c-02
Buil-Fabregá, Marian; **5a-06**
Butt, T. E.; 3b-01, **3b-04**
Buttriss, Gary; **5a-02**
Butu, Ahmed I.; **0D-06**

C

Cabeza-García, Laura; 3b-05
Cabral, Henrique; **0B-08**, **Poster**
Caeiro, Sandra; 0A-05
Caeiro, Sandra; 1b-07, 1c-02 (3), 1c-03, 1c-06
Caetano, Fernando; 0D-05
Caetano, Nidia; 1b-01
Calapez, Ana; 2c-04
Calapez, Teresa; 3b-02
Calderon, Franz; **5d-01**
Callaghan, Edith; **2b-07**
Calvache, Marta; 2a-02
Camacho Otero, Juana; 7c-03
Camacho, Franciele; 1a-08
Cambra, Paulo; **4b-08**
Camilleri, Michael; 3b-04
Cantele, Silvia; **5a-02**
Cardoso, Andreia; **4a-02**
Carlos, Jorge; Poster
Carlson, Annelie; 5d-09
Carlsson, Liesel; 2b-07
Carmo, Miguel; 4a-02
Carpenter, Angela; **0B-08 (2)**
Carr, Constance; **7a-05 (2)**
Carrillo Herмосilla, Javier; 5c-09
Carstea, Elfrida; **Poster**
Carvalhoes, Vinicius; 1b-07
Carvalho, Marly; 5a-04
Casaca, Ana; **5a-02**
Casagrande, Rodrigo; **Poster**
Case, Paul; 0D-08
Caser, Ursula; 7a-01

Castro Gómez, Miguel; 3b-02
Castro, Paula; **4a-05**
Cativa, Fernando; **Poster**
Cesetti, Carolina; **Poster**
Ceulemans, Kim; 1c-03, **1c-06**
Chaiyapa, Warathida; **5c-06**
Chang, Robin; **7a-05 (2)**
Chang, Ya-Ju; **1b-02**
Chappin, Maryse; 5c-02
Chase, Miranda; 0D-05
Chen, Hungchu; **Poster**
Chen, Lily; 6d-06
Chiguvare, Zivayi; 3b-02
Cho, Eun Ji; **0C-04**, 5d-05
Chowdhury, Shahana; **3b-09**
Christie, Belinda; **3b-02**
Chung, Kin Hung, Jacky; **4b-02**
Ciocanea, Cristiana Maria; 7a-07
Claus, Rachel; 2a-08
Clem, Kyle; 3ac-05
Clemente, Pedro; **2a-02**
Clifton, Kelly; 4a-08
Cobbledick, Michael; 5f-03
Coelho, Filipe; 6d-01
Coelho, Marilisa; 7a-01
Cohen, Claude; 6d-07, 7a-07
Colaco, Rui; **5a-09**
Comin, Francisco A.; **2a-03**
Conceição, Sandro; 5e-03
Connolly, Linda; Poster
Conte, Marcelo de Melo Bernini; Poster
Cooper, Lauren; 4a-02
Correia, Nelson; 3b-02
Coruche, Luis; **Poster**
Cosme, Inês; **1b-01**
Costa de Oliveira, Eveline Haiana; **Poster**
Costa, Ana; Poster
Costa, Carlos; 3ac-02, 4a-08
Costa, Evaldo; **3b-08**
Costa, Gustavo; 3b-08
Costa, Ines; **5e-03**
Costa, Joana; Poster
Costa, João Pedro; 3ac-08
Costa, João Pedro; 4b-08
Cramer, Jacqueline; 5a-06, 5c-02
Crossin, Enda; 2c-04
Cruz, Luís; **3b-04**, 6d-01
Csutora, Maria; **5f-04**, **6c-09**, 6d-01

D

D'Assunção Ramos, Kátia Regina; **Poster (2)**
Da Silva, Bernardo Barbosa; Poster
Dallamaggiore, Eve; Poster
Damert, Matthias; **5a-09**

de Albuquerque, Felipe Alcântara; Poster

de Almeida Perão, Barbara; Poster

de Almeida, Adiel; 3ac-02

De Boer, Luitzen; 5a-09

de Mello-Théry, Neli Aparecida; Poster

De Melo-Abreu, José; 4a-02

de Mesquita Lima, Joana; 4b-08

de Souza Silva, Bruna; Poster

De Vries, Bauke; Poster

de Vries, Bert; 1a-08

Debizet, Gilles; 3ac-08

Del Río González, Pablo; 5c-09

Delano Rodrigues, Carlos; 7c-03

Denney, J. Michael; 0D-08

Denning, Rod; 2c-04

Deutz, Pauline; 5e-09, 7c-04

Dewancker, Bart; 4a-05, 4b-04

Dharmapiya, Priyanut; 1c-03

Dias Sardinha, Idalina; 2c-04

Dias, Ana; 2a-08

Dias, Ana; 2b-01

Dias, Ana; 5d-01

Dias, Joana; 4b-02

Dias, Luis; 5d-01

Dias, Nuno; Poster

Diaz-Maurin, François; 0A-01, 3b-02

Dijkstra, Jacob; 6d-07

Ding, Xiaohui; 2a-03

Diogo, Paulo; 3ac-05

Diprose, Kristina; 6d-06

Disterheft, Antje; 1c-02 (2)

Djama, Marcel; 5f-04

Dobos, Imre; 5f-04

Domingos, Orlanda; 0A-01

Domingos, Tiago; 4a-02, Poster

Domingues, Ana Rita; 1b-01

Domingues, Diana; 6c-03

Domínguez-Machuca, José Antonio; 5a-04

Dontu, Simona; Poster

dos Santos Barreto, Monique; 6d-07

Dreoni, Ilda; 2a-08

Driessen, Peter; 2a-08

Du, Chongyang; 5d-01

Dunphy, Niall; Poster

Duzgun, Sebnem; 1b-04

Dwyer, Marshall; 2b-01

E

Edeholt, Håkan; 0D-06

Eiseman, Danielle; 6d-07

El Jai, Boutaina; 0C-04

Eller, Michael; 5a-01

Elliott, James; 7d-09

Emanche, Victoria Omeche; 3ac-08

Emanuelli, Isabele; Poster

Engelman, Robert; 6c-04

Escobar, Bernabé; 5a-04

Essl BSc., Isabella; 7e-07

Esteban, Miguel; 5c-06

Estevão, Mariana; 4b-08

Esteves, Isabel; 3b-09

F

Fahmi, Arief; 2b-01

Fajardo, Marcia; 7e-07

Fajarwati, Ruslina; 2b-01

Falleiro, Alice; Poster

Fan, Mingyue; 0A-01

Fanning, Andrew L; 1b-04

Faria, Maria Inês; 7c-03

Faridah, Eny; 2a-06

Farinha, Carla; 1c-03

Felipe, Maria R.; 2a-03

Felix, Rosa; 4a-08

Fernandes, Eliane; Poster

Fernandes, Elton; 1b-01

Fernández, Luz; 5e-05

Fernando, Ana Luisa; Poster

Ferrão, Paulo; 5e-03, 7d-09

Ferraz, Lavínia; 4b-08

Ferreira Dos Santos, Maria Joao; 2a-08

Ferreira, Francisco; 6ab7b-07

Ferreira, João Pedro; 3b-04

Ferreira, José Carlos; 7a-01

Ferreira, José; 1c-06

Ferreira, Maria Adelaide; 0A-09, 0B-08

Ferreira, Pedro; Poster

Ferreiro, Maria; 5c-06

Ferreiro, Maria; 7e-07

Ferro, Filipa; 7a-01

Figge, Lukas; 7d-09

Figueira, Cláudia; 5a-02

Finkbeiner, Matthias; 1b-02

Fischer, Thomas; 0A-05

Flache, Andreas; 6d-07

Fleiß, Eva; Poster

Flores, Lucas; 6c-03

Fonseca, Carlos; Poster

Fonseca, Isabel; 3b-09

Fonseca, Sidney; 1b-01

Fonte, Steven J.; 2b-07

Fontes, Margarida; 5c-06

Fortes, Patricia; 3b-01

Franco Garcia, Maria Laura; 5c-07

Franco, André; 4b-08

Frankenberger Silva, Fernanda; Poster

Franklin, Alex; 7a-06

Freire, Fausto; 5d-01

Freitas, Helena; 4a-05

Freitas, José; 0D-05

Fretes Fariña, Alcides Rene; 7a-06
Fritz, Morgane Marie Caroline; 3b-01, 7c-07
Fröling, Morgan; 1b-02, 2a-03

G

Gabarrell, Xavier; 5d-01
Gabriel, Magdalena; 5e-03
Gaffney, Christine; Poster
Gamito, Rita; 0B-08, Poster
García-Álvarez, María Teresa; 3b-05
Garcia, Katia; 3ac-08
Garvey, Brian; 6c-09
Gastaldi, Massimo; 5a-06
Gawlik, Lidia; Poster
Gearey, Mary; 7a-06
Gebauer Muñoz, María Adriana; 4b-02
Genari, Denise; 5a-08
George, Mary Ann; 2a-08
Getvoldsen, K. S.; 3b-01
Geyler, Stefan; 5a-01
Gfrerer, Margareth; 0D-06
Ghislandi, Marcos; Poster
Giampietro, Mario; 0A-01
Giannetti, Biagio; 5a-06
Gibbs, David; 5e-09
Gillespie, Marie; 5a-08
Gimelli, Francesco; 6ab7b-07
Giné Garriga, Ricard; 1b-04
Glasbergen, Pieter; 7a-07 (2)
Godinho, Sérgio; 2a-06
Goedkoop, Fleur; 6d-07
Gomes, Ana Claudia; 7a-06
Gomes, Cesária; 1b-01
Gómez, Miguel I.; 5f-06
Gomi, Kei; 6c-04
Gonçalves, Alexandre; 4b-08
GONZALEZ-ARELLANO, Salomón; 0C-04, 7c-03
Gope, Gideon; 3b-02
Göransson, Peter; 5d-01
Gorgel Pinto, António; 7c-03, 7c-04
Goussia-Rizou, Maria; 6c-04
Gouveia, Joao Pedro; 3b-05, 6ab7b-07
Graça, António; 1b-01
Grönlund, Erik; 1b-02, 2a-03
Gu, Alun; Poster
Guadalupe, Angeli; 3ac-08
Guéneau, Stéphane; 5f-04
Guimarães, André; 6c-09
Guimarães, Helder; Poster (2)
Guimarães, Helena; 2a-06
Guiomar, Nuno; 2a-06
Guo, Yinman; 5d-05
Guoping, Ni; 4b-04, 6c-03

Gustafsson, Mats; 5d-09

H

Haase, Dagmar; 2a-06
Hamwi, Michael; 5c-09
Han, Qi; Poster
Haomin, Zhou; 4a-05
Harangozo, Gabor; 6c-09
Harris, Clodagh; Poster
Hatzl, Stefanie; Poster (2)
Haxeltine, Alex; 5c-02
Hayles, Carolyn; 1c-02, 7a-07
Hecher, Maria; Poster
Hedrich, Malte; 5a-01
Heinz Philipp, Conrad; Poster
Hekker, Marko; 5e-05
Hensel, Michael; 4b-04
Hermansen, John Eilif; 0A-09
Hernandez-Aguilera, Juan N.; 5f-06
Herrera, Gricelda; 1b-07
Herrera, Rafaela; Poster
Heywood, Chris; 7c-04
Hidayat, Nia Kurniawati; 7a-07
Hillman, Joanne; 5c-07, Poster
Hiroatsu, Fukuda; 6c-03
Hogervorst, Robbie; 5f-04
Hojnik, Jana; 5a-01
Holden, Meg; 0C-04, 7a-05
Horne, Ralph; 5c-07
Hospes, Otto; 5f-04
House, C.; 3b-01
Hristova-Popovska, Aneta; 4b-04
Huambachano, Mariaelena; 4a-02
Huang, Ye; 6c-03
Hultman, Johan; 7a-01

I

Iannuzzi, Giulia; 2a-02
Ibnu, Muhammad; 7a-07
Idrus, Shaharudin; 4b-06
Idrus, Shaharudin; 5e-05, **Poster**
Ingram, Verina; 5f-04
Ino, Akemi; 4b-04
Isely, Elaine; 2c-04
Isely, Paul; 2c-04
Ivanova, Maria; 0D-08
Iyanna, Shilpa; 6d-07

J

Jaca, Carmen; 5e-05
Jafari, Mohammad Javad; 1b-04, 1b-07
Jauregui Becker, Juan Manuel; 5c-07
Jerónimo, Winston; 5a-01

Jiang, Youyu; 5d-05
João, Elsa; 0A-05, 2a-02, 5c-03, 6c-09
Johnson, David; 0A-09, 0B-08
Jones, Heather; Poster
Jothi Venkatachalam, Lavanya; 4b-02

K

Kameyama, Yasuko; 1b-07, 5c-06
Kamleh, Amer; Poster
Kanamori, Yuko; 6d-01
Kartikasari, R.; 7e-07
Katiliute, Egle; 1b-01, 5a-04
Kazmierczak, Bartosz; Poster
Kearney, Sean Patrick; 2b-07
Kešeljević, Aleksandar; 7d-03
Kharrazi, Ali; 1a-08, 1b-04, 1c-07
Khattabi, Abdellatif; 0C-04
Khew, Yu Ting Joanne; 1b-02
Kiefer, Christoph; 5c-09
King, Lester; 7d-03
Kipöz, Şölen; 7c-04
Kiravu, Cheddi; 0A-01
Knoeri, Christof; Poster
Knudson, Haley; 0A-09
Kocsis, Tamas; 6c-09
Kopacz, Michał; Poster
Koroschetz, Bianca; 6d-06
Korsten, Nikkie; 3b-08
Kovacic, Zora; 4b-04
Krause, Kathleen; 6d-06
Kritzinger, Karin; 3b-08
Krucken, Lia; Poster
Kryzia, Dominik; Poster (2)
Kryzia, Katarzyna; Poster
Kudo, Shogo; 1c-07 (2)
Kuei, Chu-hua; 0C-04
Kuei, Steve; 0C-04
Kulay, Luiz; 5d-01
Kunecki, Piotr; Poster
Kwon, Tae-Hyeong; 3b-08

L

Lamas, Pedro; 3ac-02
Lambrechts, Wim; 1c-06
Lanchinha, Susana; 3b-09
Langis, Joanne; 0C-04
Lanzrath, Natalie; 7e-07
Lapa, Nuno; 3b-09
Lavalle, Carlo; 2a-08
Laza BSc., Iasmina; 7e-07
Lazzarini, Boris; 1c-07
Le Gallic, Thomas; 6d-01
Leal, Walter; 3ac-08
Ledvinka, Ondrej; Poster
Lee, Khai Ern; 6ab7b-01

Lee, Picheng; 0C-04
Legardeur, Jérémy; 5c-09
Leite, Marco; 5a-08
Lemos, Diogo; 5d-01
Lennon, Breffni; Poster
Li-Ying, Jason; 5a-04
Li, Guoping; 2a-03
Li, Jia; 1a-08, 1b-04
Lima, Fernanda; 4b-08
Lima, Joana; 5a-04
Lindahl, Mattias; 5d-09
Lino, Rafael; 3ac-05
Liu, Canny; 6d-06
Liu, Liguang; 3b-05, 7a-01
Lizama, Maria de los Angeles; Poster (2)
Lizarralde, Iban; 5c-09
Lockrey, Simon; 2b-01, 2c-04
Lombardi, Ginevra Virginia; 5a-06
Lombardi, Patrizia; 5d-09
Lopes, João Marcos; 4b-04
Lopes, Rita; 2a-03
Lorena, António; 5e-03
Loureiro, Carlos Frederico; 1b-01
Lozano, Rodrigo; 1c-07, 5e-09
Lucchetti, Maria Claudia; Poster
Lutas Craveiro, João; 7c-07

M

Machado, Marco; 3ac-05
Macke, Janaina; 5a-08, Poster (2)
Madhavan, Shobhana; 7d-03
Maes, Dries; 7d-09
Magalhães, Manuela; 4a-02
Magalhães, Paulo; 6ab7b-07
Magee, Liam; 0C-04
Magole, Lapologang; 0A-01
Maioli, Veronica; 2b-01
Maizi, Nadia; 6d-01
Makunda, Collins; 0D-06
Malvestio, Anne Caroline; 0A-05
Manhice, Halaze; 1b-01
Manolache, Steluta; 7a-07
Mansouri, Nabiollah; 1b-04, 1b-07
Manzambi, Ornelie; 5c-07
Mapar, Mahsa; 1b-04, 1b-07
Margerison, John; 0A-01
Marí Rivero, Inés; 2a-08
Markham, Vicky; 6c-04
Martin-Aranda, Rosa; 1c-02
Martinho, Ana Paula; 1c-02, 6c-09
Martinho, Carla; 1c-06
Martins, António; 1b-01 (2)
Martins, Filomena; Poster
Martins, Nelson; Poster
Martins, Nuno; 4b-08

Martins, Rute; 0A-01
Marzban, Soroush; 2b-07
Mascarenhas, André; 2a-02, 2a-06
Mascarenhas, Egas; 3b-02
Mata, Teresa M.; 1b-01
Matache, Marius Lucian; 7a-07
Mateus Moretto, Evandro; 1b-07
Mathijs, Erik; 5f-06
Matos Silva, Maria; 3ac-08
Mauerhofer, Volker; 7e-07 (2)
Mayans, Begoña; Poster
Mayer, Carmen; 7e-07
McCarthy, John; Poster
Mcquaid, Katie; 6d-06
Meade, Keelan; Poster
Meira, Teresa; 7a-07
Meirelles, Maria; Poster (2)
Mejia, Santiago; 5e-03
Melo, João Joanaz de; 2c-04, 3b-04
Mendes Oliveira, Luzia; 3b-02
Mendes, Adriano; Poster
Mendes, Paula; 5d-09
Mendoza, Marcelo; 6c-09
Mendonça, Miguel; Poster
Merli, Roberto; 5a-06, Poster
Metzger, Alexander; 0D-08
Michallet, Benjamin; 6ab7b-07
Miedes-Ugarte, Blanca; 0C-04, 7c-03
Miliacca, Michela; 5a-06
Milne, Markus; 5a-01
Minderman, Mirjam; 1c-06
Miranda Silva Zopelari, André Luiz; Poster
Miranda, Ana Isabel; Poster
Miras, María del Mar; 5a-04
Mizgajski, Jan; 5f-03
Mogus, Solomon; 0D-06
Mohamad Ismail, Shaharuddin; Poster
Mohamed, Ahmad Fariz; 5e-05
Mohd Ariffin, Noor Fazamimah; Poster
Mohd Ismail, Shaharuddin; 4b-06
Mokhtar, Mazlin; 6ab7b-01
Molderez, Ingrid; 1c-03
Molina-Murillo, Sergio A.; 2a-08
Monica, Lisete; Poster
Montaño, Marcelo; 0A-01, 0A-05
Monteiro, Margarida; 0A-09
Monteiro, Maria; Poster
Montenegro, Suzana Maria Gico Lima; Poster
Moreira Teixeira, António; 1c-02
Moreno Cuesta, Eduardo; 0A-01
Morgado, Fernando; 3ac-05
Morioka, Sandra Naomi; 5c-02, 5a-04
Morrissey, John; 5c-07, Poster
Mostaghimi, Golnaz; Poster

Mota, José Paulo; 3b-09
Moura, Filipe; 4a-08 (3), Poster
Mourato, João; 2a-02
Mqadi, Lwandle; 5c-09
Mullaly, Ger; Poster
Muradian, Roldan; 6d-07, 7a-07
Murphy, Maya; 5a-01
Mursaleen, Huma; 1c-07
Musango, Josephine Kaviti; 4b-04, 5c-09
Mwamba Tshibangu, Ghislain; 0A-01

N

Napitupulu, Richard; 2a-06, 2b-01
Nascimento Carvalho, Marilda; Poster
Nascimento, Filomena; 4a-05
Nascimento, Luis Felipe; Poster
Negro, Simona; 5e-05
Nemat Gorgani, MOhammad Reza; Poster
Nesterenko, Natalia; 2b-07
Neto, Belmira; 2b-01
Neuhold, Bianca; 7a-06
Nguyen, Hung; 2c-04
Nguyen, Linh; 3ac-05
Nicolau, Paula; 1c-02 (2)
Nita, Andreea; 7a-07
Nolasco, Maria; 7a-01
Nordman, Erik; 2c-04
Notten, Philippa; 5f-03
Nunes, João; 3ac-05
Nunes, Luis Miguel; Poster

O

O'Connor, Paul; Poster
O'dowd, Mary; 6d-07
O'Neill, Daniel; 1b-04
O'Reilly, Ciarán J.; 5d-01
O'Riordan, Timothy; 5c-02
Offermans, Astrid; 7a-07
Offermans, Astrid; 7a-07
Oh, Yonghyup; 7d-03
Ohioze, Wilson; 2b-01
Ohlmacher, Jay; 3b-09
Okamoto, Cláudia; 1b-07
Oliveira, Carla; 0D-05
Oliveira, Carla; 1c-02
Oliveira, Karina; Poster
Oliveira, Marcus; 0A-05
Olsson, Gunilla Almered; 4a-02
Onsongo, Elsie; 5c-07
Onuki, Motoharu; 1b-02
Onuki, Motoharu; 1c-07
Ormazabal, Marta; 5e-05
Othman, Mohd Raffi; 4b-06
Otto, Daniel; 1c-02 (2)

P

Padilla-Salas, Carla; 2a-08
Page, Daphne; 5c-03
Painho, Marco; 6ab7b-01
Paiva, Maria Rosa; 5c-02
Pakhomova, Nadezda; 2b-07
Palma, Jorge; 4a-02
Pan, Bolin; Poster
PANEK, Rafal; Poster
Papastathopoulos, Avraam; 6d-07
Park, Jooyoung; 5e-03
Partidário, Maria; 0A-01, 0A-09, 4b-02, 5a-04, 7c-07
Partidário, Paulo; 5d-05
Pasquaud, Stéphanie; 0B-08, Poster
Patchell, Jerry; 5f-06
Paul, Arijit; 3b-04, 5a-09
Pavelescu, Gabriela; Poster
Pedersen, Jiesper Tristan; 1b-01
Penha-Lopes, Gil; 7a-01
Peplowska, Monika; Poster
Pereira da Silva, Carlos; 0A-09, 0B-08
Pereira Dias, Luis; 3b-01, 3b-05, 3b-08
Pereira, João; 5e-03
Pereira, Maria Conceição; 6d-01
Pereira, Wesley; 6c-03
Pérez-Foguet, Agustí; 1b-04, 1c-07
Pérez-Ilzarbe, Isabel; 3b-09
Pertiwinigrum, Ambar; 2b-01
Perzon, Jennie; 0D-06
Pesch, Udo; 6d-07
Phillips, M. R.; 3b-01, 3b-04
Pilke, Riina; 7a-01
Pina, André; 7d-09
Pina, Leandro; 2b-01
Pinho, Rosa; Poster
Pinto Correia, Teresa; 2a-06
Pinto, Afonso; 3ac-02
Pinto, Luisa; 5f-04
Pixová, Michaela; 7c-07
Planko, Julia; 5c-02
Plentz, Natália; 7c-03
Pocho, Claudia; 1b-01
Polido, Alexandra; 0A-05, 1b-01, 2a-02
Popescu, Viorel Dan; 7a-07
Portela, Maria Manuela; Poster
Posch, Alfred; 5e-03, Poster (2)
Praia, Amanda; 1b-07
Pražmo, Anna; 7a-07
Preziosi, Michele; 5a-06, Poster
Prieto Sandoval, Julieth Vanessa; 5e-05
Priori, Luiz; 3ac-02, 3ac-08
Priyanta, Maret; 7e-07
Pruneau, Diane; 0C-04

Pulice, Sérgio; 1b-07
Pushkar, Svetlana; Poster
Putra, Pamungkas; 2a-06

Q

Qi, Guangping; 6c-03
Queiroz, Margarida; 5a-02
Quinteiro, Paula; 2a-08, 2b-01
Quist, Jaco; 6d-07

R

Rainville, Anne; 5e-09
Ramos Mejia, Monica; 5c-07
Ramos, M. Rosário; 6c-09
Ramos, Pedro; 3b-04
Ramos, Salvador Boccaletti; 1b-07
Ramos, Sara; 5a-01
Ramos, Tomás; 0A-01, 0B-05, 0B-08, 1b-01; 1b-07 (3), 2a-02, 2a-06, 5c-02
Räsänen, Pekka; 7a-01
Ratanachoti, Tiraprapa; 7c-04
Rauter, Romana; 3b-01, 5a-03, 7c-07
Ravera, Federica; 2a-06
Razera, Dalton Luiz; 5d-01
Razman, Muhammad Rizal; 6ab7b-01
Reaes Pinto, Paula; 7c-04
Realista, Luis; 5e-03
Rego, Luiz; 2b-01
Reike, Denise; 5e-03
Reischl, Christiane; Poster
Ribau Teixeira, Margarida; 1a-08, 5d-09, Poster
Ribeiro de Araújo, Renata; Poster (2)
Ribeiro, Adriana; 7c-07
Ribeiro, Mateus Duarte; 1b-07
Ribeiro, Paulo; 5e-03
Ribeiro, Rita; 3b-01
Ribeiro, Rui; 3b-09
Richter, Knut; 2b-07
Ridoutt, Bradley; 2a-08, 2b-01
Rio, Maud; 2b-01
Rivas, Cristina; 3b-09
Rizk, Maria Cristina; Poster (3)
Roboz, Ágnes; 6ab7b-01
Rocco, Giorgia; 5a-06
Rocha, João; 3ac-05
Rocha, Marco; 3ac-02
Rocha, Sara; 7a-01
Rodewald, Amanda D.; 5f-06
Rodmann, Nina; 7d-09
Rodrigues De Oliveira, Adriano; 6c-09
Rodrigues Lucena, Tiago Franklin; 6c-03
Rodrigues, António; 3ac-05
Rodrigues, Miguel; 7c-07

Rogers, Briony C.; 6ab7b-07

Rönblom, Agnes; 5d-09

Roquetti, Daniel Rondinelli; 1b-07

Rosati, Francesco; 5a-04

Rosca, Eugenia; 5a-01

Ross, David; 2c-04

Rotondaro, Maria Angélica; Poster

Roy, Michael; 0D-05

Rozyłowicz, Laurentiu; 7a-07

Rudd, Linda R.; 3b-04

Rueda Fajardo, Ximena; 5f-06

Rüger, Jana; Poster

Ruzzier, Mitja; 5a-01

S

S. Manolova, Tatiana; 5a-01

Sá Caetano, Paulo; 3ac-02

Sahay, Arun; 5a-03

Sahay, Arvind; 5a-03

Salavisa, Isabel; 3b-02, 5c-06

Salgueiro Baptisttella, Ana Maria; Poster

Sampaio Marques, Carolina; Poster

San Carlos, Ricardo; 1b-02, 1c-07

San Martin, Roberto; 6ab7b-01

Sandberg, Audun; 2a-06

Sander, Kirsten; 1c-02

Sandström, Per; 5d-09

Sang, Katharine; 6d-07

Santos, Ana; 5d-09

Santos, Cláudia; 3ac-05

Santos, Patrícia; 7a-01

Santos, Paulo; 3ac-05

Santos, Rui; 1b-02, 2a-02 (2), 2a-06, 6d-06,
Poster

Sara, Pires; 0C-04

Sarate, João; Poster

Saratun, Molraudee; 1c-03

Satanarachchi, Niranjani; 1c-07

Savastru, Dan; Poster

Säwe, Filippa; 7a-01

Schaldach, Rüdiger; 5f-03

Schebek, Liselotte; 5f-03

Schögl, Josef-Peter; 3b-01, 5d-05, 5e-03

Schot, Johan; 5c-07

Schröder, Andressa; 1a-08

Schultmann, Frank; 7e-07

Schwarz, Jana; 5f-06

Sdrali, Despina; 6c-04

Sebitosi, Ben; 3b-08

Seebauer, Sebastian; Poster

Seeliger, Leanne; 6ab7b-01

Seixas, Júlia; 3b-01, 3b-05, 3b-08, 6ab7b-07

Sekiyama, Makiko; 3ac-08

Selvakkumaran, Sujeetha; 0D-08

Selverio Fuso, Raul; Poster

Sequeira, Miguel; 3b-04

Serranheira, Florentino; 4a-08

Serrão Sousa, Vânia; 1a-08, Poster

Settele, Josef; 2a-06

Sevecke, Katharina Janja; 2a-02

Sheate, William; 7c-07

Shelton Zumpano, Petras; 6c-04

Shi, Guang-Ming; 2c-04

Shimbo, Lucia; 4b-04

Sidiropoulos, Liz; 1c-03

Siles, Pablo; 2b-07

Silva-Plata, Catalina; 6c-09

Silva, Flávia; 7a-01

Silveira, Claudia Alexandra Bolela; 1b-07

Silveira, Semida; 0D-08

Simaens, Ana; 5a-08

Simão, João Miguel; 0A-05, 1c-06, 5a-03, 5a-09, 7c-03

Simões, Paula; 6d-01

Simoës, Sofia; 3ac-02, 3b-05

Skjerven, Astrid; 4b-06

Smit, Suzanne; 4b-04

Smith, Heidi; 7a-01

Smucker, Thomas; 3ac-05

Smukler, Sean M.; 2b-07

Smulders, Eva; 5f-04

Soares, Isabel; 3b-05

Soares, João; Poster

Soeherman, Yudistira; 2b-01

Sokolovska, Iskra; 7d-03

Solér, Cecilia; 6d-06

Sonetti, Giulia; 5d-09

Sousa Rocha, Cristina; 5d-05

Sousa, Cristina; 3b-02

Sousa, Cristina; 5c-06

Sousa, Jorge; Poster

Souza, Aline; Poster

Spangenberg, Joachim; 2a-06, 6ab7b-01

Spekkink, Wouter; 6d-07

Stål, Herman; 5a-08

Stamatopoulou, Athanasia; 6c-04

Staniskis, Jurgis Kazimieras; 5a-04

Stankeviciute, Zivile; 1b-01

Stefani, Gianluca; 5a-06

Stough, Talia; 1c-06

Stozek, Beata; Poster

Strachan, Peter; 0D-06

Strokov, Anton; 3ac-02

Strumillo, Jan; Poster

Sunguroglu Hensel, Defne; 4b-04

Sunikka-blank, Minna; 5d-09

Supriadi, Supriadi; 2b-01

Surano, Beatrice; 5d-09

Surová, Diana; 2a-06

Surra, Elena; 3b-09

Suryanti, Nyulistiowati; 5a-06

Syed Zakaria, Sharifah Zarina; 6ab7b-01

Sznelwar, Laerte Idal; 5c-02

T

Taha, Mohd Raihan; 4b-06, 5e-05

Takao, Akagawa; 4a-05

Takemoto, Ricardo; Poster

Tanno, Nataly; Poster

Tasaki, Tomohiro; 1b-07, 6d-01

Tasaki, Tomohiro; 6d-01

Teah, Heng Yi; 1b-02, 1c-07

Teixeira, Antonio; 1c-02

Teixeira, Célia; 0B-08, Poster

Teixeira, Renata; 2b-01

Tellström, Susanne; 2a-03

Terefe, Yeneneh; 6c-04

Tiberti, Marco; 5a-06

Topić, Milan; 5d-05

Tortato, Ubiratã; Poster

Tourais, Patricia; 1b-01, 5a-03

Trevisan, Marcelo; Poster (2)

Tschiggerl, Karin; 5d-05

Turchetto, Queila; Poster

Turrentine, Thomas; 3b-08

U

Ueasangkomsate, Pittawat; 5f-03

Unterberger, Christian; 3b-04

V

Vale, David S.; 4a-08

Valentine, Gill; 6d-06

Van De Broek, Marijn; 2a-08

van den Berg, Floris; 6ab7b-07

van den Brink, Paul; 2a-03

Van Es, Harold M.; 5f-06

van Helvoirt, Bram; 5f-04

van Heyningen, Pieter; 5c-03

van Hille, Nicky; 5f-03

van Hille, Rob; 5f-03

van Hoof, Bart; 5e-03

Van Laerhoven, Frank; 2a-08

Van Passel, Steven; 7d-09

Vandecasteele, Ine; 2a-08

Vanderbeck, Robert; 6d-06

Varanda, Marta; 2a-06, 7c-07

Varanda, Marta; 7c-07

Vargas Rayo, Orlando; 1b-02

Vasconcelos, Helena; Poster (2)

Vasconcelos, Lia; 7a-01

Vaz-Fernandes, Paula; 1c-02, 6c-09

Veiga, Inês; 7c-03

Velempini, Kgosietsile; 3ac-05

Velho, Ana; 6c-03

Velho, Luiz Felipe; Poster

Vendas, Daniel; 3ac-02, 4a-08

Ventura, Andrea; 5e-05

Verbitsky, Oleg; Poster

Verghese, Karli; 2b-01, 2c-04

Vermeulen, Walter; 5a-06, 5e-03

Vermunt, Dorith; 5e-05

Verweij, Pita; 5e-05

Vesely, Martin; 7c-07

Vetóné Mózner, Zsafia; 5f-04

Vicente, Romeu; Poster

Videira, Nuno; 2a-03, 5a-03, 6d-06

Viégas, Osvaldo; 1b-07

Vieira, Rui; Poster

Vilar, Vítor; 1c-06, 5a-03

Vilas Boas, Joao; 5a-08, 7c-07

Vildåsen, Sigurd Sagen; 5a-09

W

Wakeford, Jeremy; 5c-07

Waller, Vivienne; 3b-02

Wang, Baosheng; Poster

Wangui, Elizabeth Edna; 0D-08

Waronker, Jay; 5d-09

Warren-Myers, Georgia; 7c-04

Watanabe, Chiho; 3ac-08

Wdowikowski, Marcin; Poster

Wdowin, Magdalena; Poster

Wei, Kua Harn; 4b-02 (2), 5e-09

Wells, Peter; 6c-03

Wilding, Colin; 5a-08

Wimmer, Florian; 5f-03

Wissman Weber, Nichole; 0D-05

Witjes, Sjors; 5a-06, 5e-03, 5e-09

Wittmayer, Julia; 5c-02

Wójcik, Joanna; 7a-07

Wolfram, Marc; 4b-06

Wulandari, Dewi; 2a-06

Wulff, Gabriella; 5a-02

Wüst, Luc; Poster

X

Xiaolei, Xiang; 4a-05

Xinqin, LI; 4b-04, 6c-03

Y

Yaylaci, Evren Deniz; 1b-04

Yokoya, Adriano da Silva; Poster

Yoshida, Aya; 6d-01

Yoshida, Yuki; 1c-07

Yunita Sari, Nirma; 2b-01

Yunta Mezquita, Felipe; 3b-02

Z

Zapata, Clovis; 6c-03

Zardini, Alessandro; 5a-02

Zawdie, Girma; 5c-03

Zero, Magdalena; 7a-07

Zhang, Mei; 6d-06

Zhang, Wanlin; 5d-05

Zhao, Sijia; 1b-02

Zhong, Weizhou; 2a-03

Zhou, Chen; 2a-03

Zietsman, Gina; 5f-03

Zimmermann, Karsten; 7a-05

Zsoka, Agnes; 6d-01

Zuca, Nádía; 1b-07

Zuza, Miguel; 3b-09

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