



# Book of Abstracts

the 27th Annual Conference, International  
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## **Book of Abstracts**

These are the original abstracts submitted to ISDRS 2021. Please note that revised abstracts as well as preliminary versions of posters and full papers are already available in the online conference program. Also, the final versions of abstracts, posters and accepted full papers will be published in the conference Proceedings containing an ISBN number.

*Accelerating the progress towards the 2030 SDGs in times of crisis*  
27th Annual Conference, of the International Sustainable  
Development Research Society  
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# **I. Sustainability and Science**

## **Ia. Theoretical approaches**

## Pulsing and sustainability

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### Abstract

Two dominating angles in the debate regarding sustainability and sustainable development has been if there are limits to growth or not, often captured with the opposites Malthusians versus Cornucopians, and if different forms of economic capitals are possible to substitute with each other or not, strong versus weak sustainability. Within the Cornucopian and weak sustainability view, continued economic growth and technological optimism are common positions. Within the Malthusian and strong sustainability view, leveling off the growth curves to a relatively stable steady state is the most common position. The system scientist and ecologist Howard T. Odum viewed sustainability as the economists' equivalent to the ecological climax concept, a supposed long-term steady state for the system. However, within the science of ecology the steady state, "final", climax has since long been abandoned. The systems ecologist C.S. Holling and coworkers has, successfully, proposed a model of continuous renewal in a closed loop four-stage model, often referred to as the "lazy eight" (since graphically it looks like a number "8" laying down). H.T. Odum came to a very similar conclusion, based on general systems models. From these models he predicted that a steady state sustainability outcome is less likely than a pulsing pattern. This mainly because the short-time competition of available resources will create such a pattern, rather than a long-term steady state pattern. Pulsing has, so far, not been discussed to a large extent in the sustainability literature. This paper will examine sustainability and sustainable development in relation to the pulsing view, 20 years after H.T. Odum's propositions on the topic. Pulsing has four main stages according to Odum: 1) Growth, 2) Climax or transition, 3) Descent, 4) Regeneration. From a sustainability point of view each of these phases probably should have different characteristics and need different management strategies. The pulsing pattern, according to general systems theory, also appears on several time scales and hierarchical levels, at the same time. This will also have impact on available management choices for decision makers.

SDG targets: The paper do not address specific SDG targets, rather it address' the fundamental mechanism underlying them.

## A Sustainable World needs Transformative Science: Ontological Reflections on Contemporary Economic Science

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### Abstract

Modern sciences promise to deliver the means to achieve the medical and technological progress needed to overcome the crisis provoked by COVID-19, thereby resuming previously charted economic growth trajectories. However, especially in times of crises, sciences are showing their paradoxes by pointing to the fact that not only their fundamental notions and theories, but also objectified facts are rooted in the social sphere (Gretzel et al 2020, 191-192). After pointing at ontological inconsistencies of modern sciences, like the Fact-Value Antinomy (Putnam 2004), this presentation recalls that all sign-systems and languages, like mathematics, theories but also empirical facts, are aspects of the same societal world, wherefore they should not be confused as isolated entities of an illusory world of 'scientific thinking' (Brodbeck 2019). Following Kuhn (1962) who reminded us that *scientific revolutions* are driven by the social, psychological and *ethical* nature of sciences, it is argued that a crisis like COVID-19 shows the potential to challenge current paradigms, especially the way we think about values and facts in relation to the *economic* foundations of our society. Therefore, major ontological discrepancies of contemporary economic science are critically reflected. Following the science paradigm, economists relate *measured* and objectified '*things*' to the *empty* abstract measuring-unit *money*, so as they receive their *price*. However, this '*calculative* form of thinking' has led to a new type of *pecuniary* socialization: Not only production processes, but also social acts of exchange, technological processes, and even skills and the arts, stop being social processes initiated by humans, rather become abstract elements in *economic equations* (Brodbeck 2019). As a consequence, the uniqueness and diversity of social acts of exchange is transformed into '*identical*' monetary values, i.e. objectified things of nature become *comparable* but *empty* units (Brodbeck 2019, 16). However, the reference to such a misleading ontology led to the paradox that economics cannot be considered an empirically exact science exactly because humans do *not* behave like mechanical objects of classical physics. The presentation concludes by showing, that contemporary economic science, although represented through a system of factual statements ('hard facts') should be uncovered as '*implicit ethics*' guided by the ontological assumptions of modern sciences (Brodbeck 2019; Gretzel et al 2020). As a precondition to transform economic thinking towards a critical science capable to cope with the needs of a truly *sustainable* world, a post-mechanist economic theory (Brodbeck 2019) which defines '*The Economy*' as a socio-communicative network in line with SDGs is deduced in the outlook.

Brodbeck, K.-H. (2019) Die Illusion der Identität und die Krise der Wissenschaften, Working Paper, 47, 03, *Cusanus Hochschule*.

Gretzel, U., Fuchs, M., Baggio, R., Hoepken, W., Law, R., Neidhardt, J., Pesonen, J., Zanker, M., & Xiang, Z. (2020). e-Tourism Beyond COVID-19: A Call for Transformative Research. *Information Technology & Tourism*, 22, 187-203.

Kuhn, Th. (1962). *The structure of scientific revolutions*. University of Chicago Press, Chicago 1962.

Putnam, H. (2004). *The collapse of the fact-value dichotomy*. Cambridge, Harvard University Press.

## **Innovations in Theoretical Approaches for Spatially Determining SDGs on Landscape Scale and Regional Planning Level – Application for Sustainably Governing Spree Forest and Lusatia Region in Germany**

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### **Abstract**

United Nations Sustainable Development Goals (SDGs) and Planetary Boundaries composite demand are showing up challenges in different theoretically scaled and levelled routes for sustainably fulfilling these planetary and Earth systems most existential overall aims. The need for an understanding about global general goals and regional to local governing structures has to be combined: assessment, monitoring and governance approaches have to be found in combination with landscape planning, land use based approaches, land system and sustainability science. Theoretical approaches have to be integrated while advancing landscape scaled, regional levelled assessment methods for fulfilling the innovation of spatially determining SDGs and therefore serving against regional crises situations.

The initial theoretical research is including global to local planning levels and is embedded in an incrementally worked out theoretical framework with an applied research part. The case studies and field data in rural and urban areas of the German Lusatia Region and inner part Spree Forest Region inhabit intrinsic drivers of finding ways to overcome deficiencies of several theoretical and applied adjusted objectives: 1. operationalising the combined deductive, inductive research parts while verifying theoretical research and framework within an applied case study; 2. scale and planning level as well as instrumental flexibility deficiencies while transmitting global transformation needs to the regional, local planning level and backwards (counter-current principle); 3. general insecurity factors and possible prediction instabilities in sustainable, climate- and water-related development paths for planning, management and decision making sectors; 4. transdisciplinarity of proper sustainability and land system sciences as well as of land-, climate- and water-related planning aspects in sorts of data management; 5. exchange and communication acceleration of planning results while applying on the ground. These main objectives were assessed on the basis of how to quicken up processes for resilience building especially in case of implementing sustainable development goals and optimizing response to climate change and several further ongoing crises. Innovative instrumental assessment structures were created in combination to a new approach of spatially determining SDGs for an accelerated Climate Smart Planning as well as Integrated Drought and Water Management. The problematic of possibly installing too many new to be introduced instruments have been carefully treated within theoretical and applied verifications. Above named objections (1.-5.) are important parameters of that discussion.

Research results examine a possible assessment or monitoring framework for supporting sustainable change management in times of climate crisis. The here integrated assessment methods are outlining a first overview and summary of research results. They are helping to provide a greater, constructive transparency on global to regional planning level.

Global SDGs are getting coupled with innovative and well known assessment methodologies. Specific SDGs such as SDG 11, 13 with a combined Climate Smart Planning or SDG 17, 15 with a combined Integrated Drought and Water Management are amplifying Lusatia and Spree Forest Regions` effective applicability for gaining more regional resilience. This research is supporting the processes around acceleration and assessment of climate change-, crises-related as well as sustainable development and land resilience options while enhancing interdisciplinary sustainability science.

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## Theory home of different environmental and sustainability assessment methods

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### Abstract

Sustainable development and sustainability are developing fields. Crucial is our ability to assess sustainability, or to assess our position in relation to the sustainability goals we want to achieve. For this indicators and indices of sustainable development and sustainability are important, as well as sustainability assessment methods, sometimes called “the toolbox” available to assess sustainability and sustainable development. This paper is an attempt to give an overview of how different assessment methods and a few indices are connected to different theory foundations. A first group of methods has an explicit strong connection to specific theories. In this paper exemplified by Cost-Benefit Analysis (CBA) and Position Analysis (PA), explicitly connected to the theories of the two main opposing paradigms in economy: CBA based on neoclassical economy and PA based on institutional economy. A second group do not have an explicit connection to theory, but is still strongly connected to what is often named the “standard theory” in natural science and engineering. Examples from this group are: Index of biotic integrity (IBI), Life cycle assessment (LCA), Material flow analysis or accounting (MFA), Substance flow analysis (SFA), Environmental risk assessment (ERA), Material intensity per service unit (MIPS), etc. A third group can be considered as almost, but to a small extent not yet fully accepted by the “standard theory”. The closest one among these in this paper is exergy analysis, which is not fully based on the theory of thermodynamic equilibrium, as the previous mentioned second group methods. Eco-exergy analysis, still in a developing phase, is located even further out on this branch. Emergy analysis is also based on the “standard theory” but is also a cross-over with general systems theory, and includes a new novel approach to non-equilibrium thermodynamics. A fourth group is suggested for Ecological footprints where the conversion from kg and joules to hectares (ha) is within the “standard theory”, but not the next step where the hectare is converted to the imaginary unit global hectares (gha). This can be said also about the conversion in emergy analysis from joules to solar equivalent joules (sej), but that conversion has a more strong theoretical underpinning than the conversion leading to the global hectare. Two other footprint methods, Carbon footprints (CF) and Water Footprints (WF) connects more clearly to the second group since they do not take the step to global hectares. A fifth group is made up indices, in this paper represented by the Human development index (HDI) and the Happy planet index (HPI). As a conglomerate of indicators that have no clear theoretical connection, they are considered having a weak connection to theory. The paper concludes that sustainable development and sustainability are such a diverse field that any outcome of “data” whether directly measurable or generated by indices or methods are interesting and needed. However, in their interpretation, a level of knowledge about their connection to theory is important to include.

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## Environmental accounting and reporting changes in Italian local governments

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### Abstract

Environmental accounting and reporting has been adopted by different organisations worldwide, including public sector organisations. Local governments are among the public sector organisations that have adopted the most environmental accounting and reporting practices. Despite some research on 'why' local governments develop these tools and 'what' environmental information is included in formal documents, it is still unclear how contextual factors (including legislation and characteristics of the surrounding area) influence the content of documents and the process that led local governments to adopt, in the majority of cases voluntarily, changes across time to accounting and reporting practices.

The purpose of this research is to contribute to a better understanding of changes in local governments' accounting and reporting practices. Particularly, 'why', 'what' and 'how' environmental aspects (related to the territory under local governments' jurisdiction, the immediate surrounding area, the organisational performance and externalities caused by their operations) are included in accounting and reporting practices, and the significance of the changes across time.

This research adopts an interpretative approach using two case studies of Italian local governments to conduct a longitudinal analysis of changes. The framework on context, content and process, suggested by Pettigrew and Whipp, is used to distinguish changes under each dimension and analyse their interconnections. Data is collected through the analysis of official documents and triangulated with semi-structured interviews to key stakeholders in both case studies. Findings are analysed within each case study and in a cross-case analysis.

The legal framework defines the boundaries of the accounting information on the territory under local governments' jurisdiction and their immediate surrounding area. Organisational environmental performance and externalities are excluded from the requirements, which originates a limited representation of reality in terms of environmental aspects. Local governments prioritise their role as 'managers' of the territory and as influencing citizens' behaviour.

The formalism that characterises Italian local governments indicates that what is not mandatory is considered less critical. An interplay between contextual elements, namely the local outer context, political commitment and organisational culture justifies the implementation of changes beyond what is regulated and implementation of transformational changes.

The member of the cabinet for the environment as well as international networks act as agents of change. Local governments engage in international networks to gain access to funding and implement changes, leading to the adoption of the dominant environmental agenda. Key stakeholders, like citizens, are not engaged in the accounting and reporting process. Thus, there is no evidence that the

environmental aspects addressed and related changes are in line with stakeholders' needs and expectations, which jeopardises its significance in the creation of value for society.

The present research portrays how changes across time occur using official documents that reflect environmental aspects. Findings from the current research have implications in other EU member states due to the harmonisation of accounting and reporting practices and the common practice across the EU in using external funding to conceptualise and implement changes. This implies that other local governments could also be representing a limited account related to environmental aspects.

# **I. Sustainability and Science**

## **Ib. Research methods and methodologies**

## Closing the loop on Transdisciplinary Research: Reflections of the project team

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### Abstract

#### Abstract

There is growing use of transdisciplinary research, to attempt to solve complex issues, particularly when seeking to find solutions to sustainability challenges. Transdisciplinary research is designed to bring academics and non-academics together and to connect different academic disciplines to improve the value, inclusiveness and quality of research. Ramchandani (2017), when explaining transdisciplinary research, discusses the “*emergence of a new discipline transcending the boundaries of disciplinary perspective.*” In this paper we utilised a transdisciplinary research project ([ECPE](#)), in its final stages, and asked the project team to reflect back on their experience of participating in transdisciplinary research. The research draws upon interviews undertaken with academics who participated in the project, including individuals who had and others who had not previously participated in transdisciplinary research. The participants were from a range of academic disciplines. This research aimed to ‘close the loop’ on the project, to harness feedback from those engaged in the project, to understand the opportunities and challenges of transdisciplinary research, from individual perspectives. The findings of this research offer knowledge and learning for future transdisciplinary projects, linked to each stage of a projects lifecycle. To further ‘close the loop’ we interviewed the non-academic participants (partners), from both the public and private sector, (who contributed to the design of the research) to gain insight into their experience of transdisciplinary research.

Key themes emerged through the research, in particular the importance of *language* when individuals were working with academic departments beyond their current discipline. Collaboration, compromise and communication were prominent themes in the research findings. This is echoed by Witjes and Vermeulen (2020), “*therefore collaboration between academic actors from different disciplinary backgrounds is key for the success of transdisciplinary.*” Transdisciplinary research has gained traction; this research provides an insight into the experience of the project team and thus provides a foundation to consider how the challenges experienced by individuals can be transformed into organisational strengths for the future.

## The stock price reaction to environmental pollution events: A systematic literature review and a research agenda

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### Abstract

Accounting for the increasing academic interest in examining the stock price reaction to environmental pollution events, this systematic literature review covers 38 stock-based event studies from 1990 – 2020. Therefore, we systemize the field and conclude that the extant literature can comprehensively be attributed to 4 research panels: pollution disclosures, environmental violation, legal penalty, and law enforcement disclosures, environmental disaster disclosures, and multi-facetted disclosures. In a first step, following this defined structure, we review the empirical findings of the extant literature which, unsurprisingly, provides a homogeneous picture regarding the stock price reaction to environmental pollution events irrespective of the research sample. In a second step, we review the underlying theoretical frameworks and outline how researchers motivate their hypotheses. In a third step, we review the characteristics of the event study methods employed following 7 pre-defined criteria. We then use these 3 distinct reviews to identify limitations and to derive recommendations. In total, we derive 4 research, 2 theoretical, and 7 methodological limitations and provide consecutive recommendations that help to advance this field and to improve future research.

## A systems model of SDG target influence on the 2030 Agenda for Sustainable Development

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### Abstract

Achieving the Sustainable Development Goals (SDGs) by 2030 requires assessing interactions, monitoring progress, and designing policy from a systems perspective. Efforts towards achieving a goal or target can often create synergies and thus leverage progress towards achieving others (Sachs et al. 2019). Hurdles also emerge given trade-offs among social, economic, and environmental aspects in persisting development paths. Past research has explored interactions among SDGs using quantitative approaches (Kroll, Warchold, & Pradhan, 2019; Lusseau & Mancini, 2019; Pedercini, Arquitt, Collste, & Herren, 2019; Pradhan et al., 2017; Zhou & Moinuddin, 2017), qualitative frameworks (Nilsson et al., 2016; Sachs, Schmidt-Traub, Mazzucato, et al., 2019), and expert knowledge (e.g. Fuso Nerini et al., 2019). However, mixed-methods that go beyond first order interactions and consider feedback processes are lacking.

We create a SDG systems model by combining a correlation analysis of SDG indicator data with literature research and expert knowledge. The influence of targets and goals on the overall objective of achieving the SDGs is assessed. Overall, we find more levers than hurdles, with SDGs 3 (*Good Health and Well-being*), 5 (*Gender Equality*), and 17 (*Partnerships for the Goals*) showing the most leverage potential while SDGs 10 (*Reduced Inequalities*) and 16 (*Peace, Justice and Strong Institutions*) are shown to create potential hurdles. However, influence at target level varies greatly within each goal, with the top three leveraging targets (5.5, 17.8, 17.6) and hurdle targets (16.8, 10.6, 15.5) representing five different goals. By conducting a sensitivity analysis to assess the dependency of findings on SDG target weights in the model, we find that the results are robust regarding this specification. Likewise, a regional analysis of continents and income groups shows that the SDG levers and hurdles are globally representative. At continent level, only Africa contributes less to SDG hurdles, indicating fewer trade-offs in relation to SDG progress.

The novel SDG systems model contributes several key findings. First, we use a data-driven approach to go beyond second-order effects of SDG interactions (Weitz et al., 2018) and capture complex feedback loops. Model results vary from the correlation analysis, with only SDGs 10 and 16 identified as potentially acting as systemic hurdles in both cases. Second, we show that most countries share both challenges and opportunities for achieving the 2030 agenda, with relatively low variation among continents and income groups. Third, our results highlight the crucial role of gender equality [SDG 5] and international cooperation [SDG 17] for achieving *a sustainable world*.

Since the model relies on underlying historic SDG indicator data, results may shift along with development pathways. The systems model should allow for increased systemic monitoring of SDG progress and can be adapted to regional or country scales. We encourage further comparative SDG

systems model research especially at these scales, since a more thorough understanding of directional relations may allow for more detailed and complex interconnections. Persisting hurdles among targets must be recognized and overcome in the long-term, while levers may multiply benefits towards achieving the SDGs.

## Open innovation model: global warming as a challenge and driver for innovation.

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### Abstract

'Global warming' represents an ecological (also socioecological) issue of importance and concern. Due to the escalation of global warming, it is time for humanity to think and act responsibly and determine sustainable solutions. Global warming, in addition to climate change, has caused the world to undertake new responsibilities (e.g. IPCC 2007), which not only include further climate change, but in the long term, also hold humanity accountable in the prevention of new political and/or social conflicts, war on resources, new environmental catastrophes as well as serious crises in the market economies (e.g. UNDP 2007; UNEP 2008). The special challenge of global warming can be tackled by 'sustainable development'.

Asian high economic growth in recent decades has resulted in the region's equally high growth in carbon emissions. As a consequence, a significant part of global carbon emissions are now coming from China, India, ASEAN and other Asian developing economies. Based on the regional distribution of global CO<sub>2</sub> emissions between 1990 and 2010 Asia-Pacific's share in global carbon emissions jumped from 25% in 1990 to 44% in 2010. Especially China alone more than doubled its share to 25%. In this regard, specifically, this paper has featured an urgent area of case studies within the Asia Pacific Region, which is the Association of Southeast Asian Nations (ASEAN) countries, including Brunei, Cambodia, Indonesia, Laos, Malaysia, Myanmar, Philippines, Singapore, Thailand and Vietnam. The countries within the ASEAN group have shown significant records of contributing greenhouse gas (GHG) emissions in recent years, especially in Indonesia, Thailand and Vietnam (GCCSI, 2014). Asian high economic growth in recent decades has resulted in the region's equally high growth in carbon emissions. As a consequence, a significant part of global carbon emissions are now coming from China, India, ASEAN and other Asian developing economies. In this regard, specifically, this paper has featured an urgent area of case studies within the Asia Pacific Region, which is the Association of Southeast Asian Nations (ASEAN) countries, including Brunei, Cambodia, Indonesia, Laos, Malaysia, Myanmar, Philippines, Singapore, Thailand and Vietnam. The countries within the ASEAN group have shown significant records of contributing greenhouse gas (GHG) emissions in recent years, especially in Indonesia, Thailand and Vietnam (GCCSI, 2014).

In the current academic debate, it is undisputed that a solution or a suitable answer regarding the challenge of global warming can only be found through utilizing the asset of human knowledge. The key to success, as being determined by our propositions, lies in using the available and newly created 'knowledge' in correspondence with Open Innovation Model (e.g. Carayannis and Campbell 2010).

Our thesis is as follows: the innovation model represents a suitable model in theory and practice offered to society to understand the link between knowledge and innovation, in order to promote a lasting development. In this paper we address the potential of a nation-state in the twenty-first century and on

the following pivotal question: How can sustainable development, with regard to global warming, be practiced step-by-step with and within the innovation model?

# **I. Sustainability and Science**

## **I c. Assessing sustainability**

## Navigating through the Emerging Paths of Organizational Assessment: The Relationship between Sustainability and Circular Economy Assessment

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### Abstract

Adopting the sustainability paradigm into organizational practices and strategies seems to be the only viable strategy to respond to changing market conditions and people’s demands for sustainable products. To assess and communicate an organization’s progress towards sustainability, Sustainability Indicators (SIs) have been extensively developed and used. Especially in the last five years, sustainability literature has been captivated by the Circular Economy (CE) concept, as it is receiving increasing attention by academia, industry and policymakers. There is a strong drive from private and public organizations to implement CE and a large number of CE indicators and assessment approaches have emerged in addition to already existing SIs. In many cases CE assessments are executed in parallel to ongoing sustainability assessment efforts or even replace them. However, the relationship between sustainability and CE assessments remains ambiguous and literature highlights that increased circularity does not necessarily lead to overall sustainability. Therefore, it is often not clear in what way CE assessments enrich, deteriorate or repeat sustainability assessments. This research aims at exploring the relationship between sustainability and CE assessments by comparing and analysing organization-level indicators from the literature in an integrative review. The main contribution of this research will be a content analysis of the selected articles identifying the relations between sustainability and CE assessment. Expected findings are a bibliometric comparison of CE and sustainability assessments covering the distribution of articles over the years, their geographical distribution, type of publication and distribution per journal. The bibliometric analysis will be followed by a content analysis. Guiding questions cover the similarities and differences between sustainability and CE assessment in the (i) aims and scope of the assessments (e.g. sustainability dimensions covered); (ii) approaches and methods in use (e.g. stakeholder engagement); as well as (iii) the progression of the assessments (e.g. current state of implementation). most importantly, the implications for sustainability and CE assessments are addressed. This study contributes to closing a gap in the sustainability and CE assessment literature and assists decision makers in assessment implementation.

## Perception of young people about Local Sustainability: a case study in rural areas, Beira Baixa, Portugal

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### Abstract

Based on literature it is indeed vital to create and develop tools to educate and engage young people on Sustainable Development (SD) and Sustainable Development Goals (SDG) to improve their knowledge, skills and attitudes. Involving students in this process allows for awareness of challenges and solutions regarding SD and SDGs. In particular, in rural areas with a high level of human desertification and deforestation, it is important to increase the sensibility of the youth about sustainability issues and to promote change in the community. The case study of this research takes place in the context of a special program, that aims to establish scientific partnerships between Secondary Education Schools (SESs) and the Higher Education Institutions (HEIs) and it refers to the Beira Baixa region. This region is predominately rural, having one of the lowest rates of youth in the country (10.6%). The main objective of this study is to reflect on the perception that youth have about SD, based on the results from a questionnaire applied to a convenience sample from the region's student population in Secondary Education. The general aim of the questionnaire was to measure the young people's perceptions and awareness about sustainability concepts and self-assessment of the local sustainability. The results showed most of the students were familiar with the term SD. However, most of them associated it to the environmental dimension, whereas the institutional dimension is the least associated to SD. When asked about what is important to evaluate in their region's SD and, specifically which of the SDG are more important to their region, the main ones are Good Health and Well-Being (SDG3) and Affordable and Clean Energy (SDG7). Students were also presented with a list of 40 themes that could be included in the Indicator System (IS) and asked to scale from 1 to 5 (where 1 is nothing important and 5 is very important) to assess the importance of each theme for their municipality. The most chosen themes by students are associated with social and immaterial themes (e.g., Health, Education, Housing, Freedom and Happiness). On the other hand, the least valued themes by respondents are "Noise" and "Marine and Coastal Environment". We asked if in the development/designing of an IS that allows the evaluation of the SD, the choice of the indicators should have in consideration the "opinion" of the citizens and a large majority (83.8%) of them considers that it should take into consideration the public participation. It was possible to observe that the practice of local sustainability is already well promoted as well as its progress, but it is essential to involve youth in this practice, especially in rural areas, that could be pertinent to assess local sustainability and monitor SDG achievement, to promote environmental conscience, and to the change in values and attitudes towards sustainability. This abstract is especially related to "SDG+Target: 4.7". In times of crisis, through education for sustainability, it will be essential to promote citizenship, to which this program intends to contribute.

## How Are Corporations Reporting Circular Economy Issues?

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### Abstract

Information published within non-financial reports allow companies to respond to demands for transparency and demonstrate how their business activities are contributing to a more sustainable society. Despite growing attention from academia and practitioners towards the advantages of the circular economy (CE), how CE is being integrated within non-financial reporting remains under explored. As CE strategies are increasingly implemented within the private sector, the demands of stakeholders for transparency of the impacts of these new strategies continue to emerge. Therefore, the aim of this research is to observe how commitments and progress towards circularity are currently being included within the non-financial reports of the world's most sustainable companies, according to certain rankings. By analysing the reports of companies with already established and recognised sustainable practices, different pathways of reporting CE issues can be identified. To achieve this aim, a sampling strategy was employed to identify companies who: publish non-financial reports in English and are included within more than one publicly available sustainability ranking or awards list. More specifically, the most recently published lists of three global rankings (which are developed from corporate non-financial information for the year 2019) were chosen: the Dow Jones Sustainability Index, the Corporate Knights Global 100 and the annual Sustainability, Environmental, Achievement & Leadership (SEAL) Awards. A final set of 43 companies were selected, not restricted by sector or geographical location. A qualitative content analysis approach was adopted to analyse the non-financial information included within these company's sustainability reports, integrated reports, annual reports and other relevant documents published for the year 2019. Preliminary findings suggest that the majority of companies analysed do mention CE within their non-financial reports. CE is most commonly mentioned in a narrative format through descriptions of the CE strategies implemented, collaborative projects they are involved in and future CE ambitions. Furthermore, several companies were found to describe business activities and/or apply metrics commonly associated with CE within academic literature but did not explicitly link them with CE within their non-financial reports. The preliminary insights obtained from this content analysis have identified a lack of consistency concerning how CE is presented and evaluated from companies who are publicly recognised for their commitment and achievements in sustainability. These findings have created a basis for the development of best practices to assist companies to uniformly report progress towards CE informed by current reporting trends.

## Dissemination of sustainability GRI reports in Colombia in the period from 2005 – 2016

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**Associate professor Bart van Hoof**

### Abstract

Dissemination of sustainable practices, as a subfield of sustainable management, studies how these types of practices diffuse among networks of firms and identifies characteristics of firms' adoption of sustainability reporting. This research evaluates the dissemination process of sustainability reports guided by the Global Report Initiative (GRI) in Colombia by analyzing the population of firms adopting the reporting practice and by characterizing differential performance in reporting. Literature related to theory of diffusion of innovations and the dissemination of sustainability reporting, shaped the framework of analysis. Quantitative analysis of a database of GRI certification provided empirical information, including 264 cases in the period of 2005 – 2016. Outcomes illustrate the dissemination process of GRI reports over 11 year-period and identifies firms and organizations adopting diverse reporting frequencies (annually, bi-annually, and dropouts). It shows a relative higher number of firms and organizations in Colombian publishing GRI sustainability reports, in comparison to neighboring countries. Most of the GRI reporting firms are large and privately owned. Companies from the financial and energy sector make up the main proportion. This study is one of the first in analyzing the dissemination of GRI reports in Latin American and offers initial explanations to understand the dissemination process of environmental reporting in Colombia. Outcomes of this study provide insights to managers of companies interested in publishing sustainability reports and to managers of the GRI certification program responsible for the dissemination of its services. Moreover, it adds to the academic literature by emphasizing the dissemination of the specific environmental management practice, such as sustainable reports.



## Sustainability reporting and organizational learning: Evidence of GRI reporting in Colombia

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**Associate professor Bart Van Hoof**

### Abstract

Management for sustainability includes the publication of sustainability reports, as main practices for evaluating and communication advances of organizational improvements and societal contributions. Reporting helps people to register and reflect on outcomes, that's why management literature recognizes reporting as a mechanism for organizational learning part of Demming's cycle. In this research, we evaluate organizational learning resulting from sustainability reporting. Literature on environmental management practice of organizational learning, and sustainability reporting served as framework for analysis. Content analysis of sustainability reports registered by firms in the Global Report Initiative database, and interviews with sustainability managers, of 12 Colombian firms, with different reporting frequencies, provided empirical evidence for this study. Research outcomes identify diverse types of learning, first in sustainability management practices, and second in communication practices of societal contributions. This research adds to literature by relating sustainability reporting to organizational learning in sustainability management. Moreover, it provides sustainability managers with arguments to pursue sustainability reports as mechanisms for advancing learning in sustainability management. This research evidence the sustainability reporting is a good practice firms should employ to advance organizational learning and the communication of their societal contributions.

## Overcoming Data Friction by Connecting Diverse Stakeholder Needs to Address Sustainability Challenges: A Typology of Data Portals in Monsoon Asia.

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**Dr. Vivek Anand Asokan**

### Abstract

The increase in types and volume of data provides new avenues and potential for a sustainability transition. Data friction, however, can hamper the exchange of knowledge. The role of data-intensive approaches in integrating knowledge and their use by multiple stakeholders to translate the knowledge into action is not understood. This paper develops an analytical framework to analyse nine web data portals in Cambodia, India and Thailand, using a case-study approach and collecting data from primary survey questionnaire and literature review. Our study shows that most web data portals are primarily providing information, and a few portals transform the knowledge into action, yet, focus on singular themes. Data-friction among various stakeholders restricts the exchange of knowledge among stakeholders. Our results have broad implications, and we suggest using a spatial scale to link knowledge among researchers and use natural hazard mitigation to connect diverse stakeholders' needs. A scale-based picture, focusing on landscapes, institutions and practices is proposed which can be used to align diverse fields by acting as "bridge" for improved science-policy interface and decision making, facilitated through cognitive proximity, matching, and coordination. A scale-based approach can play a key role in connecting human behaviour, a [social science](#) thematic topic, with ecosystems, a natural science thematic topic.

## Assessing sustainability across circular inter-firm networks: Insights from companies engaged with circular economy practices

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### Abstract

Companies employing circular economy (CE) practices are often implicitly expected to conduct their business in a sustainable way. However, this claim is more often based on narratives than on actual sustainability assessment. Since companies with CE practices are usually embedded within a regional or global network of supply chains, it is essential that the comprehensive sustainability impact of these network actors is considered. While the academic literature on sustainability assessment approaches for circular inter-firm networks has already been summarised by the authors, relatively little research has addressed how industry practitioners assess the sustainability impacts across their supply chains related to CE practices. Therefore, this paper compares the results from the aforementioned literature review on sustainability assessment on an inter-firm level with companies' actual assessment practices going beyond company borders, and describes whether assessing sustainability in supply chains is relevant to them. The empirical data were collected through 43 semi-structured interviews with companies engaged with CE practices in Italy and the Netherlands. The direct comparison of supply chain assessment approaches discussed in literature and those applied in industry aims to identify gaps and overlaps to advance the application of sustainability assessment across circular inter-firm networks. It was found that CE actors saw sustainable supply chains as a priority, even though about a third of the respondents did not conduct any sustainability assessments of their supply chains. The main reasons for this were the small company size with few supply chain partners, or in the case of larger companies, that clients did not give significant weight to the sustainability impacts of products. The companies which conducted supply chain assessments mostly did so in a qualitative way, together with their upstream and downstream partners, or opted for a life cycle assessment. In general, two thirds of the respondents found that CE practices enabled them to collaborate more intensely with their network actors. Finally, while the supply chain assessments were less elaborate than described in literature, almost three quarters of the respondents mentioned they applied supplier selection criteria instead of a complete assessment, ranging from certification requirements to having a long-lasting relationship. It thus became clear that rather than relying on assessment results, companies engaged with CE practices placed high importance on supply chain management tools and a relationship based on trust with their supply chain partners. In a next step, the identified supply chain assessment approaches will be benchmarked according to literature-based criteria of sound sustainability assessment on an inter-firm level.

## The value of a unified Sustainable Development Goals (SDGs) database. How the selection of SDG data matters

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### Abstract

The 2020s are a crucial decade for actions towards achieving the 2030 Agenda and its Sustainable Development Goals (SDGs). To close the gap between science, policy, and society, SDG research needs to provide reliable results to ensure that scientific outcomes are translated into concrete actions. Quantitative SDG research primarily uses databases provided by the United Nations (UN), the World Bank Group (WBG), and the Bertelsmann Stiftung & Sustainable Development Solutions Network (BE-SDSN). In order to understand how the selection of data affects our understanding of SDG interactions, our approach is threefold: We compile the UN, WBG, and BE-SDSN SDG data into one database to show the value of a unified framework. To analyze SDG interactions, we statistically investigate synergies and trade-offs at global, income, and regional scale across the UN, WBG, BE-SDSN, and unified SDG database. We apply network analyses to examine key goals and targets within the SDG system across all four SDG databases. Our results highlight a few insights on how the selection of data forms SDG results. First, we show the varying data availability across the UN, WBG, and BE-SDSN SDG databases. Second, by comparing all four SDG databases, we obtained more different than similar understandings of SDG interactions. Differences in synergies and trade-offs mainly occur for those SDGs that are not based on the Millennium Development Goals or that are environmentally-oriented. Those SDGs [SDG 13 - 16] are still not well quantified to represent the actual purpose described within the targets. Third, the choice of SDG data forms the SDG interactions differently on income and regional scales. Fourth, the most influential target does not necessarily belong to the most influential goal. Fifth, due to the increased data availability and consistency, the unified SDG database offers a more pronounced few on SDG interactions as well as on key goals and targets. In summary, our results evidence that the selection of SDG data forms scientific results, and thus implementation strategies that might neglect trade-offs and spill-over effects – one reason the world is not on track to meet the SDGs by 2030. As the current Covid-19 pandemic has also shifted the foundation on which SDG indicators were built in 2015, the global indicator framework needs to be revised and a unified SDG monitoring framework implemented.

## Assessing the Sustainability Performance of the Sharing Economy

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### Abstract

#### Background of the research

With the rapid spread of businesses using one or another kind of resource sharing, the concept of the sharing economy has become an often researched topic. As a result, a number of related concepts have emerged, such as 'collaborative consumption' and 'access-based consumption' and these are often used interchangeably to describe initiatives aiming at a better utilization of resources (see e.g. Möhlmann, 2015, McArthur, 2014, Mallargé et al., 2017 and Ferrari, 2016).

Apart from economic concerns, the sharing economy also raises a number of questions relating to its environmental and social impacts (Soltesz and Zilahy, 2020). We still have to see if the promises of resource savings are going to lead to more sustainable societies or various types of rebound effects will hinder significant changes to the environmental impact of our lifestyles. Social issues have also risen relating to the organisations of the platform economy, which should be answered to better understand the sustainability performance of the sharing economy.

In order to answer these questions, the measurement of the sustainability impacts of the sharing economy is of crucial importance. Yet, the tools developed over the years to assess company environmental and social performance show serious limitations when they are to be used in the case of the sharing economy.

Depending on the type of sharing economy businesses, companies may be able to influence the use of the resources, which provide the basis of their operations or they may not even possess these resources. Car2go does own its car fleet, but its control over how their cars are used is limited. Uber does not even own the car fleet operated by their platform and has no direct influence on the choice of cars owned by their members.

#### Research activities, preliminary results

While these operators often claim that their services are environmental sound compared to traditional products and services, in fact this is based more on an overall expectation and not on their direct control of environmental aspects and impacts.

In order to gain a better understanding of how sharing economy businesses can utilise established tools of corporate environmental performance evaluation, an empirical analysis is being carried out at the Budapest University of Technology and Economics.

The research focuses on identifying the relevant indicators to be used by sharing economy businesses and will contrast it with actual company practice based on the review of company communication readily available through the internet.

The first results show that sharing economy businesses often do not provide detailed information about their environmental and social performance, but are still promoting an image of a sustainable enterprise to their customers based on general statements about the industry.

During the next few months up to the ISDRS conference several sharing economy businesses will be analysed through their sustainability communication and suggestions for good practices will be established.

### **Relationship to SDGs and conference objectives**

This proposed abstract aims at dealing with goals identified by *SDG 12*, more specifically, it fits under 12.2 and 12.6.

## **2. Education**

### **2a. Provision, quality of and access to education**

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Given the report of a national committee on manpower planning, successive governments have made a significant progress in promoting access to higher education in Nigeria since the 1960s. Unfortunately, lack of synergy between the national manpower board and government agencies in charge of the regulation of higher educational institutions has affected the employability of graduates from higher educational institutions in Nigeria. Therefore, this article examines workforce planning and access to higher education in Nigeria, with a focus on the following research questions: (1) How does workforce planning affect access to higher education in Nigeria?, (2) To what extent has the national manpower board performed its functions in Nigeria?, and (3) What are the reasons for the underlying inverse relationship between the levels of access to higher education and human capital index in Nigeria? These questions were addressed through a systematic review of relevant literature on workforce planning, access to higher education, employability, and human capital development in Nigeria. The theories of structuration and human capital provide a basis for an understanding of the importance of workforce planning and access to higher education. The findings revealed that the issue of workforce planning has contributed to the proliferation of higher educational institutions but it received inadequate attention in national development plans in Nigeria. Also, the national manpower board has not adequately performed its functions, hence the missing link between access to higher education and human capital development in Nigeria. Moreover, a new class of the educated workforce has emerged with inadequate opportunities for decent jobs, thereby making it difficult or impossible for them to attain upward social mobility in Nigeria. The national manpower board has become moribund, while the increasing levels of access to higher education and human capital index are moving in different directions in Nigeria. This article is directly relevant to SDG 4 dealing with quality education and SDG 8, which focuses on decent work and economic growth. The issues raised in this article will enhance an understanding of the topic of the conference, Accelerating Progress Towards SDGs in Times of Crisis.

**Keywords:** Access to Education, Employability, Human Capital Index, Workforce Planning

## Digitalization and Sustainability in Higher Education in Covid Pandemics

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Complex problems are characterized by the fact that sometimes contradictory answers can be correct. You don't learn to deal with that at any school. It's based on the courage to question your own truths - and to always ask the question: "What if the opposite were true?" Dirk von Gehlen

Sustainability addresses an understanding of values in dealing with resources, people, animals, plants and nature as well as cycles in present and future. The development towards sustainability includes a value attitude with regard to an equal balance of ecological, social and economic goals. The principles of sustainable development include the design of human systems considering ecological and social carrying capacity limits and scientific principles. The earth's ecosystems must remain intact in their assimilation, buffering and regenerative capacity to enable life and human economic activity in the long term. This includes designing socially and economically resilient structures and systems. Education and education for sustainability is a crucial module in reaching these goals and distributing sustainable values.

The global pandemic had and still has immense impact on education and caused and still causes a ground-breaking shift in higher education systems. The global COVID-19 pandemic does not only focus on health and social issues, but the topic of digitalization as well. Universities have to (re)act very fast and demonstrate their adaptability: Within shortest time, the university life was reduced to a minimum. Simultaneously, the courses were transferred into digital formats. How this transformation was done, by which advantages and disadvantages they were accompanied, how sustainable these processes are and how the future of higher education can look like, was surveyed by this questionnaire at the Chemnitz University of Technology. The questionnaire was aimed at both staff and students of the university. The main goal was to identify impellent forces of resource consumption, potential rebound effects and give digital equipment. Between July and end of September 2020, the survey Digitalization and Sustainability in Higher Education was executed at the Chemnitz University of Technology due to the conversion from in-person teaching to digital courses. We got approximately 400 complete surveys by students and stuff. The surveys will be repeated in the winter term. The questionnaires were analysed by means of descriptive statistics and qualitative content analysis.

The results show a high diversity regarding the behaviour and responses to changes in digital teaching and learning due to the pandemic. Digital teaching and learning at home offer many advantages and challenges at the same time - as well as learning and working at the university campus do. In fact, there are financial and infrastructural boundaries of digital teaching, e.g. limitations in available bandwidth. Moreover, we identified severe lacking knowledge and action regarding the connection between sustainability and digitalization. Potential rebound effects are lower than expected. The reduction of mobility reduces greenhouse gases, sufficient electronical equipment mainly was already given, so that there is no immense over-consumption, and additional home shopping is adequate. The study also shows, which aspects can be taken up constructively to further develop digital teaching.

## EDUCATION POLICIES AS DRIVERS OF ECONOMIC DEVELOPMENT; OYO STATE AS A CASE STUDY

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University of Ibadan, Ibadan, Nigeria

The 2030 Agenda for Sustainable Development is defined by the United Nations as a plan of action for people, planet and prosperity and comprises of 17 Sustainable Development Goals (SDGs). Of the 17 development goals, goal 4 particularly stands out in relevance to this work, as it seeks to foster inclusive and equitable quality education and promote lifelong learning opportunities for all. Goal 4 is not only crucial in such a time as this, but also crucial for such a country as Nigeria which has been named the poverty capital of the world. In seeking to implement poverty reduction strategies locally, education is undoubtedly a pivotal strategy without which other strategies though executed, may be short-lived. The seeming correlative relationship between these two economic variables, education and poverty, serve to strike a nexus between sustainable goal 4 and sustainable goal 1. Invariably, sustainable goal 1 may not be entirely attainable without specific recourse to sustainable goal 4. This in itself is a key to diverse pragmatic recommendations, programs and interventions for the achievement of these two goals in particular. This, the Oyo State Government has recently identified and so passionately strives for. Of the 10,193,918 children who are presently out of school according to the Federal Ministry of Education, 170,536 (62,733 hawkers and 107,803 almajiris), are resident in Oyo State and have become the policy target of the State Universal Basic Education Board. Have the resultant policies however been properly thought-through, or are they sheer zealous expressions of intent?

This work specifically relates to Sustainable Development Goal (SDG) 4 + Target 4.1, which seeks to ensure that by 2030, all girls and boys complete free, equitable and quality primary and secondary education leading to relevant and effective learning outcomes.

This paper, being my proposed contribution is pivotal to the Conference's theme - Accelerating Progress Towards SDG's In Times of Crisis, as it proffers recommendations as to better and speedy implementation of the Sustainable Development Goal 4, exploring the use of policy as a tool.

## Teaching Agricultural, Biological and Ecological Knowledge and the Impact of These Courses on Rural Development in Transcarpathia

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Dr., PhD. Irene Polin - Department of Biology and Chemistry, Ferenc Rákóczi II Transcarpathian Hungarian College of Higher Education, Berehove, Ukraine

Prof. MVDr., PhD. Janka Poráčová - Department of Biology, Faculty of Humanities and Natural Science, University of Prešov, Prešov, Slovakia

Dr. habil., PhD. Sarolta Darvai - Department of Biology, Faculty of Education, J. Selye University, Komarno, Slovakia, Department of Natural Sciences, Faculty of Primary and Pre-School Education, Eötvös Loránd University, Budapest, Hungary

Ing, PhD. Iveta Szencziová - Department of Biology, Faculty of Education, J. Selye University, Komarno, Slovakia

The education system in Ukraine combines the traditions of the European and Eastern blocs. The Transcarpathian region in the southwestern part of Ukraine is home to a significant number of Hungarian minorities. After World War II the borders of Hungary were reconstructed and the area became part of the Soviet Union and, since 1991, has been the part of Ukraine. To this day, Hungarian is spoken in the region, they adhere to the traditions of the Carpathian Basin and maintain a close relationship with Hungary.

### Material and methods

The goal of this study is to present the opportunities in this region for young adults who want to study in Hungarian, to further their education in topics that require biological and ecological knowledge, related to agriculture, livestock breeding, rural development and sustainable development. The study focused on selected outsourced undergraduate education which is performed under the supervision of the Ferenc Rákóczi II Transcarpathian Hungarian College of Higher Education. This course provides training to advance sustainability. The obtained degree can be used by students not primarily for the purpose of further education, but for the practical application of the acquired knowledge and to ensure their livelihood in Ukraine. The training of a skilled workforce is an important benefit for the development of the region.

### Results

During the 20-year existence of the horticultural engineering course, 170 students have been able to receive a degree. Analysing the data of the graduated students, it is possible to support the fact that the training helps to increase the population retention power of the agricultural sector, and with it an increased amount of people is staying in the Transcarpathian homeland. Since the 20-year existence of the training, nearly 95% of graduates have sought to establish themselves in their home country. Only 5% of students chose a job opportunity in Hungary. However, working abroad is not exemplary at all. Further analysing the correlations of the territorial data of graduated students, it

can be observed that the district of Beregszász provides 58% of the graduates. This can be explained by the fact that the district has the largest proportion of rural Hungarian-speaking population, as it is considered to be the centre of Hungarians mainly engaging in agriculture.

#### Discussion

Our results show a significant correlation with the territorial distribution dominance of the winning tenders of the Egán Ede economic stimulus subsidies, which has been operating since 2016. This also upholds the specific importance of the agricultural sector in the Hungarian-inhabited region of the district of Beregszász. The Beregszász is followed by the district of Ungvár (by almost 23%), and the district of Nagyszőlős, where the proportion of graduates reaches about 10.5%. The share of the scattered regions is small (it is only possible to find graduate students in the districts of Munkács, Huszt and Rahó, but the proportion of graduates in these districts does not reach 10% in total).

#### Conclusions

The proposed results relate to the 4th and 12th SDGs, especially to the Targets 4.3., 4.4., 4.5., 4.7., 12.2. and 12.8.

## **2. Education**

### **2b. Educating for sustainability**

## MAPPING SUSTAINABLE DEVELOPMENT GOALS ON UNIVERSITY EVENTS

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The Sustainable Development Goals (SDGs) of the United Nations have emerged as an index of an organization's commitment to sustainable growth. A need to measure the outcomes related to SDGs in businesses, countries or citizens' initiatives has also been growing in recent years. There are many ways of measuring these objectives in an institution, both internally and externally, but focusing on what the organization really DOES on a day-to-day basis and not before what the institution SAYS IT DOES, seems like an effective and attractive strategy.

Universities' teaching is not limited to lectures from different subjects of a specific degree. Universities also organize many events that can be considered part of the learning experience: workshops, debates, meetings, expositions, performances, etc. More interestingly, those activities are open to all students and they end up as spaces of interdisciplinary discussion, breaking the natural specialised silos of faculties or colleges. In many cases, these social gatherings attract people off campus and have a significant impact on their communities. The study and categorization of university events grasps the real concerns and priorities of the community built by students, staff and faculty. Furthermore, a very interesting way of approaching the real commitment of universities to the SDGs is, precisely, the analysis of the events that are really happening on campus. Their study and classification is also an excellent way to prove publically, especially for university rankings, the real commitment to sustainable development.

However, being generally a decentralized organization, many times university has difficulty in registering and analyzing the activity organized by its schools and centers. Only the websites offer a precise and complete panorama of the activity, but they, generally, fail to categorize the events in a useful manner for analyzing SDGs. Also getting the information from the University CMS (website system) is a tedious and long task.

In this proposal we explain how to map SDG related events in the universities with the use of Big Data techniques. To prove the interest and measure its efficiency, the method has been applied to five top world universities according to QS and THE Rankings. 20.825 events were analyzed and 1,418 events considered as connected with SDGs. The results can be found in this Google Data Studio document. It adapts to the educational events of the university the techniques already applied to academic research (see Körfgen, Förster, Glatz, Maier, Becsi, Glat, Meyer, Kromp-Kolb, and Stötter, 2018, or Jayabalasingham, B., Boverhof, R., Agnew, K. and Klein, L. 2019), adding another dimension to the analysis of universities sustainability.

We think that this new approach is interesting for management involved in learning and teaching, students and other stakeholders in Higher Education. The methodology connects to all SDGs because it can be used to understand the contribution of universities to any UN's sustainable goals. It can also help to write plans to improve the educational contribution to sustainability in the HE.

## Training in purpose: a route to Corporate Sustainability. Evidence from a multinational service company

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Dr. Álvaro Lleó-de-Nalda - Tecnun-School of Engineering. University of Navarra, Donostia-San Sebastián, Spain

Dr. Marta Ormazábal - Tecnun-School of Engineering. University of Navarra, Donostia-San Sebastián, Spain

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**Energy survey in Universities: a catalyst for an integrated and sustainable policy**

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PXL, University of Applied Sciences and Arts, Hasselt, Belgium

Prof. dr. Janaina Macke - University of Caxias Do Sul (UCS), Caxias Do Sul, Brazil

Prof. dr. Debby Cotton - SCION Research Group, Plymouth Marjon University, Plymouth, United Kingdom

Prof. dr. Arminda do Paço - University of Beira, Beira, Portugal

Prof. dr Jean-Pierre Segers - PXL, University of Applied Sciences and Arts, Hasselt, Belgium  
HEC-ULg, Liège, Belgium - Riga Technical University (FEEM), Riga, Latvia

As the second decade of the 21st century begins, universities are adopting an increasingly responsible attitude towards society, seeking a sustainable development agenda for the future, in line with an enhanced focus on the circular economy and the United Nations' SDGs. Given the proactive and problem-solving nature of entrepreneurial universities, it can be argued that they have a natural tendency to grapple with societal issues rather than merely engaging in activities that generate solely economic gain. Moreover, grappling with societal problems is a two-way alley: Apart from the obvious benefits societies garner from university engagement, universities make gains too. This paper sought to evaluate undergraduate students' attitude and behavioral factors and their relation to their energy use. The research analyzed on-line interviews with undergraduate students from Belgium and Brazil through quantitative techniques, such as factorial analysis, linear regression, and variance analysis. The sample consisted of 754 undergraduate students from Belgium (n = 377) and Brazil (n = 377). 66.2% (n = 499) of students are up to 25 years old and 8.8% (n = 66) are over 46 years old. The sample is balanced concerning gender: 50.7% (n = 382) are women. The research identified three dimensions of sustainable attitudes: citizens' role, scientists' role, and government's role, explaining 65.522% of students' sustainable attitudes. Concerning behaviors, the factorial analysis revealed three factors (total explained variance = 64.543%): Consumption of eco-friendly products, Financially-driven behavior, and Household energy saving. The linear regression model based on attitudinal and behavioral factors revealed that energy use could be explained based on three factors ( $R^2 = 0.203$ ,  $p < 0.05$ ): Scientists' Role, Consumption of eco-friendly products, Economy driven behavior. The most important factor in assessing energy use was "Scientists' role" (beta = 0.381; sig. 0.0000), which means that reported energy use increases with the strong belief in scientists' role. The model also revealed that energy use decreases as people consume more eco-friendly products and adopt more economy driven behaviors. The respondents' overall perception showed that: (i) Brazilian students are more Economy-driven ( $F=38.351$ ; sig. 0.000); (ii) Belgian students showed a greater propensity for consumption of eco-friendly products ( $F=7.745$ ; sig. 0.000) and household energy saving ( $F=273.939$ ; sig. 0.000); (iii) female students rely more on eco-friendly product consumption ( $F=13.322$ ; sig. 0.000). From a sustainability perspective, the research concludes that: (i) universities should focus on individual behavioural changes alongside teaching sustainability science; (ii) governments should encourage public policies to raise awareness of the role of citizens in the sustainable use of energy; and (iii) universities should identify key elements for the construction of north-south cooperation proposals, such as capacity building programs for the

dissemination of best sustainable practices. Finally, the study provides pertinent evidence for social researchers and university managers by identifying factors influencing students' perception of sustainability and providing elements for a sustainable university debate.

Keywords: Higher education institution, Energy efficiency, Sustainable Development Goals, Survey.

**Do Brazilian Business Schools prepare future financial executives to account for SDGs?**

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In September 2015, the 193 countries members of the United Nations (UN) signed the 2030 Agenda: a global plan composed of 17 Sustainable Development Goals (SDGs) with 169 goals for those countries to achieve sustainable development in all areas until 2030. The SDGs goals, such as number 4. Quality Education and 10. Reduction of Inequalities are fundamental, not only for business schools, but for any type of business education around the world. The goal number 12.6 of the SDGs, on the other hand, asks companies to start integrating information on sustainability in their usual financial reporting cycles. As a result, business schools play a key role in helping to achieve these UN goals by preparing business students to achieve this UN target number 12.6. In business schools, through undergraduate and graduate courses in areas of Accounting and Administration are taught ways of preparing financial reports, required by regulatory bodies in the countries in which the companies are established, or even management reports that assist in decision-making by the company's top management. The objective of this research is to investigate how, and if, Brazilian Universities, especially business schools, are preparing future executives for this reality, in compliance with the goal number 12.6 of the SDGs. The sample is composed by the 22 Brazilian Business Schools signatory to the Principles for Responsible of Management Education (PRME). PRME principles include the programme's objective of developing students' capacities to be future generators of sustainable value for companies and society at large and to work for an inclusive and sustainable global economy. To this end, educational institutions must incorporate into their academic activities and curricula the values of global social responsibility as portrayed in international initiatives such as the UN Global Compact Through the use of a semi-structured questionnaire based on the Auditing Instrument for Sustainability in Higher Education (AISHE), it will be investigated whether business schools adopt the teaching tools and sustainability frameworks, such as Integrated Reporting or other sustainability reports, such as Global Reporting Initiative (GRI). Learning these tools, the students and future executives are going to help organizations to be prepared to get through the challenges for sustainable development, particularly in reaching the goals of the SDGs. Given the importance of corporate involvement towards sustainability, it is relevant to question how future managers are being trained today, and whether the training they receive meets the needs and demands that the reality of the world of work imposes on them.

Keywords: Sustainable Development Goals (SDGs). Sustainability. Business Schools. Integrated Report.

**Bringing landscapes to school: experiences of developing a learning methodology for secondary school education**

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According to the European Landscape Convention (Council of Europe, 2000) “landscape” means an area, as perceived by people, whose character is the result of the action and interaction of natural and/or human factors. Focusing on the territory as a whole, not distinguishing between the urban, peri-urban, rural and natural parts, landscapes are not limited to cultural, artificial and natural elements. This concept expresses the theme of the quality of the surroundings where people live. Taking into account the above definition, it is interesting to analyse what are young students’ and secondary school teachers’ beliefs, impressions and perceptions on landscapes. The presentation will focus on students’ and teachers’ attitudes and existing knowledge on landscapes, water surfaces. Above that, analyzing their environmental awareness is also a crucial factor in protecting landscapes and promoting sustainability. Furthermore, the role of landscape in formal education will also be examined. How is it possible to develop an innovative and integrated learning methodology, focusing on the European landscape and the role of water in shaping it? How can we bring landscapes to school education? Empirical data was collected through a questionnaire survey among secondary education teachers and students, as well as specific stakeholder organisations in four involved countries: Greece, Hungary, Italy and Turkey. The online questionnaires were available from May to June 2020, and they were completed altogether by 515 respondents. The presentation will address the main findings of the survey, focusing on the impression and perception of landscapes, the environmental consciousness of teachers and students, and their willingness to learn and teach about landscapes. The methodology to include landscapes into the curricula will also be discussed. Differences and similarities among participating countries will be highlighted, however, aggregated data was also analyzed, in order to measure current and general tendencies.

The survey and the methodology was carried out in the frame of the Erasmus+ WaterSTEAM project (“Landscape, water and active citizenship: a nature-based STEAM teaching methodology”).

## **Destination entrepreneurs' experiences of problem solving and cooperation with the university students**

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**Purpose:** The Purpose of this study is to describe tourist entrepreneurs' experiences of co-operation with university students solving the entrepreneurs' practical challenges for Sustainable Development. **Methods:** A qualitative approach is used in this study. Eleven destination entrepreneurs on the island of Gotland, Sweden, responded to an online survey. The survey guide contained questions about entrepreneurs' backgrounds, the business's art, the challenge offered to the students, experiences over the co-operation with the students, and solutions to the students' challenges. Besides, the questionnaire included questions on how entrepreneurs experienced the suggestions and how they were planning their implementation. Also, questions over sustainability issues were brought up in the questionnaire. Analyse of these responses were made by using theoretical concepts such as learning, problem-solving, meaning- and sense-making. **Results and Discussion:** The study's significant implication is that destination entrepreneurs are optimistic about using university students in organisational change approaches. Also, the students fill the gap for the needs of theoretical and practical knowledge of the challenges. The exchange of knowledge, not least in sustainability matters, is of great importance to both parties and promotes learning. Entrepreneurs need reciprocity in relationships and collaboration with the university. They need to be confirmed as essential and valuable resources and committed as actors in developing destinations. **Implications:** The study results show the importance of paying more attention to the role of small entrepreneurs in the development of destinations and their work of sustainability. Co-operation between universities and entrepreneurs should be nuanced by highlighting these entrepreneurs' practical needs.

**Keywords:** co-operation, destination development, small entrepreneurs, sustainability, value creation

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The present paper analyzes the effects of an innovative higher education practice aimed to integrate volunteering initiatives in sustainability courses, with the purpose to strengthen students' sustainable awareness and foster the transformation of the society. In this regard, the transformative service research (TSR) recognizes that education, by nature, has an explicit transformative mission (Rosenbaum, 2011). Hence, it becomes a research priority to identify educational best practices that allow society members to contribute to the pursuit of individual and collective well-being. It is also highlighted by the target 4.7 of the Agenda 2030, which promotes an education capable of providing students with knowledge and skills concerning sustainable development and lifestyle, human rights and global citizenship. Moreover, as emphasized by Elkington (2018), it is time "to help individuals operating in the system to reconnect with their core values, renewing, their sense of purpose, meaning, and integrity"; accordingly, the volunteering can represent a practice that helps to create this re-connection.

In light of this, this study deals with the integration of volunteering practices in an Italian master degree program in Business and Management. Specifically, a volunteer initiative is proposed within the Business Ethics and Corporate Social Responsibility lectures. The lecture wants to sensitize and strengthen the students' awareness of the importance of behaving as societal sustainable citizens at individual and collective (i.e. as members of an organization) level. The research adopts a sequential mixed method design, based on a pragmatic approach. First, a quantitative study is carried out by administering a questionnaire inspired by the Theory of Planned Behavior (Ajzen, 1987) to investigate the students' attitude toward sustainable behaviours and volunteering. Second, after the volunteer lecture, a qualitative study is proposed combining two steps: i) the analysis of the student's projects aimed to embody volunteering within a real company's business practices; ii) the development of in-depth interviews with the students to investigate their feelings about the volunteer initiative, and collect their perceptions on the potential effects that it can produce on their future sustainable behaviours.

The research reveals the usefulness to integrate volunteering practices within the managerial master degree program, highlighting that it contributes to foster the primary university mission to develop sustainable and consciousness individuals before they become active members of business organizations. It represents a best practice that can be systematically adopted within university program, contributing to accelerating the societal sustainable transformation. The originality of the paper lies in the fact that, as far we know, it is the first study that attempts to establish a relation between higher education and volunteering to trigger and support the societal sustainable transformation.

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The audio-visual industry is known for its grand façade of glamour. However, several problems are usually hiding behind-the-scenes such as the environmental, cultural and socio-economic impact the sector itself produces. Hence, the concept of sustainability is understood as the meeting of the economic, environmental and social needs of the present, also referred to as profits, planet, and people, without compromising future generations' ability.

Nonetheless, there are many aspects in which audio-visual practices fail to develop the Sustainable Development Goals (SDGs) suggested by UNESCO. From the misuse of natural resources, e.g., *The Beach* (Boyle, 2000), the permanent racism with certain ethnicities, e.g., patanking, whitewashing, blackface to other issues like animal abuse or sexual harassment, among many others. The concept of media sustainability, is regarded as a counter-cultural initiative commonly known as Green Shooting, its compounded by policies and proposals for the media industry that align with the seventeen Sustainable Development Goals (SDGs) suggested by UNESCO, particularly SDGs 7 and 13, even though it could be applied to 4, 5, 9, 14, 15 and 16. Few cinematographic, television and advertising studios -with the help of companies and associations designated to this specific purpose such as EcoProd (France) BAFTA Albert (UK), Earth Angel NYC (USA), BC Creative (Canada), Fresco Films (Spain), among many others- have already accomplished great results by not only opting for sustainability practices in their audio-visual projects, but also for making available to other companies and creators carbon calculators and sustainable policies. Through a theoretical and case study, the current paper aims to explore the reasoning of the lack of demand and non-expansion of Green Shooting practices all over the sector. The results show that is due to (1) a lack of institutional support at a social and economic level, especially in the European context since most audio-visual productions depend on public finance; (2) misinformation on the meaning of the term sustainability; (3) a lack of social conscience, contrary to other sectors; (4) "the star system" blurry out the attention on those issues; and (5) many critics focus mostly on the quality of the plot instead of praising good practices. Instead of focusing on the nature of the material, critics emphasised the incontinuity within the plot.

In conclusion, the audio-visual sector should try to opt, when possible, for Green Shooting protocols or new media sustainability roles such as eco-consultant/supervisors to ensure that the SDGs are being accomplished. Hence, in a sense, change or rebuild the established system. Nevertheless, we can not forget the reality: most of the audio-visual sector relies on commercial interests, often having a creative and behaviour limitation. This paper provides newer literacy in the audio-visual sector to educate new generations to conceive and plan productions from a sustainable perspective. Hence, it relates intrinsically with the call because it targets professionals of the sector, academics, and students and proposes a dynamic course of use related to the environment and social justice.

Keywords: green shooting, sustainability, media, culture, environment, and audio-visual

**Non formal educational approach with poor communities about waste management: A case study in Belo Horizonte, Brazil**

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The current issue about the lack of adequate and accessible dwellings, increase the number of people living in the slums for absence of a better option. The agglomerate of people living in poor conditions provides a series of social problems, most of them associating the damage to the environment and the loss of quality of life. Much is said about the harmful environment affects caused by bad living conditions of part of population in developing countries, that consume a lot of resources, with unmanageable urban waste and associated bad health conditions.

Through awareness and educative campaigns to avoid cosmism and to show another significance for wellbeing without the need to adopt a lifestyle imposed by capitalism, we can minimize environmental impacts and combat pollution in developing countries.

Brazil has a propensity for urban problems. According to recent surveys carried out by institutes linked to the Brazilian government, almost 85% of the population is concentrated in less than 1% of the territory, causing a great density in certain areas that culminate in serious social and environmental problems. Due to this agglomeration close to large centers, the challenge to achieve sustainable urban planning faces barriers of time and resources, mainly in the waste collection and sewage treatment system. However, always aware that the environmental impact on river and forest springs is out of control.

This research shows the work that was accomplished with a poor community in Brazil, specifically in Belo Horizonte, capital of Minas Gerais about urban solid waste management. It was about an action-research that had been performing in an illegal settlement called Rosa Leão - metropolitan region of Belo Horizonte, where around 1500 families lived. With a Non-formal educational approach, we developed skills related with composting for urban agriculture, waste recycling, public health and how these measures could also improve their quality of life. This approach targeted the Sustainable Development Goals n's 1, 4 and 11.

With the help of government institutions close to the region, the researcher's work was able to advance towards the development of socioenvironmental skills in a long term and straight approach with 14 families (along the years of 2018 to 2020). Face-to-face and remote workshops were held addressing the various issues related to waste management.

The exploratory study aimed to get to know the reality of the researched context in depth, as well as to promote education aimed at improving the living conditions of the community through actions that reduce environmental impacts through the adoption of good practices.

A prior conclusion was reached, before all data were analyzed, that some families started to provide home gardens, recycling waste, reducing the amount of waste production, and contributing to the improvement of their quality of life.

### **How the community of a University is addressing the sustainable Development Goals? The case of Universidad Autónoma de Madrid, Spain**

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The number of studies on SDGs and education in HEIs is increasing, even though studies about what business faculty members know about SDGs are less common. This study will focus on business faculty staff and students of Universidad Autónoma de Madrid), investigating their knowledge about SDG, their perception of the relationship between SDG and education, their lifestyle and profession. The most important contributions of this study are: 1. The identification of advances and limitations in one particular university faculty's implementation of SDG. 2. Proposed actions for each stakeholder in order to improve implementation. UAM is one of the biggest public universities in Spain that has worked with different stakeholders on implementing SDG (some initiatives are: ecocampus office and SDG Labs – where different UAM staff members, students and collaborators meet to develop strategies and plans in a SDG context). In particular the faculty of economic and business sciences is attempting to align with the 17 Sustainable Development Goals –SDGs- planned for the 2030 Agenda. The research is based on a descriptive analysis of an online survey conducted from October to December 2020, distributed to students (Bachelor (undergraduate) and postgraduate), administrative staff and teaching staff – all participants are from the faculty of Economic and Business Sciences at UAM. The students' questionnaire was divided into four parts: i) previous knowledge of SDGs; ii) development of the individual SDGs in the context of university studies; iii) SDGs and the participants' personal lives; iv) relationship between SDGs and the participants' profession at UAM. The teaching and administrative staff's questionnaire did not include the second part because it was not relevant for their profile. Preliminary results show the teaching staff are adequately trained in SDGs whereas the majority of administrative and service staff indicate that they have not received any formal SDGs training. Approximately half of the students who have completed the survey say they have no knowledge about SDG s– this finding has to be seen in the light of the fact that about a third of this group of students began their university studies less than six months before completing the survey. As for SDGs-related themes in business studies, students highlight the priority of decent work and economic growth, followed by gender equality, whereas the theme that receives the lowest priority is care for underwater life.

### **Sustainability in Action: Lessons from the EUSTEPs Online Educators Training on Sustainability and Ecological Footprint**

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Higher Education Institutions (HEIs) are faced with increasing requests to disclose how sustainability values are being incorporated in all institutions' aspects. The interconnection of class practices with 'real world' experiences seems to be key for academic educators to effectively implement the sustainability concept and practices in their curricula. However, only few educators across different disciplines are properly equipped to teach sustainability in a fun and interactive manner within their courses.

Designed for all educators and students at HEIs, the ERASMUS+ EUSTEPs project - Enhancing Universities' Sustainability Teaching and Practices through Ecological Footprint- has been set up through a strategic partnership among four European universities and an international Non-Governmental Organization to make sustainability practical on campuses by engaging the whole academic community. This paper aims to present and evaluate a pilot course where the traditional "educator-to-student" flow of teaching is coupled with an "educating-the-educators" approach. The

course was used to present and discuss the content of a developed EUSTEPs teaching module to educators from EU and non-EU Universities, thus helping to spread the module to a high number of students from diverse universities and fields of education.

The EUSTEPs module, made of 6-to-12 academic hours, can be inserted in any existing course and presents a novel and experiential approach to teaching sustainability foundations and concepts through Ecological Footprint (EF). Based on the outcomes of the pilot teaching in Spring 2020 in the four Universities involved in the project, a short-term joint training entitled “EUSTEPs Module: Educators' and PhD's Online Training” was carried out in September 2020, targeting both academic educators (trained on how to teach the EUSTEPs module in a cross-cutting and interactive way) and PhD students (trained on the EF accounting and how to build a calculator for their HEIs).

34 educators and 20 PhD students from 10 different countries, attended the training. A guideline containing background materials on how some concepts can be transferred by educators to students was developed, and the PhD students also contributed to identify the parameters for the EF calculator for future adaptation to the HEI organizational context. Two sets of questionnaires were developed to evaluate the expectations before the training, as well as educators' and PhDs' perceptions on the training aspects, the EUSTEPs module, and intentions towards sustainability.

The Findings show that the training was overall satisfying and fully successful in meeting all attendees' expectations. Educators particularly appreciated the diverse materials the module consists of since they significantly increased their intention to teach sustainability and EF concepts based on EUSTEPs module within their courses. Also, PhD students indicated an intention to engage more actively in actions towards sustainability on campus after receiving the training.

The transferability potential of the module – also considering its online set-up – is high and it will contribute to increasing the teaching skills of involved educators. Also, its inclusion in the e-learning environment of the EUSTEPs web-platform allows accessibility by educators from all EU (and beyond) countries in time of COVID-19, hence contributing to continuous progress towards SDG 4, particularly target 4.7.

**Challenges of educating the youth on Sustainable Development**

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The ways the society develops and progresses are determined by the people who live in it, who have the vision of its future and set the goals for its development. Educating young people about Sustainable Development is of great importance as they are to become the driving force of our society in the nearest future. The paper demonstrates the level of awareness of the concept of Sustainable Development and its Goals among the students of Saint-Petersburg branch of the Financial University under the Government of the Russian Federation and the ITMO University of Saint-Petersburg identified with the help of the existing data research method and the method of survey and describes ways of raising their awareness on the global and local perspectives of Sustainable Development through various means such as evaluating the relevance and importance of Sustainable Development Goals for a particular country, region or industry, considering local business and social initiatives as contributions to the success of the global Sustainable Development, identifying problem areas and developing projects for local businesses, non-for-profit and government organizations to help them follow the principles of Sustainable Development in their work, taking part in the events connected with Sustainable Development. The paper touches upon the effect of COVID-19 on the indicators of Sustainable Development in the region statistically and as seen by the students and describes the students' attitudes and the proposed ways to improve the current situation. The paper also suggests the framework for the design and development of the educational course on Sustainable Development both for university and college students and members of the local community.

## **Impact of Covid-times on subjective wellbeing of students – in the light of sustainable consumption**

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The pandemic crisis of 2020-2021 has had significant impacts on consumer behaviour and everyday life of people, affecting their subjective wellbeing seriously. Pandemic-related constraints are partly similar to those of an economic crisis but go well beyond its features, by restricting individual freedom, forcing lifestyle change and threatening well-established habits of consumption and social life. Society is facing a double challenge of changing habitual behaviour – shifting towards more sustainable consumption and adapting to the pandemic situation in a resilient way. Those challenges may support but also fight each other and the question remains: when the troubles are over, are we going to keep our new habits, or we cannot wait to return to our previous consumption habits?

Our research focuses on university master students who visited a course on sustainable consumption in the Fall semester of 2020, getting new insights, knowledge, attitudes and impulses for action towards sustainable consumer behaviour. On parallel, they have experienced the effects of the pandemic on their lives every day, leaving controversial impressions and feelings in them. In the study, we apply mixed qualitative methodology to show the Janus face of this situation. On the one hand, we used the reflective writing technique, to collect and assess students' reflections to their own consumption habits in the light to sustainability. The use of reflective writing in qualitative research lies in its contribution to the trustworthiness of a research study and in its feature to facilitate critical thinking, discover previously unrecognized linkages between theory and practice, actions and impacts, as well as to gain deeper understanding through bringing tacit knowledge to consciousness.

On the other hand, we used the method of participatory system mapping (PSM), to map the causal loops and interconnections between forced changes, triggered by the Covid-19 pandemic and subjective wellbeing. The central research question is how rigid the established habits are and how willing people are to change their consumer behaviour if circumstances dictate. The use of PSM helped focus groups explore the impact of shock events and the adaptation strategies they followed to cope with these effects. PSM was capable of exploring systemic effects while reflective writing showed individual-level emotions and narratives attached to wellbeing and sustainability impact of the Covid-19 pandemic situation.

**Keywords:** Covid-19 pandemic, subjective wellbeing, sustainable behaviour change, participatory system mapping, reflective writing

## The Representation of Sustainability in Turkish Universities

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The purpose of the paper is to examine how Turkish universities represent sustainability in their mission, vision and value statements. The importance of sustainability has been discovered by the corporations and there are many serious and joint attempts to create generations who are sensitive to sustainability. In this wave, universities also have an important responsibility. For example, their curriculums are integrating sustainability focused courses, or sustainability related courses and new sustainability programs. Also students at different subjects are encouraged to work on sustainability projects. There is an attempt to create sustainability sensitive generations. The suggested study is going to analyze the vision, mission and value statements of the Turkish universities on their websites. Three research questions are going to guide the study: RQ1: Is sustainability represented in the mission, vision and values of the university? RQ2: How sustainability is mentioned in the vision, mission and value statements of the Turkish universities? RQ3: Is there a difference among foundation and state universities in terms of sustainability representation? Also differences among regions and the foundation of the universities will be taken into consideration in terms of sustainability representation. According to 2021 data of Higher Education Council of Turkey (YOK), there are altogether 207 universities in Turkey. Of these, 74 are foundation, 129 are state and 4 of these are foundation-vocational universities. The research will be done using content analysis. This analysis will provide us with qualitative and quantitative data. The study may be useful to sustainability research and it may encourage the universities to take sustainability more strategically. Sustainability being integrated into the mission and vision and value statements of Turkish universities is an important initiative.

**Sustainable Tourism for Generation Z: Communication Students' Understanding of Sustainability and Sustainable Tourism**

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Associate Prof. Dr. Burcu Oksuz - Izmir Katip Celebi University, Izmir, Turkey

In this study, the Generation Z undergraduate communication students' understanding of sustainability and sustainable tourism was analyzed. Those students that are part of Generation Z, also known as "post-millennials" or the "iGeneration," demonstrate certain characteristics, one of which is that they are comfortable with using technology and social media because they have been exposed to the Internet starting from a very young age. Generational segmentation suggests that what people experience in their early lives can affect their social values, attitudes, and behavior. Generation Z people describe themselves as thoughtful, loyal, compassionate, and responsible. Previous studies add that these people are passionate about making the world a better place and acknowledge the importance of social issues. Given that sustainable development is considered an important goal for many countries, higher educational systems around the world should play a role in increasing the number of graduates with a thorough knowledge and understanding of sustainability. Five focus groups were conducted with students from a university in Turkey (3) and the United Arab Emirates (2). This study reflected on these students' personal travel experiences and their observations of sustainable tourism from their domestic and international experiences. Issues in sustainable tourism and opportunities for achieving both sustainability and sustainable tourism were also discussed in these focus groups. The findings offer implications for teaching and learning about sustainability. The participating students were generally aware of sustainability, but in a limited scope. In sum, Generation Z students, as future travelers, are sensitive to the concepts of sustainability and sustainable tourism, but have not yet internalized these concepts. These students are not entrepreneurs in this respect, that is, they do not waste the water and do not pollute the sea or the environment, but are neither involved in any sustainability campaign nor initiate anything that will influence others. They also expect that along with other major players in the society, governments will play a major role in educating them about sustainability issues in a way that is appealing to them.

**Madeiran public perceptions on marine litter: identifying gaps to design educational strategies**

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Marine litter, defined by the United Nations Environment Programme as ‘any persistent, manufactured or processed solid material discarded, disposed of or abandoned in the marine and coastal environment’ is a worldwide problem with noteworthy environmental, social, economic, and aesthetic impacts. The recognition of the marine debris problem has been increasing over the years, being acclaimed as one of the most meaningful environmental crises of the 21st century. The management framework of the subject encompasses four categories: prevention, mitigation, removal, and behavior change measures. The behavior change actions are stated as the most challenging ones, as ‘humanity will never achieve a truly clean marine environment unless there is a fundamental shift in human mindsets and behaviour’ (Williams and Rangel-Buitrago, 2019, p. 657). Considering education’s role in influencing individuals’ behavior, a survey about marine litter knowledge, awareness, perceptions, personal experience, and behavioral intentions of Madeira island inhabitants (Portugal) will be launched. The main aim is to identify where are the main gaps in order to design educational actions and strategies to promote citizens’ attitudes and behaviors in favor of marine litter reduction. To date, a first pilot assessment survey (n=22) has been conducted (during January 2021 and using paper surveys). Most respondents (mean age=35.8 years) were aware of marine litter presence and perceived the sources, associated behaviors, and impacts of marine debris. Perceived responsibility and behavioral intentions were equally gathered, with most of the participants (95%) recognizing that their individual actions are required to tackle the marine pollution problem. Altogether, the results indicated that the marine litter educational interventions that will be designed and implemented after the survey must focus on the perceptions that respondents have considering the sources of marine litter and in raising awareness about the extent of the problem. Nevertheless, these are preliminary results. The second phase of this study will consist of a large scale online questionnaire that will be generically widespread to the entire Madeiran population via electronic pathways (e-mail, Facebook, Instagram, LinkedIn). After the responses’ analysis, future work will consist of the development of educational actions, that will be pointed at different target audiences and evaluated through a methodological triangulation.

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Williams, A., Rangel-Buitrago, N., 2019. Marine Litter: Solutions for a Major Environmental Problem. *J. Coast. Res.* 35, 648–663.

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SDG 4 (Target 4.6) + SDG 14 (Targets 14.1 and 14.2)

With the pandemic situation caused by the coronavirus SARS-CoV-2 the focus of marine litter studies will probably suffer a slight alteration, as new items will appear in the ocean and beaches and more single-use plastics and personal-protective-equipment will become to be used and discarded. This change, together with the current state of pollution of the ocean, highlights the necessity of placing marine litter on the podium of the issues that need an urgent and immediate educative approach to raise awareness and promote behavior change action.

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The purpose of this multinational study is to examine the role of national culture, education, and GDP on the progress being made to combat climate change. In this study, climate change refers to the progress of a country to combat global climate change and is measured through eight indicators comprised of different emission rates of greenhouse gases (CO<sub>2</sub>, CH<sub>4</sub>, F-gases, and N<sub>2</sub>O) and black carbon. Education and the cultural dimensions of uncertainty avoidance, individualism, and long-term orientation are used as independent variables in the study. GDP is used to account for potential influence on the independent variables. The four hypotheses addressed in this study are:

1. The higher the degree of uncertainty avoidance, then the higher the climate change progress
2. The higher the degree of individualism, then the higher the climate change progress
3. The higher the degree of long-term orientation, then the higher the climate change progress
4. The higher the average years of schooling, then the higher the climate change progress

For the dependent variable, the Environmental Performance Index is utilized. Hofstede's cultural dimensions database is used for the uncertainty avoidance, individualism, and long-term orientation variables. Our World in Data provides the mean years of schooling (education variable) and GDP data comes from the CIA World Factbook. The results provide important insight on the direct and indirect impacts of the cultural dimensions on climate change. Individualism has both an indirect and direct impact on climate change while uncertainty avoidance has only a direct impact. Education has a direct impact on climate change and both individualism and long-term orientation have a direct impact on education. GDP did not have any significant impact on the variables, demonstrating an absence of GDP. These findings suggest that culture and education play an important role in the progress a country is making to oppose global climate change.

**Education for sustainability in time of crises – possibilities for learning in relation to a unknown future**

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Retiree Associate Professor Aage Jensen - Nord University, Levanger, Norway

A new pedagogy that can manage an unknown future is needed in time of crises. Especially the western world needs a change in attitudes, behaviors, and lifestyles. The world has changed, with destructive consequences for many, will continue to change and will not return to the situation 'normal'. That is, it will not return to "normal" global temperatures or species abundance and fluctuations experienced by earlier generations of humans. The epoch has been labeled 'The Anthropocene'. With the pandemic, also our daily social life has changed and have an impact on us as human beings and our relation to nature. The planet is facing problems that are of such a kind that they cannot be looked upon as only technical problems. The pedagogy of today partly confirms and gives support to a kind of status quo in society - or business as usual. This paper aims to illuminate and discuss how a pedagogical model for education and teaching could be formulated that manages the challenges for education and pedagogy concerning an unknown future. For our discussion, keeping the Anthropocene in mind, we present the main ideas of Wild pedagogies [WP]. WP began as a graduate course at Lakehead University (Canada) and was later developed through an international network. WP tries to rethink education and re-examine relationships with places, landscapes, nature, more-than-human beings, and the wild. WP also tries to challenge recent trends towards increased control over pedagogy and education, and how this control is constraining and domesticating educators, teachers, and students. In WP six 'Touchstones' are intended to be reminders of what educators could do in teaching. We have used an abductive approach for the analysis and content analysis as method. We used constructive critical didactics as a theoretical framework. This gave possibilities to illuminate what perspectives and strategies educators and teachers can be aware of and how that could have an impact on theories, practices, and approaches in education. Our results show that educators can problematize the dominant versions of education that are enacted in powerful ways and turn to a practice that challenges a human-centred view and unecological status quo. Given the dominant current human relationship with the earth cannot be sustained we posit that any critique suggested must be paired with a vision - and corresponding educational tools. We discuss this through possible didactical concepts. A conclusion is how it allows for the possibility to enact a new relationship through education that also has an inexorable impact on how to understand learning and teaching.

Keywords: Abduction, Content Analysis, Education, Didactics, Sustainable Development, Wild Pedagogies

The proposed abstract especially relates to SDG 4 + Target 4.7.

We are heading towards an unknown future with accelerating progress. The challenges and problems cannot merely be looked upon as technical problems but it is more important to have a shift in values and attitudes and that is more of a pedagogical problem.

## **From Waste Management Education to Waste Reduction Effectiveness: A Novel Pedagogical Practice**

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The amount of human-made mass has surpassed that of biomass on the planet. Excluding few exceptions, the vast majority of this stuff will eventually become waste. Therefore, waste management education has a central role in educating the next generation of sustainability scientists and, unsurprisingly, this topic is generally taught in most circular economy and sustainability-focused programmes.

However, waste management education does not always translate into waste reduction effectiveness, with assessments varying from exams to coursework, either individual or collaborative. In this paper we present a novel approach to pedagogical practice that combines the theoretical understanding and evaluation of learning objectives with positive environmental benefits. The learners are tasked to pick one action from within each layer of the waste pyramid and implement it in their own lives over a four-week period, monitoring any waste reduction incurred.

In so doing, they learn first-hand the barriers that specific actions pose (e.g. home composting) as well as the opportunities offered by less-thought-of undertakings (e.g. upcycling and re-purposing). Additionally, in having to monitor and report on the environmental benefits of their waste reduction efforts students also familiarise (i) with the latest findings on environmental impacts of products, processing and packaging – thereby supporting their learning with novel scientific evidence; and (ii) with the environmental footprints of different products and materials – thus increasing their sustainability awareness as citizens. Results highlight the overall reductions in waste generation and environmental impacts achieved by the students, the actions chosen by each, and a synopsis of personal reflections on the barriers and enablers that each of them identified.

Uniquely, the prospect of a conference paper has been embedded since the beginning in the pedagogical approach to further strengthen the importance of the work done and the value of its findings. The result is that this paper is co-authored by the professor and some of the students to truly close the loop in the research-teaching continuum. At a time where waste flows steadily grow in every country of the globe (further exacerbated by the single-use products required by the Covid-19 pandemic) this paper contributes to accelerating progress towards waste reduction, and specifically addresses a number of Sustainable Development Goals (SDGs) and their targets: SDG12.3, SDG12.5, SDG13.3, and SDG14.1.

## **Lifting children's preference to use bikes for sustainable school commuting: A practice-based approach along different levels of education**

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Prof. Dr. Marlen Arnold - TU Chemnitz, Chemnitz, Germany

### **Introduction**

Sustainable means of mobility are significant for a city's image, spatial order and for creating good quality of life and harmony with the environment (Macioszek et al., 2020). The current COVID-19-related momentum of a changing mobility awareness and behavior among adults concerning the bicycle could serve as a starting point for other societal groups and their everyday mobility patterns, namely children and their way to school. Due to barriers, false myths and path dependencies, however, this requires specific measures and approaches that meet the needs of children and their parents and that focus on changing frames and conditions for the daily use of bikes. In fact, the percentage of children who actively cycle to school has been decreasing in recent years, with negative effects on children's health and development (BUND n.d.; Canters et al., 2010). Our study builds on this by elaborating aspects that promote or hamper children to use bikes for commuting to school.

### **Method**

The study grounds on a practice- and needs-based approach in the further education of children's mobility (Scheurenbrand et al., 2018). Key participants are students aged 10 to 12 years in grades 4 to 6 and different school types (primary and secondary school). We use different theory-based indicators and criteria, data and media formats (on-site, digital) for data collection and evaluation. Multiple methods and approaches are applied based on an empirical-qualitative case study with a pilot school and according to specific groups of participants in the study. This includes fieldwork activities and participant observations, surveys and qualitative interviews with children, parents and other stakeholders.

### **Preliminary results & discussion**

Preliminary results include the participatory implementation of a bike course in the school yard of the pilot school, the elaboration of bike maps, the implementation of teaching units and the associated multi-perspectival knowledge transfer between the topics mobility, environmental and climate protection and health education. The children consolidate their knowledge of the bicycle as a technical, cultural and aesthetic object and extend skills and competencies concerning motor activity, sustainable mobility and social aptitudes.

We expand existing research on mode choice related to primary school commuting (Kelly & Fu, 2014), by testing it against the peculiarities of the German school system and extending it to the specific context of secondary schools. The student-centered approach allows to derive (success) factors and measures that determine the perception and the decision in favor of cycling as a means of transport for everyday school commuting.

### **Contributions to SDGs/Targets**

The research contributes to SDG/Target 3.D, 4.1, 4.7, 4.A, 9.1, 11.2, 11.3, 11.7, 12.8, 13.2, 13.3, 17.14, 17.16 and 17.17.

### **Contribution to the overall conference topic**

One of the most vulnerable groups in society is addressed, namely children and young people, who during COVID-19 have been severely exposed to fragile conditions in their daily routines. Focusing on strengthening children's sustainability competencies in a participatory way could elevate the negative impacts of the crisis.

## **Education for Sustainable Development in Germany: Aims and Scope of the “ESD Competence Centre”**

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Carolin Hoch - German Youth Institute, Halle (Saale), Germany

Education is considered to be a key element in shaping a sustainable world. This assumption is especially formulated in the multilateral political program on sustainable development that began with the Agenda 21 and continued with the adoption of the Agenda 2030. In connection with the current Agenda the program “ESD for 2030” aims at the realisation of the 17 SDGs and emphasizes the key role of Education for Sustainable Development (ESD) in that process. In order to implement sustainable development as a guiding principle one main objective of those programs was and still is the promotion and structural anchoring of ESD in local educational landscapes.

Against this background the project “ESD Competence Centre Education – Sustainability – Municipalities” (original name: “BNE-Kompetenzzentrum Bildung – Nachhaltigkeit – Kommune”) funded by the Federal Ministry of Education and Research aims at identifying and embedding contributions towards ESD at a regional and local level in Germany. For this purpose, about fifty model municipalities with different levels of ESD related efforts, i.e., municipalities i) that rather have implemented ESD into their local structures, ii) that rather have implemented SD into their local structures, and iii) in which rather individual stakeholders have launched isolated (E)SD initiatives, will be identified and won for cooperation. In parallel, various empirical approaches will be pursued, including quantitative methodologies for the detection of supply structures and structural conditions in the municipalities, and qualitative case studies. The empirical part of the project will build on different theoretical considerations, for example on educational governance theory and network theory. These empirical findings are supposed to serve to support the municipalities in building, implementing and systematically developing further local and regional ESD structures. Furthermore, the process support will draw on existing structures, processes, measures and products provided by the municipal educational landscapes and adjust the offers accordingly. Hence, in order to optimize local processes regarding ESD different formats will be used and combined.

In this contribution particularly related to SDG+Target: 4.7 we would like to present the status of the project and its approaches. Moreover, we will especially consider the question of how the implementation of ESD is affected by the recent COVID-19 crisis, for instance in terms of economic and temporal considerations in local contexts or networking within and between actors of different branches and municipalities. Therefore, we will discuss potential effects of for example the restructuring of workforce, the closure of (non) formal educational institutions or the limitation to virtual communication that may amend the political priority of ESD or hinder its implementation in general.

**Immersive learning as an answer of teaching sustainable development goals in relation to the sustainable paradigm of education in higher education**

PhD Katarzyna Chłapek - Cracow University of Economics, Cracow, Poland

PhD Sylwia Krajewska - Cracow University of Economics, Cracow, Poland

PhD Ewelina Wawryk-Gawda - Medical University of Lublin, Lublin, Poland

Postulating a balanced paradigm of education in universities is an attempt to adapt the teaching model to new requirements shaped by the changing reality. We live in a time where distractions are ubiquitous, so experience learning and personalized learning are ways to support adult education. The COVID 19 pandemic requires universities to answer the question of how, in a constantly changing educational landscape, existing human and material resources can contribute to the effective transformation of classical education into online education using virtual classes and other key tools. The previous educational paradigm of the instruction paradigm, whose aim was to transfer knowledge from the teacher to the student, is slowly being replaced by the learning paradigm, which places emphasis on stimulating the discovery and construction of knowledge by the student himself in accordance with the idea of centered learning, SCL. The student-centered learning concept (SCL) can be particularly relevant to the development of soft skills. Orienting the didactic process to the individual needs and capabilities of students in order to activate them, through involvement in building their own knowledge, will contribute to the development of the learning paradigm and the holistic preparation of the student to enter the labor market. Based on the conducted literature and empirical research, the authors state that the use of hard and soft skills along with the implementation of immersive learning in teaching sustainable development goals allows for achieving the desired attitudes among students (Hornik S., Thornburg S., 2010; Yusof AA, Adnan AHM, Kamal NNM, Kamal MAM, Ahmad MK, 2019; Mishra L., Gupta T., Shree A., 2020; European higher education in the Covid-19 crisis, 2020; Barbier EB, Burgess JC, 2020; Chłapek K., Krajewska S., Jonas K., 2019) The aim of this study is to show the advantages and disadvantages of immersive learning as a method of teaching the goals of sustainable development in the perspective of the sustainable paradigm of higher education education. The basic research methods used to achieve the research goal are surveys and literature studies. Based on the statistical analysis, deductive and synthesis methods were used to formulate conclusions. The conducted research shows the necessity to modify the SDGs education model in order to adapt it to the requirements of an electronically equipped society. At the same time, the need to accelerate the implementation of the SDGs was identified. COVID-19 has been a huge challenge for higher education. Universities should learn from this challenge to improve learning and teaching for the future.

# **3. Biodiversity and Ecosystem Services**

## **3a. Life on land**

## Combatting Desertification under SDG 15: Meeting Future Demands for Ecosystem Services – a Case Study

Mr. Justin Roborg-Søndergaard, Mr. António Galvão, Dr. João Joanaz de Melo

Nova University Lisbon, Lisbon, Portugal

### Abstract

The Monchique Natura 2000 site, an area of 76,135 hectares protected under the European Union (EU) Natura 2000 network (EC, 2008), is in southwestern Portugal. However, unsustainable land use typologies (LUTs), inappropriate land use decisions and poor land management, combined with wildfires and increasing land abandonment, as well as an influx of invasive plant species, such as the Australian acacias, will severely impair the potential for this site to meet future demands for ES. The reduction in land potential and biological productivity, described by the IPBES as processes of land degradation, will in turn exacerbate the effects of climate change (UNEP, 2016; IPBES, 2018).

Meeting future demands for ecosystem services (ES) implies that the health, integrity, and stability of current ecosystems is intact. The potential flows of ES, created from ecosystem functions as emergent properties, are the result of interacting elements of ecosystem structure and fundamental underlying ecosystem processes (van Andel & Aronson, 2012). Without this natural ecosystem framework of interacting plants, animals, microorganisms, and present abiotic resources, future flows of ES will be severely impaired.

Despite the protection status afforded to this site under the EU Nature Directives, LUTs focus primarily on industrial forestry. This has resulted in the clearing of large areas of land, further modified by the construction of terraces cut into the hillside slopes for the planting of eucalyptus (*Eucalyptus globulus*) and, in some instances, pine (*Pinus pinaster*). This forestation of previous agricultural (farmland) areas is historic, the intensification of which started around the late 1950s and early 1960s driven by the demand for wood pulp for the burgeoning paper industry in Portugal at that time.

The restoration of impacted habitats, terrestrial and riverine, the amelioration of soil, and the planting of endemic tree groves in conjunction with a managed strategy for planted forests is envisaged to recover the social-ecological and socio-economic potential this area represents. The aim of this study, which is in progress, is to establish a baseline from which to measure and plan ecological restoration efforts. The focus is on SDG 15, life on land, and target 15.3, the 'proportion of land that is degraded over total land area'. By following the 'Good Practice Guidance' (Sims et al., 2017) for SDG Indicator 15.3.1, this study aims to: 1) assess and evaluate, land cover and land cover changes and trends; 2) analyse the status and trends of land productivity; and 3) determine values and changes in the carbon stock, using soil organic carbon as the proxy.

By analysing these sub-indicators in the context of sustainable development, intergenerational equity - meeting future demands for ES - and climate change, a baseline will be established for developing measurable ecological, social, and economic strategies that support the sustainable development of this protected area. This approach will be centred around landowners working with rather than against

nature to achieve both ecological and economic goals aimed at meeting future demands for ES; a process that can be replicated and scaled-up for supporting progress towards meeting SDG 15.

## Forest health and its biodiversity

PhD Matilda Lindmark

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### Abstract

#### Introduction

Monocultures is a potential threat to forest health. In the urgent rush to promote economic development, the area of large monocultures of Norway spruce in Europe have increased.

Mass-attacks from European spruce bark beetle, *Ips typographus* (L.). have already killed over 50 million m<sup>3</sup> of Norway spruce forests in Europe. With an ongoing climate change, the epidemic outbreaks of *I. typographus* and other pest insects are expected to increase.

Set-asides in monoculture forest landscapes are important sources of biodiversity. Policymakers for forest industry often argue that set-asides may increase the population of *I. typographus* because those small islands of biodiversity also held higher volume of old and downed Spruce trees. But, we want to turn that question around! Natural forests with higher volumes of trees suitable as habitat for bark beetle enemies such as *Thanosimus formicarius*, a widespread and effective predator to *I. typographus*.

To reach the SDG-target for biodiversity and increase forest health, we will focus on biological pest control of *I. typographus*. *T. formicarius* develop in Pine trees (Scots Pine) and the proportion of pines nearby attacked spruce trees is the main variable influencing predator/prey ratios (Warzee, 2006).

#### Hypothesis

The predator/prey ratio is higher in coniferous forests with higher heterogeneity compared to homogenous plantations of spruce.

#### Method

*T. formicarius* is easily catch in funnel traps baited with aggregation pheromone for *I. typographus* (ips-lure). By place funnel traps in 3 different types of stands suitable for *I. typographus* attacks, we can evaluate the predator/prey ratio.

Baited (ips-lure) funnel traps will be placed out during the first flying period for *I. typographus* in early summer 2021 in Västernorrland county, Sweden. Funnel traps will be placed in 5 clearcut areas with former spruce dominated forests (< 85 % spruce), 5 monoculture stands of planted spruce (< 90 % spruce, >75 years old) and 5 areas of set-aside semi-natural coniferous forests (> 3 ha, < 60 % spruce). The traps will be emptied 2 times/week for a 2 week period.

Individuals of *I. typographus* and *T. formicarius* will be sorted out and counted.

## **Discussion**

If we see a higher predator/prey ratio in areas with higher biodiversity, our findings support that increased area of set-aside forests will not only increase biodiversity but also increase biological pest control of *I. typographus* and increase forest health. To handle increased outbreaks of *I. typographus*, we have to increase the population, and habitats, of their natural enemies as well.

This abstract relates to SDG Target: 15.2.

Relate to the topic of the conference (“ACCELERATING PROGRESS TOWARDS SDG’s IN TIMES OF CRISIS”), this project will emphasize the importance of break the urgent rush of short-time economical goals in forestry. Especially during time of crisis, the risk to jeopardize forest health and biodiversity tends to increase.

## **References**

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## Biodiversity in California: From Policy to Implementation

Ruhina Surendran<sup>1</sup>, Susan Karasoff<sup>2</sup>, Peter Brastow<sup>3</sup>

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### Abstract

California is a bio-diversity hotspot, with over 1500 native species of plants of which more than 70% are impacted and threatened by extinction. California is the most bio-diverse of the 50 US States. Meeting California biodiversity and sustainability needs requires defining the needs, expanding funding, and reducing non-native plants in publicly and privately funded capital projects and maintenance activities.

This study looks at the connection between the current high-level policies, City level ordinances and initiatives, and the inclusion of native plants across neighborhoods through research and case studies. Volunteer based organizations like the California Native Plants Society promote native plants. The State of California has a Statewide Executive Order on biodiversity. In 2017 Governor Brown initiated it to preserve California's vast and biodiverse flora and fauna.

California sustainability needs include:

- Enhance biodiversity - local native plants and wildlife - to enhance human and ecosystem health, pollination services (including green corridors), clean air, clean water.
- Reduce/remove invasive species from these ecosystems and replace with local native plants and wildlife to enhance biodiversity.
- Measure and moderate water use to adjust to increased water needs for development of people, agriculture and industry
- Mitigate climate change - enhance use of local native plants specifically in grassland plant communities, woodland plant communities and coastal water plant communities to absorb carbon, clean water, clean air and pollination services. These local native plants are also needed in cities and suburbs where grassland plant communities and woodland plant communities occurred to absorb carbon, clean water, clean air, mitigate urban heat island effects.
- Adapt to climate change - protect land and sea, including low lying coastal areas, including using adaptive, green storm and tide management techniques and wildfire resilience.

Funding opportunities to enhance California biodiversity include: State, City and Federal sources which will be researched in more detail.

At the City level, San Francisco has a Biodiversity Initiative which promotes biodiversity, improving access, awareness and stewardship. Other ways such as incorporating biodiverse greening into open space and utilizing natural ecosystems to build resilience are also included in this initiative.

In addition, the San Francisco Estuary Institute (SFEI) provides a roadmap to enhance biodiversity with its Making Nature's City: A Science-based Framework for Building Urban Biodiversity. These biodiversity success indicators are our roadmap to advocate for funding and prioritizing biodiversity projects.

Privately funded green projects on private land, such as homeowners' properties, choose to add limited local native plants and ecosystems, preferring mid-20th century landscaping styles, regardless of the negative effects of biodiverse dead zones, excess water and excess herbicide and pesticide use.

Landscape architect use, promotion and understanding of the value of native plants and ecosystems could benefit private landscapes, enhance bio-diversity and enhance climate resilience. The appeal of a well-mowed lawn, and exotic ornamentals is being tested against the need for more biodiversity and a better understanding of the implications of not following climate change imperatives.

This presentation will study SDGs 11, 13, 15 and 17. Given the imperative of climate change, this study would address the changing conditions in California.

## Reported & Reported: differences among local and international game hunting data and potential reasons on the example of South Africa

MSc. Lucie Johanisová<sup>1</sup>, Professor Volker Mauerhofer<sup>1,2,3,4</sup>

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**MSc. Lucie Johanisová**

### Abstract

Trophy hunting constitutes globally a major part of the wildlife tourism industry and is connected through the export of kills to international wildlife trade. South Africa plays a major role in the operation of sport trophy hunting compared to other African countries. Inconsistencies found between kills and exports can contribute to identify illegal trophy hunting that constitutes a major threat to biodiversity conservation. This paper quantitatively analysis in how far data of trophy hunting kills and of trophy exports are consistent on the example of South Africa and what are potential reasons for inconsistencies found. Data was extracted from two different sources for the year 2018. These were the South African Professional Hunting statistics (SAPHs) containing trophy kills information for each species and the country of origin of the hunter on the one side and trade data reported under the CITES Trade Database on export of trophy items from South Africa on the other side. In the CITES trade database the relevant parameters and related variables were selected to gain the appropriate data. The data collection from both sets were contrasted to determine the level of inconsistency among numbers of trophy items exported across national borders out of South Africa and numbers of trophy kills. The findings show on the one hand in both data bases the same 28 trophy-hunted endangered taxa reported. On the other hand the same data reports hunters with in total 64 nationalities from abroad participated in a total of 4,726 trophy kills were reported while a total of 3,126 hunting trophy items were exported out of South Africa to 37 countries as the final destination. The data of trophy hunting kills and data of trophy hunting

export was found to differ to varying degrees across the countries contributing to trophy hunting and CITES-listed trophy-hunted species. Possible reasons for this inconsistency are identified and also recommendations for improving the CITES reporting system are made.

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## Biodiversity and multiple value chains in boreal mountain forests

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### Abstract

Extensive commercial forestry in the North European boreal forests have left forests and forest landscapes substantially transformed and dominated by young and middle aged managed forests and with only few and small remnants of natural forests left. However, along in the westernmost part of northern Sweden, a belt of forests with limited harvesting still exists – the Scandinavian Mountain Green Belt (SMGB). This belt extends almost 1000 km and include more than 2.2 Mha forestland with a significant share of old-growth and natural forests with high biodiversity values, and as such unique in a European perspective.

The debate around the future of the SMGB is intense. Although a significant share of the area is already protected, a recent government review has suggested to set aside additionally 500 000 ha of the area as a contribution from Sweden to fulfil the goals and targets of international agreements (CBD and EU directives). Beyond the conservation benefits, this will have implications also for rural development in the region. It would support the economy for the tourism sector, support amenity migration, secure land for reindeer husbandry and in general provide opportunities for value chains related to non-wood resources such as fishing, hunting, berry- and mushroom harvest and carbon sequestration. On the other hand, industrial and non-industrial forestry actors sees the initiative as a threat to their resource base.

We have analyzed the spatial distribution of different forests types and presence of forests with high natural values across the SMGB and highlight how these are distributed across public, forest company and non-industrial private forest owners. Traditional wood-based economic value chains are often in conflict with value chains based on socio-cultural and ecological benefits and hence calls for discussion on multiple-use strategies that involve all landowner categories and other stakeholders. There is an urgent need to identify methods for comparing wood/biomass-based value chains and new value chains that take into account both direct benefits (such as wood or mushrooms) and indirect benefits linked to immaterial forest values (such as recreation and tourism), as well as non-use and bequest values.

### *Relations to conference themes:*

Our study address several SDGs goals and targets, including 8.3, 8.9, 11.4, 13, 15 and 17.17. The loss of biodiversity is one of the planetary boundaries that are already passed, and there is an urgent need to reverse the trends of biodiversity and ecosystem services loss while at the same time ensure the potential for rural sustainability.

## Jaguars substituting Tigers? Results from a Systematic Literature Review on Illegal Wildlife Trade

BSc. Vaclav Panek<sup>1</sup>, MSc. Lucie Johanisová<sup>1</sup>, Professor Volker Mauerhofer<sup>1,2,3,4</sup>

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**BSc. Vaclav Panek**



**MSc. Lucie Johanisová**



**Professor Volker Mauerhofer**

## **Abstract**

Jaguars and Tigers are both threatened species and top-predators in their natural surroundings in the Americas and in Asia respectively. In the Americas, jaguars are now considered “near threatened” by the International Union for Conservation of Nature despite all the international trade of jaguar products being prohibited under the Convention on International Trade in Endangered Species since 1975. The population of tigers has declined, they become listed as endangered species and poaching is considered to be the primary cause. Recent research indicates an increasing pressure on Jaguars, which is likely to begin to replace tiger products being sold for a variety of reasons but particularly as ingredients used in traditional medicine in some Asian countries. The more of these reasons are out there, the higher the demand for these body parts may become. Latin America now represents a potential new hotspot for the opening of such a market mainly due to lack of funding for wildlife crime, insufficient enforcement provisions (control and sanctions) and poverty.

This paper assesses if and in how a substitution of tiger products by jaguar products is already reported in the literature. It reveals the most frequently discussed themes. The method is a systematic literature review implemented in scientific databases (esp. Web of Science, Scopus) as well as in grey literature. This paper provides a detailed description of the applied method as well as a structured overview of literature found about illegal trade of jaguar parts and its connections with illegal trade of tiger parts. The information found will be organized in a variety of categories such as most often reported parts used as substitutes, reasons behind the demand and future research questions expressed. Limitations of the data will be presented as well as limitations of the applied method, particular with regard to grey literature.

In summary, the current research project results indicate that there are already first indications apparent in the literature available that a substitution effect between Jaguars and Tigers takes place. Furthermore, the presentation will end with additional research questions identified beyond the literature review.

The contribution links particular to SDG 15.c „Enhance global support for efforts to combat poaching and trafficking of protected species, including by increasing the capacity of local communities to pursue sustainable livelihood opportunities.“.

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# **3. Biodiversity and Ecosystem Services**

## **3b. Life below water**

## Study of heavy metals including mercury (Hg) within Fiber Banks of Västernorrland and Norrbotten counties by portable X-Ray Fluorescence (pXRF) spectrometry

Dr. Faisal Zeeshan, Dr. Alireza Eivazi, Dr. Gabriela Paladino, Assist. Prof. Börje Norlin, Mr. Hafizur Rahman, Prof. Erik Hedenström, Ms Siwen An, Assist. Prof. David Krapohl

Mittuniversitetet, Sundsvall, Sweden



Dr. Faisal Zeeshan

### Abstract

Sweden is among the world leaders in the production of pulp and paper. However, this industry generated large quantities of wastewater that was discharged into nearby rivers or seas and thus potentially affected the aquatic environment. Effluent water from the pulp and paper production contains contaminated cellulose or wood fibers that can accumulate on the seafloor and lead to the formation of so-called fiber banks. The production-related wood and cellulose fibers that were suspended in the water accumulated and formed fiber banks at several places in Sweden.

Portable X-ray fluorescence (pXRF) spectrometry is a non-destructive analytical technique suitable for analysis of various elements in the environment and many industries and applications. In this study, Bruker/ Tracer 5i pXRF instrument was employed to determine the concentration of Hg and other heavy metals in the fiber bank areas of Essvik (Västernorrland) and Karlshäll (Norrbotten) in Sweden. Eight different samples were collected from the pollutants within and close to Sundsvall's fiber banks (Essvik) and four samples were collected from Karlshäll region. pXRF instrument was used by applying restricted materials calibration method in two phases (50 kV/ 13  $\mu$ A and 15 kV/ 13  $\mu$ A) to determine the concentration of elements  $Z \geq 13$ . The analysis was divided into two parts, (1) *in-situ* analysis of fresh samples, (2) *ex-situ* analysis with sample preparation such as drying and grinding, for the comparison

between field and laboratory results respectively. The obtained results were compared with the inductively coupled plasma-mass spectrometer (ICP-MS) measurements.

This study targeted the advantages of *ex-situ* pXRF. The results (*in-situ* and *ex-situ*) indicate that pXRF was capable of determining the concentration of heavy metals in fiber banks and its fibrous polluted sediments. Ex-situ results measured by pXRF showed high concentrations of Al, Cl, Fe and Zn varies from 1600 mg/ kg to 330000 mg/ kg and also high concentration of Hg was detected but only in Karlshäll fiber bank samples (30 mg/ kg) and in fibrous polluted sediments samples (10 mg/ kg). It is due to the fact that Hg was used as phenylmercuric acetate (pulpasan) for wooden magazines in the process to prevent mold damage to the pulp bales around 50 years ago in Karshäll region. Possible explanations of differences between ICP-MS and pXRF based results are due to the calibration of the pXRF system, matrix effects and excessive elemental enrichment in *ex-situ* samples. We conclude that pXRF is a rapid and cheap analytical technique compared to expensive ICP-MS methods.

Our proposed abstract relates to SDG+target: life below water+14.1, life below water+14.2. It is of high relevance for the society and to provide better facts for decision makers to prevent and reduce marine pollution and to protect and restore ecosystems to avoid significant adverse impacts, and take actions for their restoration in order to achieve healthy and productive oceans.

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# **3. Biodiversity and Ecosystem Services**

## **3c. Ecosystem services**

## Evaluating world's marine ecosystem services through an emergy-based method

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### Abstract

Marine ecosystems can provide a variety of services, such as habitat provision, pollution control, floods and storms mitigation, etc. However, with the development of society and the continuous expansion of the scope of human activities, the abuse of marine areas and unregulated pollutant discharge have threatened the marine ecosystem. Besides, the current lack of research on the evaluation of marine ecosystem services makes the value of marine protection, development and restoration underestimated during the decision-making process. Therefore, based on the non-monetary ecosystem service evaluation framework, a marine ecosystem service classification has been established, which divides marine ecosystem services into three categories: direct, indirect and existing services. Direct services are provided due to changes in the flows and storages of the studied ecosystems, including biomass increase, carbon sequestration, soil/sediment organic matter building and groundwater recharge. Indirect services are the additional impacts during the ecological process in producing direct services, including air purification, water purification, erosion control, natural power generation potential, and microclimate regulation. Existing services are the local apportionment of global services and human preference-oriented services, including global climate regulation, biodiversity conservation, and cultural and education value. The world's coastal ecosystem services has been measured as an example by using emergy analysis method.

The results show that (1) the world's coastal ecosystem service value is about  $4.26E+23$ sej/yr, of which Asia and North America contribute about 55% of the total service value; (2) the top ten countries in terms of the world's coastal ecosystem service values are Canada, Indonesia, Australia, the United States, Brazil, the Russian Federation, Norway, the Philippines, Mexico, and China, which contribute about 60% of the total service value; (3) estuaries have the highest ecosystem service values, followed by mangroves, seagrass beds, tidal flats, salt marshes, and warm water coral reefs; (4) developed countries can make better use of their coastal resources and pay more attention to the marine protection while the opposite is true in developing countries, which means that developed countries still occupy an advantageous position in the process of marine protection, development and utilization.

This study assesses the coastal ecosystem service values in various coastal countries from the perspective of ecosystem contributors, emphasizes the importance of protecting them in marine management, and provides a certain reference basis and theoretical support for decision-makers in formulating marine-related protection and development strategies.

This study is related to SDG-target 14: Life below water, aiming at conserving and sustainably using the oceans, seas and marine resources for sustainable development by evaluating marine ecosystem

services. In addition, this study also reveals the gaps between developing and developed countries in terms of developing and protecting the oceans, and provides a certain reference for the sustainable development of the world's oceans, so as to accelerate the progress towards the 2030 SDGs in the marine sector, which is related to the topic of the conference.

## Sequestering carbon in agricultural systems with concrete demolition wastes

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### Abstract

Cement manufacture releases CO<sub>2</sub> from mineral components under strong heating. That CO<sub>2</sub> has the potential to be re sequestered by concrete (Xi et al. 2016). Achieving this has been a recent focus (Cao et al. 2020, Schneider 2020). Sequestration of CO<sub>2</sub> by concrete demolition waste (CDW) is most rapid when it is reduced in particle sizes and placed in environments having high CO<sub>2</sub> concentrations and available moisture (Renforth 2019).

China is largest global producer of concrete, and building replacement produces more than 1.3 billion tons of CDW per year (Lu 2014). This country also has short (about 23 years) lifetime of concrete construction (Cai et al. 2015). Most CDW in China and globally is now land-filled in environments with weak CO<sub>2</sub> sequestration (Huang et al. 2018). Their potential for CO<sub>2</sub> sequestration is about 0.1 petagrams of CO<sub>2</sub> per billion tons of CDW, of which little is currently being achieved.

Adding CDW to non-vegetated soils caused net sequestration of 8.5 kg of CO<sub>2</sub> m<sup>-2</sup> y<sup>-1</sup> (Washbourne et al. 2015). Addition of CDW to agricultural soils has not been examined previously. Here we will report results from adding CDW to soils planted with a non-mycorrhizal crop, a mycorrhizal crop, and a mycorrhizal crop also having nitrogen-fixing bacteria. This is a pot-based study with non-photosynthetic CO<sub>2</sub> transfer rates measured directly by infrared spectroscopy. Fluxes of CO<sub>2</sub> across treatments will be completed by mid-2021, with crop yields, soil chemistry, and soil microbial changes following later. We hypothesize that CO<sub>2</sub> sequestration will be highest with tripartite symbioses (including nitrogen fixation), lower with mycorrhiza alone, and lowest without mycorrhiza. Further, that all rates here will exceed those measured previously in non-vegetated soils.

This is a new way to increase ecosystem services of agricultural systems, particularly where CDW is available nearby (and so with low transport costs). CO<sub>2</sub> sequestration, crop yields, and especially their symbiotic interactions with microbes and CDW added to soil addresses SDG targets 9.1, 9.4, 12.2, 12.4, 12.5 and 13.3.

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## Depopulation related ecosystem services supply in Mediterranean rural areas

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**Francisco A. Comin**

### Abstract

Changes in demography constitute an important factor related to land cover and land use, so to the provision of ecosystem services. Here, we examined the relationships between the dynamics of demographic variables (human population and density, and number of villages) and provisioning and regulating Ecosystem Services (ES) in three Mediterranean rural areas which followed contrasting socioecological and environmental trends. We expected depopulation diminished provisioning ES but increased regulating ones. To test this hypothesis, we compared demographic and ES data between the 1950s and 2010s in three severely depopulated rural areas of Aragón (NE Spain). SWAT (Soil and Water Assessment Tool) was used to estimate water supply, soil retention, food and biomass productions directly as ES, while others were estimated as the combination of two or more output SWAT variables (water and nutrient regulations). Number of inhabitants, population density and number of villages per municipality in the three study areas were calculated from decadal census compiled by the Aragonese Stats Institute (1900-2018). The values of each ES were aggregated at municipality scale to be able to relate ES to population dynamics in subsequent analysis. To check depopulation trends, the changes in the number of inhabitants, population density and number of villages per municipality during the last century (from 1900 to 2018) were analyzed through Generalized Additive Models (GAM). They were performed considering “date” and “zone” (and their interaction) as fixed factors and municipality as random factor. an equivalent LME procedure was applied to compare ES provision between the 1950s

and the 2000s (fixed effects: date, area and the interaction between them; random factor: municipalities), and a similar one to investigate the role of depopulation in these changes (fixed effects: inhabitants, population density and number of villages). Goodness of fit was evaluated with Marginal  $R^2$  (associated to fixed effects in LME procedure) and conditional  $R^2$ . Likelihood ratio tests were implemented to compare these models (fixed and random effects) with null ones (only random effects) and detect model significance. An extended LME was performed to check if these relationships between population variables and ES differed among zones and dates (adding them as fixed factors).

We found severe depopulation (-41.7% in population and -44.7% in density) and associated land-use changes, with significant spatial differences between high-altitude mountainous areas, where a more intense depopulation (-63%), and abandonment of agricultural (-35%) trends were observed. Contrasting patterns were found between more fertile and easy-to-access areas where agriculture was intensified, and less productive isolated mountainous ones where rewilding was observed, boosting the food production service (>600%) and regulating services, respectively. Depopulation trends resulted significant for all the ES evaluated, especially through the general increase in water regulation (>1000%) and soil retention in mountainous depopulated areas (>400%). Spatial trade-offs, in particular, among depopulation, crop production and regulating ES, should be considered in the management schemes and policies for rural areas in order to get a balanced and sustainable supply of ES in the long-term.

## The evolution of the main topics in Payments for Environmental Services: Where and why do they differ?

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**Dr. André Batalhão**

### Abstract

Payments for Environmental Services have become a sophisticated economic instrument adopted by governments and environmental regulation organizations to guarantee the conservation of natural resources. However, the wrong implementation of this economic instrument can generate different environmental, social, and economic problems, especially in developing countries. This article seeks to elucidate the understanding of the different points of view of scientific production on the subject. We analyzed the textual corpus of 1,169 peer-reviewed articles from ISI Web of Science, using the Latent Dirichlet allocation algorithm. The period analyzed was from 2000 to 2018. The association of the searched terms in a cluster was carried out through the online platform CorTextO manager. Complementary analyzes were performed with package R. The research data suggest that: 1) there are three evolutionary moments of the theme during the researched period: a) the initial phase as a promising approach in the conservation of natural resources; b) extrapolation to peripheral problems with a focus on social issues; and c) the suppression of general and discontinuous terms of preservation; 2) the use of the radical Ecosystem or Environmental services in the context of Payments occurs due to the theoretical contextualization of Neoclassical Environmental Economics and Ecological Economics, and 3) conditionality and environmental gain are described as important within the theory, however, there are only two types of environmental service (carbon sequestration and biodiversity conservation). The main findings highlight that the various initiatives for the conservation of natural resources are “labeled” as PES. The implementation of PES in developing countries has occurred with greater intensity

in poverty alleviation than in environmental preservation. Conditionality in the provision of environmental services occurs in favor of changing production techniques, regardless of environmental gains.

## Assessment of water ecosystem services and alternative scenarios to climate change and human impact in neotropical mountains

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**Daniela Ávila García**

### Abstract

Water ecosystem services (ESw) are related to aquatic ecosystems and to the interaction with water and land in different ecosystems such as forests, agricultural lands, riparian areas, wetlands, and water bodies. ESw play a central role in human well-being and water management at different scales. However, different drivers of change, such as land-cover degradation and climate change, affect the ability of forests to provide ESw, resulting in water insecurity.

This study explores the forest-water nexus and provides an overview of the water management related to potential hydrological impacts of land-use and land-cover changes and climate change in two neotropical mountain watersheds: Río Grande de Comitán-Lagos de Montebello (RGC-LM) watershed, Chiapas, México, and Las Piedras river (LPR) watershed, Cauca, Colombia. Although ESw related to cloud forest and páramos are of vital importance for their socio-ecological functioning, both study areas face water-related challenges because of different pressures related to climate change, deforestation, and accelerated urban, agricultural, grazing, and touristic growth. Therefore, a combination of methods recommended by the Toolkit for Ecosystem Service Site-based Assessment (TESSA), as well as scenario modelling based on an ecological index of riparian quality, were used to assess how alternative scenarios of reforestation or deforestation and climate change scenarios can affect water provision and water quality at different scales.

Considering the socio-ecological context, a total of four scenarios were modelled on each study area: two of the modelling scenarios included the implementation of land-use policies that aimed at mitigating the likely consequences of land conversion to cropland or cattle grazing. In contrast, the two opposite scenarios represented increased deforestation, forest fragmentation and degradation of riparian vegetation. Hydrological modelling and the impacts of change were assessed annually using WaterWorld modelling tool. In the case of the RGC-LM watershed, the results were statistically compared at watershed and subwatershed scale, whereas in LPR watershed, climate change scenarios were included, and three zones were delimited according to altitude differences.

The results in both watersheds indicate that water quality is positively related to forest cover. The effects of terrain, climate and forest-cover conditions on fog inputs and actual evapotranspiration were relevant to increase or decrease water yield under all scenarios. However, deteriorated water quality and decreased water quantity are not only related to climate change, degradation and reduction of forest and riparian vegetation, but also to inadequate water management in the study areas. Therefore, an effective improvement of ESw in the long-term would require management policies that consider forest-based solutions at different scales, sustainable productive practices, equitable local agreements, and efficient distribution networks for water resources.

The magnitude of today's biodiversity and climate crisis calls for urgent transformative change in public decision making to catalyze pathways towards more sustainable futures. In this sense, this study provides an overview of the potential benefits of some ES-based solutions to address multiple SGDs simultaneously, such as SDG 6 (clean water), 13 (climate action) and 15 (terrestrial biodiversity), as well as increasing evidence for the many benefits for society from working with nature.

## THE GOVERNANCE OF ECOSYSTEM SERVICES IN OCEANIC ISLANDS: DRIVERS, ACTORS AND CHALLENGES

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### Abstract

Oceanic islands are the home of special and sensitive ecosystems that distribute goods and services free of charge, guaranteeing quality of life for humans and regulating environmental aspects at local, regional and global scales, such as biodiversity conditions or climate. Biodiversity integrity, including endemic and endangered species, presents itself vast in these environments and are subject to great pressures and vulnerabilities, largely due to their territorial limitations. This work aims to discuss how governance models of oceanic islands, particularly regarding Marine Protected Areas (MPAs), impact the conservation of ecosystem services within these areas and how the different set of actors can contribute to better manage them. A systematic literature review was carried out, based on scientific articles, extracted from relevant databases. A total of 36 articles were collected, of which 16 were analyzed in detail. A revision of international legislation pertinent to the topic was also done, such as laws and decrees around the governance of ecosystems, as well as norms and rules that manage island environments and MPAs, to embody the discussion. Socio-political, cultural, environmental and institutional aspects that comprise oceanic islands governance were considered as main categories of analysis, in a deductive and inductive way in this review. The analysis done allowed to discuss important elements to how the governance of oceanic islands may influence the conservation of their ecosystem services. This study concludes that the oceanic islands are usually under protection through some conservation tool, however, they are vulnerable to diverse externalities and to the weaknesses of their own governance models. Thus, there is a need to understand deeper the governance drivers, actors and main challenges in order to seek proposals to reduce conflicts and improve the management of ecosystem services. Overall, the study discusses how environmental and sustainability governance tools of oceanic islands are aligned with Sustainable Development Goals (SDGs) 11 (Sustainable Cities and Communities), 13 (Climate Action) 14 (Life Below Water) and 15 (Life on Land) of the 2030 Agenda. Specifically, it adds exertions to the achievement of the following SDGs targets: 11.4 Strengthen efforts to protect and safeguard the world's cultural and natural heritage; 13.3 Improve education, increase human and institutional awareness and capacity on mitigation, adaptation, impact reduction and early warning of global climate change; 14.c Ensure the conservation and sustainable use of oceans and their resources by implementing international law as reflected in United Nations Convention on the Law of the Sea (UNCLOS); and 15.a Mobilize and significantly increase financial resources from all sources for the conservation and sustainable use of biodiversity and ecosystems. Additionally, it contributes to the topic of the Conference by exploring governance issues related to environmental, social and economic aspects of ecosystem services conservation and their interrelations with main stakeholders.

## Nutrients recovery as a strategy for integral management of wastewater in times of crisis: challenges for Valle del Cauca, Colombia

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**Dr. Nancy Vásquez-Sarria**

### Abstract

Another great challenge of sustainable development goals is to guarantee the sustainable management and availability of water in quality and quantity to supply vital functions both in normal and crisis times such as the one that humanity is currently experiencing with the COVID-19. This implies that water resources must be protected and safeguarded from negative impacts derived from anthropic activities.

In recent years, technologies have been developed to carry out not only the elimination of pollutants present in wastewater, but also their valuation through resources recovery. Even today, in times of pandemic where clean water is required available for hygiene activities, this continues to be a prevailing need if the availability of water is to be guaranteed in the medium and long term.

Although, these technological options are viable in environmental terms, there is still a technical, social, economic and political gap that needs to be reduced, in such a way that the products and resources obtained from wastewater management are used and incorporated into the production chains.

Colombia is a country in which wastewater management is still on the way to comprehensive management. For this reason, efforts continue to establish alternatives that allow reducing the impacts generated on surface water resources, which continue to be receptors of wastewater discharges with a high nutrient load, that could be recovered and integrated as alternative sources of nutrients for agro-industrial activities.

In this paper, we present a route towards the recovery of nutrients from wastewater, with an application perspective in the department of Valle del Cauca, which represents one of the main departments of Colombia where can be potentiated the use of nutrients recovered from wastewater treatment.

This research was developed at the Universidad Autónoma de Occidente using as a referent the wastewater treatment plant of the campus (UAO-WWTP), located in the Municipality of Santiago de Cali, Valle del Cauca, Colombia.

The research was made up of three stages. In the first stage, we analysis of the physicochemical and structural characteristics of the sludge obtained from nutrients recovery of wastewater treatment processes. The second stage consisted of a comparative analysis of the struvite-rich sludge with pure struvite and other nutrients used in industrial and agro-industrial processes. In the third stage, the possible uses of struvite-rich sludge were established for the context of Valle del Cauca.

The results of our research showed that the recovered nutrients can be used as an organ mineral fertilizer for crops such as sugarcane, coffee, banana, Technified and traditional Corn, citrus, mechanized rice, chontaduro, forest plantations, crops of ornamental plants, and as raw material for Valle del Cauca industries related to the formulation, manufacture and distribution of fertilizers.

This transformative route is expected to reduce the impact of the incorporation of chemical fertilizers in the agro-industry, and water pollution due to discharge of wastewater with a high content of nutrients.

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## The role of community perceptions on ecosystem services' valuation: A case study of the Gaddi community of Himachal Pradesh in India

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**Mr. Kritishnu Sanyal**

### **Abstract**

#### **Abstract:**

Regardless of the well-recognized understanding of forests' economic importance, forest degradation takes place. At certain point of time, we often fail to consider every ecosystem service and its respective valuations to each stakeholder. This undervaluation makes overexploitation and the resultant degradation permissible. While scientific valuation of forest ecosystem services continues to be important in the academic and policy discourse, studies investigation the role of dependent community's perception in this regard are relatively sparse.

This paper explores the awareness and preference pattern about forest ecosystem services and the perceptions regarding monetary valuation of those services of the Gaddi community of three remote, forest neighbouring villages of Chamba district in Himachal Pradesh, India.

Quantitative and qualitative data have been collected through interviews of 60 randomly selected households with a semi-structured questionnaire and informal discussions with 102 villagers. In-depth qualitative and statistical analysis reveals the following.

The respondents' awareness was highest for 'provisioning services' as it was most important to them. While they had an intuitional understanding of 'regulating' and 'cultural services', they were relatively

less aware of the 'supporting services'. Different food and medicinal plants, fodder, fuelwood, timber were the main collectibles and meat, pinecones, pine needles and resin were minor collectibles. While most respondents collected food and medicinal items, to name the collectibles, they most spontaneously mentioned 'fodder' and 'fuel-wood'. Some benefits from the forest were just too 'obvious' to report. This perceived 'obviousness' of an ecosystem service caused significant underreporting and was identified as a major cause of undervaluation. The respondents' forest resource extraction related perception that "One can't be a thief in his/her own house" also caused underreporting. Resource extraction was independent of economic status or caste though some small-scale gender and age based division of labour was observed. Even for the 'provisioning services' obtained from the forest in the form of tangible goods, most respondents were unaware of their respective market values. Estimation based on proxy market prices suggests that on an average, a household yearly received direct benefits equivalent to almost ₹65,400. Though spontaneously or after probing the respondents revealed their strong appreciation for all kind of ecosystem services, the idea of attaching monetary values to other sorts of ecosystem services was beyond their conceptualization. Their inability to attach monetary value again caused an underreporting and hence undervaluation.

These findings conclude that the perceived 'obviousness' of a service and unique perception regarding resource extraction rights are two main reasons of underreporting and subsequent undervaluation. The mechanism of value formation of the forest dependent community significantly differs from policy makers' perspectives because of the community's unique perceptions.

Understanding the user community's perceptions regarding forest ecosystem services is important for sustainable forest management as it directly helps in achieving SDG 15 while indirectly addresses SDG 2; 16 and 13 as well. This study helps in "ACCELERATING PROGRESS TOWARDS SDG's IN TIMES OF CRISIS" by offering an understanding of the background of sustainable forest management.

**Keywords:** Forest, Ecosystem services, valuation, Himachal Pradesh, India

## Ecosystem functions in pond aquaculture and their roles in providing ecosystem services and disservices

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PhD student Tamara Fonseca

### Abstract

Aquaculture ponds are engineered aquatic ecosystems, managed for improving the provision of food and income. Managing aquaculture systems for maximizing not only fish productivity, but also other potential benefits that the “aqua-ecosystems” can provide is a pathway towards more sustainable systems. While a proper management can improve ES delivery, unsustainable practices also generates dis-services, defined as the ecosystems functions and aspects that results in perceived or actual damage for human wellbeing. Ecosystem services (ES) derive from ecosystems functions (EF), which are the ecological processes that control the fluxes of energy, nutrients and organic matter, through ecological systems. This study aims to provide a donor-side approach for accounting the ecosystem functions and its roles on providing services and dis-services in freshwater aqua-ecosystems. The emergy synthesis is an eco-centric approach that accounts for all the work done by nature, society and economy on a common basis: solar-equivalent joules, named solar emjoules (sej). In other words, emergy with m, is all the available energy directly and indirectly embodied for the production of a good or service We applied emergy synthesis on nine semi-intensive “lambari” aquaculture farms as a model to identify the connections between aquaculture practices and the ways they may increase or diminish aqua-ecosystem services. We accounted for seven water ecosystem functions that are linked to four ecosystem services and three disservices provided by lambari culture in freshwater ponds. Water regulation and microclimate regulation are services inherent of the systems features. Water provision,

fish provision, and global climate regulation are influenced by the management practices adopted and can have positive or negative impact. In this study, the eutrophic effluent causes the larger disservice by demanding energy for water dilution (range from  $4.30E+12$  to  $1.69E+13$  sej/ha/year) or treatment (range from  $1.45E+15$  to  $5.65E+15$  sej/ha/yr). Greenhouse gas absorption and emissions vary according to the management practices adopted, and in this study has a neutral effect on global climate change. The trade-offs between positive and negative externalities in lambari aquaculture indicates that the services surpasses the disservices as long as the system operates under nature's carrying capacity. The internalization of the environmental costs by remediating the damage does not necessarily leads to more sustainable systems. By doing so, more energy and resources are needed, which diminishes the natural capital in detriment of recovering the damage caused by the system itself. An ecological approach that considers the integration of species and cultures, the upcycling of resources, and the surrounding biophysical aspects, makes systems higher efficient at a lower environmental cost, which seems more effective on the long term.

Track: 1a. Theoretical Approaches (Systems ecology/ energy / ecosystems services)

# **4. Climate Change and Energy**

## **4a. Predictions and responses**

## **Accelerating the Renovation Wave in Portugal in the aftermath of the Covid-19 crisis: Key insights from interviews with experts on building retrofitting**

Mr. Miguel Macias Sequeira, Dr. João Pedro Gouveia, Mr. Pedro Palma

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**Mr. Miguel Macias Sequeira**



**Dr. João Pedro Gouveia**



**Mr. Pedro Palma**

### **Abstract**

The European Commission has launched a Renovation Wave, aiming for decarbonization of buildings, living conditions improvement and job creation. Most Portuguese buildings have low construction quality, poor energy performance and lack thermal comfort. Leveraging the retrofitting economy is crucial to mitigate these problems, which may be exacerbated by climate change.

With the goal of gathering multidisciplinary perspectives on building retrofitting, eleven Portuguese experts were interviewed; key findings are discussed below. The interviews took place on October-December 2020, being performed individually through online meetings, and included 32 questions divided by six topics: Portuguese buildings characterization, retrofitting market evolution, technical measures, policies and regulations, financing instruments, and stakeholder engagement. Interviewees included architects, engineers, journalists, researchers, business leaders, and politicians.

Historically, buildings deep retrofitting in Portugal was scarce (i.e. 0.06%/year, well below European average of 1%). Since 2014, urban centers saw a boom in retrofitting, driven by tourism and gold-visas. However, retrofitting did not consistently abide by regulations due to a deregulatory regime (2014-2019); often only “makeup” interventions were made. In 2020, Covid-19 brought uncertainty to this growing market, freezing investments and lowering incomes. On the positive side, the pandemic might have exposed dwellings’ pathologies and shown that housing is more resilient than tourism. Interviewees agreed that retrofitting seemed mostly immune to the crisis in 2020 and that business-as-usual could return if Covid-19 were swiftly controlled. Otherwise, this market may crash alongside with the economy. Overall renovation rates in Portugal remain very low. Lack of economic capacity and financial barriers hinder the ability to invest, lead to delays, and steer decisionmakers towards non-optimal solutions. Other barriers include slowness of licencing, small labor force, lack of expertise, and insufficient information. Envisioning the future, interviewees underlined recovery funds as a fantastic stimulate for renovation and were adamant about avoiding past mistakes.

Interviewees unanimously agreed that an “insulation first” rule must be applied, prioritizing roofs and façades. Active systems should only come later, and the perspectives were less aligned regarding

optimal technologies. Nevertheless, three solutions were highlighted: solar thermal water heating, biomass-based heating, and heat pumps; but there is also a growing demand for solar photovoltaic.

Although interviewees recognize the existence of policy and financing mechanisms aimed at retrofitting, most also affirm that their effectiveness has been modest due to lack of allocated funds, low attractiveness of financing products, excessive bureaucracy, and insufficient awareness. Retrofitting costs cannot fall entirely on homeowners and public funding should be assigned according to families' income; more information campaigns are also necessary. Local authorities were highlighted as key stakeholders, but most require additional resources.

The interviews provided key insights on how accelerating building retrofitting requires levers as regulations, financing, businesses, authorities and citizens to be all aligned. This work is directly linked to SDG7+Target:7.3. and SDG11+Target:11.1., being insightful for research on improving energy efficiency of Portuguese buildings. It is also related to SDG13+Target:13.2. and SDG1+Target:1.4. Multidisciplinary perspectives are key to successfully implement the Renovation Wave in Portugal, which can provide wide-ranging societal, environmental, and economic benefits for the Covid-19 green recovery.

## Climate change reporting: A comprehensive literature review

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### Abstract

Climate change has evolved rapidly over the last few decades to become a crucial issue with implications for the natural environment and companies.

The main factor affecting and contributing to climate change is greenhouse gas (GHG) emissions, directly related to economic activities. Therefore, companies, as generators of GHG emissions, are required to report on their environmental impact. Reporting on climate change impacts and related risks and opportunities provides insight into how companies respond to this problem, how they meet stakeholders' information needs, and how they monitor environmental performance over time.

The authors conducted a literature review on the top 50 most cited papers on Google Scholar dealing with climate change, carbon reporting, and accounting, published in 28 journals over 2008-2020. The keywords chosen were climate change reporting, climate change accounting, carbon reporting, carbon accounting, GHG accounting, and GHG reporting.

Climate change accounting can be considered a subset of sustainability accounting, but specifically focused on GHG emissions. The literature review highlights three relevant findings: 1) In the field of climate change reporting, the lack of mandatory reporting and universally recognised standards has made reporting largely voluntary and difficult to compare. 2) Stakeholders' pressure on companies' climate change impact is growing, and consequently, the request of information on companies' approach to the topic. 3) Companies also have to report on risks related to climate change to establish mitigation actions.

The climate change dimension is increasingly becoming an integral part of companies' sustainability strategies and risk management processes. Companies with better climate change reporting practices and strategies will be able to better assess and manage their environmental performance.

Some suggestions for future research can be identified from the findings of the review. Future research could investigate whether mandatory reporting guidelines lead to greater standardisation of the documents produced. At the same time, it may be interesting to study the progress of reporting in line with climate change evolution. More research is needed on the connections between carbon accounting with other SDGs. Last but not least, the risk management process explicitly related to climate change deserves attention too.

This paper is directly related to SDG 13 on Climate Action. The following are the SDG targets and a brief indication of this study's contribution to the topic of the ISDRS Conference.

1. SDG 13 + Target 13.2: This target can be applied to companies that are expected to extend their reporting to climate change impacts and to integrate the environmental variable into their strategies and decision-making process. SDG 13 + Target 13.3: Companies can implement actions to mitigate their impacts on climate change and extend risk management to environmental risks.
2. Climate Action is a global environmental problem and challenge. The proposed paper contributes to the progress towards the achievement of the SDG 13 as this study shows the state of the art on climate change and the companies' approach to dealing with it.

## Energy transition and decarbonization in resource-based developing countries: The case of oil dependency

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**Dr. Keyvan Hosseini**



**Dr. Agnieszka Stefaniec**

### Abstract

Petroleum products combustion is one of the primary anthropogenic sources of greenhouse gases (GHG) emissions. Holding more than 85% of world crude oil reserves, the Organization of the Petroleum Exporting Countries Plus (OPEC+) plays a crucial role in the world oil product market and consequently,

its related GHG emissions. Environmental and social injustice resulting from the oil supply chain in OPEC+ members goes beyond their territories and threatens the planet's wellbeing. Thus, addressing possible economic, social, and political interventions to facilitate the sustainability transition in the OPEC+ energy sector and concurrently liberate their economy from heavy reliance on exporting crude oil is necessary to fulfill climate treaties targets. It can also contribute to United Nation sustainable development goals (SDGs), in particular, SDG 13 (Target 13.2) to combat climate change drivers in developing countries and SDG 7 (Target 7.2) to shift from fossil fuels to renewable energy carriers. The central theme of this study is to develop renewable-oriented energy transition policies based on the OPEC+ state's current socio-economic and socio-ecological status to replace oil with other more secure and clean energy carriers using integrated assessment modeling and Hofstede cultural dimensions assessment. Due to the negative impacts of ongoing GHG mitigation treaties and COVID-19 pandemic on the economy of petroleum-based countries, OPEC+ members have limited time to move from oil dependency to ensure their stability, secure inclusive economic growth and the decent job market for their young population. Therefore, the first objective of this research is to investigate the feasibility of the transition of OPEC+ members' economy and energy market from oil based on SDG 7 (Target 7.2). Toward advanced and cleaner fossil-fuel technology, this study also aims to design a comprehensive framework to measure the efficiency and sustainability of the downstream oil of the OPEC+ members to deal with the existing imbalance in their domestic petroleum products market in particular gasoline and also investigates the reasons of the inefficiency of their petroleum refining sectors in line with SDG 7 (Target 7.a) and SDG 12 (Target 12.a). Finally, this study develops the Shared Socio-economic Pathways (SSPs) to frame all possible contingencies in OPEC+ countries to show how current interventions shape the possible futures.

## **Fairness in Enhancing Compliance under the Paris Agreement: Lessons from the Montreal and Kyoto Protocols and the feasible Path Ahead**

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### **Abstract**

Broad participation and compliance are key elements of any successful international environmental agreement (IEA). Notwithstanding the significant participation of countries in the Paris Agreement, the level of compliance still remains challenging. This article investigates the potential role of fairness in enhancing the compliance under the Paris Agreement. It reviews lessons from the Montreal and the Kyoto Protocol which could assist the Paris Agreement to incentivize countries to comply with the agreement. Among different fairness principles, the principle of Common but Differentiated Responsibilities and Respective Capabilities (CBDR-RC) is potential to be applied by treaties. However, it is differently operationalized across treaties as it is a broad principle. Carbon market mechanisms and financial supports have been practical approaches towards fairness which are emphasized by the Paris Agreement, as well. To improve compliance with the Paris Agreement and on the path forward, a formulaic approach to define fairness, imposing restrictions on non-compliant Parties, transparent regulations in carbon market mechanisms and a global carbon price could be effective. As a formulaic method towards fairness, adjusting emissions targets based on per capita income is recommended. To impose restrictions, the Paris Agreement appears to need supplementary agreements that can more effectively change countries' incentives. For example, the international maritime organization (IMO) could propose a standard that all international shipping be fueled by liquefied natural gas. Transparent financial programs in IEAs will particularly motivate developing countries to comply more. To this end, it is suggested that developed countries include their financial supports in their nationally determined contributions (NDCs) under the Paris Agreement. Moreover, a uniform carbon price among a group of willing countries and lump-sum transfers among developing countries is considered a fair burden sharing approach. Besides, more research on environmental and health benefits of compliant countries will also create a strong incentive to mitigate emission even if other Parties do not do so.

SDG+Target: The abstract stands in track 4a: Climate change and energy-predictions and responses. The abstract specifically relate to the goal "Environment, economic and social determinants of climate change vulnerability and adaptation".

A brief relation to the topic of the conference: There is no sustainable and decarbonized future without a cooperative behavior. However, we still observe that the submitted nationally determined contributions of countries are not sufficient to comply with the climate goals. To foster international compliance with climatic actions, a rigorous grasp of international incentives among countries are important. This research highlights the past global experience and suggests potential long-term solutions for the future.

# **4. Climate Change and Energy**

## **4b. Affordable and clean energy**

## **Review on Malaysia's Energy Legal Framework: The Road Towards Spurring the Hydrogen Fuel Cell Industry in Malaysia**

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**Mr Muhammad Asyraf Azni**

### **Abstract**

Since the launch of Sustainable Development Goals (SDG) in 2015, Malaysia has been mainstreaming SDG in its development policies and plans. Among others, Malaysia aims to increase renewable energy (RE) share in its electricity generation mix to 20% by 2025. However, until 2019, RE penetration stood at only 2%. The authors employ a doctrinal research in reviewing energy-related policies and laws in Malaysia to identify the gaps between agenda setting and implementation. The data were gathered from primary sources including national policies and laws. The secondary sources are academic journals from online databases. It reveals that RE share failed to increase significantly after many years of planning. The paper also discovered that Malaysia has been slowed in moving into hydrogen dan fuel cell (HFC) industries despite the current world's trend. This will delay SDG 7, Target 7.2 of increasing the share of RE in the global energy mix by 2030. Further, by increasing the share of RE in its energy mix, this paper also come in line with SDG 13, Target 13.2 in reducing the greenhouse gas emissions. In time of crisis such as COVID-19, the closure of schools has forced the children to have their study at home. Hence, uninterrupted energy supply is crucial in online learning and working.

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## Assessing the Potential of Hybrid Wind and PV plants across Sweden

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**Oskar Lindberg**

### Abstract

Replacing fossil fuels with Variable Renewable Energy Sources (VRES), like wind power and Photovoltaics (PV) power, is key in the transition towards a sustainable energy system worldwide. However, ever since the large-scale commercialization of wind power, scientists and practitioners have been striving to tackle the operational inflexibility and financial risks posed by the inherent, partly complex and unpredictable nature of wind power production [1]. The same problems are present in PV power production, although the characteristics of the solar resource is different from the wind resource. These challenges and disadvantages create negative externalities that translate into grid integration costs for both wind and PV power [2].

In order to reduce the fluctuations in power output of VRES, the ideal would be to combine sites that are anti-correlated, as proposed in early studies by Kahn [3]. This is equal to decreasing the instances of high and low power production by 'smoothing out' power output [2]. As a result, the predictability of the power production may be enhanced, reducing the challenges of grid integration. This problem may be partially overcome by a co-located wind and solar PV park, referred to as a Hybrid Power Park (HPP).

Combining the energy sources have recently shown enhanced reliability and a more resource effective system compared to single resource power parks [4, 5]. A first step in evaluating the feasibility of a HPP is to predict the combined power output of wind and solar PV compared to single resource power parks.

The purpose of this study is to assess the temporal variability of combined wind and PV power plants across Sweden. This will be done by studying the correlation coefficient using the meteorological reanalysis dataset CosmoREA-6. The reason for that is because the wind speeds and solar irradiances are produced in the same physical model as well as at high spatial (6x6 km) and temporal resolution (hourly). The study will also take already existing extensive wind farm infrastructure (equivalent to 12% of power generation in Sweden 2019 [6]) to assess to what extent these may be complemented with PV parks for a resource effective deployment. This study may be used as a tool for preliminary identification of locations with potential for installing HPPs. Although this study will cover Sweden, there is a possibility to scale the model to also cover Europe and northern Africa as that is the spatial coverage of the CosmoREA-6 dataset.

Existing HPPs in the world are limited and this methodology is a step forward towards showing its potential as it may be applied to other areas than Sweden. The project therefore contributes to the use of existing power infrastructure and to the up-scaling of sustainable energy use in a more reliable, affordable and resource efficient way, in line with Sustainable Development Goal 7 – Affordable and Clean Energy and 13 – Climate Action.

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## Energy Poverty and Sustainable Development Goals in Poland and Greece

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### Abstract

The seventh goal of the Sustainable Development Goals (SDGs) is dedicated to ensuring access to affordable, reliable, sustainable and modern energy for all by 2030. The Paris Agreement was adopted by 196 Parties at COP 21 in Paris, on 12 of December 2015; according to its goals, global warming should be limited to well below 2, preferable 1.5 degrees Celsius compared to pre-industrial levels. To meet the 1.5 degrees Celsius goal, coal's share in global energy supply should drop between 73% and 97% by 2050. As so, the results of Paris Agreement affect world employment structure; the transition to a decarbonized economy is a chance for further development of the green jobs. To ensure that in the energy transformation processes no one is left behind, "just transition" was included as a part of 2015 Paris Agreement on climate change.

Energy poverty is described as the absence of sufficient choice in accessing adequate, affordable, reliable, high-quality, safe and environmentally benign energy services to support economic and human development. Energy poverty creates additional levels/dimension of poverty. The SDGs emphasize the direct linkage between household energy access and consumption and poverty and development.

Changes in energy production can create 18 million jobs through the world economy. Job creation in the renewable energy sector is an important indicator for assessing the socio-economic impact of implementing energy strategies. These professions influence other socio-economic aspects, such as the eradication of extreme poverty, the standard of living of the inhabitants and the development of the region. Judging from the experience of many countries, the thesis has been confirmed that renewable energy creates the most permanent jobs, evenly distributed throughout the country, and not only in industrial centers.

In both Poland and Greece, there is a significant employment potential in modern and future-oriented branches of the economy related to renewable energy. Still, there is a need for job reorientation and reskilling from the mining industry to renewable energy systems. A good example of a project dedicated to reskilling coal workers for the transition to the RES sector is the RES-SKILL project, in which both countries are represented. The goals of the project are to strengthen VET provision in the energy sector aimed at coal workers for compatible RES sector jobs, increase their reemployment opportunities, and

cover at the same time RES sector's skills demand by developing a novel curriculum and tailored training content to facilitate coal workers reorientation to the RES industry. It also aims to support VET providers to integrate the RES-SKILL materials in their VET offerings and to improve the cooperation between VET providers and businesses, as this will provide opportunities for coal workers' transition to the RES sector. Correspondingly, the aim of the paper is to assess the social and economic opportunities and threats of energy transformation in Poland and Greece in light of SDGs.

**Developing an online one-stop-shop for residential buildings retrofitting in Portugal: Key features of “Menu de Renovação Verde” and pathways for future growth in the Covid-19 green recovery**

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**Mr. Miguel Macias Sequeira**



**Dr. João Pedro Gouveia**

**Abstract**

Buildings are the largest single energy user in the European Union. Approximately 80% of existing buildings will still be used in 2050 and 75% of this stock is energy inefficient. Previous research shows Portuguese dwellings' low energy performance and lack of thermal comfort; current rates of improvement are insufficient. Main obstacles include information barriers, market and financing failures, lack of expertise, and regulatory barriers. The European Green Deal foresees a 'Renovation wave', which aims to scale up renovation rates. Energy efficiency one-stop-shops have been highlighted as a key tool to accelerate building retrofitting.

In project PAS2020 (Pan-European Approach on Sustainable Heritage: Regeneration by a retrofitting economy), co-funded by the EIT Climate-KIC, the consortium developed 3 country-specific (The Netherlands, Slovenia, Portugal) online one-stop-shops for retrofitting. The following steps were taken: i) selecting representative building typologies, ii) identifying key features, iii) gathering data on financial instruments, regulations, and technical measures, iv) identifying bottlenecks, and v) mapping local challenges and growth strategies. In Portugal, based on previous work, the typology of single-family house from Lisbon, built before 1919, was chosen for analysis. Nevertheless, most information available on the Green Menu is also applicable to other similar typologies.

Main results are available online in the country-specific Green Menus with a 3D model representative of the building typology and information on technical measures, financial tools and regulations (Portuguese "Menu de Renovação Verde": [www.menurenovacaoverde.pt](http://www.menurenovacaoverde.pt)). In total, 130 technical measures, tips, points of attention and innovations were selected. User-friendly calculation tools are available for 12 key measures. The platform also contains data on regulations and on 12 Portuguese financing schemes and tax benefits, which are linked directly to the relevant measures.

The Green Menu serves as a one-stop-shop for building retrofitting, closing information gaps, accelerating sustainable renovation, and activating stakeholders. The platform enables access to context appropriate measures, without on-site visits, thus accounting for potential innovative business models and Covid-19 social distancing. Green Menus are available in Portugal, Slovenia and Netherlands, and further growth is anticipated by expanding to other building typologies and other European locations.

In Portugal, the Green Menu roll-out will follow two main strategies: increase the online footprint of the platform and bridge the gap between online and offline. On one hand, additional typologies, measures, financing schemes, regulations, and other relevant information will be continuously updated. Partnerships will be fostered with key stakeholders to reach a growing number of users. On the other hand, although information is an important trigger, building retrofitting demands concrete real-world actions. Thus, the Green Menu will connect with trustworthy facilitators as local authorities, energy agencies, community associations and cooperatives, as well as with businesses that work on retrofitting, renewables, and smart technologies.

This work is directly linked to SDG11+Target:11.1., as it assists in improving housing conditions. It is also related to SDG7+Target:7.3., SDG13+Target:13.3., and SDG1+Target:1.4. One-stop-shops for retrofitting are still in embryonic phase in Portugal. These tools have the potential to increase building renovation rates, enabling wide-ranging positive societal and environmental impacts and contributing to the Covid-19 green recovery.

## The move towards net zero energy buildings: A systematic review of its concept and progress in the 21st century

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Mr. Aveek Ghosh



Mr. Rubaid Naskar

### Abstract

In today's age of rapid climate change and environmental deterioration, there is an increasing quest for built environments that are climate sensitive and environment friendly. However, climate

responsiveness and environmental friendliness should not be limited to building design, rather should be considered at larger scales including at neighbourhood and city level. This study is a part of global ongoing efforts to study climate responsiveness spatially, focusing on passive design strategies for urban neighbourhoods. In recent years, the concept of zero energy building (ZEB) has attracted researchers and policymakers in improving energy efficiency and reducing environmental impacts. The combined challenges of climate crisis, excess energy consumption and increasing energy prices paved the way for exploring ZEBs to achieve energy neutrality and consider environmental impacts. The term ZEB is generally characterized by a very low or almost zero annual energy requirement, substantially fuelled by renewable technologies and sources. To achieve low and zero net energy performance objectives in buildings, designers must make optimal use of passive environmental design strategies based on local climatic conditions. The study investigates the current development/progress of net zero energy building (NZEB) concept across different climatic regions to meet specific sustainable energy goals. The paper provides a systematic review of key design strategies, technology choices and energy performance mechanisms to achieve net zero energy. The review assesses progressive NZEB literature and existing frameworks to improve efficiency and reduce energy consumption in buildings. It attempts to understand the origin, principles and progression of NZEB concept as a clean, affordable and sustainable energy system. It focuses on varying definitions of NZEB and prominent drivers in practising sustainable development. The study is extended to identifying key policies supporting NZEB development and the possibility of integrating the NZEB concept in climate change action plans. The review provides critical policy recommendations and recognises potential areas of NZEB research towards a low carbon future.

## Life cycle assessment and life cycle costing of unitized regenerative fuel cells: a systematic review

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### Abstract

The design of a Polymer Electrolyte Membrane Unitized Regenerative Fuel Cell (PEM-URFC), a compact version of the regenerative PEM fuel cell with a single electrochemical cell, is one of the competent technologies for reducing fossil fuel consumption and greenhouse gases emissions linked to energy power production and energy storages issues. A URFC can produce hydrogen fuel, storing the excess energy produced (e.g., from renewable energy systems, solar plants) and electric energy in a fuel cell mode to meet the energy demands of a specific sector. Life Cycle Assessment and Life Cycle Costing are useful methods to evaluate the potential energy-environmental-economic benefits of these technologies, identifying the main hotspots and comparing them with traditional ones. The research here presented aims to analyse the state of the art of the application of the two methods, LCA and LCC, to the URFC, to verify what is already present in the literature to determine the research trend over the years. A systematic protocol has been chosen as the research method to provide a complete and minimally biased in defining the sample on the life cycle of the PEM-URFC and its components. Then a bibliometric and network analysis is carried out. Regarding the results, the review allows to obtain an overview of the materials and energy flows accounted for in the reversible operation of the device under consideration (i.e., the use of capable bifunctional electrocatalysts, prototypes, etc.) and of the resources and environmental, energy, and economic impacts. Results highlight that there is significant variability in the results, given by the selected boundary systems, the final users (e.g., industry, buildings, vehicles, production of electricity and hydrogen), and the steam reforming of the systems. Regarding the technological features of components, no consensus was reached on the power, materials, and life cycle phases. The analysis highlights the need to have more scientific studies on LCAs and LCCs applied to PEM-URFC systems for evaluating the economic and environmental performances of the emerging technologies. Furthermore, in general, when these methods are combined with an energy model, the mandatory parameters of the life cycle approach are neglected or omitted, reporting limited information on the materials of the prototype studied or environmental /economic datasets. This paper reports the preliminary results of the literature review conducted. The full systematic analysis and methodological issues of the approach applied to the papers selected will be the object of future publications.

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## Life cycle based environmental and economic assessments of PV installations - empirical findings from Hungary

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### Abstract

The photovoltaic (PV) based electricity generation is a central element of the sustainable energy transition worldwide. The newly adopted Hungary's National Energy Strategy 2030 targets photovoltaic systems as one of the most promising sustainable and safe power production methods. Recently, the growth rate of total installed PV capacity has exceeded 72%/year and it is expected that (PV) based electricity generation would reach 6 GW by the year 2030 in Hungary.

The environmental impacts, the sustainability implications, and the full economic costs of renewable energy use are equally important. The aim of this study is to assess and compare the environmental and economic performance of three photovoltaic power plants of differing scales: a household PV system (5 kWp), a commercial PV system (500 kWp), and a large-scale PV system (above 2 MWp). The assessments are based on empirical data from Hungary. The two pillars of the complex, life cycle based assessment are environmental Life Cycle Assessment (LCA) and economic Life Cycle Costing (LCC). LCA is a method to assess the environmental aspects and potential impacts associated with a production system. LCC is an economic approach that sums up the total costs of a product discounted over its lifetime, including investment, design and production costs, operation and maintenance costs, and end-of-life costs. While LCC is originally not an environmental evaluation tool, there are similarities between the two methodologies.

Considering the importance of environmental and economic information in PV-related policy planning and decision making, we develop a common evaluation framework based on indicators derived from LCA and LCC case studies of photovoltaic power plants in Hungary. Our preliminary results suggest that specific production costs (life cycle costs for the production of 1 kWh of electricity) are higher for household-level PV systems than large-scale PV power plants. As for the environmental impacts of the production of 1 kWh of energy, the difference is less significant between the various scale PV systems, possibly because the technology is modular. Other factors might have a greater role in the differentiation of environmental impacts, e.g., the solar panel type or the solar irradiation of the location.

We concluded that an integrated LCA and LCC-based evaluation framework may contribute to regional and national policy-making related to PV utilization. The options for cost effective (in its lifecycle terms) and optimal environmental performance of different size PV installations could be useful in city-level or regional sustainable energy and climate action plans (SECAPs) and urban climate change strategies, as well. The governmental and municipal level financial grant schemes may also apply the results derived from our common environmental and economic evaluation framework for (PV) based electricity generation.

*Finally, our research properly fits in SDG Target 7.2 by increasing renewable energy in the energy mix. The dual (environmental and economic) optimization of PV installations may also accelerate the sustainable energy transition and implementation of Paris Agreements after the pandemic crisis.*

## Hosting capacity scenarios of PV park deployment in a Swedish rural distribution grid using Monte Carlo simulations

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**Dr David Lingfors**



**Prof Joakim Widén**

### **Abstract**

Transitioning away from a fossil-based energy system to one based on renewables is one of the corner stones to mitigate climate change, as reflected in one of the Sustainable Development Goals (no 7) of the UN's 2030 Agenda. Photovoltaics (PV) were recently declared by the International Energy Agency as

the cheapest means of power generation in a global perspective. However, in the Nordics, the solar resource is relatively small and a high share of hydro power has kept retail electricity prices low in comparison to most European countries. While the PV market has been concentrated to roof-mounted systems for self-consumption, the continued price drop for PV modules has fostered a growing interest in ground-mounted PV parks. These parks are today on the brink of feasibility, requiring access to suitable and cheap land and that grid-connection costs are kept low. In this study, the so-called hosting capacity (HC) is determined for a Swedish rural distribution grid with a power consumption of about 50 GWh/yr. The HC is the total generation capacity of PV parks that can be allowed without any grid enforcements or other measures, while maintaining an acceptable quality of operation. A previous study showed that parks  $>1 \text{ MW}_p$  are difficult to implement in this type of grid due to limited availability to sufficiently large land areas and lack of substations that can host the power [1]. Power flow simulations were performed for the entire grid during a sunny summer week and considering land availability for a set of scenarios, using a Monte Carlo simulation with 1000 iterations. A first scenario showed that if parks of  $1 \text{ MW}_p$  are randomly placed in the grid until an over-voltage or over-current occurs, i.e., the HC is per definition exceeded, the HC varies between 0-24%, with an average of 5.5% of annual consumption. The spread indicates the variation in HC between substations. In a second scenario, PV parks were connected incrementally until no substation could host another PV park without exceeding the HC. Interestingly the spread of the HC was 14 to 52% in this scenario, indicating the importance of the order in which PV parks are installed, as some substations have higher influence on the total HC than others. The study motivates introducing incentives for dialogue between the grid operator and the PV park owner when discussing the implementation of parks to make best use of the existing grid infrastructure.

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## Energy Transitions: Stakeholder Engagement to Sustainability System

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**Doctoral Student Gabriela Almeida Marcon Nora**

### Abstract

The energy industry is highly complex, dependent on significant infrastructure networks, and heavily shaped by policy intervention and regulation. The challenge of decarbonization and pollutions means that we need new policy thinking and market designs that put these challenges at the center of decision-making across the whole system. Valkenburg and Cotella (2016) say that the governance of complex processes, such as energy transitions, large infrastructural projects, or comprehensive spatial planning issues, has hitherto primarily been approached along two lines. On the one hand, there have been calls for a broadening of the knowledge base that informs decisions. There are also calls for additional actors' enrollment than the incumbent policymakers, technocrats, and innovators. In this context, Stakeholder Theory would be the basis for energy transitions towards sustainability understanding, allowing to explore the relationship of multiple actors in the energy system. The research question is What are the possible categories of stakeholder engagement involved in the transition to sustainability in the electricity sector? This paper proposes, based on an integrative literature review using the SCOPUS, Science Direct, and ISI, to develop a conceptual background to bring the Stakeholder Theory closer to the debate on energy transition drawing potential interests and stakeholders in this context.

The Stakeholder Theory argues that all people or groups with legitimate interests that participate in an organization do so to obtain benefits. There would be no importance of one set of interests and benefits over another. This study based its analysis on a pragmatic perspective. In this sense, the influential company will manage the critical relationships (FREEMAN, 1984). In the Stakeholder Saliency model

proposed by Mitchell, Agle, and Wood (1997), stakeholders can be considered from three different attributes: Power, legitimacy, and urgency. Authors assume that their relevance will be inferior where only one of these attributes is perceived. The model allows establishing the significance of stakeholder interests with the company's objectives as the focal point. According to the performed discussion, it is possible to categorize the energy sector stakeholders in four different groups, namely: i) Market and Financial Resources; ii) Value Chain; iii) Political and Institutional; iv) Organized Civil Society. These four categories consent to creating social, environmental, and economic value for the organization, to the extent that its interests can be made compatible with the organizational goals. In qualitative research, it is highlighted that the study of relations with stakeholders can benefit significantly from the analysis of cases, able to provide details of the dynamics present in a situation.

This proposed abstract especially relate to SDG 7, targets 7.a, 7.b and 7.2. As for how this contribution relates to the acceleration of SDG in times of crises, it addresses the importance of stakeholder theory to enhance cooperation regarding clean energy research and technology. It is recommended to deepen the research on energy transitions, drawing an overview to understand relations with stakeholders in the energy transition to a system more sustainable.

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## CAPACITY BUILDING IN THE FABRICATION AND ADVOCACY OF COOKSTOVE IN NIGERIA

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Forestry Research Institute of Nigeria, Ibadan, Nigeria



**Mr. Abdulwaheed Salaudeen**

### Abstract

The issues of clean and improved energy access for domestic, institutional and industrial usage are of utmost concern to citizens, governments and international organizations globally. On a global scale, half the world cooks with inefficient stoves via wood and charcoal with smoke killing 4 million people a year (IEA, 2017) with high rate of deforestation and global climate change consequences due to lack of access to energy efficient cookstoves by over 2.7 billion global population out of which 657 million is from Africa. In Nigeria, the bulk of energy supply is met from firewood and charcoal which accounts for over 70% of total primary energy supply and about 60% of the final energy demand. In 2010, 40.2% of households used fuelwood as main fuel for cooking, 33.7% used charcoal, and only 18.2% used LPG3 (World Bank, 2015). On the average, a household in Nigeria uses 1,064.7 kg of firewood and 434.4 kg of charcoal every year. It is estimated that 20 million tonnes of woodfuel are consumed annually by about 80% of the households in the form of firewood or charcoal. If this trend of consumption continues, Nigeria is likely to consume more than 45 million tonnes of woodfuel by the year 2030 (IEA, 2017). The demand for wood puts the country's forests under serious threat with severe consequences for the ecosystem. Deforestation rates in Nigeria are amongst the highest in Africa, with current levels of woodfuel consumption far exceeding forest growth. Health wise, over 6,500 deaths are attributed to cooking induced illness yearly due to inappropriate cooking technologies as well as the fuel type used. Realistically therefore, there is no functional "vaccine" against climate change other than to switch to stop felling and switch to renewable energy via capacity building and adoption of Cookstove. It is on this premise that, the paper posit capacity building program as a diversionary, affordable, clean energy

innovation to avert poverty and hunger as well divert the attention of domestic felling away from deforestation. The main objective presents alternative energy sources through the fabrication of energy efficient cookstoves to rural women and advocacy for adoption by food vendors and other vulnerable towards mitigation and adaptation of climate change and GHG effects respectively in the 774 LGAs of Nigeria.

## Solar Technologies Pathways for EU Electricity Generation under Project Drawdown Framework

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**Mr. Luiz Silveira**



**Dr. João Pedro Gouveia**

### **Abstract**

The emergency associated with the climate crisis demands immediate action. All economic sectors need to decarbonize in order to fight Climate Change. The Power Sector is strategic, whether it be by its

massive contribution to greenhouse gas emissions or for its intrinsic capacity to decarbonize other energy-consuming activities in a transversal way. The Energy Transition era will be filled with various complex and interlinked challenges but, at least in the technological domain, there are good solutions to build a future energy mix that can combine the security of supply, environmental protection, and economic performance both for investors and consumers.

Within the regionalization phase of Project Drawdown in Europe, this work collects several recent projections for the European Electricity generation mix towards 2050, in order to evaluate the contributions of three solar technologies (i.e. solutions) for both electricity generation and avoidance of GHG emissions, using the Drawdown model and methodology. Solar solutions assessed are photovoltaic in centralized scale (U-PV), distributed photovoltaic (D-PV), and concentrated solar power (CSP). This work directly links to targets 7.1.1; 7.1.2, 7.2.1.

To determine the impact potential of each solution requires a forecast of implementation based on estimated electricity generation for the period of study (2020-2050). We use the Drawdown Reduction and Replacement Solution (RRS) model that is an excel-based, bottom-up model, which promotes the comparison between projections of adoption of a given technology, versus using conventional technologies (Coal, Gas, Fuel Oil). The model determines the emissions that would be avoided between 2020-2050 by replacing these technologies with renewable solutions. In addition, it also computes the investment required to implement this solution.

The intent of this work is to report the current range of expectations towards solar energy technologies providing a reference against which current and future assessments can be compared to evaluate solar energy future role. In total, more than 50 reports were analyzed and have produced 37 interpolated annual projections of total EU electricity generation, and 16 projections for each solar technology growth. Techno-economic data of such technologies were also researched assembling a variable meta-analysis result for both solar solutions as well as conventional technologies. Sensitivity Analysis of the model was conducted throughout 72 iterations finding out that First Cost and Fuel Price are the two variables that most impact economic results of solutions.

Results of the analysis suggest that EU electricity generation and solar role by 2050 is still uncertain with a lot of variation depending on the type of studies, models used, and key assumptions (ranging from 3,732 - 10,455 TWh/y), with U-PV adoption of 146 - 2,181 TWh/y, D-PV adoption of 93 - 901 TWh/y and CSP adoption of 33 - 372 TWh/y. Together, solar-based solutions may account for 7% to 33% of total electricity generation in 2050. Over the next decades, solar adoption can avoid 1.32 - 26.31 Gt CO<sub>2</sub>e of GHG emissions and may require investments in between 233 - 2.230 billion €.

## Is energy poverty the missing link? Exploring the realities of intersecting Sustainable Development Goals with qualitative interviews

Katherine Mahoney, Dr João Pedro Gouveia, Dr Rita Lopes

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**Katherine Mahoney**

### **Abstract**

Energy poverty (EP) is a problem which can be applied in both the global south and the global north. While in the global south the phrase generally refers to a lack of access to an energy supply in the global north it generally refers to the inability to maintain a “decent” standard of living through the services energy provides. This situation is principally associated with the affordability of energy services rather than access to energy infrastructure. Global SDG 1 seeks to end all forms of poverty, SDG 7 to ensure access to affordable and clean energy and SDG 13 to take urgent action to tackle climate change. At the intersection of these three goals a challenge arises-how do we ensure access to an adequate level of energy services at a fair price without compromising climate change goals?

In Portugal, an impressively high rate of renewable uptake has coincided with a prevalence of the condition of energy poverty in both the winter and summer months. The mitigation of climate change is essential for the health and well-being of the global population, yet in the Portuguese case these broader benefits are obscured by a low capacity for citizens to reach indoor temperature thresholds recommended by global health bodies. This is attested by Portugal having one of the highest Excess Winter Death rates in Europe despite relatively mild winter temperatures. A prevalence of high energy prices, low rates of climatization equipment and a trend of “underconsumption” are further areas of concern. A key goal of the European energy transition is placing consumers at the “centre” of EU energy

policy, yet the future agency of Portuguese energy consumers has been questioned. The integrity of the climate agenda is thus compromised by a perpetuation of the inequalities inherently connected with fossil fuel-based energy systems.

In line with the Paris agreement, Portugal has released an ambitious carbon neutrality strategy for 2050, an important part of this strategy is a renovation of the building stock and the reduction of domestic energy consumption. Despite these policies recognising the need to assess and tackle EP, uncertainties remain regarding how these targets will balance with the mitigation of EP, particularly with reference to the accessibility of costly energy efficiency measures for disadvantaged households. Building on a stakeholder analysis which revealed a misalignment between the interests of the most influential groups in the energy transition with those of vulnerable consumers, this work explores the utility of qualitative interviews to assess areas of synergy and discord between the different stakeholder groups. Through a deeper understanding of the perspectives of these various groups, this research aims to contribute to improved policy alignment in the Portuguese case. Given the increasing interest in realizing the global energy transition this work also aspires to feed into better synergy between the various SDGs at a broader level on the premise that the conflicts identified herein are part of a wider systemic problem rather than being limited to Portugal alone.

## Exploring the Advocate-Journalists Role in Achieving Affordable and Clean Energy Solutions in Global South? The Case of Pakistan

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### Abstract

Pakistan had been facing the worst ever electricity supply shortfall in its history largely due to the poor generation capacity from the year 2010 to 2019. To overcome this crisis, a number of solutions were worked out and a few of them were later started enacting in the year 2015. However, despite having a lot of potential to generate power from eco-friendly renewable sources, unfortunately, the decision-makers went for investing mostly in oil, gas and coal-fired power plants.

Between its 'Advocate-journalist' and 'Civic-advocacy' models (Waisbord, 2009), the former one carries an enormous potential to advocate affordable and clean energy systems to stimulate democratic dialogue among the public audience that eventually pushes leadership to pick eco-friendly energy solutions. This study critically analyses the extent of advocacy journalism's support to either dirty or clean energy solutions (**SDG. Target: 07.02**) in the editorial contents of mainstream Pakistani newspapers by using the quantitative content analysis method.

Results reveal that all selected newspapers excessively recommended dirty energy solutions to the policymakers. This professional inaptitude can be sensed from the fact that the most suggested and editorially advocated energy solutions were natural gas-based projects, despite the experts' cautions that they are as harmful to the environment as coal. Additionally, all newspapers went for advocating the dirtiest of the dirty energy solutions (i.e. gas and coal-based projects), possibly owing to the fact that the then government had given the highest-ever advertisements to the print media during the years 2015-16; and in the light of prevailing energy crisis, most of such advertisements were containing content to highlight the governmental efforts to address the said crisis. The focus of such advertisements was to assure the much-agitated public that their government is making serious efforts to avail all best-suited options (to the government), particularly the Chinese funded coal projects, gas ventures with Iran, Qatar and Turkmenistan.

An overwhelming amount of scientific evidence informs that Pakistan is among the richest countries in the world in terms of having enough solar energy opportunities. Another study computed the potential for renewable energies and reported an estimated power potential of 169, 15, 13 and 3 Gigawatts (GW) from solar, biomass, wind and small hydro sources respectively. However, the findings of such scientific studies are missing in the contemporary editorial contents of mainstream Pakistani newspapers. This also suggests the inefficiency of the 'advocate-journalist model' and reasons seem to lie either with the political economy of the press or the editorialists' inattention.

In any case, Waisbord's (2009) suggested 'civic advocacy' groups can play a vital role in helping to plug gaps by 1) perusing scientific studies on clean energy solutions from the academic community; 2)

communicating their findings to the advocate-journalists; 3) organizing journalists training workshops on how to use such findings to effectively influence environmental policymaking process; and 4) sharing with journalism academic community to ensure necessary amendments in relevant journalism course contents.

Waisbord, S. (2009) Advocacy journalism in a global context. In K.Wahl-Jorgensen, & T. Hanitzsch, (Eds.), *the Handbook of Journalism Studies*. New York: Routledge

# **5. Production, Consumption and Innovation**

## **5a. Corporate Sustainability and CSR**

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Professor Sebastiano Mazzù, University of Catania, Catania, Italy  
Dr. Valeria Naciti, University of Messina, Messina, Italy  
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## **Corporate Social Responsibility in Banking: exploring Diversity in Corporate Governance**

### **Abstract**

The stakeholder theory states that the purpose of a business is to create value, besides shareholder and creditors, also for agents that are interested in organizations' actions toward sustainability. The environmental and social activities implemented by organizations are communicated to stakeholders using corporate sustainability reporting. In the recent past, several studies have been focusing their interest on corporate social responsibility (CSR) and the relationship between corporate governance and the disclosure practices of an organization. It is debated whether CSR should address solely voluntary initiatives to go beyond regulations or should also be subject to regulatory measure. Governance researchers have studied board diversity connected with corporate financial performances strategic action and corporate social performances. They focused largely on the relationship between board structure and strategic decisions with financial performances that was used as a dependent variable.

Only recently, social performances have been saying as another measure of the banks' performances: corporate boards can play an important role in social disclosure practices of banks. Although the topic has been debated in recent years, the results are not univocal, and scholars devoted narrowed attention to the topic of diversity in banking industry. Therefore, this research aims to examine the impact of the composition of the board of directors on CSR reporting, based on a study on financial institutions. In order to do that, we employ several regressions on a panel data sample.

This study can contribute to strengthening the understanding, promotion discussion on the current state of the art of CSR reports and to verify the development of the tools of corporate management. Moreover, the results suggest the importance of specific aspects of banking governance capable of influencing CSR and indicating the correct direction to strengthen good governance practices of banks.

## **Covid-19 impact and influence on environmental innovation efforts in manufacturing firms**

PhD Candidate Fanny Hermundsdottir, PhD Dag Håkon Haneberg, Professor Arild Aspelund

Norwegian University of Science and Technology, Trondheim, Norway

### **Abstract**

#### **Abstract**

Many firms and their innovation activities have suffered from the consequences of the Covid-19 pandemic (hereafter called covid), and in this study we examine how covid has affected environmental innovation in manufacturing firms.

More specifically, we study how much impact covid have had on the firms, if and what kind of changes the firms have done due to covid, and environmental innovation efforts before and after covid. In order to examine these topics, we conduct a quantitative analysis based on data gathered through a questionnaire from N=526 Norwegian manufacturing firms. K-means clustering and OLS regression were used in the analysis process.

The findings reveal that negative impact from covid has a strong influence ( $p > 0.01$ ) on the overall innovative actions conducted by the firms. Next, we find that environmental innovation before covid is strongly related to environmental innovation during covid ( $p < 0.01$ ). Interestingly, negative impact from covid have a negative influence on the environmental innovation during covid ( $p < 0.01$ ) whereas general innovative actions conducted due to covid have a positive influence on environmental innovation during covid ( $p < 0.01$ ). Firms involved in environmental innovation before the pandemic thus continue to do this despite the circumstances, and actively innovating firms do indeed prioritize environmental innovation. Lastly, we differentiate less innovative and more innovative firms in terms of their pre-pandemic environmental innovation. The findings show that there are several distinctive differences between the groups, including that negative impact from covid has less negative influence on environmental innovation for already more innovative firms. Finally, we discuss implications of the findings both theoretically and practically, in light of how crises such as covid affects environmental innovation and why more innovative firms seem to be less affected by the pandemic.

#### SDGs

Since we study environmental innovation our paper relates to several of the SDGs including: 6. Clean water and sanitation (target 6.3), 7. Affordable and clean energy (target 7.2, 7.a), 9. Industry and infrastructure (target 9.4), 12. Responsible consumption and production (target 12.2, 12.4, 12.5), and 13. Climate action (target 13.2).

How the contribution relates to the conference “Accelerating progress towards SDG’s in times of crisis”

Since we study how environmental innovations efforts are affected by covid-19, we think that our paper fits perfectly into the theme of the conference.

## **Incumbents in sustainability transitions in the context of transitioning economy: an onlook of incumbent actors' initiatives**

Joana Ramanauskaitė

Kaunas University of Technology, Kaunas, Lithuania

### **Abstract**

Incumbent actors are becoming more prominent topic in the current scientific research of sustainability transitions. They are most known for their role as opponents of sustainability transitions; however, this notion is shifting and their role as promoters is being discussed more often. Nonetheless, geographical perspective might reveal how different regions respond to the issues of sustainable development. This abstract investigates current situation on incumbents in sustainability transitions in the context of post-soviet transitioning economy using scientific literature review that is illustrated with five sustainability-oriented examples of incumbencies in Lithuania. Objective of this research is to explore the initiatives of incumbent actors in sustainability transitions in transitioning economy. Research question: what initiatives do the incumbent actors in transitioning economy take in sustainability transitions?

The research method is deductive, derived from interesting information gathered from a research on tensions in organisations in sustainability transitions in Lithuania. Five examples of incumbent-like actors were selected to visualise the role of incumbent actors in sustainable transitions in a transitioning economy. These examples provide insights on initiatives that organisations that are already interested in sustainability take to promote sustainability ideas and be active members of the transition themselves, supporting the contemporary view of incumbents as agents of sustainable transitions.

The incumbent actors' examples of the transitioning economy reveal that there are organisations interested in a more sustainable society promoting sustainable decisions and influencing other actors of their environment to participate in the sustainable transitions, challenging the notion of incumbents actors as inhibitors of transitions towards sustainability.

This abstract relates to the SDG's Targets 8.3, 12.6, and 12.8, encouraging enterprises, especially large ones – incumbent-like actors, to actively promote sustainable development, build awareness, participate in policy and decision making, creating a more sustainable environment. This abstract looks at how incumbent organisations promote sustainable development, encourage their stakeholders to be more sustainability-oriented, how they act themselves, thus accelerating the progress towards SDG's in the crises of the modern world, such as climate change, diminishing natural resources, and the pandemics.

## Sustainability Strategies of Indian Social Enterprises

Mrs. Reeti Kulshrestha<sup>1</sup>, Dr. Subhanjan Sengupta<sup>1,2</sup>, Prof. Arunaditya Sahay<sup>1</sup>

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**Mrs. Reeti Kulshrestha**

### Abstract

For a social enterprise, creating a social impact and ensuring financial viability are inseparable. It embraces this duality and towards that end, forever, there is a hanging sword by their neck. It is a challenge for a social enterprise to create social value while keeping the financials in place. There have been many studies that have talked about socio-economic tensions and conflicting logics arising out of this duality but what comes as a red flag because of this dual nature of the enterprise remains relatively less explored. This duality of balancing its social and economic mission poses a threat to the sustainability of the enterprise. As a consequence, social enterprises use different strategies and enablers to achieve their sustainability. Our study focuses on the little explored area of social entrepreneurship (SE) literature, i.e. how does a social enterprise achieve sustainability and what are the strategies it adopts to fulfil its socio-economic mission? In this regard, we followed a narrative approach to capture the essence of the strategies that the two social enterprises; JanaJal and Goonj, adopt to ensure enterprise sustainability. Our study reports legitimacy and rhetoric as primary enablers that help the two social enterprises achieve sustainability. Since SE literature is itself in an evolving stage of being understood and conceptualized, this study intends to contribute to a better understanding of the ways in which social enterprises are ensuring their sustainability and the strategies they are adopting to remain sustainable.

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## Foot print of Indian Corporates in meeting Sustainable Development Goals: The Challenges and Opportunities

Prof. P. K. Biswas, Dr. Shalini Rahul-Tiwari

Institute of Management Technology, Ghaziabad, India



**Prof. P. K. Biswas**



**Dr. Shalini Rahul-Tiwari**

### Abstract

There has been considerable activity since independence in India in the field of economic development. A vast amount of resources (Physical, Human and Financial) have been utilized by the government and various international agencies like World Bank, UNDP (United Nations Development Programme) Asian

Development Bank, DFID (Department for International Development, UK) and others for the upliftment of the poor. And yet the level of development remains alarmingly low. There is still much poverty, malnutrition, unemployment and underemployment. In a recent study by Oxford University it has been estimated that the incidence of poverty highest in the World in the seven BIMARU states of India (Bihar, Uttar Pradesh, Rajasthan, Odisha, Chhattisgarh and Jharkhand). Poverty has been augmented by lack of access to resources by growing population and inadequate infrastructure, both social and physical.

Accordingly, Govt of India has initiated lot of programs to alleviate poverty and ensure a just and sustainable society. Social protection & financial inclusion is of paramount importance. NGOs have been rendering yeomen services to supplement govt. initiatives. However, it was realized that given the complex situation & diverse socio-cultural condition, requirement of capital & manpower is imperative. In this context, role of Indian Corporates became significant in accelerating progress towards the 2030 agenda of SDGs.

With the enforcement of Companies Act,2013 on 1<sup>st</sup> April,2014, India became the first country in the world to make Corporate Social Responsibility (CSR) mandatory. This Act requires large companies to spend at least 2% of their average profits of previous 3 years on CSR on each year. Funds so generated strive to address economic, social and environmental issues which can lead to sustainable development. For survival of human society, sustainability is the key. Gone are the days when sustainability was a small part of Corporate Social Responsibility for business. Globally, sustainability challenges are becoming extremely material, reaching thresholds of importance to companies' long-term strategies, to their customers, and external stakeholders. From increasing demand for natural resources to economic disparity to climate change, companies are facing a more complex array of trade-offs and risks across their value chains.

Our paper has examined the foot prints of Indian Corporates, in last five years, in meeting the Sustainable Development Goals, what are the challenges and opportunities. It has analyzed how Indian Corporates are making efforts to alleviate poverty and achieve SDG through various interventions.

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## A STUDY ON IMPACT OF COVID19 ON CSR ACTIVITIES OF SELECT INDIAN COMPANIES

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Christ (Deemed to be University), Bangalore, India

### Abstract

The paper explains the description of CSR activities undertaken by the selected Indian companies categorized under their respective industries. The paper further discusses the CSR activities undertaken in response to Covid19 along with its expenditure in comparison to previous year and the year of pandemic. The industries selected for the study are FMCG, Automobile and IT Sectors. The companies respectively under the selected industries are Dabur Ltd, HUL Ltd, Tata Ltd, Maruti Suzuki Ltd, Bajaj Auto Ltd, Mahindra & Mahindra Ltd, Wipro Ltd, Infosys Ltd and HCL Ltd. The paper analyses the prescribed and actual amounts spent by the select companies for its CSR activities. The paper also discusses how much and in what way these companies have contributed towards facing the pandemic.

The paper summarizes the CSR activities undertaken by the selected companies before the pandemic and the new CSR activities initiated during the pandemic. The paper also summarizes the amount spent on such activities by these companies for the past 3 years and discusses the activities and spendings done since the time of the pandemic. The paper compares the CSR performance between the select industries and its select companies and have been ranked on the basis of their percentages between prescribed and actual spendings. The paper comprises of findings and conclusions based on immense research of the facts published by the companies and various articles and literature. The paper also includes an in-depth descriptive statistics analysis combined with t-tests, taking into consideration the recent past years, evaluating the percentage change in the expenditure on CSR activities by the selected companies. This helped in understanding the impact Covid19 had on CSR activities since the inception of the pandemic and how the companies have modified their spendings according to the situation. The paper is helpful to understand the kind of change the pandemic had brought in, in regard to company's CSR activities.

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## Corporate Sustainability of Indian Automobile Firms

Ms Suman Phalswal, Mr. Pankaj Rawat, Dr. Arunaditya Sahay

BIMTECH, Greater Noida, India



**Ms Suman Phalswal**



**Mr. Pankaj Rawat**



**Dr. Arunaditya Sahay**

### **Abstract**

Sustainable Development has emerged as global concern, being the key driver for government policy and corporate strategy. In this regard, nations had first agreed for millennium development goals (MDGs) and subsequently sustainable development goals (SDGs). Firms, too, found that to be sustainable, they need to incorporate the sustainability goals in their strategy. Hence, the relatively new concept of Corporate sustainability (CS) was born. It has been gaining importance though the concept and its meaning is not yet well defined (Montiel, 2008 and Aras & Crowther, 2008). There is no widely accepted definition for CS today, however, several terms such as corporate sustainability, corporate social responsibility (Srivastava & Sahay, 2004 and Bhattacharya & Sahay, 2008) corporate citizenship, and stakeholding firm (Valor, 2005) have been coined. Further, the financial or nonfinancial-based approach of firms for sustainability is yet another important issue for CS debate. According to Salzman et al., (2005), Weber (2008) and Schaltegger et al. (2012), numerous recent studies have focused on the business case of CS where corporate environmental and social efforts have been observed to enhance corporate financial performance. Dyllick and Hoeckerts (2002) found that some works went beyond the business case by highlighting the need for a new theory to merge environmental and social aspects with financial ones. Lozano et al. (2015), criticized the classical view emphasizing financial aspects of firms, by stating that many of these theories fit into the strategic management of firms rather than solve actual sustainability problems.

In this context the authors have undertaken the study of the sustainability reports of the Indian automobile companies. Though Government of India (GoI) has made corporate social responsibility (CSR) report mandatory, sustainability report is still voluntary. Automobile firms, however, are regularly making sustainability report, mostly following the GRI format. Though these companies are connected with many of the SDGs directly or indirectly, the focus of the study is on SDG 12. The inclusion of transparency underlying in the target 12.6 of the SDGs have encouraged these firms to adopt sustainable practices and integrate sustainability information in their reporting which had helped the firms to communicate and manage their contributions to the SDGs. However, there exists a dilemma about whether the sustainability practices adopted by the automobile companies result in better performance, especially with regard to profitability and customer satisfaction. This study, therefore,

evaluates the influence of Sustainability Reporting on firm's financial and Customer satisfaction/delight performance but is limited to the listed Indian automobile manufacturers of passenger cars and two wheelers only. For measuring the financial performance, the secondary data was taken from the annual financial results, company websites and Securities and Exchange Board (SEBI) of India. For Customer satisfaction/delight performance Perceived Service Quality survey research was conducted on the existing and prospective customers of the selected organizations.

The existing theories like resource-based theory, stakeholder theory, knowledge based theory and legitimacy theory will be used to understand the promotion of economic, social and environmental response of the firm by adopting sustainability practices and providing a truthful sustainable report.

## REVISITING THE RELATIONSHIP AMONG CORPORATE REPUTATION, CSR ENGAGEMENT AND CSR TRANSPARENCY

Dr. Paula I. Rodríguez-Castro, Dr. Teresa Duarte-Atoche, Dr. María del Mar Miras-Rodríguez

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### Abstract

Findings from previous literature about the impact that CSR disclosure has on Corporate Reputation are mixed, although it is well documented that many stakeholders are reluctant to believe in this kind of initiatives. Nevertheless, literature suggests the key role that companies' CSR engagement. On the one hand, it helps to build or maintain Corporate Reputation but it is process which requires long time. On the other hand, companies' irresponsible behaviours will have such as a consequence a quick and immediate destruction of Reputation.

Therefore, it is convenient considering both, CSR engagement and CSR disclosure, at the same time in research which tries to explain Corporate Reputation. Particularly, it is really helpful to understand if stakeholders perceived CSR disclosure such as a way of green-washing or an attempt of improving legitimacy (Symbolic Approach) or a reflection of their commitments (Substantive Approach).

Despite previous research, there is a lack of literature which try to explain changes in Corporate Reputation based on CSR engagement or disclosure. Therefore, the main aim of this manuscript is to analyse if changes of Corporate Reputation are explained by changes in CSR engagement and disclosure levels of companies.

The sample was composed of 150 listed firms which Corporate Reputation data available for years 2017 and 2018. Recent research on the topic suggests the convenience of not using a one-size-fits-all approach in order to overcome the heterogeneous results, so that companies of the sample are grouped. Corporate reputation data are based on the RepTrak provided by the Reputation Institute and collected manually by researchers from the reports available online. CSR engagement as well as CSR disclosure (measured by CSR transparency) data were based on data available on Eikon Thomson Reuters. CSR transparency variable was designed such as an index of content based on the variables reported by Eikon Thomson Reuters in order to be able to complement the CSR engagement level.

SDG+Target: 16.6

Companies accountability is key to accelerating the progress, particularly, in times of crisis

# **5. Production, Consumption and Innovation**

## **5b. Design for sustainability**

## URBAN CHALLENGES IN SCENARIOS LIKE COVID-19 PANDEMIC AS DRIVERS TO SERVICE DESIGN AND SOCIAL INNOVATION FOR RISK GROUPS

Dr. Luiz Melo Romão, Dr. Marli Teresinha Everling

Universidade da Região de Joinville, Joinville, Brazil



**Dr. Luiz Melo Romão**



**Dr. Marli Teresinha Everling**

### **Abstract**

The 'Design for products and Services in Urban Context' discipline integrated in Univille (University of the region of joinville) Master's program in Design was scheduled to start on 17th march of 2020. Because of Covid-19 pandemic, the University, following municipal regulations, canceled every

educational activity. During the following two weeks advances were made to afford the imposed reality that required social distancing and isolation. One huge step was the permission given by CAPES (Coordination for the Improvement of Higher Education Personnel) to offer online classes. So, two weeks later on March 31st, the classes started in a distanced approach using MS Teams platform. The schedule prescribed 13 meetings. At the beginning it wasn't clear how long the activities might be online, but it soon became obvious that the online mode would endure until the end.

Considering the connection of the subjects with urban context, every planned activity, suddenly, sounded obsolete. It stood out as a strong opportunity to discuss the cities in a pandemic scenario. So, the whole planning was reconfigured and the five first meetings were dedicated to concepts and theoretical discussions related to city, urbanism, sociology, social innovation and design based on: (i) Yuval Harari analysis about 'The World After Coronavirus'; (ii) New Capitalism documentary; (iii) chapters from books alike 'The image of City', 'The Death and Life of Great American Cities', 'Cities for People', 'The Conscience of the Eye: The Design and Social Life of Cities' published respectively by Kevin Lynch (1960), Jane Jacobs (1961), Jan Gehl (2010) and Richard Sennett (2006), (iii) organizations and networks like World Design Organization, Council Design, and DESIS (Design for Social Innovation and Sustainability) Network because of their comprehension of design and approaches related to sustainability, communities and cities; (iv) Social Innovation based on authors like Murray et al. (2010), Brandsen et al. (2016), Mulgan et al (2007), Manzini (2008).

On the sixth meeting, a challenge named 'All2Gether' was proposed ; the team was invited to develop products and services that could minimize problems and sufferings of Covid-19 risk groups in the areas of health and wellbeing, logistics, behavior, mobility, citizen, housing and relationship. Double diamond was the methodological process used due to its fitability to challenges connected with Design, product service systems, urban context and problem solving centered on people. The team was composed of eight students and the activities (workshops) were mediated by professors Luiz Romão (skilled in Social Innovation) and Marli Everling (experienced in Participatory Design and urban context).

By focusing the challenge the team polished the problem as: development of products and services to reduce sufferings of Covid- 19 risk group.

During the process were used procedures like CSD Matrix (Certainties, Suppositions, and Doubts), asking the users, asking the experts, personas, scenarios, blueprints and service prototypes. The challenge resulted in a service driven to help elderly people in their daily life for the pandemic and post-pandemic scenarios. Besides, the experience helped to clarify how to work with participatory approaches using the double diamond in online learning classes.

**Sustainable design of a trigger sprayer suitable to e-commerce market. A case study of design for material reduction, disassembling and recycling**

Lucia Pietroni, Jacopo Mascitti, Daniele Galloppo

University of Camerino, Ascoli Piceno, Italy



**Lucia Pietroni**



**Jacopo Mascitti**



**Daniele Galloppo**

## **Abstract**

Worldwide consumption of plastics related to the production of household detergent containers was over 17 million tons in 2018, with an average annual growth over the last decade of 4.8% (1). Moreover, the pandemic will increase the demand for household detergents in 2020, 90% of which are packaged in plastic bottles. These are often associated with a liquid dispensing system called “trigger sprayers”. Due to its greater functional and formal complexity and due to the high number of heterogeneous materials used for the different components, the trigger sprayer often represents a critical issue in the disassembly and recycling phase of the bottle. The proposed paper aims to describe the research, development and prototyping process of trigger sprayer concepts, applicable to bottles of home care products sold through online purchasing channels, able to meet the requirements for the certification of “product suitable for e-commerce sale”. The project, developed in collaboration with Aptar France, had as its further objective the optimization and enhancement of the environmental performance of the new product, through a life-cycle design approach (2) and through the use of specific *DfS* strategies and tools (3). The new concepts developed are characterized by innovative technical-formal solutions able to increase the resilience of the product during transport, drastically reducing both the use of materials and the number of components, improving their performance. In the first phase of the project, a series of activities were launched aimed at identifying and analyzing the main environmental criticalities of traditional trigger sprayer models for domestic use. Through the photographic survey, the disassembly and weighing of the components and the identification of the materials used, it was possible to analyze the types consolidated on the market, the material and aesthetic-perceptive characteristics of the products, the ergonomic requirements and the technical and functional characteristics of the dispensing systems. At the end of the analysis phase, some new trigger sprayer concepts were generated, developed according to the *DfS*'s design criteria and optimized to be used in bottles sold through e-commerce platforms. In the third and final phase the concepts have been prototyped to experimentally validate the strategies adopted and verify, with a special consumer test, the appreciation by the end user. The life-cycle design of the trigger sprayer with the adoption of design strategies aimed at environmental sustainability (4) have led to a substantial reduction of the plastic material use and to the optimization of the disposal and recycling phase. The results obtained from the project have contributed to increase the company know-how, in terms of *DfS* of the Aptar group, aiming to focus on the SDG 12 “Ensure sustainable production and consumption patterns” (12.2-12.5-12.6).

Conference topic: Case studies of DfS products and life cycle approaches to design.

(1) <https://www.plastmagazine.it/mercato-mondiale-packaging-detergenti/>

(2) Thiebat, F., Life Cycle Design: An Experimental Tool for Designers, Springer International Publishing, 2019

(3) Giudice, F., La Rosa, G., Risitano, A., Product Design for the Environment: A Life Cycle Approach, Taylor & Francis, 2006

(4) Vezzoli, C., Manzini, E., Design per la sostenibilità ambientale, Zanichelli, 2007

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## 25.5.2020 Overshoot day

Ms Filipa Pias

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### Abstract

Portugal exhausted its natural capital in May 2020 and lived on credit until the end of that year (Earth Overshoot Day, 2020). At this rate, a planet is not enough to suppress production and supply needs. Portugal needs 2.5 planets (*idem*, 2020). At this rate, we are questioning our future, because in this logic of unlimited growth the natural cycle of renewal is not being respected, causing in some situations; soil erosion, loss of biodiversity and water in the crops which at the end of the process will be part of food waste. In fact, according to IUCN between 2016 and 2019 endangered species in Portugal almost doubled having become the fourth country in Europe with more species at extinction risk (Mendonça, 2019) and in Portugal inadequate eating habits represent about 86% of the chronic illness burden in the health system (Nogueira, 2016, p.30), being the main cause of absenteeism and incapacity at work, with consequences for the competitiveness of the economy (Diário da República, 2017).

What if the collaboration of design in the process of developing a project for the agri-food sector helped to delay Overshoot Day, to adopt the principles of a circular economy and contribute to improve consumption patterns? Born out of the need to find or adapt solutions to problems day-to-day life, based on people's experience, how they use and enjoy products and services, design is a facilitator, which regardless of complexity and technology (Viladas, 2010, p.25) translates benefits into something that can be enjoyed by society.

Present in several stages of the value chain, through *product*, which is often the first contact that the consumer has with a company, the company's *communication* and the physical and digital *spaces* where its activities are developed, which includes the production, offices, points of sale, promotion actions, site and social networks, design can develop solutions that minimize the impact on the environment and simultaneously empower people on eating habits and environmental preservation, namely through shapes, materials, production processes, colors, legibility, concept and narratives that must value what is systemic, that is what it is done instead of what is sold, sometimes intuitively, by tradition or knowledge.

Starting from an idea or a design project you want to boost, we invite to a reflection on what you intend to achieve with a design collaboration, in a dynamic of cause and effect, which helps to identify, weaknesses and opportunities for the adoption of a circular design, in order to each stage of the process, the useful life of a raw material or product, successively reused with add value. This process begins by characterization of the design project and agri-food product, follow by objectives and targets that define, what you intended to achieve with the design project. After that come the Initiatives, a program of activities in line with the company's strategy, aiming to achieving what was previously defined.

The aim of this tool is to contribute to sensitize for the impact of design solutions and guide their collaboration to circular solutions.

**Design strategies in times of pandemic – a case study of how Covid-19 is visualized in the Nordic countries Sweden, Norway, Finland, Denmark and Island**

Senior Lecturer Karina Goransson, Senior Lecturer Anna- Sara Fagerholm

Department of Design, Sundsvall, Sweden



**Senior Lecturer Karina Goransson**



**Senior Lecturer Anna- Sara Fagerholm**

**Abstract**

In a pandemic, a large amount of information must reach people in an efficient, coordinated and credible way (Folkhälsomyndigheten, 2019a: 12). A lack of communication has been shown to exacerbate the crisis and reduce citizens' confidence in those in power (MSB, 2006). Here, design is

important for how people perceive information as visual messages tend to have more impact than text (Jacobs, 2020; Otten, Cheng, & Drewnowski, 2015). Therefore, it could be beneficial to use visual elements in the design of complex information to ensure that messages reaches the target groups (King, 2016). Here, infographics can be a tool (Jacob, 2020; Weinschenk 2011). Visual elements in communication can also contribute to health-related topics being perceived as more interesting (King & Lazard, 2020).

To reduce the spread of Covid-19, people around the world are urged to follow the recommendations communicated by authorities in each country, (FHM, 2020). In this context, designed infographics can be used – in research these graphic design elements are described as visual representations of information, data, or knowledge (Ocampo, 2011), presenting complex stories or a large amount of data in a visual and accessible way (Jacob, 2020; Damman, Vonk, van den Haak, van Hooijdonk and Timmermans, 2018; Weinschenk 2011).

Against this background, the purpose of this study is to examine how Covid-19 is visualized in information material from authorities\* in the Nordic countries Sweden, Norway, Finland, Denmark and Island, and how design elements are expressed in the material.

Previous research has to a large extent been quantitative with surveys and opinion polls, but with the gradual increase in the role and visual expression of the media, qualitative studies are increasingly common (Vigsö, 2016: 74).

In this comparative case study, a visual content analysis is used, and results are presented on similarities and differences between how different northern countries visualize information material about covid19 and how design elements and infographics are used in the material aiming to build trust in times of risks and crises.

The background to research on crises is often about improving how society handles new crises (Vigsö, 2016: 73). In times of pandemics, there is always a high risk of misinformation being spread, which is a phenomenon that the World Health Organization (WHO) term as infodemia (Institutet för språk och folkminnen, 2020). Visual strategies can be used to improve the quality of health communication during public health crises and reduce the unintended effects of infodemic conditions (King, 2020). During public health crises such as the ongoing corona pandemic, there is a great need to improve and strengthen public communication to reduce the spread of infection (King, 2020). The overall ambition of this study is thus to build on knowledge of the role of design in societal crises. This can be linked to the UN's global target number 3 and the sub-goals 3.3 Fight infectious diseases and 3.D Improve early warning systems for global health risks.

\* National authorities that has a national responsibility for public health issues and works to ensure that the population is protected against communicable diseases and other health threats.

**A life in Design would suggest that current design theory has underplayed the most promising track revealing that Responsible Design is the Apex Design Mode to create our sustainable future.**

Mr Greg Campbell<sup>1,2</sup>, Mrs Cheryl Campbell<sup>2</sup>

<sup>1</sup>DesignOz Pty Ltd, Sydney, Australia. <sup>2</sup>Society for Responsible Design, Sydney, Australia



**Mr Greg Campbell**

### **Abstract**

A revision of Design theory papers, courses and subjects in recent decades reveals multiple themes, theories and fashionable monikers with solid progress on designing for sustainability reflecting the main thrust of most all of the SDGs. All of the streams reviewed to date have various strengths and several weaknesses. They are all worthy of comparison and evaluation to assess which should be adopted, developed, combined or discarded.

It is widely acknowledged that there are now imperatives for better process, clearer thinking, improved methods combined with greater efficiency in resource use and energy. We are now able to work more closely with natural forms of creation and ensure less waste and toxicity. It is also seen as possible to regenerate lands and resources that have always supported our existence. How may we best combine these ideas for our future now or is it to just use Circular Design? As an example illustration, we're pretty sure that a "truly circular coal mine" that properly accounts for all of its environmental footprints is never likely to be possible in our lifetime.

Perhaps to be truly transformative for our current needs, we need to identify and foster an 'Apex Design Mode', which proves to be more resilient and adaptable in enhancing the sustainable changes needed across all design disciplines and beyond for the immediate and longer term.

Collectively, we are short of time, facing many global tipping points and potentially disastrous feedback loops. So the most energy and effort should be directed at what are the best methods to facilitate the greatest gains in the historical, recent and currently popular design trends. The number of valid streams of sustainable design theory suggest that this should be the most appropriate means of getting the optimal results in the shortest possible time.

It is reported that there is good public support for positive change to stop species loss, reverse climate change and to help the environment in particular. Yet, there appears a disproportionately small amount of support in many recent and current national governments though that balance appears to be significantly shifting this year. It is now more reliant on business and everyone else to further innovate and support this change process, enhanced by governments at city, state and national levels (where possible) to encourage this to happen. The use of multiple methods to implement this such as cooperation, cooptation, competition, incentives and disincentives, gamification, marketing and applied logic are all regarded as essential components to accelerate to the level of change required. It then remains to show how best to combine the good ideas, thinking and processes which can be challenging and even somewhat variable. To get best traction to achieve all the SDGs, using a good review of all sources available it can be clearly shown that Responsible Design is the Apex Design Mode to create our sustainable future.

## Responsible Design is the Apex Design Mode to create our sustainable future

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**Mr Greg Campbell**

### Abstract

While there are many studies in design practice and theory that explore the trends, few are broad or agile enough to evolve to new problems that seem to arise just as quickly. Considering this, has led us to look at intentionally capitalising on their current strengths and to combine them with the best elements of future trends into a more cohesive framework for developing real long-term sustainability. A fusion of Circular Design plus Regenerative Design and incorporating Transition Design would come fairly close to the mark but each falls short in several critical areas. These are crucial to address current crises and timeframes as we are running short of time to 'get things more wrong'. Indeed, there is a strong need to enable a design modality that fuses together the best ideals and have that as a starting base that works to benefit all natural life, understanding that nature is integral to our current and long-term future survival. Looking at how to define and include all essential elements, then better balance these needs is the goal. Going beyond reviewing major design trends by defining what is lacking and show how best this may be addressed. Over thirty years, practitioners and Society for Responsible Design curators have proposed beneficial new ideas and additions to design thinking practice. Initial research and feedback has been very positive and we include these additions for wider review and consideration. The continuously developing area of Responsible Design is a methodology or mode that invites everyone to fuse together all the best features of the major trends in design for sustainability then adds several of its own, particularly Responsible and multiple view angles. These combined make it worth claiming the relatively new term Apex Design Mode as completely appropriate. This forms the description of a collective of processes that holds the greatest capacity to address all the SDGs and more. It is well supported by the capacity to achieve significantly better results in many fields and our own research on design directions. By including and following a more robust technique of collating, assessing, developing

and implementing best global greener practice, across all design and related fields, we shall achieve much better results in the fastest manner possible. We can show, 'Responsible Design = Good for everything'.

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## Environmental design of outdoor sensors

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**Márton L. Kiss**



**Dr. Judit Mária Pintér**

### Abstract

Nowadays, it is becoming increasingly important to measure environmental impacts in industrial cities. We have developed an outdoor, low-cost environmental sensor that measures airborne dust concentrate and other air parameters. Our goal is to perform high-resolution measurements based on hundreds of measuring devices to achieve full urban coverage. Using the data measured and collected

by the sensors, our goal is to create an anomaly map that represents the current measured values. As an additional function, the system will be able to send alarms if one of the remote sensors measures a critical value. As the planned system will consist of hundreds of nodes, its environmental impact and durability cannot be neglected either. Therefore, environmental planning is of paramount importance to us during development. When developing sensors, ecological design should focus on the most important factors. However, the environmental assessment of ICT infrastructures still faces methodological shortcomings. Interesting studies can be found on the primary environmental impacts of each ICT infrastructure and service, on the methods and tools used for research (embodied energy, life cycle impact assessment (LCA)), which serve as a starting point for further research. The analyses assessed the environmental effects, shed a light on the „hot spots” and gave important information for eco-planning. However, the problem is that, most environmental studies are not available (Andrae and Andersen (2010)). The ICT field does not have the necessary transparency, so inconsistencies cannot be easily understood which makes it difficult to learn about the environmental effects of ICT. In the course of our research, we tried to map the environmental impact of the entire infrastructure of outdoor sensors using the method of life cycle analysis and to evaluate them on the basis of sustainability aspects. During the calculation of environmental effects of the network, life cycle and synergistic effects had to be taken into account. In the environmental assessment of the deployed ICT infrastructures, we aspired for system-level description and modeling, ensuring clear system boundaries and functional unit formulation and transparency. During the life cycle analysis, we examined the combined environmental impact of the nodes and the network itself. The results of the obtained environmental assessment effectively helped our work during the planning. With this, in addition to the operating mechanism of the outdoor sensors and the service they provide, we also got a more complex picture of their environmental impact over their entire life cycle.

This research was supported by the European Union and the Hungarian State, co-financed by the European Regional Development Fund in the framework of the GINOP-2.3.4-15-2016-00004 project, aimed to promote the cooperation between the higher education and the industry.

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## INTEGRATING FINANCIAL AND PHYSICAL SUPPLY CHAINS: HOW FINTECH CAN ENABLE A SUSTAINABLE BUSINESS PROCESS MANAGEMENT

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### Abstract

The financial supply chain, running parallel to the flow of goods and services, is common to all economic supply networks, and its integration with the physical supply chain is a critical and ubiquitous. However, physical supply chain globalization is making sustainable business process management more and more difficult. Since the onset of COVID-19, demand shocks have troubled supply chains, highlighting their vulnerabilities, and raising concerns about resiliency. Much of the disruption to the supply chain appears to occur at the levels of production and distribution centers, but less at the transportation level. In this framework, blockchain technology - as a distributed digital ledger technology which ensures transparency, traceability, and security to the miners - may be crucial to easing some global supply chain management issues.

Community and consumer pressures to meet sustainability goals, but also to overcome some of the restrictions posed by the pandemic, prompt us to investigate how fintech can address and aid financial and physical supply chain integration in a sustainable management perspective. In fact, the study aims to critically examine the tools provided by fintech which could support the physical and financial supply chain integration, overcoming the abovementioned issues and, at the same time allowing for the achievement of the Sustainable Development Goal 9 (SDG), consisting of building resilient infrastructure, promoting inclusive and sustainable industrialization and fostering innovation.

The study is based on a theoretical approach and presents a general framework model supported by the most recent scientific literature in the industrial field.

The research findings show that fintech tools can support buyers and suppliers by contributing to coordination, collaboration, information sharing and information visibility, integrating the supply chain in a sustainable perspective.

The research is limited in that it is theoretical. Therefore, further research is required in order to quantify the impact of fintech interventions on physical and financial supply chain integration, but also the SDG achievements. However, it has some practical implications. The proposed framework model requires an understanding of the flow of physical and financial resources across supply networks and can help buyers and suppliers to develop a more holistic understanding of the supply chain, improving integration and optimizing working capital, overcoming inter-organizational, intra-organizational, technical, and external barriers, thereby achieving higher sustainable performance.

The study is original because presents an interdisciplinary model which uniquely recognizes the role of fintech in enabling buyers and suppliers to improve the integration of physical and financial supply chain, contemporarily ensuring the SDG 9.1 and 9.3 targets achievement and accelerating progress towards SDGs in times of crisis. Future research propositions and directions could provide insights into overcoming barriers and the adoption of blockchain technology for supply chain management.

## Territorial product-service systems for the circular society: a prescriptive design method

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### Abstract

Product-service systems (PSS) are considered key elements of a transition to a circular economy (CE). In addition to environmental impacts and resource decoupling, circular PSS design needs to consider and support the wider transition to an equitable and just circular society. This paper adopts a territorial view as a lens for ensuring PSS contribution to the transition to circular societies. The concept of the territory in this study is not only an area delimited by an administrative authority. The notion of the territory here refers to an inhabited physical space that is economic, cultural, and political at the same time, it is a social construct. Since sustainability does not fall evenly across space, the meaning and potentialities of PSS are likely to vary between territories. Thus, considering the territorial dimension explores on a larger scale the potential of PSS to contribute to sustainable societies. At present, PSS design methods mention the importance of collaboration, mostly with the aim of reducing environmental impact and not creating a circular society. This paper aims to fill this gap, by proposing a prescriptive design method for the development of PSS concepts that evolve and are aligned to the local sustainability challenges and priorities of territories. An initial version of the method is developed through a literature review, of PSS design methods and tools adopting a systemic and territorial approach. The prescriptive framework comprises four main parts, understanding, envisioning, designing, and developing pathways. The first version of the method was tested by 56 MSc students during a two-month project. A second version of the method, which is presented in the paper, is currently under evaluation by companies and experts in the field to increase its validity and reliability. This research aims at aiding companies to align their sustainable and competitive strategies with local problems and to create stronger links with territorial actors focusing on the design and innovation processes within organizations.

## CULTURAL ASPECTS IN FRUGAL DESIGN FOR THE BOP– EXPLORATORY STUDY OF ITS APPLICATION IN A SOLAR ROOF COMPOSED OF ARTISAN CLAY TILES

Mr. Carlos Alberto Pineda Pérez<sup>1</sup>, Mr. Luis Miguel López Santiago<sup>2</sup>, Mr. Víctor Darío Cuervo Pinto<sup>1</sup>

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### Abstract

Since the concept of the Base of the Pyramid was introduced by Prahalad, numerous projects have been developed to serve this segment of the population. However, many of the design projects oriented to these contexts do not fulfill their purpose. This is mainly due to the lack of understanding of people's needs and the cultural and social differences that define the type of appropriate solutions for each BoP context. Recently, frugal innovation has emerged as a strategy to adequately address the challenges of designing and developing sustainable solutions for people living in contexts of poverty and marginalization. Regarding the enablers of this innovation approach, the literature highlights the dominant role played by the local ecosystem and culture. In this sense, there are factors specific to these contexts, which significantly determine the characteristics of the solutions. Among these factors, cultural aspects are considered key factors, since they can add additional value to the products, both for the economic growth of the communities, as well as for the promotion of the uniqueness of the local culture within a global market. In this sense, the transfer of cultural characteristics to solutions developed through a frugal design process becomes a relevant strategy, particularly when targeting marginalized communities. Advances in frugal innovation research have identified a number of criteria and attributes that should be considered during the development of a solution. These attributes are generally focused on functionality, cost reduction and resource optimization. However, there are still few works that address frugal innovation with a perspective of integration of local cultural aspects. In this study, we explore the integration of cultural aspects in the development of a solar roof made of handmade clay tiles. This technological solution aims to address the lack of energy in rural BoP communities within the Mexican context. To develop the prototype, we used Pahl&Beitz's engineering design methodology as main framework and integrated the criteria of frugality identified in the literature. Subsequently, we propose a series of metrics aimed at evaluating the cultural integration of the product developed within the local Mexican context. The metrics are based on Mexican research in the development of socially appropriate technologies whose key indicators are the jobs created and their characteristics. The results show that contextual aspects can be integrated into a standard design process and the frugality attributes are key elements to achieve the cultural acceptability of the technical solution developed. The case study also reveals that it is necessary to design the manufacturing process technology under the same criteria used for the technical solution. The harmony of the technical solution (solar roof) with the local architectural style in which it will be installed reduces the rejection of the product for aesthetic reasons. This generates a desire and acceptability on the part of the user to use this type of solutions. This study contributes to the literature on frugal innovation by integrating the cultural aspect based on a case study in the Latin American context.

## FRUGALITY AS A LEVER FOR SUSTAINABLE DESIGN: A CASE ON FOOD AID DISTRIBUTION.

Ms. Nicole Denisse Zoza Tejeda<sup>1</sup>, Mr. Luis Miguel López Santiago<sup>2</sup>, Mr. Leonel Pérez Montes<sup>1</sup>, Jesús Alberto Ramírez López<sup>1</sup>, Mr. Víctor Darío Cuervo Pinto<sup>1</sup>

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### Abstract

To meet the unmet or underserved needs of people living in poverty, several programmes have been developed by governmental, academic, non-governmental and civil institutions. Various movements focused on sustainability and poverty reduction have generated a variety of concepts related to the creation of social well-being, as well as innovative technologies, in different areas and at different scales. Within this context, frugal innovation (FI) has been positioned in the literature as an essential element for the creation and promotion of social and economic sustainability through the improvement and generation of technological solutions, particularly those aimed at meeting the needs of the people at the base of the Pyramid. Due to its recent emergence, studies on frugal innovation are scattered across different disciplines. From the engineering perspective, frugal innovation has been largely oriented towards identifying criteria and attributes related to functionality, cost and optimization in product and process development. However, it has not been made explicit how to accurately integrate this innovation approach during the design process. In this study, we present a proposal for the operationalization of frugal innovation during the design and development of a technological solution. Within the Latin American context, Mexico is a country with constant economic growth. However, the country faces a series of challenges related to poverty and social inequalities in multiple dimensions. Nearly 52 million people live in poverty and their income is not enough to access the basic food basket. In this context and with the collaboration of a local food bank in Mexico, the idea of applying technological innovation to address the problem of food aid distribution arose. For the development of the solution, the Pahl&Beitz's design methodology applied in Mechatronic engineering was used as a framework for the integration of frugal criteria. These criteria were mainly implemented at decision-making points, particularly in the early stages related to the definition of system functions and the selection of its components. The implementation of these criteria allowed to obtain a virtual-experimental prototype that fulfils the main function of distributing and storing food. The main result of this design case was the reduction of manufacturing cost by about 87% compared to similar machines in the international market. This proposal represents a social innovation (helping to distribute food aid) through a technological solution (a machine), since, until now, there are no similar projects in the Mexican context. The results of this study contribute to the literature on frugal innovation and design for the Base of the Pyramid from an engineering perspective, particularly in the way to implement the criteria associated with this innovation approach.

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## Developing sustainable products for the circular economy: the circular Sustainable Product Development (cSPD) process model

Anna Diaz Tena<sup>1</sup>, Tatiana Reyes Carrillo<sup>2</sup>, Rupert J. Baumgartner<sup>1</sup>

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### Abstract

*Over the last years, circular economy (CE) literature has made a significant progress on developing key concepts, identifying circular product typologies, outlining assessment methods, and exploring the synergies of circular product design with manufacturing practices such as digitalisation or environmental management. Nevertheless, less attention has been paid on describing changes in company processes necessary for the implementation of circular product development. For this reason, this research presents the circular Sustainable Product Development (cSPD) morphological box, aimed at providing implementation guidance to business and industry. The cSPD is based on the analysis of 24 value-retention strategies implemented in manufacturing industries enabling circular products. The framework describes process reconfigurations in the Sustainable Product Development (SPD) process model to further integrate circularity considering process phases, design guidelines, criteria for evaluation, information management and new inter- and intra-organisational actors. With this framework, we intend to identify the most defining parameters in the process model and assign them a discrete number of categorical values so that different combinations explain the generation of most prevalent circular product typologies in the manufacturing of durable goods. This framework is intended to be applied in industrial settings in the coming months in order to help product planners envision the organizational changes required to implement high value-retention CE practices*

## Post-anthropocentric Design Principles

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UFPR, Curitiba, Brazil



**professor Aguinaldo Santos**



**Mr Felix Varejão Neto**

### Abstract

This paper reports the preliminary results of an ongoing investigation into the theory and methods of post-anthropocentric Design. Conventional approaches see nature as a never ending reservoir of resources to fulfill human needs, regardless of the implications on the survival and wellbeing of other species. Paradoxically, by disregarding the well being of other forms of lifes, the conditions for human

life on Earth is increasingly diminished. A pos-anthropocentric design considers that all forms of life have an equal right to live and are all interconnected and mutually dependent. The theme is investigated by the authors through a literature review and a field study carried out through an Action Design Research, focusing on developing a solution to protect a native stingless bee (*Tetragosnisca angustula*), widely present in the Brazilian urban environment. Besides of designers, the project involved a multidisciplinary team which included biologist, agriculture engineers, a zootechnician, a chemical engineer. The task consisted on developing a digitally manufactured beehive, using the products requisites gathered through a literature review, interview with experts and direct observation. The 3D printed stingless beehive was later implemented on a primary school where it was used to promote more empathy of pupils with stingless bees as well as a subject on disciplines such as mathematics, biology and geography. After crossing the results with the existing theory, the following non-anthropocentric guidelines were confirmed on this study: a) adopt a bioinclusive Design process: actively including the non-human into the design process; b) adopt a open learning attitude: to actively observe and learn from the non-human, understanding its processes and transformations of the non-human, bringing such lessons to the design process; c) promote bio-synergies: actively seeking a synergetic rebalancing in the living system, creating conditions to mutually benefit tall forms of life involved; d) consider the priorities of all beings involved: actively consider the priority demands of the non-human, making an effort to identify potential rebound-effects and, also, the possibility of a hidden non-human in the design process. This is perhaps the most counterintuitive approach since a human-centered Design is widely taught and understood as synonymous of good Design. Hence, applying these guidelines demands revision of our ethics as well as a new methods, aesthetic, onthology and epistemology in the Design field.

## Vernacular Design as a source of innovation to contribute for a distributed economy model

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**Gabriel Tanner Pasetti**

### Abstract

The distributed economy model, with small-scale value-adding units synergistically connected in a network and serving local needs near or at the point of use, offer a more promising scenario to achieve a more sustainable society.

Covid-19 pandemic has confirmed the higher level of resilience of those communities and organizations adopting the distributed economy concept. Yet, the limited access to products and services and the rise of teleworking had an impact on the generation of several improvised solutions to everyday problems.

This kind of manifestation, based on solving a problem adapting local resources and knowledge, will be considered as vernacular design in this paper. These vernacular solutions could be seen as a reservoir of innovative knowledge with great potential to benefit others with similar problems.

This research first analyzes the main characteristics of a sample of different solutions developed by average people in response to daily problems. Then explores its dissemination via open Design and digital manufacturing, two key strategies to achieve a more distributed economy.

It is achieved through a Design Science approach where a vernacular solution is converted into an improved digital product and then shared with other users via an open design platform and, finally, produced locally by another user by means of digital manufacturing.

The analysis has emphasized the economic dimension of sustainability, achieving as a target the SDG+ 8, 11 and 13, confirming the following implications of the distributed paradigm: a) better fulfilment of local needs, allowing on-demand production and reduction of marketing costs due to customer proximity; b) a higher level of customization and faster delivery of product/service changes; c) shorter, more flexible and smaller supply chains, with sharp reduction in logistics costs, lead-time, waste and capital investment; d) better monitoring of product performance, with higher local control over production; e) valorizes the local economy, integrating local competencies and infrastructure into the design process, increasing the bargaining power of local providers and encouraging open source innovation.

Finally, it is clear that the concepts and phenomena discussed in this article proved to be a different way to propose solutions in situations of crisis. This model emerged naturally through community action in response to the COVID-19 pandemic. But it also could be applied in other contexts. Relevant discussions on a global scale, such as climate change and more environmentally sustainable futures, can benefit from this model of proposing solutions based on distributed production and open design. Offering quicker responses adapted to the realities of each region and involving communities in the process.

## Using 2030 SDG meta-scenarios to foster a transition towards a green economy: a case study on a footwear company

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**PhD Aguinaldo dos Santos**

### **Abstract**

In the search for a more sustainable society, there is an emerging demand for strategies that enable a transition of companies towards the Green Economy (GE), which has as its purpose the search for economic equity associated with environmental preservation and social cohesion (UNEP, 2019).

Regarding sustainability transitions, such a purpose can be reached by the systemic and societal approach (GEELS, 2010; LOORBACH, 2010; PESCH 2015). Design can contribute to such transition by articulating alternative visions of the future (CESCHIN, 2012; GAZIULUSOY & RYAN, 2017; COSTA 2019), triggering an organizational change and learning towards a GE. Nevertheless, the GE current studies focus on technological aspects and are often lead by big and multinational companies, most of them located in the global north (LOISEAU, E.; SAIKKU, L.; ANTIKAINEN, R. et al, 2016). In contrast, the present study intends to contribute to our understanding of the issue of GE societal transition by investigating the theme of a small company in Brazil, focusing on strategic business direction shift, changing organizational culture and developing competencies. The goal is to propose a protocol as an artefact that trigger such a transition. The authors have explored the subject through an Action Design Research, developed in partnership with a footwear company. It involved the use of a reflective learning workshop using meta-scenarios guided by the SDGs related to GE: 01; 08; 09; 10; 11; and 12 as well as its 2030 targets. The process occurs along with three phases: (i) strategic diagnose: assessing the current strategic status of the organization regarding GE principles (DUARTE & SANTOS, 2019); (ii) co-creating meta-scenarios: a co-creation activity focused on sustainable product + service systems (S.PSS) concepts and; (iii) validating scenarios: selecting meta-scenarios by evaluating their feasibility, barriers and attractivity of each meta-scenarios and setting up goals and an action plan. A total of X meta-scenarios were developed, involving the use of systems maps, blueprints, illustrations, customer journeys and storyboards. The observation has confirmed that meta-scenarios were effective in triggering a learning process towards a GE. Evidence of such learning included the adoption of new vocabulary associated with the GE as well as the set up of actions directed towards its principles. Hence, meta-scenarios did contribute to strengthening discursive and practical awareness (GIDDENS, 2002) regarding the economic dimension of sustainability. Since a transition towards a GE demands a long term perspective it must start at the strategic stages of the business process, including the fuzzy front end of the product development process. Meta-scenarios have enabled an effective understanding of the implications of GE to the organizational competencies, the changes required in the relationship with the supply chain, the need to revise key company values and new metrics to assess the organizational performance.

## Critical factors for diagnosing transparency for sustainability in services

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**PhD Candidate Marcella Lomba**



**Prof. PhD. Aguinaldo dos Santos**

### **Abstract**

Transparency is one of the principles to enable sustainable development, implying openness, communication, and accountability, regarding social, environmental, and economic aspects at all organization's levels. Although there has been an increased demand for transparency, the adoption of transparency as a service strategy for sustainability is still very limited due to challenges and barriers

involving the organization's business and customers. An important challenge is to understand the contextual conditions that facilitate diagnosing the state of transparency, to support organizational learning and forward-looking strategies for sustainability. Diagnose is an evaluation criteria-based process, useful for guiding service design activities for envisioning new strategies and service concepts towards sustainability. This research draws on prevalent theories and approaches through a literature review of selected publications, including transparency, design for sustainable behavior, service design, and service management. The combination of theoretical findings is used to discuss and provide a structured overview of the factors that influence diagnosing transparency for sustainability in services. Based on these results it is argued that transparency at a service level implies a more systemic perspective than only providing greater information visibility, traceability, or compliance with sector-specific norms and rules. Services mediate different levels of communication and interactions, between customers and service stakeholders. Besides information visibility, transparency in services can also have a pro-active role in raising awareness, educating and engaging customers about sustainability's positive and negative impacts, and also supporting informed decision-making and trust-building including sustainability factors. For service organizations, transparency represents a promising approach for enhancing stakeholder participation and continuous learning process through higher governance, identification of problems and opportunities stimulating continuous improvement towards sustainability, and strategic reformulation of the service's value proposition. The article concludes by framing transparency for sustainability, the role of service design(ers), and methodological approaches. The proposed contribution is related to SDG+Target(s) 12.6, 12.8, 12.a, 16.6, and 16.7, and is also related to the topic of the Conference since the research about transparency in the context of design is an emerging theme and represents a promising approach to sustainability. How designer's discovery and shape transparency in service systems (e.g.: food/energy/water/health consumer services) can affect how sustainable goals are addressed and measured in a broad social, environmental, and ethical dialogue, given the weaknesses and potential consequences of design.

## A Case Study Analysis of the Furniture System From Sustainable Product-Service System Design Perspective

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**Dongfang Yang**



**Professor Carlo Vezzoli**

### Abstract

**Introduction:** Studies on design for sustainability indicate that the concept of Sustainable Product-Service System (S.PSS) is a promising approach to bring radical changes in the production and consumption system of environmental, socio-ethical and economic benefits. The sustainable furniture

system has been recently identified in the Circular Economy Action Plan (2020) as one of the key sectors that should be addressed and improved for environmental protection and economic prosperity. In this respect, this paper presents a case study research aiming to explore and characterise the adaptation of S.PSS to furniture sector as a promising approach towards sustainability.

**Methods:** This case study research of S.PSS applied to furniture is based on two primary sources: documentations and expert interviews. The analysis aims to verify and characterise the six win-win economic and environmental benefits into the furniture systems. In particular verify whether and under what condition applying the S.PSS approach to furniture design and offer make the provider economically interested in improving: 1) Product lifespan extension and use intensification; 2) Material life extension (recycling, energy recovery, composting); 3) Materials consumption minimisation; 4) Energy consumption minimisation; 5) Resources (materials and energy) renewability/biocompatibility; 6) Resources (materials and energy) toxicity/harmfulness minimisation.

Furthermore, through literature review and desk research, selected companies are analysed on the furniture products and services they offer (i.e. the satisfaction unit), the stakeholder configuration (i.e. Furniture System Map tool (redesigned based on the system map tool from LeNS international network[1])), and sustainable benefits. A case study format has been designed based on the LeNS international network case study format to analyse relevant cases information. A further expert interview is conducted to go deeper into these cases. An interpretation of results is presented to better frame and specify the S.PSS approach for the furniture system.

**Results:** The case study analysis indicates that applying Sustainable Product-Service Systems (S.PSS) in the furniture sector can indeed bring win-win benefits, even though with some differences to the six general win-win S.PSS economic and environmental benefits. Some reflections are given concerning this approach in the Covid-19 pandemic crisis, starting from the assumption that S.PSS furniture can open access to the high quality and well-designed furniture to even low-income entrepreneurs and individuals.

**Discussion:** Finally, the research concludes by highlighting the crucial role of design in envisioning and design a new generation of sustainable furniture systems. This research is specially related to 'SDG 12 responsible consumption and production + target 12.6 encourage companies to adopt sustainable practices'. This analysis provides new visions of applying S.PSS to the furniture sector and brings six win-win economic and environmental benefits into the furniture sector.

[1]<http://www.lens-international.org/>

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# **5. Production, Consumption and Innovation**

## **5c. Circular economy**

## Minimization or precaution for sanitary waste? Answers from life cycle assessment studies.

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### Abstract

Waste management is a hot topic today: it requires careful reflections to solve the great dilemma between waste minimization, coherently with circular approach, and risk reduction for workers and citizens, coherently with precaution principle. Within this dilemma, sanitary waste is very critical: it involves ad hoc collection, transportation and pre-treatment processes that require huge costs and produce high environmental impacts which are however inevitable to reduce the danger to human health in final treatment steps. At the same time, reduction of sanitary waste is not always possible due to the delicate operating procedures in which they are generated. Moreover, the quantity of sanitary waste is progressively increasing by virtue of disposable therapeutic and surgical techniques that ensure high sterility.

In the last decade several scientists have been asking questions about convenience of reduction of environmental impacts related sanitary waste, decreasing the quantity produced and testing recycling options. However, the need to guarantee safe health and medical procedures and precautionary methods of waste collection and treatment remains, in order to avoid creating greater risks for public health. Faced with the dilemma of reducing waste in favor of the circular economy or increasing it in favor of the precaution perspective, the life cycle approach can be the keystone. This is what is highlighted by the critical review of recent scientific literature inherent of themes “circular economy” and “precaution” in “sanitary waste management” through the “life cycle assessment”. From the literature analysis it is possible to identify the main environmental impacts associated with sanitary waste, the most common treatment options, and the environmental benefits derived by their recycling. Results demonstrate that environmental impact evaluation through the entire life cycle of sanitary waste can be resolute to understand if and how reduction or reuse or recycling is environmentally convenient rather than replacement of sanitary materials and products.

The research conclusions can support decision making in implementing more effective strategies to choose the best compromise between precaution and minimization about sanitary waste, to safeguard the health both of environment, workers and citizens, pursuing at the same time the SDGs “sustainable cities and communities” and “good health”.

## Quality in Circular Economy: Consumer and the perceived value.

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**Fatima Vidal**

### Abstract

The concept of Circular Economy has become a widely used concept among scholars and practitioners with great variety of definitions, depending on the sector or field, which it refers. In the latest literature reviews Circular Economy has been defined as a paradigm of sustainability, which aims to replace the concept of “end-of-life” for the concept that encompasses the 4R-Framework (reduce, reuse, recycle and recover) and all its variants, operating at different levels such as micro, meso or macro, with the ultimate goal of achieving sustainable development, which at the same time brings environmental, economic and social improvement to current and future generations (Kirchherr et al. (2017)).

However, in order to achieve this new paradigm, circular economy needs the implication and cooperation of consumers. Consumers need to be involved throughout the value chain, being aware that circular products have higher value than those produced in linear systems, even when it is made from secondary materials.

Based on this concept, the aim of this article is to analyse the perception of quality of consumers in the products/services offered through the Circular Economy. Not in a comparative way between a product/service obtained in a circular way versus the same obtained in a linear system, but as the value perceived by the consumer. Therefore, a review of the literature of three key concepts will be carried out: Circular Economy, quality and consumer, in order to obtain a clear idea of the quality perceived by the consumer and relate it directly to the perceived value. Once reviewed, it is planned to give rise to

the quality concept as a perceived value in the field of the circular economy and thus be able to develop this concept and its relevance within the paradigm of the circular economy.

Regarding the SDG approved by the United Nations, this paper is related to the SDG nr. 12 Responsible Consumption and Production by target 12.5 and nr. 13 Climate Action by target 13.3.

The article fits with the topic of the conference "Accelerating progress towards the SDGs in times of crisis" as it aims to develop knowledge and increase awareness of citizens, as agents-consumers, can promote more responsible and sustainable consumption and production.

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## Network orchestration in sustainability transitions – first insights from the circular economy transition in the Dutch textile sector

Dr. Julia Planko, Dr. Lori DiVito, Dr. Iteke van Hille, Dr. Jason Good, Dr. Ingrid Wakkee, Dr. Jakomijn van Wijk, Dr. Richard Martina, Tuanh Lam, Alexandro Carolina

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### Abstract

For the global fashion system to become more sustainable and to make better use of this planet's finite resources, a sustainability transition is necessary, which includes the incorporation of circular economy principles in production and consumption patterns. Sustainability transitions require deeply rooted changes of socio-technical systems, which includes changes in artefacts, technology, regulations, production practices and user behavior. In addition to developing products and technologies that enable a more sustainable and circular use of resources, actors need to strive for socio-cultural changes, such as user perception and behavior, as well as creating markets.

A wide range of actors is necessary to achieve these changes, such as government actors, companies, research institutions, NGOs and user groups. In different constellations, these actors collaborate in 'system-building networks' to achieve transition goals. Such goals could for instance be achieving enabling changes in regulation, co-creation of products, knowledge development, infrastructure development or market creation through innovative business-models or procurement policies.

System-building networks are managed or steered by so-called 'network orchestrators'. Network orchestrators assemble networks and manage their growth toward network-level collective gains. Because the outcome of a sustainability transition is often uncertain, network orchestrators need to navigate their networks in a changing environment towards evolving or changing goals. They try to align the goals of their network members in order to bundle efforts toward the transition goals they are working towards.

In this paper, we study the transition to circularity in the Dutch textile sector. We focus on the roles and functions of network orchestrators in the transition towards a circular textile industry. We use an embedded case study method. Four key networks in the Dutch fashion industry are studied, which are interlinked by their actors and their common vision to make the Dutch textile sector circular.

Preliminary findings are that system-building networks are orchestrated by not one, but two or more actors, which collaborate closely. There are several roles in network orchestration, and these can be distributed among several network actors. Examples of these roles are: Project manager, content driver, chairman, opinion leader, workshop facilitator, spokesperson.

Next to these roles, we also identified different functions that a network fulfills, for example knowledge exchange or coordination, business model development or connecting actors in the field. These functions are related to system-building goals, i.e. the networks fulfill a functionality in reaching certain

transition goals and thereby steering the sustainability transition in the textile sector. Our aim is to generate a typology of network orchestrator roles and connect these to network functions.

We contribute to the literature on network orchestration and the literature on sustainability transitions. Moreover, we generate insights for practitioners involved in circular economy transitions.

This paper is related to SDG 12, esp. 12.2. and 12.5. This contribution relates to the conference topic, because network orchestrators accelerate the progress toward SDGs by stimulating and enabling the transition to sustainable production and consumption patterns.

## Evolution of CE through IS in Spain: analysis of implementation strategies among different regions

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### Abstract

For the past few years, industrial symbiosis (IS) and more recently the circular economy (CE) and have become key factors for the generation of tools that stimulate the different economic sectors to integrate sustainability within their operation and business models. The industrial symbiosis (IS) framework at its core refers to exchanging waste with a focus on industrial facilities that deal with managers and other stakeholders within the value chain. This means that IS in the CE may be seen as a business model innovation to gain value from turning waste into valuable resource. These key factors are oriented to maintain the value of their resources along their value chain, so that a transition from a linear production system to circular systems could be achieved. This transition to a circular economy is also the goal of the European Commission's Green Deal as it will result in the increase of Europe's economic competitiveness, sustainability, resource efficiency and resource security. In some cases, CE has been implemented based on concepts such as the recovery and reintroduction of secondary materials in production and consumption activities in order to close the cycles and thus maintain the value of the materials. As part of the circular economy, industrial symbiosis is the way in which different industries cooperate for generation of networks in which those industries can work, exchange and share different resources in order to reduce the waste generated in each industry and add value to that resources.

In Spain, the development of these IS projects is becoming a priority for its autonomic communities which are developing plans and policies to help companies to recover their waste and secondary raw materials. Those projects are part of a broader circular strategy in the country, that has an objective of reduction of 30% the national consumption of materials in relation to GDP, taking as reference 2015 (España Circular 2030).

This document compares the situation of the IS projects in different autonomic Spanish communities. This analysis has been made by the investigation and identification of the projects conducted in each of the communities in order to identify the evolution from a linear to circular system through IS and how they have been integrated them within their regional strategies, its alignment with European Union objectives and their commitment to a new economic system Also interviews with agents that participate in those projects where conducted in order to identify which aspects are crucial within the development of project and what is their perspective regarding changing to a new economic system and its future challenges. According to the information gathered, this paper shows the actual situation of the autonomic Spanish communities and its principal characteristics regarding the circular economy and how they are made within the territory. The research shows how Spain is responding towards its responsibility to a sustainable economy.

SDG objectives and targets:

1. Ensure sustainable consumption and production patterns 12.5 & 12.7
2. Strengthen the means of implementation and revitalize the global partnership for sustainable development 17.6

## **Human Development in Circular Economy: a new conceptual framework for sustainability**

Dr. Luz Elba Torres-Guevara<sup>1</sup>, Miss Tatiana Rojas-González<sup>2</sup>, Mrs Nina Constanza Rodríguez-Correal<sup>3</sup>

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**Dr. Luz Elba Torres-Guevara**



**Miss Tatiana Rojas-González**

**Abstract**

In order to solve the problems related to deep economic and social inequalities and the mismanagement of natural resources, the Circular Economy (CE) has been proposed in recent years as a new paradigm of sustainable development capable of achieving the Sustainable Development Goals (SDGs). However, this model focuses on the traditional economic development (unlimited economic growth) and on the mitigation of environmental impacts only, leaving aside human development based on well-being, the development of being, and respect for different worldviews and cultures. Despite this, the understanding of circular systems as a new sustainability tool has encouraged many countries and international organizations to create and incorporate new policies that ensure the transition from linear to circular economy, believing it allows the achievement of all the SDGs, and the solution of social, economic, and environmental problems.

However, concern about the lack of social aspects in CE has led the scholars to the question of how CE addresses historical development problems, such as poverty, hunger, inequality, and injustice. Likewise, questions have arisen about what are the conceptual bases that support the CE model. To fill these social gaps, some scholars have developed proposals that seek to incorporate elements of development theories (e.g., Human Development-HD) in the CE model. In the same vein, this research delves further into the relationship between CE and HD, and asks how to incorporate into the CE model the social perspective of HD and Human Scale Development (HSD), particularly the concept of Buen Vivir? Thus, this research aims to develop a conceptual framework that integrates these concepts in the CE model. To achieve this goal, this research carried out a narrative literature review of 130 academic papers on CE, HD, and HSD, which allowed us to find common grounds to build a framework centered on the well-being of all people and the sustainability of the ecosystems

As a result of the research, we propose i) a conceptual framework that articulates to the current CE model the social elements of development, especially those related to the Buen Vivir, and ii) a tool to identify social indicators that allow assessing the impacts of CE on the people wellbeing. Thus, this framework would allow achieving just, and inclusive societies since it is centered on the satisfaction of needs, the expansion of capabilities, and the respect for nature. Likewise, we believe this framework would help to achieve at least those Sustainable Development Goals related to people and human rights such as no poverty, zero hunger, good health and well-being, quality education, and gender equality, besides those that are already covered by the classical vision of the CE.

Finally, we believe the proposed framework could accelerate the progress towards SDG in times of crisis by being a comprehensive proposal that understands not only the importance of development in social, economic, and environmental aspects but also the key role people and communities play in the thinking of the sustainability solutions.

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## MEASURING CIRCULARITY THROUGH LCA AND CE INDICATORS: A CASE OF AN ELECTRONIC EQUIPMENT

Dr Giovanni Mondello<sup>1,2</sup>, Prof Roberta Salomone<sup>3,2</sup>, Dr Teresa Maria Gulotta<sup>3,2</sup>, Ms Alessia Luna La Monica<sup>3</sup>

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### Abstract

During the last years, the concept of Circular Economy (CE) has become of crucial interest in public policies, business strategies and among the scientific community, due to the need of moving from a linear economy towards a system in which reducing resources use and considering wastes as valuable products is a priority. Nevertheless, among the international scientific literature focused on the measurement of CE at micro-level and, in particular, product level, there are contrasting ideas about the use of proper methods and indicators to be adopted for assessing circularity. The sector related to the electronics and electrical equipment is continuously focusing on producing and providing products characterized by durable materials, such as plastics and metals. Despite this, the disposal of electrical products, without following the bases of the CE concept, contributes to a higher amount of energy and resources used as well as to the loss of their embodied value. In this context, the early-stage study here presented is aimed to evaluate the circularity performance of a switchboard used for controlling an electric pump. In particular, the analysis is carried out by applying both, the Life Cycle Assessment (LCA) method and specific CE indicators commonly applied for assessing circularity at micro-level. In addition, the suitability of such method and indicators for evaluating CE performance of electrical equipment is also evaluated. The LCA is a standardized method that allows assessing the potential environmental impacts of a process, product, or service by following a life cycle approach, from raw materials extraction to the end of life. The assessment of product's circularity through LCA can be put in practice by including the so-called avoided productions in the analysis. The inclusion of the avoided products means evaluating the environmental benefits due to the substitution of a conventional product with an alternative one that satisfy the same function. Regarding the CE indicators, the analysis is focused on the application of the Material Circularity Indicator (MCI) developed by the Ellen MacArthur Foundation (EMF), Material Reutilization Score (MRS) provided by the Cradle-to-Cradle Products Innovation Institute (C2C) and Circular Transition Indicators (CTI) proposed by the World Business Council for Sustainable Development (WBCSD). The data adopted for carrying out the analysis and related to the production stage and transport activities of the switchboard and its components have been directly obtained through questionnaires submitted to a company operating in Sicily (Italy). The raw materials used in the production process are from both virgin and recycled sources. On the contrary, data related to the end-of-life stage has been obtained by means of scientific literature and assumptions. The expected results will firstly allow to evaluate the environmental and circularity performance of the product object of the analysis, secondly, to highlight the usefulness of the LCA method in measuring CE strategies, and, thirdly, to provide a critical discussion related to the combined application of the LCA method and CE indicators.

## Weaving circular ties: Social networks as empowering mechanisms for the social enterprise-led and inclusive circular economy development at the city scale

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### Abstract

Circular economy (CE) is a transformative paradigm, which has received a lot of attention among policy-makers and practitioners in recent years, and is rooted in concepts such as resource efficiency and cleaner production. Despite the rapid growth in research on the CE, the dominant discourse surrounding the development of the CE in practice primarily focuses on business-as-usual and resource-related economic processes whilst overlooking social and relational aspects. This paper thus proposes a more holistic approach to the CE, which recognizes the role of mission-driven social enterprises (SEs) and their networks, viewed together as circulatory systems, in harnessing the socio-ecological premises of CE thinking and practice. In doing so, it draws upon the Social Network Analysis approach and semi-structured interviews with 38 SEs spanning the food, textile & crafts, wood & furniture, electronics, housing, hygiene & cleaning, elderly/women and ethnic minorities sectors in the city of Hull, UK.

In focusing on SE networks, this paper acknowledges the importance of the relational context for the local development of the CE. This is because the quality and provision of SEs' products and services depend on their cross- and multi-sectoral relationships with the private, public and social sector organizations. More importantly, SE networks can be 'woven' in such a fashion that they foster knowledge spillovers and enable resource flows for the local development of the CE. This paper thus represents 'ego-networks' (i.e. ties of each particular SE) that are embedded within the broader SE landscape. It then explores how these same network constellations not only embody, but could also be potentially reconstructed to embody symbiotic relationships between environmentally-, CE-, socially- and/or commercially-oriented enterprises in order to foster socially inclusive CE development. We contend that integrating considerations of SEs' organizational attributes and their social and spatial positioning, which, in turn, impact the content of SEs' ties and network heterogeneity, offers new insights into the underlying power-relations and associated variegated levels of trust within the social circular enterprise ecosystem, yet in a given institutional context. Crucially, these aspects need to be scrutinized due to their impact on SEs' performance outcomes and, ultimately, on the development of a socially inclusive CE at the urban scale.

**Key words:** circular economy; social enterprise; networks; social network analysis; social inclusion

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## Proposing an ex-ante company-level CE assessment framework: design and validation

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**Erik Roos Lindgreen**

### Abstract

Companies require assistance in assessing the sustainability of circular solutions prior to strategic decisions on their introduction. This article proposes an ex-ante, holistic circular economy (CE) assessment framework SCEIA (Strategic Circular Economy Impact Assessment) at company level, using a mixed-methods approach. First, the framework's normative core and objectives are formulated. A critical literature review method is used to position this article's view that CE, as a concept, is valuable only when contributing positively to all three dimensions of SD. Secondly, a descriptive literature review of previously applied methods in CE assessment is used to design the framework's basic methodological structure, matching its previously defined normative core and objectives. The selected methods comprise a combination of the existing methods of Life Cycle Assessment (LCA), Life Cycle Costing (LCC), Social Life Cycle Assessment (S-LCA) and Material Flow Analysis (MFA), leading to a wide selection of to-be-applied indicators. These indicators can subsequently be tailored and simplified accordingly to the organization's goals at hand through a materiality assessment (MA). A Multi Criteria Decision Analysis (MCDA) TOPSIS approach is optional to assist in decision-making. Thirdly, the procedure of using the framework in a decision-making process at the strategic level is made explicit by connecting it to existing strategic decision-making frameworks and specifying its application routine. The CE assessment framework is designed to prevent trade-offs and burden shifting, and to deliver valuable insights in the impacts of company-level CE activities. It will be validated in next research steps.

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## **"Prato Circular City": an integrated strategy to accelerate the circular urban transition through innovation, regeneration, cohesion**

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### **Abstract**

Accelerating the transition towards a circular economy is an important challenge for institutions, cities, production clusters, organizations and citizens. Alongside the many virtuous initiatives that exist at a micro level, it is essential to encourage the development and affirmation of increasingly systemic and integrated circular models aimed at sustainability on a larger scale. Cities are the main drivers of economic development and the production districts introduce a bio-uniqueness principle among the urban and industrial dimension at a territorial level. The circular economy offers great opportunities for innovation and sustainability of cities and their production systems. Enabling organizations to identify these opportunities can help the transition acceleration. This also means enhancing all the initiatives developed by virtuous organizations at micro level translating them into a wider system, where that symbiotic phenomena are favoured. The development of more sustainable consumption patterns among citizens is an additional opportunity to move the economy to a circular direction. Cities are able to motivate and push their citizens in this direction.

At urban level, circular economy principles need to be managed in an integrated manner by policy makers and relevant stakeholders. In order to overcome barriers, our proposal to local policy makers is to approach to the circular economy taking into account innovation, regeneration, cohesion.

Innovation means rethinking production processes in a circular way considering the product's life cycle. A better legislation can facilitate the recovery and reuse of waste and by-products, better funding can help to adopt less impactful technologies, better knowledge can affect organizations on the one hand and citizens on the other to drive more informed consumption.

Regeneration means unused or underused spaces and buildings must be rethought and destined for new productive, recreational and social functions. Better legislation can help in temporary or permanent change of destination, better funding can contribute to the necessary adjustments, and better knowledge can push more aware citizens to reclaim "forgotten" spaces.

Cohesion, by promoting participatory processes and active citizenship within the cities, may contribute to improving the quality of life and collaboration at all levels.

This paper presents the integrated strategy promoted by the Municipality of Prato in order to accelerate the city's transition towards a circular economy. The so-called "Prato Circular City" is a local public strategy, supported by scientific supervision, able to involve public and private local stakeholders, also favouring connection with upper level of decision makers. The territory of Prato is strongly characterized by a homogeneous production district (e.g. textile and clothes production) which is a fertile ground for

this transition. Prato Circular City explores four relevant vertical themes, and it defines an innovative model of governance of the circular economy transition at local level

The paper relates mainly to SDG 11, target 11.a. The health emergency due to Covid-19 forces the reconsideration of lifestyles and coexistence, the training system, the ways of using spaces, and our production processes. Pushing the transition to circular economy at urban level could contribute in accelerating progress towards SDGs.

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## Analyzing and contrasting the discourses and policies of the circular economy in different European cities

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### Abstract

The Circular Economy (CE) concept has recently become a popular discourse in the public private, academic and social sectors alike. However, the concept remains contested, often unclear and ill-defined, and its practical implementation remains a large societal challenge. Cities and urban areas play a central role in the CE as they are directly in charge of key sustainability policies such as waste management, water provision, transportation, housing, industrial development and energy and infrastructure provision. Urban circular economy policies thus have a key impact on the metabolic stocks and flows of resources, waste, capital, labor, knowledge, energy and materials that societies process (the so-called urban metabolism). Considering that urban areas currently consume 60–80% of natural resources, produce 50% of global waste and 75% of greenhouse gas emissions, CE policies at the city level are crucial to address the manifold social-ecological challenges of the 21<sup>st</sup> century. In this context, European cities have developed a wide diversity of new CE policies and projects, with many different and often contrasting CE discourses and perspectives. Yet these initiatives remain poorly researched, compared and critically analyzed. This research thus aims to address this research gap by analyzing and comparing the policies and discourses of the CE in different European cities in order to draw key lessons and recommendations. It does so by conducting a critical literature review on CE policies in cities, as well as a comparative policy and discourse analysis of city level CE plans and strategies through document analysis and interviews with various societal actors. The literature review, case-selection and data collection will be finalized by June 2021. At the ISDRS conference first findings will be reported. We expect that this research will help improve the understanding of CE implementation at the city scale and lead to valuable insights for academics and practitioners alike.

### Keywords:

Circular economy, urban planning, circular society, policy analysis, discourse analysis, urban metabolism, degrowth, sustainability.

## Keeping plastics packaging in the loop – policies and supply chain structures

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### Abstract

Among the many effects of the COVID19 pandemic, increasing use and appreciation of plastics packaging (e.g. due to hygienic aspects) has been observed. This trend is currently reinforcing the challenges for EU member states to reach the European Commission's plastics packaging waste treatment targets, which are set to a recycling rate of 50% by 2025, whereby material is considered recycled as soon as it enters an effective material recycling process and if the material is recycled back into plastic. At the same time, for low-value products such as plastic packaging, little economic incentive to promote recycling exists. Therefore, primary plastics are usually preferred over recycled ones. It is thus the aim of this study to examine external factors, such as political factors or power structures, since they are of particular importance in systems that favour the use of primary materials from an economic perspective.

To do so, the study uses a two-step real-time Delphi method with experts (35 in round 1, 20 in round 2) along the supply chain of plastics packaging. The real-time Delphi method is an adaptation of the conventional Delphi method, which allows for real-time and dynamic interaction between participants. While in the first round, different factors were collected and rated, the second round served as prioritization and confirmation.

Results suggest that policy support plays a crucial role in the plastic packaging sector. Specifically, standardization and harmonization, tax policy and fees, extended producer responsibility and deposit schemes, as well as different quotas or bans are seen as potential leverage points towards a more efficient circular plastic packaging economy. Respondents also provided specific suggestions for each category. For example, the intended harmonization of extended producer responsibility schemes is perceived as an important legislative factor, which – if combined with ecomodulation of fees – can foster a circular transition. Structural changes could be accompanied by further monetary (dis-)incentives (such as higher costs for waste incineration or an increased CO<sub>2</sub>-tax for raw oil) or quotas (such as minimum recycled content quota, or incineration ban). The results furthermore revealed insights on power structures within the plastic packaging supply chain. Downstream actors such as waste separators or recyclers do, despite their importance for a circular plastic packaging economy, have only limited decision-making power within the supply chain. Therefore, a more intensive exchange between those downstream and upstream actors, such as plastics converters and brands, is encouraged. Additionally, it was found that practitioners views on circular economy options other than recycling remain limited. The results of this study provide useful insights for the research community (e.g. use of the real-time Delphi method, policy development), as well as for policymakers and practitioners.

## **Circular economy implementation strategies towards circular economy operationalization: transition perspectives from the meso-level in Spain.**

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### **Abstract**

The circular economy (CE) is still struggling to move away from the current linear system and make the shift towards a factual sustainable development that brings economic prosperity, social justice and environment protection. Despite the reasonable benefits that this paradigm shift towards the CE might deliver to society, the endless pursuit of continue economic growth is challenging the materialization of closed-loop systems of resources and energy with lower carbon emissions. As material extraction, processing and handling are accountable for large chunk of emissions, CE strategies are even more necessary for emissions reduction through a systemic transformation of the current consumption and production pattern. This calls for solutions with a systemic approach involving a plurality of actors, namely policymakers and businesses in coordinated strategies that transforms narrative into practice. In order to do so, an approach that brings initiatives aimed to foster systemic action along with rigorous collaboration with multiple stakeholders across and within value chains will be particular key for a circular transition to materialize. In particular, transition theory could be used by stakeholders (i.e., policymakers and businesses) to coordinate and mobilize capabilities to solve problems by emphasizing in certain initiatives wherein all the stakeholders within it may execute such CE implementation activities. Thus, this study aimed to analyse possibilities for deploying activities at the short-term to mobilize results towards a CE model by applying transition management theory. This study carried out multiple semi-structured interviews among CE stakeholders to explore what implementation activities might transform strategies into practice in a certain circular transition scenario (i.e., industrial symbiosis). Multiple stakeholders (policymakers and businesses) were interviewed regarding the implementation activities that must be either practised, tried out or showcased based on a set of strategies for this transition scenario that were previously prioritised for this study. The results were analysed through MAXQDA software to seek new insights on how certain experiments and actions towards the CE can be upscaled to established practices. Therefore, the transitions might be fully deployed from both the bottom-up and top-down. Transition management theory offers a good basis to design and adapt policies and strategic frameworks in which stakeholders explore novel possibilities to a more sustainable mode of production and consumption aligned with the sustainable development goal 12 which can guarantee an outcome that goes from narrative into practice.

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## ARE FOOD PRODUCTION INNOVATIONS ALWAYS SUSTAINABLE? AN EXPLORATORY ANALYSIS OF AQUAPONIC SYSTEMS

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### Abstract

The continuous increase in food demand related to population growth, together with the inefficient use of resources for food production, requires a transition and acceleration progress towards Sustainable Development Goals, especially in time of crisis. The agri-food system is facing global environmental, social, and economic challenges that require innovative solutions. Aquaculture systems have become imperative because fish demand is rapidly increasing. Since they generate high amounts of nitrogenic and phosphoric wastewater, innovative pollutants abatement systems are needed.

Aquaponics is one of them and consists of a food production system that, integrating hydroponic production and aquaculture, uses nutrient-rich water from fish culture to irrigate and fertilize vegetables.

Due to its characteristics, aquaponics is therefore a sustainable food production system with less dependence on energy and material inputs compared to conventional production systems; specifically, this technology involves the cultivation of vegetables without the use of soil and with a significant decrease in water consumption.

The main aim of this study is to assess if aquaponics is able to increase the overall economic value of both aquaculture and hydroponics products, while closing the food-water-energy cycle within a circular bio-based economy. Numerous different fish species have been reported to be produced in commercial aquaponics in Europe, but feasibility on an industrial or small scale and its competitive advantage is still debated.

This study is based on an exploratory methodology to assess the sustainability of aquaponics systems compared to the traditional aquaculture and agriculture systems, in relation to specific fish and crops and to examine whether economic aspects may facilitate or humper the further development of aquaponics as a technology for sustainable food production. We will also discuss possible scenarios emerging by the state of implementation of these food production systems.

Aquaponics research could be surely considered part of a sustainability strategy. Considering that aquaponics relaxes the pressure on natural resources, if government implemented effective policies to ensure large-scale plants, a real and eco-sustainable access to food could be achieved. Aquaponics

systems, however, should be monitored and submitted to strong regulations regarding the food safety operational risks.

The study represents an original contribution to understand if aquaponics is a change driver in itself strong enough to bring about a radical shift towards responsible consumption and production (SDG 12), or if it is able to generate positive effects only in particular context.

## Size matters in a Circular Economy: a practical framework applying Futures Literacy to support Small and Medium sized Enterprises (SMEs)

Ricardo Weigend Rodríguez<sup>1</sup>, Giulia Viero<sup>2</sup>, Graciela Guadarrama<sup>3</sup>, Tanja Schindler<sup>3</sup>, Francesco Pomponi<sup>1</sup>

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### Abstract

The Circular Economy (CE) is conceived by many as paramount to decouple economic growth from environmental impacts and resource depletion. The implementation of this economic paradigm in the private sector is challenging, as it requires substantial changes at the strategic level. However, while SMEs represent 99% of all businesses and 67% of employment in Europe, the available support for a CE transition has been mainly focused on large corporations. Therefore, the backbone of the European economy might be left out by the CE if tailored solutions are not implemented for SMEs. Furthermore, most strategic decision-making activities lack Futures Literacy (FL): the capability to understand the role that the future plays in influencing the present and the skills to generate the imaginary futures to catalyse change today.

Through a literature review complemented by a snowballing technique we reviewed the available CE and FL approaches and analysed further the most prominent of these frameworks. As the available frameworks lack guidance for their implementation we developed an integrated and systematic process to make it more practical and applicable, especially for those SMEs in which these CE and Futures' concepts are new.

The combination of foresight methods and a futures mindset could contribute to a successful transition towards more Sustainable Futures by (i) understanding the different concept and meanings of the term future(s); (ii) exploring possible future pathways for better decision-making in the present; and (iii) building resilience for unexpected events to survive and stay future-relevant in uncertain times. The developed process provides a customizable approach to SMEs, making a contribution to both disciplines' literature. This paper attempts to initiate a discussion on the relation between FL, CE and the way in which SMEs can thrive with the support and input of both communities.

We expect that this research would influence the interface between top-down policy-making and bottom-up industrial movement as a valuable hands-on guidance for the development and enhancement of policies that focus on supporting the wide number of existing and future SMEs in Europe and around the globe.

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## Universities driving sustainability: Exploring pathways to a circular economy of plastics in a time of crisis

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**Jana Busch**

### **Abstract**

The Covid-19 crisis struck as universities and other organisations were responding to an international environmental crisis of plastic pollution. Concern for marine pollution amongst other impacts provoked both practical and research examinations of pathways to reducing plastic use. The emergence of a further crisis, with highly visible impacts (literally a matter of life and death), has sparked a renaissance for single-use plastics. However, when the Covid-19 crisis arose, the environmental crisis was not resolved and the need for sustainable change remains unchanged. What are the implications for a university campus that went to great lengths to reduce plastic use on campus in the last years? The study explores the constitution, drivers and challenges of a circular transition on campus. Further, the research examines what and how practices got interrupted by the pandemic, how the campus recovers, and sustainability efforts resumed. In the research project, the University of Hull is used as case study to explore social practices on campus concerning sustainability and circular economy. The research project builds on practice theory and ethnographic research methods. Observation methods on campus are utilized, interviews and surveys conducted with the university population and experts and affiliated stakeholders of the university are included in the data collection. First findings at the University of Hull show that established environmental practices introduced by plastics initiatives in recent years gave way to the implementation of new hygiene measures. At the moment it seems that the environmental focus is surpassed and incidental next to the immediate health concerns.

The research project relates to the implementation of SDGs **Target 11.6** 'By 2030, reduce the adverse per capita environmental impact of cities, including by paying special attention to air quality and municipal and other waste management' and **Target 12.5** 'By 2030, substantially reduce waste generation through prevention, reduction, recycling and reuse. The research project relates to the Conference's theme by exploring progress towards sustainable development in times of crisis in the context of university campuses.

Keywords: Circular economy, plastics, campus sustainability, social practice theory

## Role of Green Innovative Projects in Achieving the Sustainable Development Goals in Nigeria

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### Abstract

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The role of youths in providing sustainable solutions and the driving sustainable development initiatives in Nigeria cannot be overemphasised. The intellectual and youthful energy of these young people when harnessed can create novel and innovative goods, products, systems and services that can be competitively priced to meet and satisfy societal needs through restorative design; promotes the use of renewable energy, eliminates the use of toxic chemicals, maximises wastes through the superior design of materials, products, systems, and business models and achieving the global goals. In the spirit of leaving no one behind, it is apposite to know that everyone has the duty of providing sustainable solutions to the protracted sustainability challenges in Nigeria. The Green Innovative Challenge covers a wide variety of undertakings that mostly focused on rethink, refuse, reduce, repurpose, reuse and recycle of waste among others. Furthermore, the high quality of life and liveability are demanded in cities through rapid urbanization and massive population growth has led to divergent challenges such as the increase in the poverty rate, the incidence of disease outbreak as a result of indiscriminate waste management, economic hardship and unemployment, slum residency, social inequality and instability, incessant crimes environmental and climate change challenges among others which threaten global green growth and green economy. It is, therefore, imperative to raise green innovative champions to tackle environmental challenges and create innovative solutions to drive sustainable development and green economy which is the core of the Sustainable Development Goals (SDGs). Therefore, the green projects aim at entrenching the culture of caring for the environment in the students, and also to promote youth entrepreneurship along with green businesses.

Keywords:

Green business, green growth and green economy, sustainability, Sustainable Development Goals (SDGs) waste management



## Pathways of the circular economy in Luxembourg: Towards business as usual or inclusiveness?

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### Abstract

The circular economy is one of the currently discussed frameworks in research to achieve sustainable development. Despite many theoretical drawbacks, the circular economy serves multiple governments in Europe and elsewhere as an umbrella concept for economic developments that are people, planet, and profit friendly. In Luxembourg, the circular economy was qualitatively analysed over the past four years from multiple perspectives. Based on 75 exploratory and semi-structured interviews, participation in local events and extensive documentary material, the analysis reveals three main interpretations. First, the circular economy in Luxembourg follows an entrepreneurial-functional approach, driven by economic interests. Second, the circular economy's understanding as a tool towards sustainable development through technology, digitalisation, and connectivity is path-dependent and fits well with other prominent buzzwords as green growth, eco-innovation, cleantech, smart buildings, smart cities. Third, the implementation of circular economy projects are public-private-partnerships that testify how blurred the lines between the civil society, the state, and the private sector are. These findings conclude that the circular economy is just another buzzword-concept that serves policy in Luxembourg to align its economic diversification policy. For the ISDRS 2021 conference presentation, new business models based on the product as a service principle will serve as examples to illustrate ongoing transitions towards a circular economy in Luxembourg. So far, implementations that are already in operation mainly focus on the transportation sector and provide sharing, pooling or pay per use solutions. However, some authors suggest complementing Luxembourg's strategy towards a circular economy with rationales from, e.g. the post-growth/degrowth debates to comply more comprehensively with the sustainable development goals. The contribution will discuss how alternative approaches such as the concept of sufficiency or the sharing economy could contribute to an inclusive circular economy in Luxembourg. Different scenarios will present and discuss prospects of the circular economy's future, considering the viewpoints highlighted by the interview data and other studies.

## **Synergies and trade-offs between European bioeconomy strategies and Sustainable Development Goals (SDGs): Development of a multi-criteria decision analysis framework**

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### **Abstract**

An increasing amount of countries in the European Union (EU) have now commenced the implementation of bioeconomy strategies and documented these efforts in their national strategy papers. The bioeconomy is further at the center of European sustainable development strategies and contributes to many Sustainable Development Goals (SDGs). Due to the integrated nature of SDGs and the associated targets, progress towards one target is also linked through complex feedback loops to other targets. We outline which SDGs and targets need to be prioritized when implementing a bioeconomy according to EU policy concepts. We, therefore, apply a multi-criteria analysis decision framework that assesses interlinkages between SDGs and bioeconomy indicators. The methodological approach is a combination of recent publications and guidelines on SDG and bioeconomy implementations. We apply a range of complementary qualitative and quantitative methods within the assessment framework, including baseline assessment, benchmarking, correlation analyses, literature review, network analyses, and policy gap analysis. For our data-driven analyses, we develop a unified SDG database and fill the *FAO Bioeconomy indicator framework* with data from various official sources. On the one hand, our results will add to the debate on how bioeconomy implementation strategies in the EU benefit or hinder the fulfillment of the 2030 Agenda and where prioritization is needed. And on the other hand, how the approach to achieve the SDGs by 2030 in Europe can contribute to achieving EU policy bioeconomy priorities. Since the world is currently not on track to meet the SDGs until 2030, bioeconomy strategies can function as enablers to drive for rapid progress. However, an unsustainable bioeconomy can certainly hinder those synergistic developments. Therefore, we detect those bioeconomy and sustainable development strategies that cause trade-offs and require revision. This creates intervention points for a successful implementation of the bioeconomy and 2030 Agenda in the EU.

## Circular Economy in the Event Sector: A Framework for Circular Festivals

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### Abstract

The events industry is a very competitive and continuously growing sector, capable of playing a fundamental role in the transformation and development of the territories. At the same time, the sector contributes considerably to the environmental problem, mainly in terms of the use of energy, waste produced, emissions, water usage, food waste, and noise. For these reasons, many players in the sector have therefore decided to start adopting tools to measure their environmental impact and to reduce it. One of the strategies that companies are evaluating to deal with the adverse effects caused by the event industry is Circular Economy (CE). CE is an alternative model regenerative by design, based on renewable sources, and where the concept of waste is replaced by that of the resource. In light of the above, this paper investigates the possibility of applying the principles of the circular economy to the event sector. Particularly, this paper deals with a specific type of events that are very widespread and therefore cause significant environmental consequences: festivals.

As a matter of fact, festivals to continue to thrive over time should adopt a circular approach, trying to minimize the use of resources and preserving the value produced for as long as possible.

The aim of this work is therefore to propose a model for the development of a circular events industry. Particularly, for the organization and management of a circular festival throughout its entire life cycle. Firstly, the paper reviews significant circular economy initiatives for the festivals industry. Then, a framework to systematize circular economy practices applicable in the sector has been proposed. The methodology adopted is based on the construction of a matrix built on three variables: Rs of CE, festivals' phases, and environmental aspects. In particular, as regards the chosen Rs, a study of the existing literature was first carried out, considering that several authors have adopted and defined different R frameworks. As regards events' phases, an attempt was made to reproduce the life cycle of an event. Finally, the selection of the environmental aspects was based in part on data regarding the major environmental impacts of festivals and in part on the indications provided by ISO 20121. Once the framework is developed it should be possible to have some insights on the impact of CE principles on festivals management and organization and on which are the areas that require greater attention in terms of research and investments to enhance a more sustainable festival sector.

SDG12 - Target 12.2: Sustainable management and use of natural resources - In 2020, the events sector was hit by an unprecedented crisis following the COVID-19 pandemic. The events sector to restart post-COVID is becoming more aware of the fact that it contributes considerably to the environmental problem, in particular through travels to events' venues, the use of energy, and the production of waste. Many players in the sector have therefore decided to start adopting tools to measure their environmental impact and to reduce it.

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## **Circular economy as a postulate of non-financial reporting in the SME sector, a way to accelerate the implementation of SGDs**

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### **Abstract**

In accordance with the applicable legal regulations, the disclosure of non-financial information is an obligation imposed on public interest entities and large companies (Directive 2014/95 / EU). This is primarily about key non-financial performance indicators related to the company's operations and information on employee issues and the natural environment. In the course of their activities, the above-mentioned entities cooperate with enterprises from the SME sector, which means that it is not possible to effectively implement the applicable regulations on non-financial reporting without involving micro, small and medium-sized enterprises in this process. The only solution that makes it possible to implement the objectives underlying the above-mentioned legal regulations is the requirement that non-financial reporting should cover the entire production chain, in line with the concept of a circular economy that takes into account all stages of the product life cycle, starting from its design, through production, consumption, collection. waste until its management. The aim of the study is to identify the need to implement non-financial reporting in the reporting of micro, small and medium-sized enterprises in the aspect of the circular economy. The research method used was the recognition of regulations in the field of non-financial reporting and a review of domestic and foreign literature (IFAC, 2017; Thompson P., 2019; Weber, T., Stuchtey, M. (Hrsg.), 2019; GRI, IOE, , Big Impact - Making the Case for SME Sustainability Reporting; Deloitte, 2018). It also presents the main conclusions of a report published by the European Federation of Accountants and Auditors for SMEs (EFAA) on the study of non-financial reporting requirements for the SME sector in Europe (EFAA, Survey, 2018). The summary of the considerations are recommendations for micro, small and medium-sized enterprises and the identification of the need to develop research in this area, taking into account the fact that the SME sector has a great influence on the implementation of sustainable development goals in large entities. The postulate of non-financial reporting in the SME sector, in line with the assumptions of the circular economy, may be an important and effective action supporting acceleration of the implementation of SGDs.

# **5. Production, Consumption and Innovation**

**5d. Value chains and trade**

## Using Input-Output Tables to Uncover Sustainable & Innovative Clusters in the German Regional Economy

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### Abstract

The production of goods and services of an economy is made possible through a dense network of collaboration. Thus, economies can be understood as complex systems.

Input-output (I-O) tables offer detailed insights into interactions between sectors in an economy. Also, I-O tables offer useful data to analyze economic properties by means of the growing field of network science. Essentially, I-O tables can be interpreted as directed and weighted networks where each sector serves as a node and every I-O relation an edge between sectors. This enables the use of tools from graph as well as network theory to analyse properties of the economic production network.

This work focuses on finding clusters in the German production network and studying its regional properties. For this purpose, we use a highly regional disaggregated version of the German I-O table by Krebs (2020) which connects all 402 German counties (NUTS3) across 17 economic sectors in an interregional I-O table.

However, the massive data resulting from this table is not trivial to analyze. We reduce this complexity by employing the map equation framework to find clusters in the German I-O network and, most importantly, how these clusters interact with each other (Rosvallet al., 2009). Focusing on clusters rather than single sector/ region combinations enables us to account for the complex interactions in modern established production networks in highly industrialised economies. Furthermore, we are able to study properties of the resulting clusters, such as their spatial, innovative, and sustainability properties.

Consequently, the first step of analysis gathers descriptive information about the clusters found by the infomap algorithm. Here, we especially focus on the regional and sectoral distribution between and within clusters. As a next step, we analyze how clusters perform on dimensions of sustainability. This comprises the use of environmental accounts, like energy uses as well as CO<sub>2</sub> emissions, computed for the WIOD (Corsatea et al., 2000).

Also, we analyse innovative capacities for clusters through assessing real price returns of industries combined with their respective output multipliers (McNerney et al., 2018). From combining measures for sustainability and innovative capacities of clusters, we can assess if these predict the greening of trade within the German production network.

This work directly connects to the Sustainable Development Goals 9 (Target 9.2.) and 12 (Target 12.2) through assessing measures of sustainability and innovation for the production network within a

highly industrialised country. Thus, we assess which sectors and regions within the German production network show capabilities to foster its greening.

## **Sustainable Development Goals: A stakeholder approach by Indian businesses to the agenda 2030**

Mr Avinash Pratap Singh, Dr Zillur Rahman

Indian Institute of Technology Roorkee, Roorkee, India



**Mr Avinash Pratap Singh**



**Dr Zillur Rahman**

### **Abstract**

India is home to one-sixth of the world population. Achieving the United Nations Sustainable Development Goals (SDGs) by 2030 is unimaginable without India's participation. Government of India is committed to the SDGs and seeks active participation of all stakeholders. Businesses will have a vital role

in realising agenda 2030 as they have the resources and capabilities to stimulate SDGs through innovation, research, technology, funding and employment. SDGs provide companies with the opportunity to deliver solutions to the world's leading challenges. Agenda 2030 was set by the collective effort of all stakeholders including government, society and businesses. Transforming these challenges into opportunities requires the participation of all concerned stakeholders. Stakeholder involvement is important in the planning, implementation, and review of corporate actions on the SDGs. This study examines the stakeholder approach adopted by the top 100 companies by market capitalisation in India to accomplish SDGs. This analysis uses published reports (annual reports, integrated reports, sustainability reports, CSR reports) and other information provided on companies websites. Our finding reveals the key actions, drivers and barriers for Indian companies engaged in addressing the SDGs. It also highlights the top SDGs addressed through corporate actions in India, and provides a broader perspective on stakeholder engagement for SDGs by businesses. We found that the accomplishment of the SDGs depends on the company's ability to develop more innovative and inclusive business models. SDGs offer businesses unprecedented economic prospects through new markets, new products and services. By developing solutions for the SDGs, companies can find new growth opportunities and reduce the risks associated with their business profiles. Investors are interested in understanding how businesses are contributing to the SDGs and creating an impact. Not engaging with the SDGs can have major negative consequences for businesses and their finances. Our analysis has several implications for researchers and practitioners.

## MANAGING SUSTAINABILITY AND RESILIENCE: A MULTI-INDICATOR FRAMEWORK IN THE ITALIAN WINE SUPPLY CHAIN CONTEXT

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### Abstract

Measuring supply chain performance is a relevant topic in the sustainable development literature. Since the onset of COVID-19, demand shocks have troubled supply chains, highlighting their vulnerabilities and their lack of resilience. Despite the negative trend observed in exports and the decline in domestic demand, the Italian wine supply chain was resilient, and the original prices remained essentially stable, especially thanks to the fact that it is a storable product. Regardless of which performance should be measured, and how it should be measured, a poorly performing supply chain can destroy value for its actors, especially in terms of market share.

The lack of interest in the wine supply chain is mainly due to both the traditional character of the industrial and logistical processes; and the product target audience interested in taste experiencing. Evaluating the performance of the wine supply chain, beyond measuring production yields or wine quality, requires the adoption of a life cycle perspective. Wine supply chain sustainability can be achieved only through the total visibility of the flow of products and information designed to reduce costs and improve operational performance.

The target of actors' decisions throughout the supply chain should be the convergence of economic, social and environmental outcomes that can build commercially viable outcomes. The study proposes a comprehensive integrated framework of indicators currently used in sustainable and resilient supply chain paradigms, developed under the food convergent innovation hypothesis and applied to the supply chain management of a wine company, including procurement, processing plants and distribution of their products to customers. This framework could provide a wine company with a multi-indicator supply chain management tool designed to test its sustainability and resilience, accelerating progress towards SDGs in times of crisis. The proposed model can serve as a decision support tool to systematically assess and improve the wine supply chain from winery to retailers.

This study constitutes a step forward for a better understanding of the wine supply chain dynamics by viewing these supply chains in the light of the SDG 12 responsible production and consumption. The pandemic offers an opportunity to reverse current trends and shift our production patterns to a more sustainable course. A successful transition means improvements in resource efficiency, consideration of the entire life cycle of economic activities, and active engagement of each actor within the supply chain.

## **An end-to-end evaluation of socio-environmental hot spots in cross-continental supply chains: the case of ready-made garment industry.**

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### **Abstract**

International soft law norms mandate that businesses implement a due diligence approach in their international supply chain processes to identify human rights, environmental and social sustainability issues. However, despite these norms and an increasing attention to their social and environmental impact, re-emphasized with the introduction of Corporate Social Responsibility (CSR), firms fail to live up to expectations in identifying, managing and mitigating adverse sustainability impacts in their supply chain.

At least two reasons for such failure are debated in the literature. First, it is argued that an end-to-end supply chain view is to be embedded in the management and control of sustainability impacts to enhance the effectiveness of due diligence. However, the complexity of the supply chain network, in terms of multi-tier chains of suppliers with a diffuse geographical spread, can lead to missing information, a lack of transparency and hindered communication, hampering the due diligence process. Second, many of the existing methods and techniques tend to focus either on human rights, or environmental aspects whereas the due diligence calls for a holistic view on sustainability.

In this contribution the authors aim to contribute to the ongoing debate on “how supply chain sustainability due diligence can effectively be conducted”.

To this end, the objective of this study is twofold. First, based on a ready-made garment case study, the application of an existing method, i.e., Sustainability Hot Spot Analysis (SHSA), is explored. It will be discussed how a relatively small extension of the method with the Value Stream Mapping (VSM) helps gain a more holistic view of the supply chain and its sustainability challenges. Second, the case study is used to identify several sustainability hot spots across the life cycle of two products, namely, a pair of jeans and a white T-shirt. As such, this study helps both scholars and practitioners by advancing our methodological understanding of supply chain sustainability due diligence.

The paper is structured as follows. First, the concept of SHSA in the context of supply chain is discussed. In this section, also, the VSM approach is detailed. Next, the research method is elaborated. Among

others, a detailed account of the cases and the life cycles are provided. The paper continues with the findings of the case study, including the identified sustainability hot spots. The paper concludes by discussing the barriers and opportunities of using an SHSA in the RMG industry as a method for EU based brands (EUBBs) to manage product-specific life cycles. The case study results demonstrate that this method can fill in the gap as it provides manners to quickly identify sustainability risks. The SHSA method can support management of EUBBs in their decision-making processes concerning possible interventions to prevent or mitigate identified risks.

SDG: 12.6

*Relates to 'accelerating progress toward SDGs in times of crisis' by exploring a sustainability due diligence method which can be employed throughout a global value chain*

# **5. Production, Consumption and Innovation**

## **5e. Sustainable consumption and consumers**

## Overmoralization of (m)eating behavior? Sustainable consumption and food choices in Central Europe, Australia, and Indonesia

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**Dr. Franzisca Weder**

### **Abstract**

#### **Study**

In recent years, there has been growing critical debate about meat consumption due to health risks, environmental concerns and economic aspects. Being one of the most energy-intensive and ecologically heavy foods, meat products are said to be highly unsustainable (Dagevos & Voordouw, 2013). On the contrary, the need for sustainable food choices has become more known to consumers, going hand in hand with organizations increasingly displaying more information on sustainability as core value in their production and processes (Wognuma, Bremmers, Trienekens, Vorst, & Bloemhof, 2011).

Furthermore, increasing information in the media and particularly in the social media (1) and knowledge about ecological costs of meat consumption (2) influence individual habits (Bellotti & Panzone, 2015; Verbeke, 2008) and the emergence of a concept of sustainable consumption (Fischer et al., 2017; Krause, 2009). With the empirical study at hand, we seek to better understand sustainability as moral compass, influencing eating behaviour and mainly meat or plant-based food choices. The methodological background is that narratives represent storied ways of those perceptions, meaning making and communicating, thus, have always been a key feature in media and communication research (Bryman, 2016; Weder et al., 2019b).

Convenience samples of individuals aged between 20 and 40 years in Austria (n = 20), Australia (n = 10) and Indonesia (n = 5) were interviewed in face-to-face settings, in telephone interviews or online-sessions depending on current Covid19-restrictions. The interview guideline addressed the following dimensions: What are your beliefs and values about food and nutrition? What factors influence individual's food habits? How did eating behaviours of people change and which factors make people change their eating behaviour. As well, we were interested in the attitudes towards meat consumption and the thoughts with regards to food choices and the environment?

## **Findings**

The two major findings, that we would like to put up for discussion at the conference are that (1) sustainability apparently plays a minor role in food choices; furthermore, even if climate change is perceived as threat, thinking about the horrors of industrial livestock farming, animal rights, pollution and waste, it does not directly influence people to change from a meat- to a plant-based diet; (2) individual food choices and changes from meat consumption to veganism or becoming vegetarian are mainly influenced by being exposed to new ideas within the closer network of family and friends, rather than media or key events.

## **Outlook**

Thus, apparently, ethical reasons and sustainability as moral compass play a smaller role than we assumed and apparently are rather insignificant when people consider their eating behaviour. The discussion at the conference will be particularly valuable due to the fact that comparative data in different cultural settings was gathered and will be again gathered later this year to generate comparative data as well. A constructive debate related to SDG #12 will help refining questions and sample choices and shape future studies to enhance and empower responsible consumption.

## **To what extent does a sporting good impact on the environment and how to communicate? A case study of a cycling product.**

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### **Abstract**

In recent years, different studies have explored the environmental impacts of sport from different point of views, for instance about sporting events, recreational activities and sport facilities. However, a further area of concern exists associated with sporting in general, and it is represented by sporting goods which is still explored in a limited number of studies. In this context, the aim of this study is to quantify to what extent sporting goods impact on the environment and define how to communicate their environmental burdens to stakeholders. The final intent is to support companies in the integration of environmental impact information into their communication reporting. In order to reach our aim, a sporting good of a seldom investigated sport has been selected as case study, namely a cycling pad. The selected cycling pad weights 40 g and it is composed of a base and a cover both produced with textile and polyurethane foam. The methodology chosen to conduct this study is a combination of life cycle assessment (LCA) methodology according to ISO 14040 and ISO 14044 to quantify the impacts of the product and of ISO 14021 to identify the communication requirements. The steps of the combined methodology were: identification of the scope definition, development of the life cycle inventory, assessment of the environmental impacts and development of a self-declared environmental claim. The system boundaries for the LCA study include the process units according to a "from cradle to gate" application and the functional unit chosen for this study is: "One pad for technical cycling shorts, including primary packaging". The primary data are collected for energy and resources' consumption, waste and emissions generated during the production of the pad under study. The results show that the most significant impacts are associated with the utilization of polyurethane foam and energy consumption for the coupling and thermoforming phases. In addition, our study highlights the impact associated with distribution separately, revealing to what extent the impacts increase for all the categories, in particular for the climate change and ozone depletion. The outcome of the study was the development of a self-declared environmental claim in accordance with the requirements of ISO 14040, ISO 14044 and ISO 14021 standards. The novelty of this study is that this is the first combined analysis of LCA and self-declared environmental claims about the environmental impacts of sporting goods and can be a common practice to integrate environmental communication in companies' reporting. This abstract relates to SDG12+Target:12.6. This contribution relates to the topic of the conference because it proposes a combined methodology to encourage companies to communicate environmental impacts and see the environment as a competitive lever.

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## **Covid-19 pandemic, consumers and companies sustainable habits and behaviours: young adults' perspectives during the lockdown**

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### **Abstract**

The current study aims to investigate young adults' perceptions of the influence of Covid-19 and lockdown on consumers and firms sustainable behaviours.

The Covid-19 pandemic is considered both a health and economic crisis, with a strong impact on the global economy. This emergency is also a threat for the sustainable development, and the 2030 Agenda more than ever represents a means to restore the quality of life and face the social, economic and environmental issues, with the purpose to build more resilient, inclusive and sustainable economies. The crisis has affected firms severely and has also posed the attention to their role in promoting the common good through more responsible businesses. At the same time, Covid-19 has influenced the consumers' behaviour due to the restrictive measures imposed. It is worth to understand which changes will last or dissipate after the pandemic.

Goal 12 of the 2030 Agenda aims to encourage the reduction of resource waste and environmental degradation. In particular, Target 12.8 focuses on spreading awareness among people to promote sustainable lifestyles. Covid-19 shows that nature has limits and cannot satisfy all our needs. This emergency is an opportunity to reflect and change our consumption and production systems building a more sustainable economy.

In this regard, to achieve the research aim and study the young adults' perceptions a qualitative approach was planned, and an empirical investigation was carried out through in-depth interviews with 115 university students of the course Corporate Social Responsibility and Sustainability. The interview is divided into three sections: the pre-emergency, the emergency and the post-emergency phase and it explores both consumers and companies habits and behaviours. Interviews were conducted in May 2020 during the first Italian lockdown. Data were analysed using a thematic analysis that allowed the authors to search through raw data recurrent issues. Interviews were recorded and transcribed; to study, code and interpret each phrase a text analysis software was utilised (MAXQDA18). Multiple investigators were involved in the coding activity to guarantee the rigour of the research.

The findings show the respondents' perceptions about the consumer in the pre-Covid phase, the evolution of consumer behaviours during the emergency and the perspectives on future consumer habits. Simultaneously, the respondents' point of view regarding companies' role in the pre-Covid society, the firms' reactions during the emergency and finally the students' vision about CSR perspectives in an after Covid-19 world are presented.

Moreover, the analysis revealed potential innovations identified by respondents as enablers for triggering sustainable changes, together with the list of the Sustainable Development Goals mostly impacted by the pandemic, and that could help rebuild the future world.

The paper originality comes from the analysis of young adults' perceptions during the first lockdown in a Western country and from the double perspective company/consumer investigation. This paper invites us to reflect upon the unusual moment that we are living and is an attempt to learn something from the emergency and turn the past mistakes in a positive knowledge to build a more sustainable future.

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## Economies of Scales in Household Consumption: How much do a housemate weigh?

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### Abstract

Sustainable consumption is an umbrella term that brings several key issues together, such as meeting needs, enhancing the quality of life, improving resource efficiency and minimizing waste. We draw attention to the beneficial practice of “common consumption” mainly by the effect of economies of scale in households with several members.

The needs of the household grow with each additional member – but not in a constant rate, thus, due to the economies of scale in consumption we do not need directly multiply the household needs by the number of the household members but we can calculate it with equivalence scales. While this type of economy of scale has been a popular research area for the last fifty years among mainstream economists and statisticians, it is mainly neglected in relation of sustainable consumption. Nevertheless, there is no generally recommended and accepted equivalence scale. There are the main equivalence scales recommended by international institutions on one hand and national equivalence scales in practice on the other hand.

Based on the above, our (1) first hypothesis is that national statistical institutions use equivalence scales when calculating poverty and inequality accepting economies of scales in consumption. Our (2) second hypothesis is that there is a pattern among countries regarding the type of the equivalence scale is actually used.

In order to answer these questions, we collected data from institutional websites all around the world, and contacted statistical offices via email in 2018–2019 for further information. We examine whether statistical offices use modified OECD scale or square root scale or any other kind of scales for calculating equalised household sizes. We sent out messages to statistical offices of 183 countries and received answers from 74 countries, which is more than 40% response rate covering 45% of the world population. We analyse the collected data, search for group-forming criteria reflecting the essential characteristics of the variables in order to explore and analyse the basic differences among country practices.

We conclude that (1) majority of the countries do calculate the needs of the households with using equivalence scales and (2) there is a wide range of scales in use while there is no any spatial or other kind of characteristics revealing any patterns. Thus, there is room for further research on this area in order to achieve sustainable consumption.

Our paper is related to the Sustainable Development Goal 12 which is ‘Ensuring sustainable consumption and production patterns’. The paper helps to find a better understanding of the measurement methods regarding sustainable consumption. This paper (1) helps theoretical and

practical development of the concept of economies of scale, and (2) support policy-makers towards the better understanding diversity of national practices (SDG12a). Finally, we (3) orientate consumers to reach a sustainable lifestyle (SDG12.8) with resource efficiency (SDG12.2) and minimizing waste (SDG12.3) by revealing advantageous patterns of a specific population in order to utilize economies of scale in consumption.

**Conservation of World Heritage Sites and host communities in the Global South:  
Assessing sustainability and handling complexities in line with SDGs**

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**Dr. Keyvan Hosseini**



**Dr. Agnieszka Stefaniec**



**Ms. Seyedeh Parisa Hosseini**

### **Abstract**

Natural and cultural sites are an essential component to create tourism activities in different destinations. This research explores how to maintain and sustain these properties and host communities against the destructive effects of neoliberal tourism. The purpose of this study is not detouristification but to curb unbridled tourism in line with UN SDGs. World Heritage Site (WHS) branding was one of the programs promoted by UNESCO to preserve these sites. Around 94% of WHSs labeled In Danger are currently located in developing countries, which shows a failure to fulfill the World Heritage treaty goal in these states. The central theme of current research is to indicate under what conditions effective conservation of natural and cultural sites can be achieved and how the strategies based on SDGs mitigate the risks related to the conservation of WHSs in the Global South in the post-pandemic era? To handle this challenging issue, we apply both qualitative and quantitative operational research approaches, namely soft systems methodology (SSM) and data envelopment analysis (DEA) to examine the impacts of factors like level of democracy, crony capitalism, and international debt sanctions, and poverty. Despite its effectiveness in policy implication, SSM was widely neglected to deal with grand challenges like sustainability issues. The current project employs SSM, discussing CATWOE and BATWOVE mnemonics related to effective conservation of natural and cultural sites by answering the following question: "who is doing what for whom, and to whom are they answerable, what assumptions are being made, and in what environment is this happening?" Empirically, we go beyond the existing conservation efforts and analyze hidden reasons for failure in fulfilling the World Heritage treaty goal in developing countries like systemic corruptions, crony capitalism, and neo-colonialism. This work also examines pathways such as tourism degrowth toward sustainable tourism and conservation of WHSs based on United Nations sustainable development goals (SDGs) for safeguarding heritage and sustainable communities (SDG 11, Target 11.4), for reducing consumptionism and production of waste in the tourism sector and turn it to more sustainable and responsible practice (SDG 12, Target 12.5), and for fair and non-hegemonic partnership between advanced economies and developing countries (SDG 12, Target 12.a; SDG 17, Targets 17.3 and 17.7). The proposed contribution of this study is related to accelerating progress towards SDGs in times of crisis. In terms of WHS conservation, COVID-19 restrictions have forced overtourism to fade, and the biosphere now has temporary relief from harmful anthropogenic activities. Hence, the pandemic can be seen as a transformative pathway toward more sustainable tourism in the future. Depending on policymakers' will, the current lockdown can be used to

reset the industry in favor of wildlife and local communities, and new regulations can be set to transform tourism in line with SDGs. Otherwise, the world is about to witness the return of unsustainable tourism in the post-pandemic era, specifically in developing countries that are already under economic pressure because of COVID-19 impacts. The findings may be of practical value to decision-makers aiming to improve tourism and heritage management.

## Using Protected Values and the Halo Effect to Explain Consumers' Decision Making when Evaluating Electricity Providers' Energy Sources

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### Abstract

The increasing use of fossil fuels in the last decades has resulted in more emissions of CO<sub>2</sub>, which is one of the main causes of global warming, contributing to the climate crisis that leads to serious threat of all possible forms of life on Earth.

Companies that reduce their carbon footprint by adopting environmental strategies play an important role in this crisis. For instance, although the energy generation sector contributed to almost 40% of the global CO<sub>2</sub> emissions in 2010, and produced 33.1 gigatons of CO<sub>2</sub> in 2018, this same sector could contribute to the shift from fossil fuels to renewable energy sources.

In this context, it is important to understand if consumers are willing to adopt and pay for those energy companies that use renewable energy sources and openly communicate their efforts. Consumers' preferences for renewable energy sources could become a central factor in the adoption of renewable energy sources at household levels. Hence, understanding consumers' choices of electricity providers based on their evaluations of electricity providers' energy sources could contribute to global environmental sustainability.

According to previous research, the communication of companies' energy supply has an influence on consumers' willingness to pay a premium (WPP) and adoption intention (AI). However, there is a necessity to better understand the mechanisms that link the communication of companies' energy sources and consumers' WPP and AI. Consequently, this research set out to study the mechanisms used by consumers to evaluate companies that employ renewable energy sources and describe their efforts to their consumers.

To explore this link, this study draws from two psychological approaches—research on protected values and on the halo effect. Protected values are values that guide people's behavior and go beyond monetary evaluations. The halo effect refers to the observation that consumers generalize positive impressions of an object or entity to unrelated positive attributes.

The study proposes and tests a model in which the halo effect is represented in consumers' perceived comfortableness (PC) at households, which mediates the effect of companies' renewable energy sources (relative to that of fossil fuels) on consumers' WPP and AI. Protected values are represented in consumers' moral orientation toward the environment, which moderates the effect of companies' energy sources on consumers' WPP, AI and PC.

The model is tested in a scenario-based behavioral experiment. Participants are asked to choose between electricity providers that systematically vary in the degree to which the provided energy comes

from renewable sources or fossil fuels. Participants also evaluate the expected comfortableness at home and the companies' environmental friendliness.

This study innovates by using two psychological approaches to explain consumers' decision making and evaluation of companies' energy sources, and contributes to the understanding of the communication role in the context of climate crisis.

- **SDGs + Targets: 7.2, 12.6**

This research relates to the conference's topic by understanding companies' efforts in developing a portfolio of renewable energy sources toward a cleaner and greener society. Additionally, this study aims to understand consumers' response to the implementation and communication of companies' sustainable efforts.

## The attractiveness of national and regional destinations: Exploring “staycations” across social media

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### Abstract

The Covid-19 pandemic has decreased international travel by as much as 72 percent and travel have for many people been limited to national or regional destinations. While this affects many companies that depend on tourism, the consequences are not only negative. Travelling close to home for leisure purposes, so-called “staycations”, is positive for the ecological sustainability of our planet since long-distance travel, particularly by airplane, contributes to large emissions of CO<sub>2</sub>. For this reason, it is important to understand attitudes and behaviors associated with staycations at present to be able to maintain such environmentally beneficial behaviors in the long run, after the health risk of the pandemic is over. Aiming at learning what people think of travelling close to home and the extent to which such travel experiences are published and interacted with online, this study employed web scraping techniques and sentiment analysis to collect and analyze social media content related to staycations. This method enabled the researchers to quantify the number of posts and interactions as well as to study attitudes towards staycations and related Swedish and English keywords. Data collection is still in process and the results will be presented at the conference. However, the researchers anticipate a growing interest for staycations but different levels of content generation and interaction in different areas. The study will have important practical implications for marketers and tourism operators. A thorough understanding of where, when and in what way people talk about staycation experiences is essential in the development of effective campaigns aimed toward appropriate target audiences, which will contribute to building competitive advantages based on ecological sustainability. Furthermore, studies that employ automated tools for data collection and analysis in the tourism field are scarce and this study could potentially contribute to methodological progress in the research area.

This study is especially connected to SDG and Target: 13.3. The study is related to the conference theme since the pandemic can be a turning point for the tourism industry with lower CO<sub>2</sub> emissions even after the virus is gone. This could be possible if people travel to national and regional destinations to a greater extent than before the virus changed tourism completely. If such staycation behaviors can be maintained, that would contribute to the progress towards meeting SDG 13 before 2030.

## Sustainable Food Production and Consumption: the case of Associations for the Maintenance of Proximity Agriculture in Northern Portugal

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### Abstract

At the end of the 20th century, the study of development diverged decisively from the economic notion of growth and began to take in the complexities of the process to promote the sustainability. Nowadays a lot of conceptions about sustainability can be found in the environment movement. Some of them have strong connection with the solidarity and sharing economy. Furthermore, some proposals to the sustainability try to improve the traditional economic relations and the capitalist way of organizing enterprises and manage the labor. The sustainability movements face a lot of challenges and contradictions to make the social, economic and environmental challenges that we need as society and planet.

At the same time, the questions about our model of growth find expression in the movements of solidarity and sharing economy. Its numerous forms of economic activities are based on autonomy, cooperation and democratic management (Laville and Gaiger, 2009).

This study analyzes how the production and consumption practices within an organization based on the values of solidarity and sharing are related to the dimensions of sustainability (environmental, economic and social). It applies, as a case study, the Associations for the Maintenance of Proximity Agriculture (AMAP), in Northern Portugal, whose principles are based on agroecology, human scale relations and food as a common good. Therefore, this study sought to answer the following research question: How does AMAP's food production and consumption contributes to sustainability in northern Portugal?

The three dimensions of sustainability (environmental, economic and social) represent differing aspects of a multifaceted process, while their conceptual distinctiveness enables scholars to analyze the process.

The qualitative field research took place in 2019 and consisted of a multiple case study in four AMAPs in the northern Portugal cities of Porto, Vila Nova de Gaia, Famalicão, and Guimarães. Thirty-one interviews were carried with several subjects.

The environmental, economic and social pillars of sustainability are present in the AMAP and were studied by way of participant narratives. Both the interviews and the speeches or practices observed highlighted narratives calling for the enhancement of the economy of proximity, environment and solidarity. The importance of consuming pesticide free, healthy products (environmental dimension)

also received attention. Thus, the importance of organic farming was emphasized as the concept of fair trade for producers which would eliminate the role of middlemen and yield greater profits for producers (economic dimension).

AMAP represents a model of organic farming that is more participative and shared between producers and consumers. The field research identified a sense of solidarity among producers and between them and consumers, which was exemplified by volunteer work that strengthened the local economy and contributed to the livelihood of producer families. However, lack of consumer's participation and difficulties in understanding the AMAP's concept as an alternative to current pattern of consumption imposes a challenge to its functioning (social dimension).

The results identified production and consumption practices encompassed within the three pillars of the sustainability paradigm, and the organizations studied demonstrate the challenges to promote Sustainability through solidarity and sharing entrepreneurship.

## BEHAVIORAL THEORIES. PSYCHOLOGICAL FACTORS THAT INFLUENCE THE INTENTION TO REDUCE THE CAR USE

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### Abstract

From the incorporation of well-founded theories to the process of analysis of experimental studies of a predominantly empirical character, the theoretical basis was established to outline and base these studies' results. Based on the study carried out by Abrahase (2009), this work used the constructs of the Theory of Planned Behavior of Ajzen (1985), the Norm Activated Model of Schwartz (1977) and the habit variable described in the work of Chen & Chao (2011), to establish as their main objective, which psychological factors are considered when opting for the use of the car in daily commuting and which have greater influence in reducing this use. Considering that in 2019 the city of São Paulo was appointed as the second most congested city in Brazil and the fifth in the world by the Inrix institute and that the levels of pollutants and particulate materials emitted by automobiles go beyond the levels recommended for health as pointed out by the Energy and Environment Institute in 2018, the factors with the greatest influence in the process of reducing the use of this means of transport, should be considered and incorporated by public managers in their planning. Within this premise, the theory of planned behavior - TPB is recognized for the robustness of its constructs in this theme. The behavioral attitude assesses the individual's perception of how much to assume a certain behavior will result in positive or negative consequences. The subjective norm considers how much the individual feels pressured by the opinion of the people with whom he relates. The perception of behavioral control assesses how much the individual believes that assuming certain behavior depends exclusively on his own will. The sum of these results defines a degree of intention that can become a behavioral action or not effectively. The norm activated model - NAM, seeks to evaluate altruistic behaviors through its constructs. As in other studies on the same topic, this theory is used because it considers that reducing automobile use involves the abdication of personal benefits such as safety, flexibility, comfort, etc., for the needs of others as a person, a community, the ecosystem, etc. With an exploratory quantitative research method of primary data and analysis carried out through the structured equations modeling - SEM, the results obtained to meet the established hypotheses, where the TPB constructs have greater relevance when explaining the preference for automobiles while the NAM constructs are positively related to the reduction of the use. Positive results for the habit variable in relation to car use showed a positive correlation with the variable attitude from TPB towards the use and based on the same statement if the cognitive process for decision making is reduced as the habit becomes constant, the perception of behavior control has a negative correlation with habit. Finally, the perception of behavior control moderates the relationship between personal norms and the behavior itself. This work is related to SDG(s) 3 and 11.

## Challenges of young consumer behavior towards the UN SDG achievement: A Qualitative Comparative Analysis in Colombia

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### Abstract

Responsible production and consumption (SDG-12) is one of the great challenges facing society nowadays due to the increasing scarcity of natural resources needed to produce the goods and services based on the culture of disposal and the linear economy. Moreover, the current unsustainable consumption is responsible for environmental pollution, resource exhaustion, and climate change (Liu et al., 2015; Tan and Lau, 2009). In consequence, consumers are no longer the last link in the production chain. Still, rather they have a protagonist role in closing the cycle by recovering materials that can then be recycled or reused in new production cycles in the circular economy framework. (United Nations, 2015). In the literature on sustainable consumption, several studies analyzed, for example, the attitudes, level of knowledge, or responsible consumption practices of people. However, a key point in this process is university students' attitudes towards sustainable consumption since they are an important group that can motivate changes inside their homes and the companies where they will work (Mont et al., 2014).

The study explores the practices and motivations under which students perceive themselves as sustainable consumers, based on a sample of 208 students from 16 to 25 years old, from three different universities in Colombia (South America), who participate in three sustainability courses between 2018 and 2020. We tested two points in time, before and after taking the course, and inspected the variation of perceptions regarding sustainable consumption.

The results have been satisfactory and surprising. Through a descriptive analysis of the results, it can be observed that all the questions and dimensions of the motivations of a green consumer, resulted in higher averages after the course finish. Meaning that the courses in sustainability and circular economy increase all the types of motivations evaluated. Moreover, it was confirmed that there is a positive impact of the courses on the sustainable behavior of their students with correlation analysis. For this reason, these training spaces should be an integral part of their education. On the other hand, there were no significant differences between men and women, which contrasts with the differentiated behavior found in studies carried out in older populations. Likewise, this study contributes to identifying responsible behaviors that require more motivation in young people from developing countries.

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## **Habits, Behavior and Post-Consumption Disposal of Cell Phones from the Perspective of Sustainability Ethics: Case Study in Students of the Technical and Technological Superior Management Course in the Region of Rio de Janeiro, Brazil**

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### **Abstract**

In Brazil, the number of cell phones in operation exceeded the number of inhabitants in the country. According to the National Telecommunications Agency, in May 2019, 228.64 million cell phones were enabled, thus, the volume of old post-use and disposable cell phones in Brazil is increasing. Inadequate treatment, improper deposits, unsafe, burning in the open or in untreated landfills, increase the levels of electronic solid waste, with consequent damage to the environment and the health of the population. These facts challenge the correct management of electronic waste, hindering the achievement of the Sustainable Development Goals (SDGs) agreed in the Agenda for Sustainable Development 2030. Research on the post-consumer management of cell phones in the Rio de Janeiro region, Brazil will help to better understand this phenomenon and will align with the SDGs, 3; 6; 8; 11 and 12. To select the results, the answers to the questions related to the two currents of anthropocentric environmental ethics (Ethics of the virtue of the environment and Ethics of environmental pragmatism) were interpreted and crossed and the association between categorical variables related to the Theory of Planned Behavior, as a theoretical framework in post-consumer research on cell phones, thus observing that the attitude must be translated into intention in order to influence conduct. In the anthropocentric framework, the research results point to a vision centered on the human being. When constructs are linked, love of nature and ecological citizenship, they produce an understanding and mitigation of the improper disposal of cellular equipment. The feeling of inadequate management of solid waste, from a moral point of view, the human being takes responsibility in the face of protecting the environment, for his own survival and the challenges for future generations. The transforming potential of man does not remove him from responsibility for nature. As for the important actions of society, in the ethical disposal, the biggest highlight is the habit of sustainable consumption, which is related to the development of effective joint actions, which are the active participation of all actors involved in the product's life cycle. Our research leads us to understand the changes in human behavior through Ajzen's Theory of Planned Behavior - TCP, assuming that individuals can plan their actions according to their own behavioral, normative and control beliefs. There is evidence of a significant association between knowledge about improper disposal, the existence of recycling companies and operators that maintain discounts for the reuse of used phones. Significant evidence associated with the knowledge of the risks to human health due to improper disposal, the various chemical substances found in cell phones, safety in regular disposal and recycling when there are information and advantages, were also proven. There was no evidence of dependence between safety when deciding on regular disposal when associated with the destination given to the replaced cell phone. As for the association between the importance of

environmental preservation and shared responsibility among the actors involved in the product's life cycle, there was also significant evidence.

## Practice of Reuse, Reduce and Recycle (3Rs) of Solid Waste among Households in Suburban Ibadan, Nigeria

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### Abstract

The 3Rs concept is developed to reduce waste generation at source, rid the environment of waste, and reduce cost of transportation. The application of 3Rs at the household level to reduce solid wastes is important because waste is indiscriminately disposed in flowing streams, wetlands, vacant land, uncompleted buildings, road verges, and airspace of buildings in suburban Ibadan. This study investigated the practice of 3Rs among households in suburban Ibadan. An average of 10 households was randomly selected from 23 communities in two suburban local government areas (Akinyele and Egbeda) to give a total sample size of 225 respondents. Qualitative data collected through questionnaire survey were presented with frequencies and percentages. The findings revealed 47 as the average age of the respondents, majority (78.0%) were married and had formal education (73.2%). Majority (93.0%) were artisans. Kitchen waste (53.7%), grocery waste (28.8%), and animal waste (17.5%) were the major waste generated. Only 0.7% was aware of the 3Rs. Inadvertently, 62.0% reused soft drink and bottle water containers, 7.6% reused cement sacks, and 4.7% reused milk tins. 67.8% disposed wastes at the backyard and burn, 24.7% deposited waste at the bank of streams, and 7.5% in the bush. Oyo State Waste Management Agency should create more awareness on the need to reduce waste at source.

## Regulatory focus and the adoption of environmentally friendly behaviors: A mediated model

Dr. Luís Cruz<sup>1</sup>, Dr. Filipe Coelho<sup>1</sup>, Dr. Maria C. Pereira<sup>1</sup>, Dr. Paula Simões<sup>2</sup>, Dr. Eduardo Barata<sup>1</sup>

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### Abstract

This study relies on a hierarchical model for the effects of psychological traits on human behavior to predict the potential effects of regulatory focus (RF) on pro-environmental behavior (PEB). Our model proposes that promotion and prevention orientations are indirectly related to PEB, and that these relationships are mediated by materialism, perceived financial strain (PFS) and perceived consumer effectiveness (PCE).

The research hypotheses are tested using structural equation modelling, with a sample of 925 Portuguese individuals.

The results provide support for our research model. The effects of both regulatory orientations on PEB are completely mediated by the predicted mechanisms. Both promotion and prevention show an indirect positive relationship with PEB, but this depends on the specific type of behavior (water conservation, energy saving, recycling and overall PEB). Moreover, the results suggest that both promotion and prevention affect PEB through positive and negative channels. Promotion and prevention are positively related to PCE and to materialism, as expected. Promotion is negatively related to PFS, and prevention is positively related to it, as predicted. In addition, materialism is positively related to PFS, and negatively related to PCE and to PEB, as predicted. Moreover, PFS is negatively linked to PCE, as hypothesized. The path from PFS to PEB, though statistically significant, is positive, contrary to expectations. Finally, PCE is positively related to PEB, as hypothesized.

This study produced a set of original insights to existing knowledge on the relationship between RF and PEB. Specifically, building on a hierarchical model for the effects of psychological traits on behavior, this study proposed, and found support, to a number of mechanisms, namely materialism, PFS and PCE, through which RF seems to influence the adoption of behavior that is environmentally friendly. Such mechanisms appear to completely carry the effects of RF into PEB. Moreover, both promotion and prevention relate positively to PEB, but they do so through sometimes opposing mechanisms. Moreover, we also enlightened how materialism reaches to PEB, identifying PFS and PCE as mediating mechanisms. This set of results advance on the scant past studies relating RF and PEB.

To ensure a more sustainable future it is critical to promote a parsimonious and more efficient use of resources, as well as to encourage the reduction of waste generation and the adoption of overall pro-environmental conducts (Targets 12.2 and 12.5). This requires behavioral and lifestyle changes, and this work contributes precisely to better understand what might influence the readiness of individuals to adopt PEB (Target 12.8). Further, the context of the environmental crisis can positively contribute to accelerate the pathway to sustainability, as the adoption of PEB not only promotes lifestyles in closer

harmony with nature, as it might also generate household's savings, either by lowering consumption or by spending less to obtain the same level of service(s).

## Prosumer in the fashion context: implications for the distributed economy in a pandemic scenario

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### Abstract

The pandemic has shown that more distributed economies offer more resilience to global crises. Indeed, from a sustainable perspective, practices and strategies that foster local production of goods and provision of services, with units integrated into networks, do contribute to reduce transportation, valuing local knowledge and resources and contribute to achieve higher social cohesion. In this paper the authors explore the concept of prosumer as a strategy to achieve a more distributed economy in the fashion sector, with a focus on the social dimension of sustainability. Prosumer can be defined as the individual that integrates the roles of the producer and consumer. The study involved a systematic literature review and an evaluation of multiple-case studies, using pattern matching analysis. The theoretical framework compares the practice of these prosumer cases against the heuristics associated with distributed economy and the impacts on sustainability identified in the literature. In this study the authors have focused on the six types of prosumer archetypes proposed by Lang et al. (2020): DIY prosumers; self-service prosumers; customizing prosumers; collaborative prosumers, monetized prosumers, and economic prosumers. The findings have demonstrated that prosumer experiences are aligned to distribute economy and do present direct win-win benefits on the social dimension of sustainability: a) it can foster a culture of mutual help and empowerment in the fashion sector, enhancing the system social resilience; b) It is a viable strategy to promote higher socio-economic equity via the fashion products and services, offering more opportunity to marginalized people to get involved on the provision of their own needs, thus accepting diversity; c) It encourages the sharing of knowledge and skills in the fashion sector, providing a better environment for wide competence building; d) it values local culture, knowledge and capabilities on the Fashion sector, by using local skills and native knowledge, enabling higher customer involvement into the Design process; and, finally, e) on an appropriate context, it can contribute to promote social cohesion among local stakeholders, with a better cultural fit of products/services, creating meaningful and long-lasting relationships with customers, promoting mutual trust at local level.

All multiple case studies have shown that in order to achieve these social impacts, particularly during a pandemic, it is critical the wide availability of communication and information technologies. This paper offers a contribution to the SDG goal of responsible consumption and production” + Target: 8.b. The proposed contribution relates to the topic of the Conference because the existence of the prosumer, being a character that consumes and produces, can influence the improvement of economic conditions, by people having a way of survival and, thus, reducing unemployment, in addition to the consequent improvement in their social conditions.

Keywords: fashion industry, prosumer, distributed economy, social dimension, pandemics, responsible consumption and production



## Behavioral background of adopting sustainable business models at the time of COVID

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### Abstract

Sustainable business models can be structured in many different ways in literature, one of the most widely spread approach is of Bocken et al. (2014). They differentiate three major archetypes, technological, social and organizational. COVID has reshaped the spread of sustainable business models. Some researchers argue for an accelerated transition from a linear economy system to a circular approach.

Certain individual behavioral factors, setting the conditions for sustainable business models, changed during COVID times. Kirk and Rifkin (2020) addresses consumer behavior from this perspective during three phases, reacting, coping and longer-term adapting. COVID has reshaped lifestyles (working, studying, travelling behavior, relationships to relatives, friends etc.) significantly. The overall environmental and sustainability impacts of reshaping consumer behavior are yet to become clear, there are both positive and negative signs from empirical studies.

Young adults are key players in shaping the future scene of a sustainable economy. They can adapt more easily to new conditions than older, and their emerging consumption patterns will determine the chances of sustainability over many decades. We developed a questionnaire to reveal the changed conditions for adapting sustainable business models among young adults. Over 600 students responded, the data offered mostly opportunities for quantitative analysis with some qualitative variables offering deeper insights. The survey instrument included three blocks:

- The first block focuses on changes in attitudes and individual behavior due to COVID.
- The second one covers future expectations for the post-COVID times including the possibility of backfire effect.
- Finally, we asked some individual characteristics, including perceived change in subjective wellbeing.

We found that the impact of the COVID situation varied at large extent for different types of sustainable business models. On one hand, the impact on stewardship and environmentally conscious purchasing behavior, for example, did not prove to be significant. The value orientation, on the other hand, showed some shift from consumer society to a more sufficiency-oriented economy. The biggest losers of changes are public transport and some forms of sharing economy. Certain lifestyle changes may persist over the longer term, e.g. many respondents reported to maintain a more frugal lifestyle even after an economic recovery, which is promising in terms of the chances of sustainable business models.

ad 3.a.: this abstract/topic is mainly related to SDG 12 (especially for targets 12.2, 12.3, 12.8)

ad 3.b.: relevance to the conference topic is very direct, this submission intends to better understand how sustainable consumption (through the individual behavioral factors of accepting sustainable business models) can be better promoted in crisis (Covid) times.

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## “Please Reuse Your Towels”: Guest Insights of Green Practices in the Hotel Industry

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### Abstract

In recent years, tourism has experienced a continued expansion and diversification to become one of the fastest-growing industries in the world, occupying a prominent role in the European economy. However, the growth of the tourism sector goes hand in hand with its increasing environmental impact. It is, therefore, necessary to find a balance between the tourism sector and its environmental dimension, to increase both the profitability of tourism and the quality of the ecosystem. In this context, the implementation of good environmental practices has become crucial to tourism facilities operations management. Over the years, more and more hotels are integrating sustainability practices in the management of their operations. Academic literature shows that hotels go green for many reasons: financial savings, access to public funding, employee commitment, facing public scrutiny, investor relations, and general social good. However, one of the main reasons for hotels to go green is to respond to consumers' growing green consciousness. Indeed, consumers are increasingly looking for environment-friendly lodging options but they are also feeling uninformed about whether hotels are truly eco-friendly. Because of consumers' concern toward environmental sustainability, the hospitality industry is also developing voluntary-based tools to reduce its environmental impacts and to satisfy the increasing market segment of green customers. In this context, third-party certified ecolabels ensure hotel compliance with specific environmental performance criteria and offer reliable communication to their guests. So, understanding how consumers perceive and evaluate the environmental quality and eco-friendly practices in hotels helps to plan and define win-win strategies for tourism sustainable management. Starting with the analysis of literature, we propose a conceptual framework to investigate whether green practices implemented by the Italian “Legambiente Turismo” certified hotels contribute significantly to the formation of guest positive behavioral intention toward green hotels. Even if little research has been conducted on this topic, understanding the role of hotels' environmental practices is pivotal in the hotel decision-making process and strategy. To clarify this point, a survey was conducted with guests of two Italian hotels awarded with the ecolabel, and 335 questionnaires were usable and employed in the analysis, adopting Partial Least Square Structural Equation Modelling (PLS-SEM) to test the hypotheses. Research findings are valuable for both hotel managers and decision-makers, clarifying the role of environmental communication and guest environmental concern in the guest recognition of hotels' environmental efforts. The study also confirms the relationship between the implementation of green practices and the rise of market awareness and loyalty towards green hotels.

SDG12 - Target 12.B: Develop and implement tools to monitor sustainable tourism. The current Covid-19 pandemic caused an unprecedented crisis with strong repercussions for the tourism sector. Companies, governments, and international organizations must consider the long-term implications of the crisis, staying abreast of the digital curve, supporting the low carbon transition, and promoting the structural transformation necessary to build a stronger, more sustainable, and resilient tourism economy.

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## Sustainable practices in the hotel industry: A systematic literature review

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### Abstract

The environmental impacts generated by the tourism and hospitality sector have gained considerable attention from scholars in recent years. Green hotels and sustainable practices have been largely studied as a way to respond to the growing consumers' environmental awareness and to improve the environmental, social, and economic impact of the sector. This growing body of literature uses different points of view, methodologies and theories, also investigating different geographical areas. The aim of this review is to give a comprehensive overview of the academic studies on green hotels research, to identify research gaps, and to provide potential future research directions on the topic.

The paper explores the body of literature on sustainable practices in hotels, revisiting 600 articles, collected through the Scopus databases, and evaluating it using specific structural dimensions to group the selected literature into analytical categories.

Several studies reviewed green and sustainability research in hospitality. With respect to past reviews produced by other scholars, this study contains various novelties that provide added value to better understand the topic under investigation.

First, it explores the topic with a systematic approach providing an exhaustive and comprehensive analysis of the phenomenon with rigorous and reproducible research criteria. Second, it includes a wide spectrum of scholars' publications (600 papers), in comparison with other reviews previously produced and it specifically explores the research about sustainable practices in hotels. Additionally, the investigations on the topic have considerably increased during the last years, and this work provides an updated overview of this research field. Finally, the paper presents the main limitations of the study and identifies opportunities for future research.

SDG12 - Target 12.B: Develop and implement tools to monitor sustainable tourism. The current Covid-19 pandemic. caused an unprecedented crisis with strong repercussions for the tourism sector. Companies, governments, and international organizations must consider the long-term implications of the crisis, staying abreast of the digital curve, supporting the low carbon transition, and promoting the structural transformation necessary to build a stronger, more sustainable, and resilient tourism economy.

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## Review on models applied to Design for Sustainable Behaviour

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Ph.D. candidate **WELLINGTON MINORU KIHARA**



Research professor **AGUINALDO DOS SANTOS**

### Abstract

This article presents a literature review on models applied to Design for Sustainable Behaviour, aiming to identify similarities and gaps in this area of knowledge. Each model has its own structure to promote behavioural change. Models used in the scope of Product Design and Service Design will be presented. Some models have stages, as in the case of the Mindful Design model (Niedderer, 2014), Behavioural

Intervention model (Bhamra et al., 2011), Design for Healthy Behaviour (Ludden and Hekkert, 2014), the NADI model (Bijl-Brouwer, 2017), Service Design model for Self-Care (Aly et al., 2017), the Cleaner Cooking Intervention model (Jürisoo et al., 2018) and the Channel Design model (Wünderlich et al., 2019). There are also models that do not have specific stages, but they point out elements to generate insights for behavioural change, as in the case of Fogg's Behaviour model (Fogg, 2009), the Design with Intention (Lockton et al., 2010), Design for Socially Responsible Behaviour (Trompt et al., 2011) and Design the Built Environment for Mental Health Services (Liddicoat et al., 2020). Despite this difference in structure, there are also similarities. For example, in the Behavioural Intervention model, the stage of behavioural elements analysis, there is a connection with the NADI model, which proposes the analysis of needs and aspirations; with the Channel Design model, that analysis internal and external aspects of the user; with the Design the Built Environment of Mental Health Services that presents principles and questions to generate insights at the individual, contextual and relational level; with the Mindful Design model that analysis the interactions and the individual's intention; with Fogg's Behaviour model and Cleaner Cooking Intervention model, where both emphasize the individual's motivations and skills. At the intervention level stage, elements of the Design for Healthy Behaviour to guide, maintain and ensure change are evident. And, in the intervention stage, it can be associated with the Design for Socially Responsible Behaviour that mentions restriction, coercion, seduction and persuasion, as well as Design with Intention with the strategies to activate, motivate or restrict a behaviour. However, each model has its own structure and details about the elements that are possibly not considered in another model. These details can connect and contribute to improve the behavioural change process for sustainability. There are studies that connect specific parts of models and build a unique structure (Cash et al., 2017; De Medeiros et al., 2018; Irizar-Arrieta et al., 2019), however, with predominance in models focused on the development of physical artefacts. Thus, there is a gap to connect models focused on physical artefacts with models focused on services. Another gap is there are few empirical researches on the application of these models. In this sense, bringing this mapping and the specific characteristics of each model to improve the application, can effectively contribute to sustainable development in order to accelerate progress towards the SDGs in times of crisis. The study contributes to SDG 12, target 12.9.

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# **5. Production, Consumption and Innovation**

## **5f. Food security and agriculture**

## **Mainstreaming sustainable seafood systems for harmonizing the use of marine natural capital and needs of indigenous coastal communities**

Prof. Dr. Saleem Mustafa, Dr. Chen Cheng Ann, Miss Stephenie Demie Kawi

Borneo Marine Research Institute, Universiti Malaysia Sabah, Kota Kinabalu, Malaysia



**Prof. Dr. Saleem Mustafa**

### **Abstract**

There is a great deal of discussion on the sustainable fisheries that highlights the benefits of marine protected areas and ecosystem-based management, but little attention has been given to identifying pathways to mainstream effective interventions. Hardships faced by the indigenous coastal communities continue to multiply as the fish catches decline to the extent of causing concerns about their food security and livelihoods. Given the slow pace of implementation of Sustainable Development Goal (SDG) 14 and the setbacks caused by factors such as the COVID-19 outbreak, the achievement of targets by 2030 appears uncertain or unlikely. However, since sustainability is a journey, the momentum generated by SDGs should continue beyond the 2030 timeline into the UN 2050 Vision of “Living in harmony with nature”. It is timely that the United Nations has proclaimed Decade of Ocean Science for Sustainable Development (2021-2030). This will help in mobilizing interest in science-based efforts for sustainable development of the ocean fisheries resources. Due to ‘commons’ status of the ocean and concentration of economic activities in the coastal zone, it is imperative to safeguard the interests of coastal communities that have traditionally depended on the marine resources for sustenance. Any management plan envisaging sustainable development of fisheries resources should include: Target setting, Monitoring and Reporting. This requires selection of indicators to provide feedback on the progress of management measures with reference to the goals and objectives. For mixed-species fisheries in the biodiversity-rich regions such as Malaysia and many other tropical countries, indicator selection should be context-specific to reflect the three dimensions of sustainable development as well as fisheries stock that are influenced by state of the marine ecosystem. The fact that the species

exploited in fisheries have different ecological thresholds and recruitment capacity, and are faced with different levels of fishing pressures and ecosystem conditions, it makes sense to identify several indicators. This will enable managing stocks and their optimization based on vulnerability and targeted management interventions by governance bodies informed by the indicators. In practical terms, this will prevent information overload while capabilities develop for application of Big Data to analyse and systematically extract information from data sets that are too complex to be dealt with by traditional data processing methods. This study focuses on tipping points for pelagic species (sergestid shrimp and anchovy) that are subject to unique pressures even as accurate assessment of critical thresholds suffers from knowledge gaps. These species are the link between their prey and natural predators and become particularly vulnerable to overfishing by the prevailing fishing methods. Given the importance of these marine pelagic species, the fluctuations and population depletion can cause imbalance in the social-ecological system of the coastal communities that are content with meeting their essential requirements and seek to live in harmony with nature. These issues are addressed in this paper.

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## **ANALYZING THE INDICATORS OF THE HOUSEHOLDS FOOD INSECURITY IN FRANCIS BAARD DISTRICT MUNICIPALITY OF THE REPUBLIC OF SOUTH AFRICA.**

Mr Norman Shushu<sup>1</sup>, Dr Jan Swanepoel<sup>1</sup>, Prof Victor Mmbengwa<sup>2</sup>

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### **Abstract**

Food insecurity is a growing concern worldwide. However, to ensure that the households are food secured, various tools to measure and evaluate food indicators should be developed using the food indicators measurement. Currently, minimal studies focus on the development of household food insecurity indicators. The purpose of this study is to evaluate and assess the indicators that are associated with food insecurity in Francis Baard district municipality. The study followed a quantitative research approach, where descriptive, correlational, and explanatory research design was used. A simple random sampling technique was utilized for this study, and 536 respondents constituted the sample size. Of the 536 households, 70.2 % and 89.2% of households are large with four members and more, are poorly educated. The results revealed that there is a positive and strong correlation between not having food at all [ $r = (534) = 0.452, p < 0.001$ ], households members eating few meals [ $r = (534) = 0.439, p < 0.001$ ] and lack of enough food for the households. These results imply that a higher number of households without food at all in this municipality could decrease food security by 11.6% ( $B = -0.499, p = 0.030$ ). The household members who go to sleep hungry could decrease household food security by 11.2% ( $B = -0.547, p = 0.032$ ). Households' food security indicators should be critical in assessing food insecurity in the Francis Baard municipality. The high number of dependents in households makes households' access to food very difficult. It is recommended that household agriculture be promoted and supported to reduce food insecurities.

## **Gender-dynamics of Household Food Security under the changing climatic conditions in Nasarawa state, Nigeria.**

Mr Abraham Akyala

Obafemi Awolowo University, Ile-ife, Nigeria

### **Abstract**

Gender inequalities and climate change are disrupting global household food security systems. Although climate change and food insecurity affect everyone within the household system, their effects are being felt in gendered ways. North-central Nigeria has been experiencing a potential reduction and both plant and animal because of a decrease in rainfall and an increase in temperature. Men and women, boys and girls are both vulnerable to the present and future climate events disrupting the households' food security systems in north-central Nigeria. The study adopted a sequential-mixed method to investigate the underlying trajectories of power-relations in household food security under the changing climatic condition in Nasarawa State, Nigeria. The study examined the effects of climate change on the food security system, examined the household levels of food security, and assessed the gender-differential household provisional and feeding practices to achieve its aim. The study employed both quantitative and qualitative data, which were being obtained from primary and secondary sources. It included meteorological data which was being retrieved from the Nigeria Meteorological Agency (NiMet) archive and interview responses from respondents using an in-depth interview format. The study used the meteorological data that are being obtained for the period of 35 years 1984 to 2019, also 40 households were being sampled respondents for the study using a purposive gender-analytical sampling technique. The study attached a spatial reference to the meteorological data and showed the variation of rainfall and temperature over the study area using an Analysis of Variance (ANOVA) using the Statistical Package for Social Sciences (SPSS). Time series analysis was being done using R statistics, which showed the trend and pattern of climate events from 1984 to 2019, while data obtained from interviews were being transcribed and analysed using thematic content analysis. Findings showed a significant effect of climate change on the household food security systems in the study area. It also found out that gender-norms are influencing household food security, and there is a low level of food security in the study area because of their low livelihood options. These livelihood options include education, health, income, and expenditure and are being influenced by gender. It further found out that female-headed households have lower levels of food security compared to male-headed households. Male-headed households have more access to food supply compared to female-headed households. More findings showed that female-headed households have better feeding practices compared to male-headed households. The study concludes that there is a significant gender gap in household food security under a changing climatic condition. The study recommends gender-integration in agriculture and climate policies and mainstreaming in projects and programs.

## Diagnosis and baseline refrigerant use in the Colombian meat, dairy, and fruit and vegetable industries

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### Abstract

This paper presents the characteristics and baseline use of refrigerant gas in the meat, dairy, and fruit and vegetable sectors. The data are based on different sources of primary information starting from a survey of the companies that constitute the three chains in different departments of Colombia, a review of secondary information to identify the use of refrigerant gases, especially in the food sector, interviews with experts on refrigeration systems, consultations with companies that provide refrigeration services and a review of the importation of these gases into the country. The results show that the management, use and handling of refrigerants is similar among the three productive sectors and that the most commonly used refrigerant gases are R22, R404, R507, and R134A. Moreover, 80% of refrigerants are traditional and 20% are natural refrigerants, such as nitrogen and CO<sub>2</sub>, especially in large companies that have managed to migrate to cleaner technologies that have less of an impact on the environment. The food sector with the highest consumption of refrigerant gas is the meat industry, followed by the dairy and fruit and vegetable industries. Except in the fruit and vegetable chain, the refrigerant charge for these sectors is less than 100 kilograms and refrigerant changes are performed in a period of six to twelve months. A consensus was reached that preventive maintenance and timely detection of leaks is essential for the efficient and rational use of refrigerant, and its reuse is not a practice that is evident in these sectors. The findings of this study are important for analysing how companies in the food sector, especially in the above three sectors, have implemented environmentally friendly practices related to vital refrigeration processes for the processing and conservation of products and for identifying controls and maintenance processes that generate refrigerant changes and reduce environmental impacts.

## THE CARBON FOOTPRINT OF MEALWORMS AS AN ALTERNATIVE PROTEIN SOURCE: A DIETARY TRANSITION PERSPECTIVE

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### Abstract

Eradicating hunger and achieving food security remains a challenge, more so in the wake of the COVID-19 crisis. At the global level, hunger and food insecurity have been on the rise. The situation is likely to get worse owing to economic slowdowns and disruptions caused by a pandemic-triggered recession.

Alternative food and feed sources are needed for the continually growing world population, which makes it necessary to produce ever greater quantities of food with negative effects on the environment

Food production processes, in fact, contribute consistently to global anthropogenic GHG emissions. Food choices, therefore, indirectly affect climate change. According to previous studies (Ooninx & De Boer, 2012; De Leo et al., 2015), mealworms show great potential as a sustainable choice for future food systems.

In this context, the present study, in order to verify the sustainable advantages of a hypothetical food dietary transition, evaluates the emissions deriving from the production process of mealworms and compares them with those deriving from other animal-derived protein sources.

The methodology adopted is the Carbon Footprint Assessment, which measures the direct and indirect GHG emissions across the whole life cycle of a product. The study is based on data extracted from Ooninx and de Boer (2012). The latter analyzed a Dutch company which produces two species of insects (*T. molitor L.* and *Z. morio L.*).

The research findings show that mealworms could represent a sustainable alternative to commonly used animal-derived proteins, potentially being a progress option towards SDGs in times of crisis. The sustainability aspects linked to the responsible production and consumption of edible insects also depend on other important factors. Mealworms are edible for 100% of their body mass, unlike other animals of which about 60% most of the mass is thrown away during slaughter (Vries & De Boer, 2010). Furthermore, CO<sub>2</sub> emissions from the production of feed for farm animals are much higher than those needed to feed mealworms. It has also been shown that mealworms do not produce CH<sub>4</sub>, which is increasingly produced in the livestock sector. Further advantages are related to the fast growth and reproduction rate of edible insects.

The study is original because highlights the relevance of a transition to dietary models which could ensure both food security (SDG 2.4 target) and responsible production and consumption in a life cycle perspective (SDG 12.2 target). Further research developments could provide insights into making the mealworms breeding more sustainable from a supply chain perspective or into proposing other options of sustainable dietary model addressed to defeat hunger.

## Local Public Policies for a Sustainable Food System: assessing the role of the Municipality of Viseu in Portugal

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### Abstract

Food has always been present in our lives, however, only recently its impacts have been reflected and understood in terms of health, society, and the environment. The increasing population growth leads to a constant demand for food and, thus, a greater exploitation of raw materials, jeopardizing the sustainability of the planet. In this way, public policies play a fundamental role in ensuring a better quality of life for citizens and, at the same time, guaranteeing the sustainability of the food systems. This transition needs to be particularly promoted at the city level due to the benefits it can bring to change the way we produce, transform, distribute, consume, and waste food. To reverse our unsustainable trends it is critical to have strong institutions and policies at the local level to ensure better information and awareness systems, administrative and government capacity, integrated local government functions and particularly strong political commitment and strategies to shift towards healthy and sustainable diets. Through this research work, we intend to reflect on the role of local food policies in the promotion of more sustainable food systems in Portugal, with an in-depth case study of the Municipality of Viseu. In this way, we seek to understand the role of the municipality of Viseu in the design and implementation of sustainable food policies, to identify the initiatives developed and understand whether these involve different actors of the local food system. To this end, a qualitative case study method based on semi-structured interviews was used to understand the perception of local actors regarding the policies implemented by the municipality. Results show that the municipality has implemented some food policies, with the development of few initiatives with special prominence in recent years, but that this policy area is still not considered as a priority in the municipality, reflecting the lack of government structures and the articulation of the policies developed. This case study analysis allows us to understand major policy gaps and propose a set of recommendations for the Municipality of Viseu, as well as certainly other Municipalities in Portugal, so that local policies are reinforced to transform the food systems to more sustainable ones.

## Transformations towards sustainable food systems – levers of change from a stakeholder perspective in light of the Farm to Fork Strategy

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### Abstract

The United Nations' 2030 Agenda calls for transformative change throughout all societal systems where transformations towards sustainable food systems is pointed out as one of the core challenges. At a European level, the need for more sustainable food systems has been recognised in the Farm to Fork Strategy, launched in 2020 as a part of the European Union's Green Deal. Furthermore, it is evident that the new Common Agricultural Policy (CAP) for the European Union needs to be aligned with the Farm to Fork Strategy and the Sustainable Development Goals.

The Swedish ambition to be one of the leading countries on the pathways towards reaching the United Nations' 2030 Agenda motivates that attention is directed towards food production and consumption. This study aims to identify features of potential food system transformations towards sustainability based on perspectives of Swedish food system stakeholders and analyses these in light of the European Union's Farm to Fork Strategy. Drawing on theories of complex systems transformations, different levers of change in food systems are identified, exploring drivers and barriers for transformations as well as associated roles, responsibilities and agency related to these changes. The study employs visualization supported focus groups with stakeholders that are engaged in farming, food production, as well as rural and agricultural development on the local and regional scale in Sweden. The results of this study indicate that there is a call for a new paradigm where food is valued in other terms than monetary and a shift of mindsets and understanding of food and food production. An identified key feature of societal transformations is Swedish food sovereignty and security and the associated values and concepts of local and sustainable food production and consumption. While significant focus relies on producers and consumers, the intermediate processes, such as retail, were assigned a more powerful role, which might be of importance for transformative changes. The study identifies levers of change for societal transformations towards sustainable food systems, discussing how these transformations could be facilitated or governed and what role the implementation of the Farm to Fork Strategy and the new CAP can play in a Swedish context.

This abstract relates to the following SDGs and SDG-targets:

*SDG 2; all targets*

*SDG 8; 8.3, 8.4*

*SDG 12; 12.1-12.8, 12.A*

*SDG 13; 13.1, 13.3*

*SDG 14; 14.1*

*SDG 15; 15.1, 15.5, 15.A*

*SDG 17; 17.6, 17.8, 17.9, 17.14, 17.16-19*

This contribution relates to the conference topic “Accelerating progress towards SDGs in time of crisis” as features for transforming food systems towards sustainability are identified in a Swedish and European context, highlighting perspectives on food security, food sovereignty as well as environmental and resource use challenges.

**Knowledge Management in the Food, Energy, Water Nexus: Accomplishments from the Food and Agriculture Organization's (FAO) Community of Practice on Food Loss Reduction**

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**Danielle M. Farley**



**Dr. Joel Iverson**

**Abstract**

Approximately 690 million people worldwide experience chronic hunger. In 2019, the Food and Agriculture Organization (FAO) of the United Nations estimate 1.3 billion tons of food is lost or wasted each year. This level of food loss and food waste equates to one third of all the food produced for human consumption alone and translates to an annual loss of \$680 billion US dollars. Issues of food insecurity and global food waste are directly connected. Consequences of food waste involves wasted land, labor, water, and energy used in the food production process. The food waste crisis is one reason the world is not on track to achieve Sustainable Development Goal (SDG) #2, zero hunger by 2030.

Complexities related to food loss require a comprehensive, global approach to identify and develop feasible solutions in various geographic areas and contexts. In response to the food loss crisis, the FAO developed a community of practice (CoP) on food loss reduction to serve as a global convener and an integrator of knowledge related to post-harvest loss (PHL) reduction. As a product of continuous interaction, CoP's expand knowledge and expertise through three identifiable communicative enactments of mutual engagement, negotiation of a joint enterprise, and shared repertoire. This CoP launched by the FAO offers a platform to facilitate linkages and information sharing amongst stakeholders, relevant networks, projects, and programs on post-harvest management. This case study examines the FAO's use of a CoP as an approach to generate knowledge related to the complexities involved in mitigating post-harvest food loss.

The researchers use a discourse analysis to collect and analyze data within the FAO's CoP on food loss reduction between 2014 and 2018. Data was collected from the FAO's CoP on food loss reduction from four forum discussions. The researchers were required to officially join the CoP to access dialogs from the open forums. Participation in the CoP forum posts represented 17 different countries and a total of 59 engagements in the CoP forums.

Two accomplishments of the CoP emerge from the discourse analysis are: a.) time-space distancing and b.) co-creation of knowledge. The richness of information exchanged through this CoP offers practical implications and specific strategies for bridging knowledge and practice to achieve UN SDGs. This case study offers a discussion for how CoP approach fosters putting the ideas of SDGs into practice through communicatively constituting the group, leading to collective action.

This research directly relates to the following SDGs: #2.1 end hunger and ensure access by all people to safe, nutritious and sufficient food all year round, #17.16 Enhance global partnerships for sustainable development that mobilize and share knowledge, expertise, technology, and financial resources to support the achievement of SDGs in all countries, #17.17 Encourage and promote effective public - private and civil society partnerships, building on the experience and resourcing strategies of partnerships. Without communication, there will be no transformation. This research contributes to understanding how knowledge is moved to action through communicative engagement.

## THE EFFICACY OF CHEMO-PREVENTIVE ATTRIBUTES OF AFRICAN NIGHTSHADE LEAFY VEGETABLE ON CANCER USING MICE MODEL

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### **Abstract**

Food insecurity and cancer is a relationship that has been overlooked by many in the oncological world. Population studies have shown that cancer risk is higher in households that are food insecure. In addition, prevalence of cancer increases as the severity of food insecurity increases. Human cancers are on the steady increase in the world yet, two-thirds of cancers are due to preventable causes. Diet is one major aspect that can be modified to lower the risk of cancer. The objective of this study was first, to assess the antioxidant potential of African nightshade vegetables and formulations in mice feed. Second, to evaluate the effect of consumption of vegetables on the expression of a tumor marker (urokinase plasminogen activator protein) in mice. The antioxidant activity of African nightshade leafy vegetable, when cooked and raw was determined using Trolox standard. Using an experimental design, mice were divided into three groups. Group one was fed on a control diet. Group two was fed on a diet formulation containing cooked vegetables. Group three was fed on a diet formulation containing raw vegetables. Then the expression of urokinase plasminogen activator protein was determined by a quantitative polymerase chain reaction. The study was conducted at a 95% confidence interval. The results indicated that the antioxidant activity of African nightshade leafy vegetable increased with steam cooking. The statistical significance was established between cooked and raw vegetables. The expression of urokinase plasminogen activator protein is reduced to 3% in mice fed with cooked vegetable formulation compared to the mice fed with control diet formulation. Expression of uPA is reduced to 61% in mice fed with raw vegetable formulation compared to the mice fed with the control diet formulation. The study concludes that steam cooking was effective in increasing the antioxidant activity of African nightshade leafy vegetables. The tumor marker urokinase plasminogen activator protein expression was shown to decrease with consumption of African nightshade vegetable.

## Is ecological intensification of agriculture really sustainable?

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### Abstract

The intensification of agriculture, started in the late 60s, has led to a rapid increase of yields per unit of land and time. However, it has also dramatically expanded the ecological footprint of the agricultural systems to a point that the intensification process itself is threatening the current crop productivity. A number of scholars proposed the adoption of a more ecological approach to intensification, where the overall environmental burden of agriculture is minimized and the ecosystems services provided by the agroecosystems are enhanced, while ensuring high yields and food security. Reduced tillage or no-till practices, cover crops, intercropping, crop diversifications are some of the key elements of an ecological intensification of agriculture.

A series of field experiments carried out between 2016 and 2019 in the U.S. upper Midwest looked into the sustainability of some spatial and temporal ecological intensification practices, more specifically intercropping and relay-cropping, crop diversification and cover crops. A sustainability assessment of the dominant cropping system (maize-soybean) with and without ecological intensification practices was performed to evaluate the environmental and economic trade-offs. In the assessment, we analyzed and quantified the impacts of the agricultural systems investigated on a global (climate change), regional (eutrophication), and local (erosion and soil fertility) scale. Relay-cropping systems of maize and soybean with cover crops showed an overall reduction of the ecological footprint per hectare in comparison with the conventional cropping system. However, when the economic component was introduced in the assessment, the sequences with cover crops showed an overall lack of economic sustainability, due to a significant reduction of the main crop's yield. Another experiment where we assessed the environmental tradeoffs of diversifying crop rotation by introducing a perennial legume (alfalfa) into a maize cropping system, showed a better performance compared with a conventional system in economic terms. Despite the promising results of the research, there is still a very limited interest from farmers to introduce crop diversification into the dominant cropping system.

These findings suggest that 1) more research is needed to design and develop sustainable and reliable alternative cropping systems based on ecological intensification principles, and 2) it is essential to work directly with farmers to address their concerns and overcome the current barriers that are slowing down transition toward ecological intensification practices. To increase the adoption on such practices, it is also important to quantify the enhancement of the ecosystem services provided by an ecological intensification of agriculture. This is a key step to develop cost-share policies that might support farmers in making crop production more sustainable.

## Knowledge, Attitude and Practices (KAP) of Farmers on Postharvest Aflatoxin Contamination of Maize in Makueni and Baringo counties, Kenya

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Ms Hannah Kamano

### Abstract

**Background:** Aflatoxin contaminated home grown maize has been a perennial problem in Kenya especially in the Eastern and North Rift parts of the country.

**Objective:** This study focused on investigating the influence of knowledge, attitude and practices of farmers on aflatoxin contamination of maize in Makueni and Baringo counties in Kenya.

**Methods:** A convergent mixed method study design combined quantitative and qualitative data collection techniques in maize producing areas of Baringo and Makueni Counties in Kenya. These methods included questionnaire administration, focus group discussions and key informant interviews.

**Results:** Of the 220 farmers who participated in the survey, 67.27% were male and 32.73% female in Baringo County whilst 45.45% male and 54.55% female in Makueni County. Majority of the farmers were in a marital union and were between the ages of 40-54 years. The average KAP score for knowledge was 57.6±11.79 % for both counties. The average knowledge score for Makueni was 37.70±11.36 % and 77.2±12.23 % for Baringo County. The average KAP attitude of the farmers in both counties was 77.1±9.32 %. There was a significant difference in the knowledge of factors contributing to aflatoxin in maize, as to the point where contamination begins, the signs of aflatoxin contamination and the consequences of aflatoxin exposure in both counties ( $p < 0.005$ ) The individual county scores were

76.5±9.24% and 77.7±9.41 % in Makueni and Baringo counties respectively. Socio-economic and demographic factors were linear predictors of knowledge ( $R^2=0.76$ ,  $p<0.001$ ), whereas they had no effect ( $R^2=0.043$ ,  $p=0.076$ ) on the attitude of the maize farmers. Farmers from Makueni County (Eastern Region of Kenya) were more likely (OR=1.24) to have higher knowledge scores on aflatoxin contamination than those from Baringo County (Rift Region of Kenya). On the contrary, with increasing age the maize farmers were less likely (OR=0.01) to have higher scores of knowledge. Farmers associated poorly dried maize and poor storage conditions as the maize causes of aflatoxin contamination.

**Conclusion:** The study findings revealed a significant difference in knowledge and attitude between the two counties. This consequently had an effect on the practices of the farmers.

**Recommendations:** There is need for increased awareness creation on dangers posed by consumption of aflatoxin contaminated maize grain within the communities. Training of farmers on good agricultural and management practices is also of utmost importance. This coupled with regular surveillance and enhancement of laboratory capacities can also significantly reduce the occurrence of aflatoxicosis in Kenya.

**Key words:** Aflatoxin, maize, household, knowledge, attitude, practices

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## Impact of Agricultural Health Training Programme on the Productivity of Crop Farmers: Evidence from Randomized Control Trial in Nigeria

Professor Raphael Olanrewaju Babatunde<sup>1</sup>, Professor Funke Iyabo Olagunju<sup>2</sup>, Dr Toyin Samuel Olowogbon<sup>1</sup>

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**Professor Raphael Olanrewaju Babatunde**

### Abstract

Low labour productivity among farming households have been associated with farmers' exposures to chemical and musculoskeletal health risks among other factors. The extent of these health risks and effectiveness of interventions aim at reducing exposure to these health risks among farmers in Nigeria is yet to be addressed by research. In this study, a randomized control trial approach was used to assign 480 cassava farmers from 24 farming communities to the study. However, 200 farmers were randomly assigned to receive the treatment. The intervention component includes one-time village level agricultural health training and a three-month farm safety mobile text messaging follow up. A peer-developed module covering safe ergonomic practices and safe use of agrochemicals was used for the training. The intervention effects were evaluated in short-term (6 months) post treatment. Structured questionnaire, interviews and random farm visit were used for data collection. Exposure to health risks is measured by recurrent self-reported symptoms. Descriptive statistics, ordinary least square regression, and difference-in-difference estimator were used for data analysis. Findings showed that during chemical application, 90% of cassava farmers reported exposure to chemical health risks and at least 40% reported exposure to musculoskeletal disorders at other stages of cassava production; farmers' sickness absence is driven by age, educational level, daily duration of chemical spray, care time and number of ergonomic exposure ( $p < 0.05$ ); every one day increase in sickness absence decreases labour productivity of cassava farmers' by 3% ( $p < 0.01$ ); the agricultural health intervention reduced sickness absence in the season by 1.9 out of 6.5 days (29%) with significant improvement in farmers'

agricultural health knowledge and attitude ( $p < 0.01$ ). The study concluded that cassava farmers were engaged in unsafe farm practices exposing them to some health risks which negatively affect their well-being. Although, evidences from the study supports that the agricultural health training intervention enhanced farm safety knowledge, attitude and reduced sickness absence in short term, additional research is needed to establish the long-term intervention effects and explore issues of cost effectiveness. Furthermore, there is a need for inclusive agricultural health policy addressing agricultural health information, agricultural health surveillance and agricultural health services for the farming population in Nigeria.

# **6. Sustainable Cities and Communities**

## **6a. Urban and regional transformations**

## Smart Villages: A review of the state of the art

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### Abstract

Over the last two decades, communities have faced many challenges. Together with environmental concerns, above all the climate change phenomenon, and the economic recession, since the beginning of the 2020 the Covid-19 pandemic crisis is threatening both urban and rural societies. There is an ongoing debate among policy makers, scholars and economic operators on how to cope with these pressures and technological innovation/ICT is often seen as a mean for helping local communities by making “smarter” societies.

If, on the one hand, the notion of “smartness” has fuelled the debate when referring to urban areas, and has led to a recognized definition of smart city, on the other hand there is not a universally accepted paradigm for translating it into rural areas, yet. The “Smart Villages” concept, in fact, is quite new; in the European Union, the Smart Village Initiative was launched by the European Parliament in 2017, and, in the same year, the EU Action for Smart Villages document was published by the European Commission together with the European Parliament. This was the starting point in Europe in order to define the conceptual framework for speculating on how to apply smart solutions in rural areas at different levels, from the general policies to the operational applications. This contribution aims at providing a state of the art of the literature review inherent to the topic. For reaching this goal, a bibliometric study has been carried out by questioning the two main scientific databases, i.e. Scopus and Web of Science, using “smart village” as a keyword (20th January 2021). 316 papers containing the wording “smart village” in the title and/or keywords and/or abstract have been detected. After checking the results for avoiding overlapping, a total of 219 has been selected to be examined. 87% of the total was published from 2017 onwards; with 55 publications moreover, 2020 represents the year with the highest number of manuscripts related to the topic, showing and increasing interest in the issue. Furthermore, as regards the type of publication, the survey lists 104 articles, 33 book chapters and 82 conference papers. This study will contribute on the accelerating progress towards SDG’s in times of crisis by providing an in-depth overview of this topic for defining potential research gaps as well as possible avenues of research, and it has to be seen particularly related to the “SDG 11: *Make cities and human settlements inclusive, safe, resilient and sustainable*”, targets 11.a and 11.b.

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## Perspectives of Sustainable Circular Economy in Regional Innovation Policies

Susanna Vanhamäki<sup>1</sup>, Dr Kati Manskinen<sup>1</sup>, Dr Satu Rinkinen<sup>2</sup>, Prof Lassi Linnanen<sup>3</sup>

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### Abstract

Circular economy (CE) is a trending concept that aims to increase the potential productivity of the economy while using fewer resources. In a CE, natural resources are used and recycled effectively; however, despite the circularity, the input in a circular system should not exceed the limits of planetary environmental constraints. If properly implemented, the CE supports the sustainable use of natural resources while at the same time contributing to solving climate crises and supporting biodiversity. Currently, the transition towards the CE is widely promoted through policymakers and governance, although this popular concept may have different meanings and origins depending on the region.

Through interviews with CE policy developers in 12 European regions, this paper explores how the CE has been defined in the context of regional innovation policies. The selected regions, along with their regional stakeholders, have defined the CE as a priority in their research and innovation strategies for smart specialisation (S3), which involves the European innovation policy approach of channelling research and innovation resources to selected priority areas. The paper presents S3 priorities related to the CE and to environmental themes that lie in the background of the transformation of regional CE policies.

The analysis showed that the regional CE context originates from environmental awareness, clean technologies and energy and waste management. Findings also showed that national policies, such as bioeconomy strategies, affect some regional priorities. In four regions, one reason behind prioritising the CE was because it was seen as a current trend in EU policies. The findings indicate that, as the CE becomes mainstream in regional policy, the importance of a holistic sustainable approach emerges. However, it seems that the term holistic can be understood in different ways in the CE context. Regions and regional authorities are challenged by the pressure to achieve concrete circular actions.

Sustainable development should guide the transformation of CE policies. To manage the transition towards the CE on a global scale, its implementation on the regional level is crucial. However, the proper understanding of all CE dimensions among regional actors might challenge the regions' capabilities to achieve sustainable change.

This research contributes to increasing the understanding of sustainability aspects of the CE in regional innovation policies by exploring its implications for Sustainable Development Goal targets 11.6 and 12.2. Target 11.6 involves how CE relates to developing waste management in the regions. Target 12.2 refers to the transformation of regional CE policy to achieve sustainable management and efficient use of natural resources. This paper relates to the ISDRS Conference topic, as it enhances the importance of a sustainable, proactive and transformative regional CE policy that involves relevant stakeholders in strengthening the regions' abilities to overcome the crisis.

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## Building Stock Energy Renovation 2050 Pathways: A Cost-Effectiveness Analysis for Portugal

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**Mr. Pedro Palma**

### Abstract

Buildings are a cornerstone of society, representing a crucial sector for the achievement of various Sustainable Development Goals (SDG), especially SDG11. In Europe, this sector is responsible for 40% of energy consumption and 36% of carbon dioxide emissions. About 35% of the EU building stock is over 50 years old and 75% has low energy performance. It is also one of the main causes of energy poverty, which negatively impacts the population wellbeing, further highlighting the need for increased energy efficiency. The European Commission has recently adopted the “Renovation Wave” strategy, as a part of the EU Green Deal, to address barriers and boost building stock renovation. This effort to enhance buildings’ energy performance has become even more relevant with the burst of the COVID-19 pandemic and the subsequent economic crisis, as buildings renovations can significantly support the economic recovery, as well as simultaneously improving thermal comfort inside homes and promoting the decarbonization of the sector. In Portugal, the residential building stock is old (70% were built prior to 1990) and has low energy performance - over 70% of all the energy certified residential dwellings have an energy performance rating equal or lower than C. Estimated deep renovation rate of buildings in the last 10 years is only around 0.06%/year, below the EU average of 1%, despite the implementation of several renovation schemes. Moreover, energy poverty affects approximately between 2.0 and 3.7 million inhabitants, potentially being exacerbated by the ongoing pandemic. A national Plan for Recovery and Resilience, stemming from a European debt issuance mechanism to face the crisis, will unlock €620M for improving energy efficiency of buildings. It is paramount to evaluate the potential impact of these funds and the necessary investment to significantly transform the building stock.

Therefore, in this study, the cost effectiveness of energy retrofit scenarios for space heating and cooling energy needs reduction of the whole Portuguese dwelling stock is assessed, considering different outside walls, roof and window retrofit measures. The cost and impact of these scenarios is evaluated for three pathways up to 2050, considering: 1) the current Portuguese renovation rate; 2) the European average renovation rate; and 3) the target renovation rate for total building stock retrofit. This analysis is supported by a bottom-up building typology method to estimate energy needs of the building stock and a survey of market retrofit measures characteristics and costs. This study sheds light on the potential effectiveness and cost evolution of retrofit measures, for different national renovation rates over the next 30 years, quantifying the necessary efforts to achieve the aimed transformation in 2050. It unfolds new knowledge that could be used in the process of designing a national-level comprehensive policy strategy for deep building stock renovation with improved use of public funding. Therefore, at larger scale, this work connects with SDG targets 11.1, 11.a, 11.b, as it supports national planning and policy towards accelerating the provision of more adequate and energy efficient housing at lower costs, a pressing need in this time of crisis.

## Periurban landscape transformation around Central Europe's middle-sized cities

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### Abstract

One of the most important territorial processes in the highly urbanized continent of Europe is suburbanization, urban sprawl which occurs in a gradual manner over long periods and is not perceived as dramatic. Nevertheless, the built-up urban areas and the urban lifestyle occupy step by step the periurban territories. Urban sprawl affects the essential environmental, economic, and social functions of the impacted settlements. In the last decades, these processes reached the less urbanized Central European region, leading to very fast and less planned changes in our settlement system. Our research deals with these processes in four Central European (Slovak, Hungarian and Romanian) non-metropolitan areas, around economically growing regional centers, and with its environmental impacts: in the case of Nitra (SK), Győr, Kecskemét (HU), and Cluj-Napoca (RO) Functional Urban Area. These cities and their area feature high enlargement dynamics looking at the past decades, compared to other FUAs in Central Europe. The areas surrounding these cities have become a rapidly changing periurban area from traditional rural life.

The aim of this presentation is to point out spatial patterns of urban sprawl and suburbanization in these functional urban areas (FUA) and to characterize the differences among countries. We can detect suburbanization from the core city to the periurban areas in each country and at the same time a very dynamic inflow of migrants from the other parts of these countries. These processes provoke a relatively fast real estate market growth with some typical regional features. The research is based on standard geographical methods including field research. Desktop and field empirical researches were conducted, with different methods such as GIS analysis of land-use change. Our analysis shows to what extent cities and urban areas grow, from which one can conclude how the landscape surrounding the urban residential areas has changed. Our data demonstrate, moreover, how artificial patches and barriers fragment landscape more and more, endangering thereby biodiversity and decreasing green surfaces. Our examination covers the 2000-2018 period, using the CORINE CLC 2000, 2006, 2012, and 2018 databases. Thereby we are able to examine changes in a longer period of almost two decades and three internal periods. All this is compared to the economic and social changes of these countries as well, in order to see to what extent the change in these features contributes to the transformation of the periurban landscape and thereby to its environmental and social sustainability.

This research is supported by the Hungarian National Research, Development, and Innovation Fund (NKFI). Reference number: NKFI-6-K-128703. Title: The Effects of Suburbanisation, Urban Sprawl on the Environmental Change of Suburbs in Central European Middle-Sized Urban Regions. Leader: Tamás Hardi.

## Analysing Obstacles for Climate Change Mitigation using System Dynamics

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### Abstract

Concerning ongoing climate change, numerous mitigation and adaptation measures were developed in the last decades, most focussing technological change but also addressing ecological and social transformation processes. However, to avoid a global warming above 2 °C the dynamics of these changes are far too slow and do often not consider the required holistic dimension of the complex transformation processes.

To gain a comprehensive understanding which drivers, obstacles and patterns affect the transformation to a sustainable, carbon neutral society the methodology of system dynamics can be helpful in two ways. First, to reveal the different mental models of various stakeholders involved in such transformation processes and collect resistances and contradictions in stakeholders mind set. Second, to simulate the dynamics of the system including interconnections and feedback loops with the aim of detecting effective leverage points to transform the system.

In the present contribution system dynamics was used to understand the process dynamics of transforming the building sector from high energy demand to low carbon by means of energetic renovation for the case of Germany. To meet climate change a renovation rate of 2 % of the building stock is required. However, the actual renovation rate is in the range of 1 % and shows a rigid behaviour in the last two decades without any significant increase. As a first step we collected mental models of different stakeholders involved in the process to determine which mind set and obstacles are present regarding such transformation of the building sector. Building on this the dynamics of the renovation decision process was simulated including several feedback loops. The model is able to explaining the rigid behaviour of the energetic renovation process and points out different leverage points.

In the developed model, the motivation to perform energetic renovation is a central element to change the intensity of energetic renovation considering certain implementation delays. These motivation is influenced by several reinforcing and balancing feedback loops leading to a non-linear impact on motivation and thus energetic renovation. However, the detailed information about the weight of the different motivating factors is an essential question of the model and needs to be analysed in more detail.

Concluding, applying system dynamics to the subsystem of energetic renovation in the building sector revealed several leverage points to transform the system from its rigid behaviour to a sustainable one with lower carbon emissions. With the central element of change in motivation achieve the desired transformation, these findings might be transferable to other system changes required to achieve a sustainable society. However, this is still an outlook and must be evaluated and examined in greater detail in future.

This work relates to the SDG 11 “sustainable cities and communities” with the SDG target 11.3 as well as SDG 13 “climate action” with the SDG target 13.3.

**This article corresponds to the Track 6a key topic “Transformative strategies, policies, initiatives and actions” and examines “Longer term or emerging future pathways”.**

## **Sustainable Performance of Green-Blue Infrastructure Based on Emergy Evaluation of Ecological Services**

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### **Abstract**

#### **Introduction**

Green-Blue infrastructure (GBI) is widely used in cities, especially when cities have been transformed towards sustainability. GBI plays a vital role in sustaining natural ecological processes in urban environments and contributing to the health and quality of life. Green-Blue infrastructure, unlike traditional infrastructure, can regulate and store rainwater naturally or artificially to improve urban resilience and ecological vitality, which is conducive to the sustainable development of cities.

#### **Method**

There have been currently models and methods that can be used to evaluate GBI's ecological benefits, such as INVEST, EcoMetrix, GVC and emergy method. The key advantage of emergy is that it accounts the donor-type value, which is determined by the production process and not by human's preferences or willingness to pay. This study systematically divides GBI into four types(wetland type, grassland type, special type and forest type) and develops its framework for small-scale ecological emergy evaluation to evaluate the application potential of each type of infrastructures in seven cities in China. At the same time, the differences in ecological services before and after transformation have been considered through examples.

#### **Results**

The results show that wetland type infrastructures (including biological retention pond and rainwater garden) can provide the highest ecological benefit per unit area to promote the sustainability of a city, followed by forest type and grassland type, and the smallest is special type. There is obvious spatial heterogeneity of GBIs' ecological benefits in seven cities in China. Compared with north cities, the construction of GBIs can provide higher ecological effects in south cities. And the emergy comparison before and after the transformation confirms the improvement of ecological benefits and the promotion of the sustainable development brought by the Green-Blue infrastructures.

#### **Discussion**

The application of BGIs is an upgrade of the original green land or hard land, which can effectively improve the collection and storage capacity of rainwater to improve the utilization of water resources, and improve the surrounding ecological environment. However, the application of different infrastructures brings different transformation effects, and the application of the same infrastructure in different places also brings different transformation effects. So a city should choose the appropriate

BGIs through comprehensive consideration of natural, economic, cultural and other aspects to maximize the benefits.

## **Conclusion**

This study constructed a donor-side accounting methodology for evaluating the ecological effects of different Green-Blue infrastructures in 7 cities of China to show their contributions to urban sustainability.

This study is closely related to the theme “6a. Urban and regional transformations” of ISDRS Conference 2021 (“SDG+Target: 6a”). From the perspective of urban infrastructure transformation, the ecological benefits of urban GBIs are evaluated, and the contribution of GBIs in urban sustainable development is explored, so as to provide basic research for improving the ability of urban sustainable development through urban infrastructure transformation.

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## Transformations toward sustainable urban settlements in Poland before and after the COVID-19 pandemic

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**Dr. Agnieszka Stefaniec**

### Abstract

Cities are hubs for the advancement of humankind, innovation, culture, finance, science, and technology. In 2008, the world's urban population outnumbered the rural population, and by 2050, it is expected that more than 65% of the world population will inhabit cities. To make the urban areas more inclusive, secure, and resilient, the United Nations (UN) introduced global indicators of sustainable urban development under Sustainable Development Goal (SDG) 11 in the 2030 Agenda for Sustainable Development, instructing its members to collect complementary sets of national and regional indicators. In reference to the UN SDG 11 and building upon the proposed by Poland indicators and available data, this study develops a measurement framework for comparing 66 most prominent polish cities (with powiat status). By measuring the degree of sustainability for the cities based on the integrated technique for order performance by similarity to ideal solution (TOPSIS) and data envelopment analysis (DEA) model, this research aims to reveal which municipalities are closer and which further from reaching the SDG 11. Employing the advantages of both methods, it also defines the distance to the ideal solution to rank the urban settlements and to identify cities needing immediate attention by regional and local governments. Additionally, this study examines to what extent the transformations toward achieving targets of SDG 11 were affected by or resisted the disruptions of COVID-19 pandemic. To do so, it investigates the pace of change in five years preceding the global health crisis (2015-2019) and collates it with the sustainability performance for the cities in 2020. Considering the severity of turmoil caused by current pandemic, we assume that, among other factors, it was a prominent

contributor to any setback for the progress of achieving sustainability targets. The empirical results are expected to indicate the substantial disparities among the municipalities in Poland and the scale of retardation. Finally, the guidelines to correct the imbalance between cities and to accelerate the progress toward achieving SDG 11 will be offered.

This research relates to SDG 11 targets 11.1-11.7.

In reference to the ISDRS Conference's topic "Accelerating the progress towards the SDGs in times of crisis", this study examines the progress toward achieving SDG 11 in Polish cities during the COVID-19 pandemic crisis, comparing it with the pre-pandemic time. The outcomes of comparison enable identifying the targets lagging behind and the feasibility of accelerating the progress so the urban development goal, as defined by the UN, can be attained by 2030.

## Airport integration in the rail network: case study of Beja Airport, Portugal

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**Ana Catarina Oliveira**

### Abstract

Integration between different modes of transport is a key-factor to increase the efficiency of public transport and a modal shift from cars. The option for public transport rather than individual cars, brings several advantages from a socioeconomic and environmental perspective. This is an essential contribution to the energy transition and to the achievement of greenhouse gas emissions and climate change targets stated in the European New Green Deal.

This research is focused on the linking of two infrastructures which serve as long-distance transport hubs: airports and railway networks. Our case-study is the Beja Airport in Portugal and the rail link between Lisbon and Beja.

There has been a large discussion in Portugal about the creation of a new airport to substitute or complement the Lisbon airport due to its close saturation. Recently, the Portuguese Government approved the installation of an airport at Montijo, however it was involved in controversy due to its social and ecological impact, and the absence of mandatory strategic environmental assessment.

The hypothesis of this study is to use the existing and underused Beja airport as the complementary airport for Lisbon. Beja should be primarily used for inter-continental flights and have a high-performance rail link to Lisbon. The pressure on the Lisbon airport can be further reduced by substituting the flights to Oporto and Madrid with rail.

The methodology comprehended the following: a survey targeting potential airport users and the population of the Alentejo region; a detailed analysis of the rail link to Beja to identify the improvements needed to the infrastructure; direct observation of part of the Lisbon-Beja journey in combination with interviews; computation of investment costs to ensure a high-performance rail link.

The population believes in the potential of associating these two infrastructures and its consequent the advantages to the Alentejo region, a region characterised by low levels of competitiveness, strong depopulation, and ageing. Also, the participants showed the concern about the lack of political will to take the strategic advantage of Beja Airport.

The analysis shows that the requalification of the Lisbon-Beja rail line for a nominal speed of 200km/h (commercial speed up to 160km/h) and the necessary expansion of the Beja terminal, the investment cost will be several times lower than the Montijo airport, with none of the major impacts, and more in line with commitments regarding climate change.

This study addresses several SDGs:7, as electrification of the railway will eliminate the need of diesel and consequently invest in renewable sources for electricity (7.2,7.3);8, as improved access to the interior of the country could promote the socioeconomic development and attractiveness of a desertified region (8.1,8.2,8.3,8.9);9, as the requalification for more efficient and sustainable infrastructure will promote the establishment of companies and industries (9.1,9.2,9.3);and 11, regarding the inclusiveness of communities in the interior of the country (11.2,11.3,11.a). This project also tackles the SDG15 (15.1,15.2), as it takes in consideration the protection of Tagus's Estuary, a Special Protection Area under the European Union Directive on the Conservation of Wild Birds.

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## Whitter End-of-Life Vehicles (ELVs) laws for Malaysia?

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### Abstract

ELVs can cause environmental hazardous to cities through the abundant of abandoned vehicles or improper scrappage of vehicles. ELVs laws set out measures to deal with the collection, storage, treatment, dismantling, reuse, and recycling of end-of-life vehicles. In addressing ELVs issues, Malaysia is at the crossroads as to which direction of regulations to put in place. Malaysia is among the biggest market for automotive industry in Southeast Asia. However, ELVs issues are not dealt with in a structured specific legislation. This paper will discuss the ELV status in Malaysia with a view to explore possible directions of ELV legislation in Malaysia. The analysis is doctrinal evaluating the applicable laws and regulations dealing with ELV and comparing them with the likes in Japan, China, and EU. The paper finds that ELVs issues are governed quite inconsistently under various laws, regulations and guidelines dealing with environmental issues, local authority's jurisdictions, and road transport rules. The paper also takes cognizance of the state of preparedness among the relevant regulatory bodies, industry participants especially relating to recycling of parts and vehicle shredders, and car owners generally. The paper proposes factors for consideration in setting up for a holistic legislation on ELV which reflects the Malaysia's circumstances based on the lessons learnt from established practices especially from Japan, China, and EU. An effective coordination among all the relevant parties to deal with the ELVs issues will require effective participations from vehicle owners, car manufacturers or dealers, local authorities, treatment facilities, and various regulatory bodies concerning environment management, road transport affairs, etc. ELVs regulation will help to change a wide range of urban and regional transformations through a prescribed environmental standard where much of the materials derived from ELVs are recovered and recycled. This paper will benchmark laws that are aimed at ELVs, which are vital at achieving the Target 11.6: Reduce the environmental impacts of cities; and Target 11.B: Implement policies for inclusion, resource efficiency and disaster risk reduction; under SDG 11: Mobilize Sustainable Cities and Communities. Further, the laws are instrumental at achieving Target 12.4: Responsible management of chemicals and waste; under SDG 12: Ensure sustainable consumption and production patterns. ELVs laws are crucial in transforming the cities through sustainable strategies, policies, initiatives, and actions by all the collective agents relevant to implement a set of viable laws that govern ELVs.

Keywords: smart cities, scheduled waste management, deregistration of vehicles, product liability.

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## Ordering the inter-city passenger rail service in Portugal

Lora Simeonova<sup>1</sup>, Eduardo Zúquete<sup>2</sup>, [João Joanaz de Melo](#)<sup>3</sup>

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**Lora Simeonova**

### Abstract

To tackle the climate crisis, all countries have to take measures to change the practice of all economic sectors that contribute to climate change, the transport sector being one of the most important. Many studies exist on the urban areas and the way that they should be changed to accommodate alternative modes of transport. But for long-distance travel, the range of studies is limited.

During the past decades, the investments in transport infrastructure in Portugal were mainly in motorways. As a result, the country is the fourth best in Europe regarding the quality of the infrastructure but has a very unbalanced modal distribution, where 89% of pkm (passenger-kilometre) are travelled by car and only 4% by suburban or long-distance rail. Besides a rail grid that steadily declined in the past decades, part of the problem is that train timetables are not aligned with customers' needs. Both the international literature and past experience in Portugal show that frequency and reliability (rather than speed) are the key factors for an option for public transportation. Nowadays, the discourse has changed towards the promotion of rail transport; but investments are being done without an overall transportation system plan. As yet, there is no coherent doctrine to guide either new investments or transport operations.

This study tries to demonstrate that it is possible to have an integrated long-distance passenger rail service with a higher frequency of trains and with a maximum one transfer while requiring a small infrastructure investment. The basis for this is the development of a common operation doctrine, which

comprehends: an expanded rail network (reopening existing but currently disused links); an integrated timetable for all long-distance passenger trains in Portugal; a frequency of trains of at least 1 train/2 hours in all lines, up to 1 train/30 min in the main line (Lisbon-Oporto); standard operating speed range and standard rolling stock adapted to the needs of all kind of passengers.

The paper compares the proposed doctrine with the situation before the COVID-19 pandemic, using performance indicators. Our findings show that, within approximately 10 km distance from each station, the revised network covers 30% more people than the present one, from 5.2 million to 6.8 million inhabitants. More important, with the new timetable, the demand for rail transport is expected to rise significantly due to the improved service quality. Between Lisbon and Oporto, the frequency of trains is almost two times higher than the present one — this should be enough to kill the Lisbon-Oporto air bridge, and to cut maybe by half the use of individual cars in the same route. In most lines, the quality of service will improve dramatically from 2-3 to 7-8 trains per day, which is expected to multiply rail demand severalfold.

This study is closely related to the 11th Sustainable Development Goal, target 11.2. The proposed rail service contributes to the reduction of Greenhouse gas emissions while its characteristics (frequency, number of transfers, covered territory) provide inclusive, safe and less crowded travel opportunities during the pandemic.

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## How does cross-disciplinary knowledge production take place? A case study on the project of “Decision Support Platform for Sustainable Taipei”

Associate Professor Liling Huang<sup>1</sup>, Professor Shang-Hsien Hsieh<sup>2</sup>, Ph.D. Student Yun-tsui Chang<sup>2</sup>, MS student Kuan-Chieh Chen<sup>1</sup>, MS student Qile Dong<sup>1</sup>

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### Abstract

To address the challenges of urbanization and environmental changes in urban and regional planning, coordination across different professional fields for knowledge production is especially important. In late 2020, 8 research groups from fields covering construction engineering and management, computer-aided engineering, transportation planning, water conservancy, earthquake & flood hazard reduction, ecological conservation, infrastructure lifecycle management, and urban planning, networked to develop an integrated project, “Decision Support Platform for Digital Governance of Sustainable City in Response to Environmental Changes”, for Ministry of Science and Technology in Taiwan. It aims to design an urban planning simulation platform for co-delivering the decision support by simulation and visual analysis based on different solution scenarios. To apply research into practices, and also in return to examine the research result, this project introduced a key stakeholder, namely the Taipei City Government. In its design, within a four-year prospect this project will start from an initial pilot project simulation, based on the urban development and ecological impact of Guandu Area and Shezi Island in Taipei City, then it proceeds to assist a revised framework for developing the Voluntary Local Review for Sustainable Development Goals of Taipei city.

The aim of this paper is to explore the process of cross-disciplinary knowledge exchange and integration in the early stage of the project. It examines how our team overcomes difficulties from the different epistemic cultures and path-dependent learning processes. We use field observations and dialogue records to analyze the interaction between members and the development of understanding on team tasks. In-depth interviews and focus group interviews are used to understand the interviewee's understanding of other fields of expertise during the cooperation process and the adjustment of the professional focus of their investment. Our main project has locked the SDG11 sustainable city and community as the common focus. But the professional fields of our individual members also cover SDG 9, 12, 13, etc. In addition, since our team's practice includes the future revision of the SDG Voluntary Local Review in cooperation with the Taipei City Government, the discussion on the SDGs framework during the initial internal discussions serves as a good tool for members to understand their differences and look for possible common ground. This research addresses the conference theme: "Accelerating Progress Towards SDGs in Times of Crisis" in that it involves innovation ecosystem settings for co-producing transdisciplinary knowledge and thus enhancing the transformative capacity of the city on sustainability.

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## Place-based identities in coal phase-out regions as an obstacle to sustainable transitions – the case of Lusatia

Julian Schwabe

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### Abstract

Considering the necessity of far-reaching structural changes against the background of sustainable transitions, traditional lignite-mining regions with carbon intensive industries play a key role in these processes. One prominent example of such a region that is faced with massive economical and societal upheavals is Lusatia in the East of Germany. Formerly an important energy supplier for the GDR, the region is faced with extensive transformation since the early 1990s and is now confronted with a coal phase-out not later than 2038 by the German government. Evidence from regional monitoring shows that within that process not only economic and political factors are relevant to the people, but also aspects of place-based identity and place attachment. The study sheds light on the questions, how these aspects are an issue in the negotiation of the transition in Lusatia and what the implications for further research are.

To address these issues, the study focusses on proponents of transformative ideas within their social contexts. Therefore, guided interviews with change-agents and especially with external people that are relevant to their projects are conducted. The study is designed as a multiple-case approach with initiatives from the fields of administration, economy, and grassroots movements to capture a certain range of different social contexts. An analysis of the interviews implicates a relation between biographical experiences of loss and an unsettling of place attachment that leads to moments of resistance to further transition. The study argues that individuals are disembedded and to some extent deterritorialized from their accustomed environment and that this circumstance is a hindrance for transformation endeavours. The research suggests that biographical fractions must be acknowledged as a major part in the social construction of space and furthermore, the formation of place-based identity within transition processes.

The study contributes to SDGs 8.3 and 9.4 by emphasizing obstacles to the retrofitting of industries and the promoting of creative and innovative activities that foster sustainable development. It is especially relevant to SDG 10.2, because it exposes the importance of different place-based identities and the need to recognize them to include all people – particularly those with bad transformation experiences – in the negotiation of transition processes. The contribution relates to the topic of the conference because it makes clear the need of identifying obstacles on a socio-cultural level to reach SDGs more efficiently.

## **Sustainable re-use of spaces and buildings: application of the principles of circular economy to urban regeneration**

Dr Leonardo Borsacchi, Dr Daniela Tacconi

ARCO (Action Research for CO-development) - PIN University of Florence, Prato, Italy

### **Abstract**

Cities are complex systems subjected to continuous transformations. The changes in society and the different production requires the redesign of urban spaces, often favouring some areas and marginalizing others. As time goes by, buildings change their usefulness, remaining unused and abandoned. The consumption of new land for new buildings, together with the production of waste materials from the demolition, contribute to burdening the negative balance of the city system in consumption of resources and production of waste. With regard to the life cycle of a building, similarities can be highlighted with the life cycle of a commodity. In the current debate, production process are shifting according to sustainability criteria. By innovative solutions, it is possible to rethink production processes, enhancing for example the use of secondary raw materials and by-products, creating the conditions to minimize negative impacts, implementing recovery and reuse, as well as by the adoption of responsible solutions.

Today, public decision-makers must define urban planning policies capable to guarantee, in the long term, a sustainable development in line with the objectives of the United Nations 2030 Agenda. In doing this, policy makers could try to consider the city as a commodity, whose life cycle is made up of continuous use and transformation of flows of materials, energy and ideas. In fact, this approach could offer opportunities for improve the innovation and the sustainability of cities. More, by increasing the level of awareness at the urban level can push citizens towards more sustainable consumption models. Through working groups formed by qualified stakeholders, it is possible to highlight the barriers (i.e. technological, regulatory, and economic) that slow down the full application of circular economy principles. Through participatory processes of co-design, it is possible to assign new functions to unused buildings.

This paper aims to describe examples of urban regeneration based on a circular economy approach, taking into account the case of the city of Prato, Italy. In fact, within the city system, the integrated understanding of interconnection between inhabited areas, commercial, industrial areas, green, and agricultural areas, enables the implementation of good circular practices.

The paper mainly relates to SDG 11, target 11.3. Thanks to the adapting reuse and the transformation of existing buildings, cities will be more sustainable and resilient in the future, contributing to the increase in the well-being and quality of life of citizens, strengthening their identities, memories, cultures, respect for the environment, contributing to social inclusion and economic growth.

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## **Making visible the “invisible” environmental impact of consumption: using Ecological Footprint to challenge the role of local policies**

Filipe Rocha<sup>1</sup>, Prof.. Sara Moreno Pires<sup>1</sup>, Prof. João L. Marques<sup>1</sup>, Pror. Filipe Teles<sup>1</sup>, Dr. Alessandro Galli<sup>2</sup>

<sup>1</sup>University of Aveiro, Aveiro, Portugal. <sup>2</sup>Global Footprint Network, Geneva, Switzerland

### **Abstract**

The Ecological Footprint and biocapacity of Portuguese Municipalities project gathered six Portuguese cities in a strategic partnership with one university and two environmental non-governmental organizations to collect new information and generate capacity for local decision-making towards sustainability and innovation of territorial systems. An assessment of the Ecological Footprint and biocapacity of those municipalities was performed in 2018 and 2020, and individual calculators were developed and set up in the website of each local government to inform about the greatest individual pressure from the citizens' consumption activities that threaten not only local ecosystems but also the stability of the planet itself. The goals for these calculators was not only to make visible for citizens the “invisible” environmental impact of their consumption options, but mainly to educate them about the necessary changes in terms of both individual consumption action and collective behavior. Mobilizing local leaders and structuring innovative local policies are key to achieve these goals. One workshop was conducted in 2019 in each of these six municipalities to train local associations, educators, administrators and citizens regarding the implications of the Ecological Footprint and biocapacity results for the city and the value of using personal Footprint calculators to identify the main drivers of the pressure local residents and economic activities place on ecological assets. A survey was conducted with the workshop attendees regarding the usefulness the Ecological Footprint calculator and questioning the role of local policies to tackle the challenges of fighting ecological deficits, gathering answers from 81 attendees. This paper therefore intends to discuss the survey's results and the use of the online individual calculator in each municipality, collected by the project team, to challenge the role of local policies for reducing Ecological Footprint. The Ecological Footprint calculator presents results in a user-friendly way, to help assessing individual impact on the environment, and provides a platform for citizens to actively participate in the development of unique sustainable actions that are specific to each community needs. It then enables an informed debate on the challenges of local leaders and citizens to invert the current unwanted trajectory of excessive use of natural resources, to define opportunities to protect and safeguard the natural heritage of municipal territories and to the realization of the Sustainable Development Goals (SDG), which are enforced by the UN Agenda 2030, particularly SDG11 (sustainable communities) and SDG12 (sustainable consumption and production).

## Designing strategies for SDG localization and human flourishing at local level: The case of Florence metropolitan city

Prof. Mario Biggeri<sup>1,2</sup>, Dr. Andrea Ferrannini<sup>2</sup>, Dr. Caterina Arciprete<sup>2,1</sup>, Dr. Federico Martellozzo<sup>1</sup>

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**Dr. Andrea Ferrannini**

### Abstract

In the Covid19 era, the capacity of local and national systems to face the intersection between vulnerability, inequalities, and unsustainability will define the future course of development (UNDP, 2020). In this regard, the real playground for action to accelerate solutions towards the Agenda 2030 for Sustainable Development is not just the global and national level, but also the local level (Biggeri and Ferrannini, 2014; UNDG, 2014; GTF, 2016; Bentz et al., 2019; Granados & Noferini, 2019; UNDP, 2019).

In this view, the SDGs cannot be effectively implemented without considering the specific characteristics of each place and its actors, with their vision, values and identities, as well as the strict inter-linkages among the three dimensions of sustainability at local level. Moreover, local and regional governments (LRGs) play a fundamental role for SDG implementation concerning access to basic social services, the promotion of economic development, and the exercise of civic rights. Nowadays, this is reinforced by the territorially differentiated impact of the pandemic, which calls for a place-based approach to policy responses along with a strong inter-governmental coordination (OECD, 2020; UCLG, 2020). Indeed, LRGs are at the frontline of the crisis management (UCLG, 2020; UNDP, 2020), not only to implement nationwide measures, but also to provide laboratories for bottom-up and innovative recovery strategies (OECD, 2020). In the long-term, LRGs have today the opportunity to plan for life after Covid19 with a range of strategic investments to pair economic recovery with social inclusiveness and environmental sustainability. For these reasons, the localization of SDGs becomes even more relevant in the Covid19

era, helping to frame priorities, align levels of governance, setting targets and monitoring real progress towards sustainable development.

The objective of our paper is twofold. First, we present a theoretical and interpretative framework to analyse how SDG localization can be pursued through strategic planning at local level centred on a vision of sustainable human development. Second, we make our framework operational by applying it to the case-study of Florence Metropolitan City (Italy), whose territory is composed by 41 municipalities spanning from small towns in rural and marginal areas (with less than 5000 inhabitants) to the city of Florence (with more than 370.000 inhabitants) representing its core and main urban environment.

This case-study is particularly interesting not only due to the structural socio-economic features of Florence Metropolitan City, but also to the efforts devoted by local authorities in recent years to plan strategies for sustainable human development through the current design of the Metropolitan Territorial Plan and the Metropolitan Agenda 2030.

Our research design combines i) the qualitative analysis of data and information gathered within the policy-making processes through semi-structured interviews and structured focus group discussions with local actors, with ii) the quantitative analysis of secondary data aggregated into five composite indices of sustainability.

This allows understanding to what extent transformative resilience, social cohesion and environmental consciousness have been firmly placed at the centre stage of decision-making processes, drawing wider insights for the international development on SDG localization in the pandemic era.

## **Transformative climate urbanism: Attempting to overcome sacred cows through public participation in urban policy development**

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### **Abstract**

Before the global economy was suspended into paralysis in March 2020 in response to a mysterious viral pathogen, 2019 was arguably the most significant year of grassroots climate activism in a generation, capturing society's attention. The voices of campaigners from the youth climate striker Greta Thunberg to the direct-action protest group Extinction Rebellion captivated media attention throughout the year, primarily calling for national and international action. Despite outsized attention on these civic pressures aimed at the highest levels of politics, novel forms of public engagement also impacted urban climate policy development processes during this period.

From September 2017 through March 2019, the city-region of Greater Manchester, UK developed a landmark carbon neutrality strategy – the 5 Year Environment Plan – utilising innovative forms of citizen engagement. Through these new 'co-productive' pathways for civic involvement in urban climate policy development, policymakers were challenged to grapple with highly politicised policy issues that had previously avoided. To meaningfully confront these concerns would require local government decision-makers to engage in policy contestation of so-called sensitive issues, demanding governance capacity for transformation. Despite the participative co-productive pathways and clear perspectives articulated by factions of the public on these sensitive issues, Greater Manchester's 5 Year Environment Plan largely avoided taking any firm action on these policy areas.

As cities seek to respond to and recover from the Covid-19 pandemic whilst simultaneously addressing the climate crisis, there is an urgent need for local government organisations to develop the capabilities required to facilitate transformation. This study used a participative embedded research approach to investigate how Greater Manchester attempted to develop a transformative local climate policy through a publicly inclusive, co-productive process. Through this embedded research approach and key stakeholder interviews, the paper finds that facilitating robust local climate policy development that may address highly politicised challenges requires local government organisations to cultivate particular organisational cultures needed for dynamic transformation. This finding has broader implications for SDG+Target 11.3, demonstrating that for participatory and inclusive urban policy and planning processes to produce sustainable urbanisation policies, local government organisations must support organisational cultures conducive to integrating diverse forms of knowledge that may be needed for transformative urban climate action.

## **Principals of Smart Growth and Land Use planning for the cities with Multiple Nuclei Model of Development: the Case of Juybar City**

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### **Abstract**

This study tried to test, analyze, and develop the multiple nuclei model principles in a city located in another geographical location with entirely diverse spatial, demographical, and social-economic structures. The type of this study is fundamental basic or pure research and accompanied by fieldwork, examination, and comparison. Analyzing the multiple-nuclei model considering motorized private transport, regardless of the geographical location and social-economic difference in this study, by practicing the Smart Growth theory principles, tried to enhance the efficiency of land uses concerning the spatial distribution of activities, facilities, and limitations. The collected quantitative and qualitative data types included geo data, development plans, scientific papers, and books. For analyzing the geodata and land use map used the Moskito GIS and Arc GIS software. Private car-based mobility created a multiple-nuclei structure of land use development in this city. It is one of the main factors that have escalated the city's physical growth horizontally. Mixed-use, compact development, high-rise building, increasing transportation options, improving public services and facilities for all families are the main strategies to control sprawl growth, reduce consumption of valuable agricultural lands, reduce environmental degradation, and realize a sustainable form of urban development in this city.

Keywords: Urban Smart Growth model, Multiple Nuclei Model, horizontal expansion, Juybar city

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## **Degrowth – characteristic elements and strategies, and two practical examples from Sweden**

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**Anja Eliasson**



**Dr. Erik Grönlund**

### **Abstract**

The negative aspects of economic growth as a policy objective and target for future development has historically been suppressed by a general belief in its superiority. Degrowth confronts the core logic of growth and pinpoints where it is failing as a system. The academic field of degrowth is relatively young

but is attracting more attention and has its own research network. With the aim of identifying characteristic elements and strategies, a small literature review were performed . Additionally, two interviews with actors in the mid Sweden region that operate within the frame of degrowth have been conducted for an insight in the practical reality.

Degrowth can be described as a frame or an umbrella keyword that connects different types of actors, initiatives, goals, strategies, and policies. It derives from multiple academic fields stretching from bioeconomics to justice and its main goal is a future guided by ecological sustainability and well-being for all. It is defined by what it is against such as the capitalistic system, GDP and development, but also by what it advocates such as equality, democracy, localization, and sufficiency. Strategies involve sharing in different forms, economic instruments such as taxation of harmful activities, restriction of advertisement and strengthening of the commons. Degrowth envisions an altogether different society consistent of new institutions that is guided by alternative values such as altruism, respect, sufficiency, and solidarity.

Both of the organizations in the mid Sweden region represented, by the inteviews, can be argued belong to the degrowth movement. Neither of the two interviewed persons identified themselves as 'degrowthers' as such but there are definitely some common reference points and strategies. The strong emphasis on the many values of localization is one. To establish this there are some common strategies such as the promotion of local capital. Another common reference point is the emphasis on the individual and the power of grassroot-movements. There is a lot of power given to the individual but also a lot of responsibility.

Relates to SDG: GOAL 11: Sustainable Cities and Communities and GOAL 12: Responsible Consumption and Production

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## Exploring the power of art and cultural initiative as drivers in urban transformation towards social and cultural sustainable development.

Associated Professor Malin Gawell, Assistant Professor Ann-Sofie Köping Olsson, Professor Monika Kostera, Professor Peter Dobers

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### Abstract

Art and cultural activities have been part of human lives and communities in diverse forms throughout time. On the one hand, art and culture relates to the essence of human interaction in which people interprets and understand our selves and the world we are living in (Fornäs,2012). On the other hand, art and culture relates to material artifacts that can be put on display as public art as well as valuable commodities. But it is not a simple dichotomy. Instead Pier Luigi Sacco (2019) emphasize art and culture's aesthetic modus of elevation, engagement and connections which sets focus on art and culture as crucial for creation and community development that is, for cultural sustainability (Soini et.al. 2014, 2016).

In cities around the world art and culture are obvious elements through theatres, operas, sculptures and other art work. But the space for and access to art and cultural activities differs. Power over resources and right to exhibit, tolerance or intolerance to ideas and/or expressions, and the sense of agency to participate, are just some aspects that deserves to be highlighted. In more marginalized parts of cities, art and culture seems to take other forms, at times more as protests or activism against predominate stratas.

The aim of this paper is to develop a framework for systematic understanding of the power of art and cultural initiatives as drivers in urban transformation towards an inclusive social and cultural sustainable urban development.

This paper is based on analysis of urban planning policy documents in Stockholm Sweden out of an art and cultural perspective and a special focus on marginalized suburban settings. It is furthermore based on case studies of cultural initiatives in diverse types of organisations such as civil society and so called alternative organizations in Stockholm Sweden, Sheffield UK and Warsaw Poland.

Art and culture are highlighted as important for growth and wellbeing in the major regional urban planning document (RUF5,2050). It does not however provide explicit policy measures or explicit means.

Case studies show how art and cultural initiatives contribute to individual and collective empowerment, active participation, strive towards decent livelihoods. These processes relate to several aspects of the UN SDGs and cultural vitality for potential future benefits. The case studies also reveal a vulnerability due to unsupportive structures including possibilities of longterm funding and livelihood for marginalized groups of participants.

There is a danger of instrumentalization and thereby violating the arm's length distance between artistic freedom of expression and political interference (Grinell,2020; Löfgren,2016; Sacco&Ferilli,2018; Valjakka,2021). The artistic and cultural initiatives we have studied, stand in the middle of a multitude of stakeholders and different power systems navigating between them in their ambition to contribute to an inclusive social and cultural sustainable urban development.

This study relates to SDG11, Sustainable cities, in particular the participatory subtarget 11.3.2, and Unesco's framework of cultural sustainability with the four dimensions: Environment & Resilience; Prosperity & Livelihood; Knowledge & Skills; Inclusion & Participation (UNESCO 2019), including connections to twelve SDGs (and 25 subtargets).

## **Indicator system based on the goals of the Sustainable Development Goals at the local level: the case of urban sustainability in the city of Rio de Janeiro**

MR ALEXANDRE CESAR MOTTA DE CASTRO

UNIVERSIDADE ABERTA, LISBOA, Portugal

### **Abstract**

#### **Introduction**

The growing phenomenon of urbanization poses permanent challenges for public administrators and for the civil society. Urban ecosystems have been increasingly under pressure as a result of the still dominant development model that favors economic growth to the detriment of social and environmental demands, causing unsustainable imbalances and affecting the quality of life in cities in the long run.

Special attention must be given on monitoring the progress made in relation to the Sustainable Development Goals (SDGs), transposed to the local scale through indicators capable of measuring urban sustainability in a continuous way.

Then, developing a system of indicators to assess the urban sustainability of the city of Rio de Janeiro, capable of capturing in depth the reality of the city as a case study, marked by profound social inequalities and the deterioration of its environmental, economic conditions and the quality of life of the population is an effort of urgent and utmost importance.

This context demonstrates the need to move forward, as existing initiatives in the city of Rio de Janeiro to monitor the city's progress towards achieving the SDGs of Agenda 2030 are not enough.

#### **Methodology**

The methodology is based on documentary research about systems of indicators for assessing sustainability at different scales (global, regional and local) that already exist, not restricted to the Global Indicator Framework for the SDGs, and related to several cities in Brazil and other countries. They're useful references for the development of an initial list of material and non-material indicators for assessing urban sustainability.

Interviews and focus groups will be conducted with experts and representatives of civil society entities from different segments of the population in order to identify new relevant indicators to measure the urban sustainability of the city of Rio de Janeiro. By doing so this will capture the data and local priorities that the official statistics fail to capture and thus expand popular participation in this research methodology, representing a new approach to the theme.

Finally, the Delphi method will be used to obtain consensus and validation by experts around the indicators that should be part of the indicator system under development.

## **Findings**

The partial results already obtained show the insufficiency of the SDGs for assessing sustainability on a local scale. The numerous systems of indicators identified demonstrate the importance of developing specific indicators that respect the urban dynamics of each city, taking into account technical, methodological and local governance constraints.

## **Conclusions**

The participation of specialists and members of civil society in the next stages of the study represents the innovative approach adopted. This is the method proposed to build a system of indicators that valorize people who live in the city and what is important to them. This is also the way to set up an effective system of indicators to measure the progress of the city of Rio de Janeiro towards a sustainable development model.

## Perspectives of Urban Agricultural Wastes Management towards Achieving Green Economy in Ondo State, Southwest Nigeria

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**Dr David Awolala**

### Abstract

#### Abstract

This study focused on perspectives of urban agricultural wastes management toward achieving a green economy in Ondo State, Nigeria. It identified agricultural wastes with likely environmental and health risks in the metropolitan cities areas by investigating the prevailing urban agricultural waste collection and disposal systems, and urban residents preferences for a voluntary agricultural waste collection system with estimated premium they are willing to pay for improved agricultural waste collection. Primary data were collected with a well-structured questionnaire from seventy-six respondents using a multistage sampling technique. Descriptive results indicated that 77.6% of the respondents alluded that waste from livestock (fish, poultry and pig) farming constituted the dominant agro-waste polluting the environment. About 98% are closer to nearest agro-waste centers within 2km. 60% of the respondents had access to environmental education but 49% perceived their environment to be average, but not that they are satisfied with the situation. Within the agro-processors, about 90% do not dispose their agricultural waste weekly. Further, it was observed that 72% of the respondents perceived air pollution as major effect from agricultural wastes on their environment. Majority were cognizant of cleaner and safer environmental transformation, and environmental condition of their areas tolerable, but not satisfied. The study concluded that most of the respondents which are not willing to pay for improved urban agricultural waste collection because it was viewed as agro-processors responsibility. It is

recommended that agro-processors contributing to urban environmental pollution should be willing to pay towards improved environmental transformation that would lead to green economy in the metropolitan area.

Keywords: Agricultural wastes, Urban environment, Health risk, Environmental transformation, Green economy, Nigeria

## **Social values and public preferences on energy futures in Asian cities: Insights from a comparative study of online deliberative pollings in Tokyo and Hong Kong**

Dr. Daphne Mah

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### **Abstract**

Smart energy transition studies have drawn attention to the limits of government-led top-down approaches and have been calling for citizen-centric transitions that explore the roles of citizens in contributing to delivering deep decarbonisation goals. The literature has however remained limited in addressing social aspects of energy transitions from the perspectives of citizens. This paper explored social values as a factor in influencing public preferences on energy futures. Based on a combined use of quantitative and qualitative data from two online deliberative pollings conducted in Tokyo (n=136) and Hong Kong (n=174), this study found that public preferences on more ambitious solar futures scenarios were associated with social values in particular one's perception of energy autonomy, one's willingness to be engaged in energy transitions, and one's perceived capabilities to act. Our findings have policy implications in relation to innovation in participatory energy transitions and empowerment.

## City Love and Place Quality: A Study on Liveable and Loveable Neighbourhoods in Rotterdam

PhD Karima Kourtiti<sup>1,2,3,4,5,6</sup>, Professor Peter Nijkamp<sup>1,2,3,4</sup>, PhD Umut Türk<sup>7</sup>, PhD Maria H. Wahlström<sup>1,8</sup>

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### Abstract

The Sustainable Development Goals (SDGs) and the *New Urban Agenda* (for 2030) contain an actionable message on sustainable cities and human settlements, with clear statements and insights demanding 'urban empires' commitment and work together to tackle urgent global complex challenges and to create a better place quality and future for all. Restructuring local governance and reframing responsive and local actions for meeting SDGs creates new opportunities, innovative approaches and original directions for urban planners and public institutions with the focus on ensuring lovable and resilient places in order to make the future city 'a place4all'. A necessary condition for coping with challenges and threats to the resilience of cities is not only to address indigenous vulnerabilities in urban structure and functioning, but also to support human well-being, satisfaction and activities in space. Understanding the local strengths and weaknesses that contribute to urban contentment – the so-called City Love - has in recent years attracted much interest from policy-makers, urban planners and scientists. The differences between neighbourhoods, in terms of their natural and built environment and their varied social-economic situation calls for local customized development strategies, actions and policies for a better future for all.

The driving forces behind the residents' appreciation for their neighbourhood are the focus of this study, where both the neighbourhood's 'body' and 'soul' are considered. Building on previous studies, the 'body' refers to the material and physical aspects of a neighbourhood, while the 'soul' refers to its immaterial and emotional aspects. However, previous studies are often based on databases regarding either residential perceptions or geographical information or official statistics. In this study, we approach the issue by combining all these types of information.

The overall aim is to develop and test a new city love concept – inspired by the soul and body conceptualisation of the 'city love' – based on a 'feelgood' and *human habitat* index (HHI) aiming to map out the citizens' contentment or appreciation of city life at a district or neighbourhood scale. This study utilizes data from a quantitative survey of 63 neighbourhoods in the city of Rotterdam. The data contains survey information from residents and also register data e.g., real-estate values, crime statistics, and socio-demographics. Geographical information from Open Street Map was added as a complement.

In addition to multivariate analysis, the paper incorporates quantile regressions with spatial econometric methods. The results show that the coefficients of the *feelgood* index decrease slightly as we move up along the distribution of the Neighbourhood Love Index, whereas the *HHI* shows an

increasing trend for higher quantiles of the dependent variables. This means that access to amenities such as public transportation, sport facilities, diverse attractions and also to bikeable and walkable road networks, become more decisive for the upper end of the distribution of Neighbourhood Love Index. One contribution of this paper is the suggested conceptual *City Love* model. Furthermore, the paper pays considerable attention to the physical nature of places in combination with register and survey data, enabling a holistic analysis of local urban qualities.

# **6. Sustainable Cities and Communities**

## **6b. Urban and regional resilience**

## **Perspectives of sustainability and resilience in the context of the UN Agenda 2030: food supply in urban conglomerates**

Luiz Henrique Maisonnett, Marcelo Fabiano Costella, Gean Lopes da Luz

Communitarian University of Chapecó Region, Chapecó, Brazil



**Luiz Henrique Maisonnett**

### **Abstract**

Urban conglomerates have faced a large number of challenges in recent years, perhaps the biggest one of them is the sustainability and resilience of cities in dealing with the food supply to the population. The complexity of the topic addresses adequate management of cities to guarantee economic, social, and environmental sustainability, contemplating the production of food within the urban space and the use of innovation and technology. This study aims to present and discuss how the UN Agenda 2030 can be an answer to the complex challenges imposed by life in cities about food supply, challenges that are amplified with the Covid-19 pandemic, and other phenomena, such as global warming. The methodology of this research is a systematic review of the literature, that aims to identify the existing scientific studies on the topic, evaluate the results and proposals presented, and create strategies that can support decision-makers in the development of policies for urban and regional sustainability and resilience. It is clear that despite the efforts of Agenda 2030 and government agencies to achieve the objectives of this ambitious plan, there is still a gap in specific, and practical action goals for cities and regions, which shows that there is a long way to go. It is concluded that local and regional actions, such as urban agriculture, for example, specific training for public agents and the population, with an emphasis on education and popular participation, would be something possible for the effective implementation of the UN Agenda 2030 SDGs.

This summary especially reports to SDG + Target: 2.1, 11.a, 11.b, 11.6, 11.7, 12.a, 12.1, 12.3, 12.7, 12.8, 13.b, 13.3

The proposed contribution reports to the topic of the Conference, regarding the resilience and sustainability of cities, food supply, and the existing global crisis, which was amplified and intensified with the Covid-19 pandemic.

## **Transforming urban water resilience through household action: an analysis of practices from Lagos, Cape Town and Windhoek.**

Dr. Adrian Healy

Cardiff University, Cardiff, United Kingdom

### **Abstract**

Understanding the interplay between individual choices and the cumulative resilience of urban areas, and their wider communities, is one of the least explored areas of resilience research. This paper addresses that gap by exploring the interface between individual resilience actions and collective approaches in three cities in sub-Saharan Africa. By examining household responses to water shocks it also promotes a new understanding of urban water resilience with lessons for governance and practice.

Water shocks and water stress stretch the ability of governmental authorities to respond, leading individuals to take action for themselves. Individual actions can be a positive element in building collective resilience but may equally undermine collective provision or lead to inequitable outcomes. Through a comparative assessment of responses to water shocks/stress in three cities in sub-Saharan Africa: Cape Town, Lagos and Windhoek, the paper provides novel insights into the role of households in urban and regional resilience.

Utilising qualitative and quantitative approaches the paper contrasts the actions taken by individual households to ensure their own resilience when faced with water shortages, their motivations for action and the consequences of this for collective resilience outcomes. Combining data from interviews with households and stakeholders in each of the cities the approach provides a novel insight into the framing of individual actions as part of a wider resilience strategy, and some of the challenges encountered.

The results provide important insights for building urban water resilience. The three cities demonstrate different modalities of water supply. In Lagos, there is a long-term practice of households sourcing their own water supplies, notably through commissioned boreholes, to offset limited municipal supplies. In Cape Town, responses to the 2018 drought led to a rise in households augmenting municipal water supplies, including an increase in private boreholes. In Windhoek, municipal water remains the dominant water supply.

The paper highlights the complex motivations of household actors, combining self-interest and altruism. Protective motivations are dominant, and secondary social or environmental impacts are rarely considered in the procuring of personal water supplies. The paper highlights the potential for maladaptive practices to produce secondary cascade effects with possible adverse impacts for social and environmental justice, both now and for future generations.

The results develop our knowledge of urban water resilience by demonstrating the complex interplay between municipal and household strategies for securing resilience to water shocks, the interface of agency and structure within this and the implications for governance. The paper develops our understanding of how water shocks can induce transformations in urban water supply structures. The

results also highlight the specificity of place when designing resilience strategies and illustrate the significance of considering the distributional consequences of cumulative individual actions.

The ability of cities in sub-Saharan Africa to achieve SDGs 6.1 and 6.4 lie at the heart of this paper. Water shocks and water stress not only challenge achievement of these targets but also raise questions as to the means by which these targets are achieved, and the wider implications for sustainable development and urban resilience.

## **Changed circumstances for destination entrepreneurs caused by the pandemic 2020-2021**

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Uppsala University - Campus Gotland, Department of Civil and Industrial Engineering, Quality Sciences, Visby, Sweden

### **Abstract**

#### **Small destination entrepreneurs' adaptation to changed circumstances caused by the pandemic 2020-2021**

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### **Abstract**

As we used to know them, life and work were, to an extreme or extensive degree, changed in spring 2020. Across the globe, the spread of novel coronavirus has been leading to profound changes in the whole tourist sector. Destination providers and entrepreneurs in the world, including the island of Gotland, have been forced to adapt to changing circumstances. The common trend in the tourist business worldwide has been the rapid decline of customers. This unexpected event has surprised a majority of entrepreneurs affected, and their companies have had no choice but to accept the situation. Purpose: This article explores the adaptation of small tourist entrepreneurs to the Covid-19 pandemic. Methods: A qualitative approach is used in this study. Eleven destination entrepreneurs in Gotland, Sweden, responded to an online survey. The survey guide contained questions about entrepreneurs' backgrounds, the business's art, experiences over the challenges pandemic has caused, and solutions used to tackle the situation. Analyse these responses were made using theoretical concepts such as change- and crisis management and skills of resilience. Results and Discussion: Results show that the current situation offers insight into both possibilities and future challenges. The entrepreneurs' efforts and attitudes show an ability for resilience. Their activities and knowledge can be seen as essential for all destinations; their ability to resilience, not least after the pandemic, should be given more attention. Their contribution to economic development and social capital in tourist destinations and societies seems to be vital. Implications: The study results show the importance of

paying more attention to the role of small entrepreneurs in the development of destinations, not least due to their ability to resilience.

Keywords: bricoleur, change management, crisis management, life-stylers, resilience

**SDG+Target:11.b**

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## **A resilience approach to stabilize the market economy in the post pandemic era: Case of metropolitan cities in India**

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**Mr. Rubaid Naskar**



**Mr. Aveek Ghosh**

### **Abstract**

Resilience has many definitions and implications referring to regaining of the prior situation. In general engineering concept, it adheres that to bounce back to its original state or shape. The application of

resilience can be found in the urban and regional social context, where livelihood is affected by natural calamities and hazards, especially affecting on the economic front. For cities and urban areas, shocks are not always adjusted and counter back to its original state instead, structural transformations and adaptations are found. Subsequently, people in urban and regional sectors establish new mechanisms to adapt in environments to sustain. The paper outlines the case of three metropolitan cities in India- Kolkata, Delhi, and Mumbai highlighting the post-pandemic COVID-19 scenario to understand the disability in economic fiscal-scale. In a developing country like India, marketplaces are often found in two distinct arrangements- formal market and informal vendorship. The COVID-19 pandemic pierced the life of shopkeepers in both the market sectors. The distribution management system became disrupted with less supply in urban marketplaces to leave them paralyzed in these cities. The paper focuses on the post-pandemic case scenario to highlight how the different merchant owners in both markets started to initiate their marketing strategy alternatively to broaden their customer chain. This paper aims to comprehend how a resilience concept can be applied in diverse scenarios. The results showed that informal vendors started to visit the local communities to sell the daily commodities and goods, door to door. Moreover, people were reluctant to visit the marketplaces to avoid contagiousness. The marketplaces portrayed a distinctive image, showcasing the rise in the business of online giants and e-commerce platforms, ensuring safety protocols and hygiene. The findings of the research present the different market strategies and how they heal their economy by adopting numerous techniques with the given constraints.

## **Mining-Dependency and Corporate Environmental Crime: the challenges in the reconstruction of the municipality of Brumadinho/Brazil**

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Pontifical Catholic University of Minas Gerais, Belo Horizonte, Brazil

### **Abstract**

Our paper discusses the dilemmas and challenges to promote sustainable local development in the municipality of Brumadinho, Minas Gerais state, Brazil. Brumadinho communities suffer from socioeconomic phenomena that we call Mining-Dependence. In our research, we discuss alternatives for overcoming it. The theoretical framework encompasses a more sociological and less economical view, with emphasis on themes involving local development, mining, the model of the Economy of Functionality and Cooperation by the French economist Christian Du Tertre. Development debates are very intense in academia and involve multifaceted views arising from various scientific fields. It is a theme composed of an amalgamation of interpretations, far from constituting a homogeneous field. Socio-environmental impacts reproduced in the territories, tensions and conflicts with communities, the collection of mining royalties, and the promotion of public policies are just some of the issues that emerge when the issue of mining is addressed. Qualitative in nature, an extended case study was carried out. The research findings show that the municipality's economic dependence is enormous, especially financial. Despite its financial weight, mining alone is unable to generate social, environmental, and cultural development. Numerous criticisms are made of public management in relation to the application of resources from mining in policies for the territory. Mining companies' social, environmental, and cultural responsibility policies, especially Vale S / A. proved to be well below what they really should be, because of how much they explore in the municipality. The dependency was more pronounced after the collapse of dam 1 of the Córrego do Feijão mine, in January 2019, the most important labor and environmental crime in Brazil because 272 people died in this tragedy. Today, in Brumadinho we can find countless repair works, bringing momentary heating of the economy, but at the same time fear and concern about the territory's socioeconomic future. Some alternatives were proposed by the social actors and involved the following sectors and activities: tourism, gastronomy, and culture; agriculture and agribusiness; education; industrial district. The Economics of Functionality and Cooperation primarily involves changing the community's thinking about proposing a model that takes into account the immaterial aspects of relationships, cross-cutting cooperation, and sustainable development. Local protagonism needs to be encouraged more, especially in decision-making processes on the social management of the territory. For this, there needs to be a cultural change and breaking off some paradigms, moving from social inertia, comfort, and isolation to a more engaged posture. The article addresses the dilemmas and challenges of promoting sustainable local development in mining territories and presents an alternative economic model based on sustainable development and the enhancement of human capital, especially of immaterial relationships between people.

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## DIFFERENT CLASSIFICATIONS OF THE REGIONAL AND URBAN LOCATIONS UNDER IMPACT OF THE DISASTERS: THE CASE OF COVID-19 PANDEMIA

Prof.Dr. İlknur ÖNER

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### Abstract

Regions and cities are usually under the classifications according to different criteria such as population, economic conditions, managerial conditions, migratory conditions, etc. However, approaches affect definitions and classifications as well. Thus, there are labelings such as ecological cities, healthy cities, resilient cities, slow cities (cittaslow), rebellious cities, bad and good imaged cities, closely knitted relation cities, culture centers, World capitals, cities under the risk so on. However, these classifications are usual approaches of the regular times. However, ongoing conditions (social, economic, political, disasters, crises, health, etc.) at the societies' fabrics alters our city and urban location, regions, and country definitions and classifications. These classifications find reflections at permanent and/or temporary levels. These classifications are present since the earliest examples from the civilizations in Mesopotamia, Nile, and Latin America. Disaster and growing sustainability issues, energy production, and consumption issues increase the necessity of examining the resiliency of settlement locations and the communities. There are certain classifications about different disaster types and processes. However, lockdown and COVID-19 pandemia injection priorities and limitations force us to face other decisions (International, national, local, individual) and related conditions of our settlement locations and community conditions to do revisions on definition and classifications. This paper will be elaborating varieties of the city, urban areas, and communities at the time of disasters in four sections. Exceptional cases will be derived through comparative scrutinization of examples from the World and about COVID-19 Pandemia. Sustainability will be examined within cultural, social, ecological, economic, political, and health conditions. The findings related to classification and resiliency issues will be evaluated in the light of SDG's, especially Goal 11 a and b articles. Methodologically sources of the study are literature reviews of hard copies and digital platforms. Formally applicable statistical findings will be scrutinized as well. Besides this, global and local observations will be taken for granted as well. The results reveal differences in definition and classifications on differing grounds (managerial, international, local decisions) and differing time sequences (short, medium, long term, and temporary-permanent). The findings of Turkey will be evaluated as a case study as well. Findings will be elaborated formal definitions and cases of crossing borders of these limitations under the conditions of community networks and relations. Cross-section of community, region and settlement definitions at the time of disasters will be discussed. Conclusion will be final section. Global, national and local findings will be evaluated under the light of disasters and the specific case of COVID-19 pandemia.

**Key words:** Resilience, Urban, Community, Disasters, COVID-19

## Regional Resilience and Spatial Distancing in the Time of COVID-19

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### Abstract

The regional resilience literature (especially that written from a bounce-back perspective) uses propositions and empirical tests of variables to predict the resilience of regions with some degree of accuracy with the purpose of making regional resilience a manageable phenomenon. Due to the current coronavirus disease 2019 (COVID-19) pandemic, measures aimed at increasing spatial distancing also likely negatively impact the level of employment and the generation of regional wealth because businesses in many sectors are closed. Hence, we aimed to verify whether the spatial distancing index is a predictive variable of regional economic resilience. This study was descriptive and adopted a quantitative approach (through a functionalist paradigm) using secondary data. Our only variable was a spatial distancing index collected for the Brazilian states. We used daily data from February 2020 until July 2020. The time series were transformed to guarantee stationarity, which made it possible to calculate the Pearson linear correlation among them. The lowest correlation coefficient was 0.85, which indicated a strong positive correlation among the transformed series. Hence, as spatial distancing increases in one state in Brazil, it also tends to increase in the others. According to the literature, due to regional disparities, shocks have different impacts on distinct regions. Our results showed that Brazilian states behave similarly with respect to the spatial distancing index, which suggests that this index does not constitute an advisable predictor of short-term regional resilience in relation to the shock resulting from the COVID-19 pandemic. The fact that a predictor varies does not make it suitable for predicting short-term regional resilience. Nevertheless, given the similar behavior among Brazilian regions, the adopted index conflicts with the understanding that different regions respond differently to a shock. It is a requirement analysis and not a sufficiency analysis. Therefore, we recommend the following: Proposition 1, the restriction or limitation of mobility is not directly correlated with employment level or gross domestic product. The main limitation of the present study was the impossibility of verifying the relationship between the spatial distancing index and other indicators due to methodological differences in database construction and also because of strong correlations among the transformed series of the adopted spatial distancing index. This verification should be explored in future studies using different databases or by considering other regions/countries. We have contributed to the regional resilience literature by (i) addressing a poorly researched locus, (ii) dealing with a recent crisis whose consequences are not yet fully understood, and (iii) yielding a proposition about the use of spatial distancing indices as a predictor of regional short-term resilience to the shock resulting from the COVID-19 pandemic. Our study is related to Sustainable Development Goal 11, Target 11.5. In practical terms, based on the yielded proposition, we argue that the index does not constitute an effective substrate to describe short-term socioeconomic policies aimed at increasing the economic resilience of regions that are most affected by the pandemic crisis.

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## How does resilience planning impact vulnerability to flooding in coastal cities?

Dr. Sara Meerow<sup>1</sup>, Dr. Sierra Woodruff<sup>2</sup>, Dr Bryce Hannibal<sup>2</sup>, Malini Roy<sup>2</sup>, Melina Matos<sup>2</sup>, Philip Gilbertson<sup>3</sup>

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**Dr. Sara Meerow**

### Abstract

The risks and costs of flood damages for coastal cities are increasing. Resilience planning is an increasingly popular framework for coordinating hazard mitigation and planning more generally. Research suggests that concept's malleable meaning allow resilience to function usefully as a "boundary object." As such, resilience planning is theorized to help increase collaboration and avoid counterproductive outcomes that arise from treating interrelated problems in isolation. Many cities are now ostensibly engaged in resilience planning, however the extent to which resilience is actually transforming planning processes, stakeholder collaboration, or mitigation of long-term flood risks is unclear. This study seeks to fill this gap, empirically examining how resilience is conceptualized by different organizations involved in flood planning, whether it does, in fact, seem to bring together different stakeholders and lead to more integrated plans and policies that are likely to reduce physical vulnerability to flooding in the built environment. We combine findings from a stakeholder survey, social network analysis, and various methods of plan analysis in four different U.S. coastal cities (Fort Lauderdale, FL, Baltimore, MD, Boston, MA, and Seattle, WA). As one of the first studies to use network analysis to assess conceptualizations of resilience across a governance network, the coordination of organizations engaged in resilience planning, and to evaluate the influence of coordination on plan integration and quality, this study will test existing theories on resilience, urban governance, and planning. This work is most closely aligned with SDG 11: "Make cities and human settlements inclusive, safe, resilient, and sustainable," especially specifically disaster risk reduction.

## **Assessing Seismic Resilience of School Educational Sector. An attempt to establish the initial conditions in Calabria Region, Southern Italy**

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### **Abstract**

School education constitutes one of the strategic functions to be recovered in case of an external shock, such as a major earthquake. The structural improvement of school buildings together with the strengthening of the administrators' capacity to react positively and keep the school community cohesive following a strong seismic event are key factors that contribute to the reduction of social vulnerability, both before and after the earthquake. Nevertheless, in Italy, except for some virtuous regional cases, the issue of seismic prevention and risk reduction policies related to the school sector has not yet been consolidated in the national and local institutional agendas.

Observing the major Italian earthquakes of the last century, among the most evident aspects, what keeps being predominant is the degree of buildings damage with consequent interruption of functionality of the urban system. School buildings are not excluded from this general picture. Among the causes of the massive physical damage, some structural ones emerge, such as the vulnerability of the building heritage, but also other causes that depend mainly on governance and institutional capacity: lack of risk mitigation policies and lack of effective and shared cognitive tools, capable of drawing a clear recovery framework and building a more resilient community to tackle future possible earthquakes.

Although it does not represent an a priori solution, that of resilience has been considered a relevant paradigm to address the issue of how to strengthen the capacity of the school system to ensure the physical safety of the buildings and to guarantee the maintenance of the school function, both looking at pre and post-event phases.

The paper proposes a set of indicators and a methodology for a preliminary assessment of the educational sector's seismic resilience, in terms of initial conditions. Starting from the literature, the method has been set up and tested on a first pilot case study: Calabria Region in Southern Italy. The results show that spatial differences in the educational sector's seismic resilience are evident. Except for some large urban areas, the less resilient areas are grouped mainly in the southern part of the Region, while the most resilient ones are located mostly in the central-northern sector. The goal is to identify a repeatable approach, useful as guidelines for school seismic prevention policies.

The proposed abstract is related to SDG 11 "Make cities and human settlements inclusive, safe, resilient and sustainable". Target 11b.

This research contributes to the Conference topic because it stresses the importance and the urgency for governments (both nationals and locals) to adopt comprehensive disaster prevention policies and

actions, proposing a repeatable operational method to assess the earthquake resilience of the school education sector in specific urban or regional systems.

## RIVERS AS CONTRIBUTORS TO URBAN RESILIENCE. ANALYSIS OF THEIR POTENTIALITY IN EUROPEAN CITIES

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University of Navarra, Pamplona, Spain



**Dr. Francisco Durán Vian**



**Dr. Juan José Pons Izquierdo**

### **Abstract**

Urban rivers are a key part of the blue-green infrastructure systems, providing valuable ecosystem services to residents (Bae, 2011; Everard & Moggridge, 2012). Despite the fact that open spaces are common along urban riverfronts, land uses on riverbanks vary a lot from one city to another (Durán &

Pons, 2021). Anthropogenic uses on the riparian corridor do not only affect the ecological state of the river system, but they also condition the quality of life of citizens as well as the resilience of the city (Ahern, 2013).

In this research we analyzed the land uses around the urban rivers of three hundred European cities. This analysis evaluated the distribution of land uses that are compatible with the creation of a green infrastructure (gardens, parks, natural areas, agricultural areas, etc.), identifying those cases with more green spaces adjacent to the waterways.

For this purpose, we used the cartography developed under the framework of the Copernicus Programme of the European Environment Agency (EEA). We first build an updated map of Urban Morphological Zones (UMZ) from the European Urban Atlas. Secondly, we clip the resulting UMZ layer with a high-resolution land use and land cover dataset of Functional Urban Areas. Finally, we cross Potential Riparian Zones (DPRZ) with the layer resulting from the previous step.

The result is a ranking of European cities based on how their green river infrastructures can contribute to urban resilience.

This proposal relate to several SDG+Targets: 6.6; 11.5; 11.7; 11.a; 13.1

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## Heatwave vulnerability and sustainability assessment in the case of Hungarian large cities

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### Abstract

Nowadays, more than half of the world's population lives in cities, and this number is even higher in the EU and Hungary. Climate change causes extreme weather events and related adverse socio-economic effects in cities; however, improving adaptive capacity can help to reduce these consequences, and thus the need for sustainable city management is crucial. The analysis of urban sustainability and climate change-related concepts are in the focus of current scientific debates. The number of urban sustainability literature strongly increased in the past 20-30 years; meanwhile current studies tend to move toward climate adaptation or vulnerability analysis. Cities have an unquestionably important role in sustainable transition by reason of occupying more and more areas, and thus the complicated relationship between broader urban sustainability and related climate change issues, such as adaptation and vulnerability, are strongly reasonable to understand and analyse. Numerous studies on climate adaptation and sustainability issues focusing on sectoral dimensions have been published in academic journals; however, far too little attention has been paid to revealing spatial trends, i.e., regional comparison of different urban areas is a much less actively studied area. It should be noted that many Hungarian scholars regularly publish papers concerning climate change issues; however, a wide range of Hungarian scientific backgrounds are missing in terms of climate change, urban sustainability and related principles, spatial comparisons, and inter-urban analysis, so the expected results of the current research are unique and can expand the knowledge base available. In the current analysis, the aim of the temporal and spatial analysis of urban sustainability and climate adaptation capacity is to reveal the regional patterns and processes through Hungarian largest cities' example, which are still a white spot in Hungarian urban studies. The examined cities are Budapest, Győr, Miskolc, Nyíregyháza, Debrecen, Szeged, Pécs, Kecskemét and Székesfehérvár with a population exceeding 100,000. Since Hungarian case studies currently lack the literature regarding the regional comparison of these aspects, therefore submission of a paper on this topic contributes to widening the existing literature with a strong emphasis on Hungarian cities. The analysis strives to reveal what spatial patterns can be defined and mapped regarding urban sustainability and heatwave-related adaptation of these cities from the early 2000s to nowadays and in the near future, and thus a comparative analysis can be performed. Regarding the method quantitative analyses are projected to be conducted in the study. The focus is on the use of widely available statistical data set, which can be downloaded easily from open data sources. The data collected will be used for both the sustainability and adaptation analysis by applying adequate indicators. As it was previously mentioned, the Hungarian context related to the topic is not well researched and therefore this analysis will fill a gap in the domestic and international literature.

## "Assessment of socio-economic and livelihood vulnerability relevant for climate adaptation: A district-level analysis of the Indian Himalayan Region"

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**Mr Mir Khursheed Alam**

### **Abstract**

The Fifth Assessment Report of the Intergovernmental Panel on Climate Change defined the 'risk' of climate change at the intersection of "Hazard", "Exposure" and "Vulnerability" (IPCC-AR5, 2014). While mitigation of climate hazard and reduction of exposure are relatively long-term goals, the governments and development agencies can address climate adaptation most effectively by reducing vulnerability in the short and medium-term. Mountain regions tend to be severely affected by the risk stemming from climate change and variability. These regions are largely characterized by complex biophysical and marginal socio-economic conditions that significantly contribute to vulnerability. Identifying and supporting vulnerable regions along with the implementation of adaptation and mitigation measures are crucial for achieving the 13<sup>th</sup> Sustainable Development Goal (SDG-13). A systematic understanding of the vulnerable locations and drivers of vulnerability at the current climatic condition is the first step towards adaptation planning. The present study employs an indicator-based approach based on the modified risk assessment framework proposed by the fifth assessment report (AR5) of IPCC 2014 for conceptualizing vulnerability and geospatial analysis for identifying the vulnerability-hotspots, considering 132 districts in the Indian Himalayan Region (IHR). The research objectives are to 1) identify the most vulnerable districts using Composite Vulnerability Indices (CVI), based on a set of 14 common indicators (such as poverty rate, dependence on natural resources for livelihood, the prevalence of rainfed agriculture, alternative livelihood schemes, and other institution and infrastructure-related indicators, 2) identifies the hotspots of vulnerability based on spatial autocorrelation (Moran's I and Local Geary), and 3) identifies the drivers of vulnerability. The results revealed that the Composite

Vulnerability Index (VI) ranges from 0.75 (Goalpara in Assam) to 0.35 (Kolasib in Mizoram). The districts have been categorized in four quartiles of 33 districts each, viz., Quartile I (0.62 to 0.75), Quartile II (0.54 to 0.62), Quartile III (0.48 to 0.54), and Quartile IV (0.35 to 0.48). Around 78% of districts in Assam and 36% of districts in Jammu and Kashmir fall in the highly vulnerable cohort (Quartile I). Spatial analysis revealed concentrated vulnerability hotspots (high-high CVI clusters) are dominated by the hazard-prone regions of Jammu and Kashmir (in the western IHR) and the '*char*' belt of the Brahmaputra river basin (in the eastern IHR). The outcomes of the study may prompt effective and targeted policy interventions in the vulnerability hotspots by the rational allocation of adaptation resources. The study may assist in prioritizing, designing effective adaptation strategies and stimulate the coping mechanisms to strengthen the resilience of the communities/sectors.

## Context-dependent Nature of SDGs at the City Level

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**Professor Semee Yoon**



**Professor Keeheon Lee**

### **Abstract**

As we enter the Decade of Acceleration for UN 2030 Development Agenda, one of the bottlenecks to progress can be our limited understanding of the interconnectedness of targets and indicators of Sustainable Development Goals (SDGs). The call for understanding synergies and trade-offs among SDGs has been emphasized both in academia and among practitioners. Consequently, using network analysis,

LeBlanc (2015) provides a mapping of 17 SDGs and 169 targets that had been suggested by the Open Working Group to be adopted at the UN General Assembly Meeting in 2016. Recognizing the knowledge gap in our current understanding of co-benefits and tradeoffs between SDGs, the literature on this topic has grown since the announcement; most of the literature focuses on the national level indicators. However, contingent upon the resources of the national statistical office, the scope of data collection for SDGs varies from country to country, which hinders thorough monitoring and evaluation of the progress.

Since 2008, more than half of the global population lives in urban areas, and by 2050, additional 2.5 billion people are expected to live in those areas, most of which will be in developing countries (UN, 2019). Thus, considering the anthropogenic influence on the sustainable development pathway, how to translate the current national-level context of SDGs to the city-level context will be crucial so that reliable data is collected by cities as well. Using network analysis of a database of city-level goals, targets, and indicators suggested by international organizations and coalitions on sustainable urban development, we find that the climate action goal (SDG 13) is the gatekeeper of all SDGs in the city context, connecting various goals, ranging from sustainable urban development to inequality. Meanwhile, there are goals that exist as stand-alone communities in the overall network, namely zero hunger (SDG2), water and sanitation (SDG 6), responsible consumption and production (SDG12) and life below water (SDG 14) and on land (SDG 15). Going forward, we suggest potential scenarios on how these isolated goals can be achieved in conjunction with other networked goals in the context of cities.

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## **Innovations from urban margins, the southwestern bow of Stockholm: a research agenda.**

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### **Abstract**

Innovations from urban margins, the southwestern bow of Stockholm: a research agenda.

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The Nordic countries, and Sweden particularly, have been praised by scholars and commentators for their combination of high living standards, low income disparity and economic growth. The picture is strengthened by statistics and rankings presented on various occasions by International organizations, thinktanks, editorials and op-eds in major international newspapers and magazines. In a report by Development Finance International champions Sweden the index on the Commitment to Reducing Inequality (CRI). The Sustainable Developing Report 2020 ranks 192 countries in the world according to a country's total progress towards achieving all 17 goals of the Agenda30. Not surprising, Sweden tops the list.

Meanwhile, inequalities have grown during the last decades even in Sweden and in big cities got obvious spatial imprints as social and economic inequality has to a large degree been transformed into segregation at the level of the city. Researchers at the Södertörn University's Reinvent Centre have identified a sustainability deficit in the area at southwest parts of the region of Stockholm. In the same area several precarious areas are located, unemployment is higher, political participation, feelings of social isolation and marginalization prevail and health inequalities are apparent.

Meanwhile, huge investments currently directed or announced, investments that will radically change the infrastructural nerve and transform the region of Stockholm from a monocentric to a polycentric city.

The Reinvent center together with actors involved is currently planning a long-term research program using the interventions of the participating actors in the suburban space as cases of study. Three empirical referents in the area have been identified as they confront different challenges: new emerging regional centers, neighborhoods and neighborhood centers.

Research is organized in the thematic areas:

1. Home, trust and belonging, mainly a search for more innovative and sustainable solutions and perspectives that can assist with knowledge of how and what contributes to the creation of trust and feelings of belonging in the neighborhood. Marginalized groups are the foci of the theme.

2. Sociability and practices of culture, the theme is planned to study the co-creation of common places and spaces in and around the emerging regional metropolitan centres, and how this knowledge can be implemented in different types of interventions (e.g. in planning, building, governing, management of the city).

3. Economic sustainability and resilience in non-core metropolis, mainly a search of a deeper understanding of what consumers, retailers, employers of office workers and their employees will demand in the future as office work, retail and wholesale trade that have constituted a significant and critical part of the fabric of the modern city, bringing people together are currently challenged by technological innovations.

Based on previous research in the area the paper discusses the empirical challenges and the theoretical rationale of the planned program.

This study relates to SDG 11, 11.3. and SDG 10, particularly 10.2, 10.3 and 10.7, as well as SDG 16 and particular 16.6 and 16.7.

## **From intrinsic values to strong sustainability in the Industrial Ecology: a case study analysis from France.**

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### **Abstract**

The development of the concept of Industrial Ecology (IE) is at the heart of the Circular Economy and sustainability studies. Born as a technical strategy to minimize the environmental impact of industries, IE has evolved to becoming a much more complex strategy that aims to deliver more comprehensive solutions to the unsustainable practices of industrial activities. Using an interdisciplinary lens to conceptualize and operationalize the complexity of industrial systems, IE has been a useful and powerful tool to describe, analyse and explain the impact of industrial activities in very specific geographical areas (e.g., industrial clusters and industrial parks). However, the study of IE nowadays is not limited to the industrial parks and the activities within them, it has grown beyond those physical boundaries, and the whole of industrial activities is being analysed in relation to the urban and regional development of the area where those industrial activities are anchored.

In France, Industrial Ecology or *Écologie Industrielle et Territoriale* (EIT) in French, places the concept of territory at the heart of critical analysis of industrial ecology, allowing the concept to go further into the analysis and development of networks of stakeholders involved in sustainable territorial development. Such an approach has produced a better understanding of how territorial governance processes align with the deployment of strategies of industrial ecology. Nevertheless, EIT's contribution to the sustainable development of the territory is assumed (theoretically) but has hitherto not really been the subject of critical analysis. However, academics such as Nicolas Buclet and André Torre have studied the activation and mobilisation of various territorial capitals and capabilities as a result of IE processes. Developments on that area have shown that the use of such capitals and capabilities can produce more attractive (economically speaking) territories, and generate more innovative activities (not just industrial innovation but also social innovation). This article will build upon those findings with the purpose of describing which capitals and capabilities could potentially deliver larger sustainable territorial development.

Using a larger geopolitical scale (e.g., city, region), rather than just the analysis of industrial parks, this article will take the reader on a journey to discover how IE can enable the development of more comprehensive sustainability strategies using the local capitals and capabilities already in place. It will describe the results of a case study analysis in Strasbourg, France, to illustrate its methodological framework. The researcher uses the theory of relational values, and highlights the importance of understanding the intrinsic values of IE processes in order to reflect and implement (further on) local and regional strategies towards a strong sustainability for the chosen territory.

SDGs related to the article: 11.a, 11.4, 12.6, 16.7, 9.4 and 9.2

This research is of great relevance to discover, manage, develop and enhance the local capabilities of territories towards a strong sustainability paradigm. All sectors of society are able to make the best decisions when they are best informed, this research brings in the local expertise, motivations, values and practices to the centre of the discussion.

# **6. Sustainable Cities and Communities**

## **6c. Sustainable Buildings and Construction Technologies**

## How business model enhances engineering wood technology towards sustainability transitions: a case study from the wood construction value chain

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### Abstract

The construction sector is one of the largest and very central industries, accounting for 13 percent of global GDP and performing core and very basic functions for our society, the needs for housing and infrastructure. The sector has its footprint literally in every aspect of our life by developing the building environment upon which we establish our business, household, institutional, and leisure endeavours. However, the dominant design in construction takes rising social and political criticism due to the fact that it unsuccessfully meets the growing sustainability expectations and productivity standards. The landscape pressure gives into labour global sustainability initiatives that push the construction sector to decrease its carbon footprint (Toppinen et al., 2018). This opens a ‘window of opportunity’ (Geels, 2002) for the niche-level initiatives, which allow market experimentation with engineered wood technologies, more radical innovations in prefabricated building processes, and collaborative business models that consider nature and society as key stakeholders.

The emergence of engineered wood is an alternative direction or development path that lead to a change towards more sustainable development of the construction industry and might disrupt or restructure the existing regime. The engineered wood already built its momentum as niche innovation. Ongoing landscape changes pressure the regime and create a window of opportunities for scaling up in the mainstream construction market. Forerunner companies with sufficient size, resources and traditions in the forest-based industry are on the edge of initiating transitions in the construction value chain towards a more sustainable future. Their efforts are in establishing engineered wood technology as a mainstream solution by reshaping the established socio-technical system. The paper conducts an in-deep case study of Stora Enso, the largest worldwide producer of engineered wood, the changes in their value creation logic and business model for achieving transitions in the construction value chain with engineered wood technology. We explain how business model innovations, which relies on collaborative value creation by multiple actors, is applied to enhance engineered wood towards sustainability transitions. Our findings help to understand how sustainable technologies are developed in a broader socio-technical system context.

This paper we aim to contribute to the following SDGs: GOAL 9: Industry, Innovation and Infrastructure, GOAL 11: Sustainable Cities and Communities, GOAL 13: Climate Action. The paper relates to key topics of the ISDRS2021 conference by exploring transitions and larger-scale system changes towards sustainable development in the construction value chain. The sustainable transition based on engineered wood technology and business model innovation is studied from a multi-level perspective including interrelations with stakeholders.

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## Urban Eco-village lifestyle and pandemic

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**PhD Bozena Guziana**



**PhD Allan Hawas**

### Abstract

To tackle the sustainable global goals, especially reducing the CO<sub>2</sub> emission (SDG 13) and transition towards sustainable cities (SDG 11, Target 11.6) there are many different initiatives around the world

that build more environment friendly housing. For example, the EU has a goal that all buildings should operate at net-zero carbon emissions by 2050. Passive houses and passive plus buildings are important initiatives in this direction. The public's perspectives, engagement, and willingness to live and adopt within an urban eco-village are essential for these concepts to take place.

The suggested paper presents an urban eco-village in Sweden. This eco-village consists of two multi story buildings constructed out of wood with total of 30 apartments that are near the center of a medium-sized city. The sustainability vision of the project includes several innovative ideas, such as electric car-pools, gardening on balconies, passive house design, and sustainable construction materials. The project was delayed due to the Corona crisis; the moving-in date is planned for April 2021.

The paper is based on individual interviews that focus on environmental willingness and engagement. The householders' motives for deciding to move into the village and their expectation on living in the eco-village were also studied. The initial interviews were carried out in November 2019, with 41 respondents from households who declared their interest in moving into the eco-village. The interviews covered the following areas; energy, transport, occupancy, and motives for living in the eco-village. The follow up interviews with persons moving in will be carried out in March 2021. These interviews will study the influence of COVID-19 on willingness to participate in environmentally sustainable programs, for example using the car-pool.

The results of the initial interview show that halve of households (21) feel positively about the car-pool system, while the other households are hesitating or not interested. Similarly, the big majority of households (28) are willing to use shared laundry facilities, while only 13 households prefer to have their own laundry machines. The results also show that the two main reasons that people want to move to the eco-village are to reduce their own environmental impact and the location of the eco-village.

The upcoming interviews will assess the question if challenges due to the pandemic (such as social distancing) can be in conflict with some aspects of a sustainable lifestyle (e.g. lack of access to a personal car and washing machine). Furthermore, traditional eco-villages are often characterized by detachment from mainstream. The urban eco-village studied is more integrated with mainstream and therefore has more potential for propagating its ideas due to high visibility and links to the larger social setting.

## The critical analysis of Tiny Houses as Sustainability Innovations for the Base of Pyramid Markets in Germany

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### Abstract

Problems related to housing shortages are becoming increasingly evident in large German cities. The insufficient number of accessible social housing is causing a growth in homelessness, associated social inequalities and poverty. In this context, the Sustainable Development Goals 1, 10 and 11 emphasise the importance of an improved housing situation. Tiny houses are creating potential to reduce inequalities. Besides providing shelter, they may also be seen as low-cost alternatives for people with limited financial means or even as helping measure for social reintegration. There is insufficient scientific research on sustainability impacts as well as the reduction of inequalities in connection with tiny houses. So far it has not yet been clarified whether the analysed housing form meets the criteria for innovations in BoP markets under sustainability aspects to be determined. This is important in order to meet the goals of sustainable development while identifying and averting problems at an early stage. There is a significant lack of academic literature on the international and the German tiny house movement including the associated housing.

The available literature is primarily composed of media content, such as articles in magazines, blogs, television reports or narratives. Principles for BoP innovations have been derived from theory and analysed. The study focuses on the German region and investigates to what extent tiny houses fulfil the criteria of BoP innovations and whether they can support a reduction of inequalities. As part of the research, in August 2019, expert interviews with different stakeholders (NGO, manufacturer, association and blogger) have been conducted. Based on the results of this study, challenges and potentials with regard to possible sustainability effects have been identified and analysed by highlighting their ecological, social and economic relevance. The study demonstrates the scope of a potential transferability of tiny houses to the principles for BoP innovations for the German region. In this context, it should be emphasised that not all principles are relevant for all use cases. The individual criteria should be selected according to their priority and usefulness for a particular situation.

The abstract refers in particular to SDG 1 Target 1.2; SDG 10 Target 10.2 and SDG 11 Target 11.1. The paper highlights tiny housing as a multi-adaptable innovation for people experiencing poverty and exclusion. It also identifies individual challenges from a sustainability perspective. In this way, the study supports progress in the sense of accommodating the focused SDGs.

## A simplified supply-demand model for availability and carbon storage potential of timber in construction

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### Abstract

The building and construction sector accounts for ~ 40% of global final energy use and energy- and process-related emissions. These emissions are of great concern because (i) construction is a hard to decarbonise sector and (ii) global urbanisation and population growth will add 230 billion m<sup>2</sup> of new buildings by 2060. A continued use of conventional building materials would pose significant carbon lock-in challenges. This is because emissions linked to the manufacture of, say, steel and cement, are incurred now on carbon-intensive energy sources and then locked into buildings and their assemblies for the whole, long lifespan of these built assets.

One of the most effective strategies to mitigate embodied emissions in buildings is through interventions at the material level. These can be broadly clustered into material efficiency (using less of the same material) and material substitution (using alternative materials with lower embodied emissions). When substituting conventional materials, a further opportunity exists if the choice falls on so-called bio-based materials that can store carbon. The transition to post-carbon cities will require the use of carbon storing materials due to both their storage potential and reduced life cycle carbon emissions. It has been recently estimated that up to 2.49 Gt CO<sub>2</sub>e per year can be stored in buildings between 2020 and 2050 with aggressive adoption of bio-based structural materials.

However, carbon stored in the world's forests has reduced at an average rate of 0.73 GtCO<sub>2</sub>e per year since 1990, a number that might increase if demand increases. This poses questions on both the availability and sustainability of an increased use of timber in the construction of buildings. By bringing together data on global forests and their yield, projected urbanisation and population growth, and the ensuing construction activities in most of the world's countries we develop a simplified supply-demand model to establish the extent to which timber based construction can meet projected growth in global floor area.

We find that globally timber demand in 2020-2050 would exceed supply by ~ 6000 Mt with current figures for forest area. As a consequence, the carbon that can be stored in timber buildings over the same time period is 0.215 Gt CO<sub>2</sub>, which is significantly lower than recent estimates. Therefore, our results contend glamorous claims on timber as a 'one-size-fits-all' solution and show that for most countries in the world a timber-only approach is neither possible to meet floor area demand nor desirable to maintain a healthy forest balance. Faster growing bio-based materials (e.g. bamboo and grasses) that have greater yields can be explored as an alternative solution which should be explored in greater detail.

At a time when there is increasing global awareness of the environmental impacts of buildings and construction, and the temptation might be to find a silver bullet for this hard-to-decarbonise sector, this paper contributes to accelerating both understanding and progress towards efficient and effective use of materials in buildings, and specifically addresses a number of Sustainable Development Goals (SDGs) and their targets: SDG11.6, SDG12.2, SDG15.1, and SDG15.2.

## Improving indoor comfort in elementary school environment in North of Sweden with green plants - experimental study.

Ph.D. Itai Danielski

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### Abstract

Poor indoor environment in primary schools in Sweden seems to be a problem in many municipalities in Sweden. In a report from the Swedish Public Health Agency, it is estimated that 40 percent of schools have complaints about air quality. The causes of the problems are poor ventilation, high humidity, changes that were made to the buildings, and high density of pupils in the classrooms. Improving indoor air by improvement of ventilation systems can be too costly for municipalities.

In this project, we have looked at whether an installation of a large number of green plants in classrooms could change that, and even reduce energy use. There is research that shows that we feel both physically and mentally better if we are surrounded by green plants. Physically, because they can purify the air and convert carbon dioxide to oxygen. In addition, they increase the humidity and regulate the temperature. Mentally, perhaps because we are part of nature and have lived in it most of human history.

The case study in this project was an elementary school located in a small rural community in the northern part of Sweden. A total of 350 green plants were installed in four plant-stands distributed in 2 different eighth grade classrooms with about 25 students in each. A similar adjacent classroom (ninth grade) was used as a reference object without green plants. The plant-stands were designed by industrial design students at Mid Sweden University and would result in functional prototypes with automatic irrigation. The project lasted for two semesters, the autumn semester 2019 and the spring semester 2020.

Measurements of the indoor temperature showed that the green plants contribute to a more stable temperature and can even increase the temperature slightly, which can be used to reduce the need for heat. The effects on humidity were only higher in the classrooms with plants during the night when the ventilation flow was low. The carbon dioxide levels in the classrooms with the plants were 10% lower during education time compared to the control classroom, which indicates that green plants could be used to reduce the ventilation air flow and thereby reduce heat losses from exhaust air flow. The amount of airborne particles was already low and no change could be observed after the installation of the plants.

## Adapting the revised REHVA guidelines due to COVID-19 in Swedish context

Ms Moa Mattsson, Dr Gireesh Nair, Professor Thomas Olofsson

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### Abstract

Since the Corona pandemic swept over the world like a Tsunami, each country has developed their own strategies to reduce the effect of Covid-19. In an interview survey, conducted during May-June 2020, on HVAC and Covid-19 in Sweden, authorities, industry associations, consultancy and real estate companies suggest the need for new knowledge on ventilation and indoor environment. Some of the 21 interviewees expressed the opinion that it is too early to assess whether there is a need to revise the Swedish HVAC codes and regulations. However, other interviewees argued for revisions in the relevant regulations. Although Sweden and some other countries has not initiated any revision in their codes and regulations, there are others including international organizations has revised their guidelines. Recently, REHVA has updated their guidelines for ventilation to reduce the risk of airborne transmitted SARS-CoV-2 infection of humans. Such revision in guidelines by international organizations have consequences in building operation in Sweden.

In this work, we introduce the results of the interview survey about HVAC and Covid-19 with a comparative study of the revised REHVA guidelines and the current relevant Swedish building codes and standards. The scope of work is to investigate how the specific revision of REHVA guidelines relates to the Swedish HVAC codes and regulations. The aim is to contribute with learnings for future revisions of Swedish HVAC codes and regulations.

## Building Thermography Inspection by using a Low-Cost Visual-Thermal Drone System

Dr Allan Hawas, Dr Jan Skvaril

Mälardalen University, Västerås, Sweden



**Dr Allan Hawas**

### Abstract

For decades, thermal imaging technology serves as an effective tool and is implemented in many industrial and commercial applications, including energy and building sectors. Recent trends in the field further show an increased interest in aerial thermal imaging applications that brings new opportunities toward sustainability. Unmanned aerial vehicles (UAVs) (i.e., drones) equipped with thermal cameras are currently used for building thermography inspection, which is a crucial technology to accelerate the identification of CO<sub>2</sub> mitigation within the building sector to tackle the global goals (SDG 11 target 11.6 and SDG 7 target 7.3).

This study presents an evaluation of a low-cost, visual-thermal drone system for building thermography inspection (SDG 9 target 5.5). The evaluation was limited to the thermal imaging potentials of the system. The UAV system is used to examine its capacity to detect various heat loss, including insulation defects, air/ water leakage, and validation of different suspected energy loss case studies. The examination also involves the evaluation of the cost-effectiveness of the thermal-drone system. The thermography inspection was carried out on several buildings with different sizes, types, and activities they are used for. Therefore, the detection/identification tasks for the thermal-drone system were different from an inspection to another. This study aimed to identify different limitations and advantages of using such a low-cost thermal-drone system for building thermography inspection. The

technical evaluation was based on several criteria, including fly duration, stability, image quality, data flexibility, integration potentials, etc.

Additionally, the cost-effectiveness and other practical aspects were considered in the evaluation. The results show a combination of both limitations and advantages of adopting such a low-cost drone system. In contrast to the supplier's description, the thermal image data are not a radiometric JPG file that significantly limits quality and opportunities. Accordingly, the thermal image gives a standard JPG file and does not provide a temperature distribution to make any post-analysis processing or post-editing presentations. This issue can be solved partially, as the live thermal images provide a temperature distribution that allows different utilizations, e.g., identifying temperature spots, which can be included in a screen-shot of the drone screen controller.

Furthermore, the image data's limitations do not allow 3D modelling of the building objects which is possible for the radiometric image files. The image resolution and accuracy are limited; however, short distance inspections provide good image qualities. The results reveal that the thermal drone system can detect common insulation issues such as missing insulation and clear energy loss.

However, the capacity is limited in regards to high accuracy demand and more in-depth data analysis. In conclusion, the examined drone system is a cost-effective tool for DIY use and superficial aerial building thermography inspection (SDG 11 target 11.6). Therefore the suggested system is not sufficient for higher demand and more professional inspections. The suggested proposal is an effective method to identify CO<sub>2</sub> mitigation potentials within the buildings that are significantly promoting the achievement of some SDGs. Additionally, the inspection method can be conducted remotely, keeping social distancing in the time of pandemics.

# **7. Social-economic Aspects of Sustainability**

## **7a. Global inequality and poverty**

## Exclusion and inequalities in access to e-health services on the example of Poland

dr Marzena Kruk

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### Abstract

- **Exclusion and inequalities in access to e-health services** concern some aspects of sustainable development as far as e-health services are concerned. Unfortunately, many countries, such as Poland, have limited access to e-health services for many reasons, e.g. lack of internet access, lack of computer skills or attitudes towards the services offered.
- The article aims to **identify barriers and factors** affecting exclusion in e-life services in Poland in relation to other EU countries and the 2030 sustainable development guidelines.

## Investigating emergent linkages between SDG 1 and SDG 7: A global survey of energy narratives under COVID19

Dr Saruabh Biswas<sup>1</sup>, Ms Ambika Opal<sup>2</sup>, Mr Julian Cashman<sup>1</sup>, Ms Sue Lafond<sup>1</sup>, Ms Koreen Legaspi<sup>2</sup>, Mr Tiago Masrour<sup>1</sup>

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**Dr Saruabh Biswas**

### Abstract

Almost immediately after COVID19-forced restrictions and counter measures took effect, a range of socio-economic distresses emerged as a consequence, disproportionately affecting low-income populations worldwide. Reports from inter-governmental agencies, industry associations, and others indicate that access to fuel and electricity resources may have fallen for low-income populations and that energy burdens may have contributed to the declining well-being and quality of life. However, reports and research thus far have not been able to illuminate the dynamics of the relationship between changes in energy systems and their multi-dimensional impact on poverty, preventing systemic action to disrupt the effects of this vicious cycle. To investigate the dynamics between energy systems, energy users, and service providers under COVID19, a global survey of organizations and individuals with first-hand knowledge is being conducted. Survey respondents will include off-grid energy businesses, energy access nonprofits, government utilities, academic experts in the field of energy access, microgrid developers, etc. Capitalizing on these respondents' proximity and service provision to socio-economically marginalized population groups, this study explores two overarching questions: What systemic strengths and weaknesses of energy systems and policies were revealed, enabling or impeding human well-being? Were existing energy burdens worsened and/or new ones created due to the pandemic?

Following the four-dimensional systemic structure of the energy-poverty nexus framework, this study investigates evidence of changes in availability, utilization patterns, forced trade-offs for energy services, and the consequential impact on socio-economic capabilities of energy users. The survey is designed to capture:

- a. Observations by service providers of changes in lifestyles, economic capabilities, and/or energy use among energy users as a result of COVID19.
- b. Operational challenges and adjustments made to energy product/service provision and/or impacts on planning and adjustments made to sustain energy services and/or support energy users in the wake of COVID19.
- c. Major risks identified or illuminated by COVID19 to energy provision, use, or demand and potential strategies to de-risk users and service providers from similar shocks in the future.

Beginning the third week of January 2021, the survey is being distributed to over one hundred primary contacts globally. By the end of March 2021, the responses will be compiled, and analysis of trends is expected to reveal insights on a range of impacts on poverty and energy systems under COVID19.

It is expected that the results of this study will demonstrate key parameters for measuring the ability of energy systems to enable pathways out of poverty, moving beyond techno-economic elements of the sector. In terms of SDGs, this study is expected to characterize the links between SDG 1 (specifically targets 1.1, 1.3, 1.4, 1.5,1.a,1.b) and SDG 7 (specifically targets 7.1, 7.b). This will further substantiate the assertions of the energy-poverty nexus framework as a key arena of attention for SDGs, underlining the need to expand the SDG 7 targets to strongly incorporate parameters that explicitly provide guidance for the role and potential of energy systems to address poverty.

## **Territorial development prospects in the light of the dynamics of economic and social polarization in the EU**

Professor Gavino Mariotti, Professor Giorgio Garau, Professor Alessio Tola, Professor M. Veronica Camerada, Doctor Salvatore Lampreu

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### **Abstract**

Financial crisis, predatory attitudes, markets, finance, speculation, international trade, asymmetrical globalization, political choices represent some of the factors underlying a growing inequality, to be found among the world population.

In the past significant differences related to the opportunity to access to resources and quality of life characterized the least developed countries. In recent years - since the 1980-, these disparities are interesting even Western countries such as the industrial economies of the Atlantic and European countries; an international scientific and political debate has developed around this theme.

Looking at the inequalities from the social and economic perspective, it produces a widespread sense of injustice, which culminates in the erosion of the trust in institutions, politics and the market economy; the issue also takes importance from a geopolitical point of view, especially if it is observed jointly with the polarization of individuals and countries, or if it is placed in correlation with the crisis of liberal democracies, often accompanied by the spread of nationalist currents capable of putting into discussion the pillars of the EU system.

The paper observes the inequalities through the scientific literature and thought it it's possible to find the causes and effects of this condition. In particular, it is possible to note the progressive impoverishment of the middle class of the population and the correlated concentration of national wealth in favor of a small minority (Joseph Stiglitz), the rise of a hyper-paid elite (Tomas Piketty, Emmanuel Saez, Gabriel Zucman), a reduced upward economic mobility (Alan Krueger). These phenomena should be reread in the light of the aggregation of individual behaviors (Angus Deaton) to better understand the increasingly evident phenomenon of the disintegration of the social fabric, considered, in many cases, also the cause of the political metamorphosis of some States. The research analyzes the statistical data acquired from Eurostat, with the aim of carrying out a comparative analysis between states, functional to the observation and definition of the dynamics of social and economic polarization in the EU space. The results of the study, declined on the local scale, could represent a contribution for a better setting of the policy lines capable of achieving objectives contained in the 2030 Agenda.

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## **Environmental Justice Legislative Tracker: Climate Change and Clean Air Provisions that Support Overburdened Communities**

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### **Abstract**

This paper addresses the legislative decisions made in all fifty states in the United States to address the needs of environmental justice communities. The research conducted for this paper explores all the environmental justice provisions embedded into clean air and climate change bills and resolutions across all the states. A legislative tracker was completed that provided a state-to-state comparison that highlighted important provisions that other legislative bodies in the country could emulate. To identify the bills and provisions that could serve as strong models for the rest of the country, a variety of questions were used to guide the analysis of the bills including: 1) whether a task force or council was created, 2) whether there were any environmental definitions included, 3) whether there was justice as recognition provisions, 4) whether there were economic provisions, and 5) whether procedural justice and community involvement provisions were included. Legislation between the years of 2018 to 2020 were the primary focus of the research. The results of the research showed that many of the eastern and western states in the United States had the most comprehensive and robust bills and resolutions in the nation. Many of the bills and resolutions included strong environmental justice definitions, procedural justice and community involvement provisions, and economic provisions. Additionally, the states in the east and west typically acknowledged the impact of climate change and the lack of clean air on vulnerable populations, especially as it relates to the health of those within the communities. These bills and provisions served as an exemplar for the rest of the country. The southern and midwestern states were missing environmental justice provisions that directly supported and protected overburdened communities. The legislative research conducted relates to SDG 1 and SDG 10. Furthermore, this research contributes to the topic of the conference as it directly addresses the global inequality and poverty that significantly disadvantage communities and their environments.

## Populations living near waste dumps in Nampula City, Mozambique: implications and perceptions on health and environment

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### Abstract

Urban waste dumps near communities cause several problems in the environment and public health, as described by several authors. Populations living near these dumps suffer several diseases such as malaria, asthma and bronchitis, diarrhea and cholera, more frequently and other diseases caused by air and water pollution. These effects cause a delay in the development of communities, causing weaknesses in the health of the populations. The objective of this study is to verify the effects that waste dumps have on public health and the environment, and to identify the perception of these populations living near the dumps about their quality of life. A epidemiological research questionnaire was developed with a pre-test of 5 people and questioned 300 people (convenience sample of populations living near waste dumps) in four different geographic areas (administrative posts) in Nampula city, Mozambique, three of these areas are exposed to waste dumps (cases): Carrupeia (n=50), Muhala-Expansion (n=40) and Namicopo (n=110) and one place is not exposed to waste dumps (control population): Marrere (n=100). This questionnaire was indirect application and are developed in five distinct sections: 1) Socio-demographic information; 2) Health status; 3) Eating habits; 4) Environment; 5) Perception about the place where they live. It is important to mention in the socio-demographic characteristics there were no significant differences between the two population groups, representing a homogeneity in the chosen sample. Regarding the perception about their health status, it was found that both in the controls and in the cases, about half responded that it was good and the other half indicating a positive perception about their health status. There were only significant differences ( $p < 0.05$ ) for Malaria disease, with a lower prevalence in controls than in cases (34%, n=34 versus 48.5%, n=97). Regarding feeding habits, it was verified that the population has only 2 or 3 meals per day. In general, 75% of the population, both controls and cases, have 3 meals and 25% of the population (also controls and cases) have 2 meals a day. The perception of the population about the quality of the place where they live is favorable and there are no significant differences between the cases and controls. The participants selected most of the normal and good options (which totaled about 92% versus 88%;  $p = 0.103$ ). When asked what could be improved in the place where they live, the most chosen options were: 1º, "build landfills"; 2º, "build walls in the waste dumps"; 3º, "build waste dumps far from the communities"; 4º, "indemnize the people who live near the waste dumps"; 5º, "resettle the people who live in the waste dumps". The least chosen option was "to give employment to people who live near the garbage dumps". The results of this study contribute to understanding the public health implications and perceptions of people living near the urban waste dumps in the city of Nampula, Moçambique.

## Variations in Sustainable Development Goal interactions: Population, income, and regional disaggregation

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### Abstract

To fulfill the 2030 Agenda, the complexity of sustainable development goal (SDG) interactions needs to be disentangled. However, a holistic understanding is currently limited. We conduct a cross-sectional correlational analysis for 2016 to understand SDG interactions under the entire development spectrum. We apply several correlation methods to classify the interaction as synergy or trade-off and characterize them according to their monotony and linearity. Simultaneously, we analyze SDG interactions considering population, location, income, and regional groups. Outcomes of our study provide a few new insights. First, our analysis reveals that synergies outweigh trade-offs and linear outweigh non-linear interactions. However, under the entire development spectrum, most SDG interactions are not-classified. Second, we detect, for the first time, (non-)linearity on SDG interactions. SDG 1 and SDG 6 are associated with linear synergies, whereas SDG 2 and SDG 5 with linear trade-offs. SDG 3 exhibits the most non-linear interactions for synergies but also trade-offs. Third, we highlight that socially-oriented SDGs currently show more variations in interactions than environmentally and economically oriented SDGs, globally. This implies that countries around the world are more likely to follow the social development paths of other countries than environmental and economic paths. Fourth, SDG interactions vary according to a country's income and region, along with the gender, age, and location of its population. Our results show significantly less non-linear and not-classified SDG interactions within the income and regional groups than globally. Further, the female, younger, and rural populations have mostly synergistic SDG interactions in comparison to male, elderly, and urban populations. Consequently, countries tend to follow the transition paths of other countries within the same group in all sustainable dimensions. In summary, to achieve the 2030 Agenda, the detected interactions and inequalities across countries need to be tracked and leveraged to “leave no one behind.” Development is generally not a linear process; neither is SDG development. For achieving the 2030 Agenda, rapid progress towards SDGs is required following non-linear paths, leaving no one behind.

## **Are international organizations influenced by global goalsetting? The case of the World Bank, the SDGs and the reduction of inequality**

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**MSc. Melanie van Driel**

### **Abstract**

In 2015, 17 Sustainable Development Goals (SDGs) were universally agreed upon, to be reached by 2030. International Organizations provided input during the SDG negotiation process, and many received the role of ‘indicator custodian’ for the SDG indicator framework. Although International Organizations therefore play an important role within the overall governance architecture of the SDGs and are crucial for the ‘success’ of this set of goals, not much is known about the extent to which these global actors themselves are influenced by global goalsetting. The current study contributes to filling this gap by studying one of the most prominent international organizations’ uptake and prioritization of the SDGs, namely the World Bank. The main questions we try to answer in this paper are the following: Have the SDGs become an integral part of World Bank discourse? Or are they solely used for outside reporting? Is the Bank also taking on goals that it might not have agreed with during the negotiation process? And if so, how does the Bank use these goals in its discourse? The aim of this study is two-fold. Firstly, we study the uptake of different SDGs within World Bank discourse. Thereafter, we provide a detailed case study of one goal, namely SDG 10 that aims to reduce inequalities, a novel goal captured in the SDG framework. This goal has been one of the most controversial goals that came out of the SDG negotiation process, and it has been remarked by scholars that the World Bank disputed the need for an individual goal on inequality. Since this goal was nevertheless taken up in the final list, it provides a good case study to explore the extent to which setting goals that might not fully resonate with a particular organization can nevertheless influence its priorities and communication. For this study, we compiled a corpus consistent of 282 key World Bank documents, separated into a pre-SDG (2000-2015) and SDG

period (2016-2020). These documents include i) speeches of World Bank presidents, ii) Annual Reports and iii) Flagship Reports. We used (automated) text analysis to map the overall coverage and prioritization of the SDGs by the World Bank. Thereafter, we used a mixed-method approach to analyze the case of SDG 10 on inequality, combining (automated) text analysis and discourse analysis. This resulted in an overall picture of the (change in) occurrence and contextualization of this disputed topic over time.

**POVERTY AND SUSTAINABLE DEVELOPMENT: A LEGAL PERSPECTIVE**

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**Abstract****ABSTRACT**

Sustainable development goals were adopted by all United Nations Member States in 2015 as a global call to action to end poverty, protect the planet and ensure that everyone enjoys peace and prosperity by 2030. The developmental educationalists define sustainable development as a reduction of hunger and poverty in an environmentally sound manner. This implies the fulfilment of human requirements within a society while still maintaining the natural environment indefinitely. This paper seeks to consider sustainable development in terms of balancing between people's economic and social needs and the preservation of natural resources and ecosystems to meet present and future needs. Idealistically, development should balance social, economic and environmental sustainability. However, the paper argues that poverty has remained a major obstacle to sustainable development in Nigeria. Indeed, the overwhelming plague of poverty has stunned the ability of its people to transform themselves and the environment. It is no gainsaying the fact that several measures have been taken to alleviate poverty in Nigeria yet no commensurate return in terms of a better life for the people. Thus, this paper will consider the nexus between poverty alleviation and sustainable development in Nigeria. In line with this, the paper will examine why despite the abundance of economic resources, attempts to reduce poverty and promote sustainable development have not become a reality in Nigeria. It will also examine other challenges confronting poverty reduction in Nigeria which include corruption, ethno-religious conflicts, income inequality, political instability, lack of proper coordination and management for sustainable development programmes and wasteful patterns of production-consumption. Importantly, the paper will further examine from legal perspective issues hindering the achievement of desired sustainable development including environment and poverty alleviation. This is crucial as Laws, regulations and policies are among the vital instruments for transforming the environment and achieving sustainable development. That being said, the paper will inevitably consider whether there is no sufficient and legal framework on sustainable development or whether they are weak or not implemented.

# **7. Social-economic Aspects of Sustainability**

**7b. The future of employment and good work**

## Ergonomic study of strawberry production in family farming.

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### Abstract

**Introduction:** Agriculture is the main source of food supply in the world and makes up the main axis of the global economy, however due to the lack of mechanization, it poses risks to workers' health. The study of ergonomics in agriculture is still not as widespread, thus, the objective of the study was to evaluate the working conditions of strawberry farmers in family farming, with a focus on strawberry production.

**Method:** This is a series of cases, with a quantitative approach, in which 4 properties distributed in the states of Santa Catarina and Minas Gerais were evaluated. The assessments were performed using the Body Discomfort Scale and the OWAS Method. Finally, the research and their coherence with the sustainable development goals established by the United Nations in the 2030 Agenda were analyzed.

**Findings or results:** It was observed that the most frequent complaint of workers was in the cervical region, head and back, which we can associate with the adoption (sustained or repeated) of body posture in cervical and trunk flexion during the harvests, which increases the demand muscle and joint in these body regions.

**Discussion:** Counseling and ergonomic education is essential for these workers. Labor gymnastics is an intervention that influences the reduction of injuries and bench planting becomes the most appropriate in relation to ergonomics, due to the fact that the worker is in a more upright and correct posture.

**Conclusions:** It is concluded that planting strawberries on benches results in less musculoskeletal disorders, being more recommended from an ergonomic point of view, when compared to planting in soil. However, planting in benches does not have all the substances that the soil itself has, making the strawberry not adapt as well as planted in the soil, perhaps this is a reason why planting in soil is even more common, as it needs a larger investment and an entire adaptation of the plant to move from the soil to the bench.

**Keywords:** Ergonomics. Family farming. Farmer. Strawberry production. Sustainable development goals.

**Relationship with the SDGs:** a) SDG+Target: 8.2; b) SDG+Target: 8.3; c) SDG+Target: 8.4; d) SDG+Target: 8.8; e) SDG+Target: 12.1; f) SDG+Target: 12.2; g) SDG+Target: 12.3.

**The proposed contribution to the topic of the Conference:** With the research of articles, it was possible to perceive that the gymnastics at work is beneficial and widely used, as well as the education and advice of producers, to make them aware of the correct postures to be adopted during the working day, in order to avoid further complications in the future. Therefore, it is extremely important to conduct research involving ergonomics and SDGs for the health and quality of workers, both in the city and in agriculture.

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## **Integrating Employee Engagement factors to enhance Sustainability in organisations**

MSc Melis Temel, Prod Rodrigo Lozano, Assoc. Prof Maria Maria Barreiro-Gen

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### **Abstract**

Employee engagement (EE) is a fundamental element for implementing sustainability in organisations. Nine EE sustainability factors can be identified: (1) training; 2) involvement; 3) engagement; 4) diversity and inclusion; 5) incentives; 6) formal rules and norms; 7) informal rules and norms; 8) supporting employee volunteering; and 9) communication. Most research on EE factors for sustainability has been on companies, with a few researches on civil society and public sector organisations (PSOs). The purpose of this paper is to analyse the importance of the EE factors and their interrelations. A survey was sent to 5,299 organisations, of which 305 responded. The survey responses were analysed using descriptive statistics, rankings, comparison between organisation types, correlations, centrality and cluster analysis. There were no statistically significant differences between different organisation size or type.

The ranking shows that communication, involvement, and having formal rules and norms were ranked highest. The results indicate that the nine factors are interrelated, though some more than others. The ones with the highest interrelations were: involvement and engagement, and training and engagement. The analyses show a number of groups of EE factors that can help to better combine them. A holistic combination of clusters of EE factors appears to be the most effective way to embed sustainability and address SDGs in organisations.

This research is related to SDG8, target 8.3 (Promote development-oriented policies that support productive activities, decent job creation, entrepreneurship, creativity and innovation, and encourage the formalization and growth of micro-, small- and medium-sized enterprises, including through access to financial services) and 8.5 (By 2030, achieve full and productive employment and decent work for all women and men, including for young people and persons with disabilities, and equal pay for work of equal value).

This research provides insights into better refocus on EE factors and clarifies the SDGs' connection to the organisations' sustainability efforts and strategies. EE factors can help to contribute sustainability and

achieve SDGs in organisations, yet they need to be combined efficiently in order to address holistically sustainability.

## Quality of working life in the Circular Economy

Heather A. Rogers<sup>1</sup>, Pauline Deutz<sup>1</sup>, Tomas B. Ramos<sup>2</sup>

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### Abstract

One of the often-cited benefits of transitioning to a Circular Economy are the opportunities for job creation. While research shows some evidence of job growth in certain sectors and industries (as well as losses in others), little research has been done to understand the quality of work that is created. In this study, quality of work is analysed through a multi-dimensional framework, which brings together literature on good work, quality of employment, and quality of working life together with social sustainability principles to develop a context and assessment structure for quality of working life in the Circular Economy. This framework is used to explore the case of the repair service sector in Hull, UK as an opportunity for (quality) employment. Hull has been characterised as a structurally disadvantaged city, which might benefit from job growth in this sector. This qualitative study uses data from interviews with repair service workers in textile, electronic, and domestic appliance repair to assess the structure of employment that exists in the sector, the skills required, and the motivation for working in the sector. Preliminary results indicate that in Hull, there is a high prevalence of independent sole-proprietor businesses in the repair sector, often comprising zero employees. Mentorship and on the job training opportunities are limited, primarily due to the nature of small business and limited excess capacity. Experience is often valued over formal education in repair services. Trade-offs in quality of working life dimensions are identified between employment structures. In particular, agency and flexibility are highly valued in owner-operated businesses, despite the uncertainty and inconsistency of work/income. This is juxtaposed to larger businesses (often associated with a specific manufacturer), where employees identify security in employment, while lacking agency in their day-to-day workflow. This study contributes to an understanding of the CE employment landscape, particularly in terms of a just transition.

*Abstract most directly relates to SDG's: 8.2, 8.3, 8.4, and 8.8.*

*This study contributes to the topic of 'Accelerating progress towards SDG's in times of crisis' by acknowledging the uniquely precarious position that the pandemic has placed much of the labour force, uncovering some of the ways in which CE employment is vulnerable, and recommending interventions which support good work into the future.*

## Transition in the European labor market: Flexible employment in selected EU countries

Prof. Maria Urbaniec<sup>1</sup>, MA Sergio Martinez<sup>2</sup>, MA Justyna Tomala<sup>1</sup>

<sup>1</sup>Cracow University of Economics, Krakow, Poland. <sup>2</sup>George Washington University, Geneva, Switzerland

### Abstract

As a result of ongoing socio-economic developments, one of the observed trends is changes in the labour market. For several decades there has been a systematic increase in demand for employees in the service sector, where temporary work consisting of the execution of orders and projects is becoming more prevalent. New non-standard forms of work are related to such concepts as the gig economy, the sharing economy, collaborative economy, on-demand economy, as well as platform economy. These concepts define the modern economy based on the realisation of tasks and projects executed on digital platforms, and not in the form of full-time jobs. The growing importance of alternative forms of work poses a challenge to traditional work organisation. This has profound implications for the division of labour in companies. The growing demand, as well as supply of temporary workers, are shifting emphasis from position-based work to skill-dependent jobs. However, the knowledge of new forms of work arrangements is still fragmented. Therefore, the aim of the article is to analyse and assess the developments of selected alternative forms of work in EU countries. Based on this, the following research question will be answered: to what extent is labour market flexibility developed in European Union countries? In order to assess the potential of current changes and trends in the labour market, this paper will contain both theoretical and empirical research on flexible work forms in selected EU countries. This research will be based on publicly available statistics on the labour market transition. Bearing in mind the growing development potential of flexible forms of employment, it should be noted that in truth they create new opportunities and are sometimes convenient; however, as a result of their use, new challenges arise, which results in a high degree of employee turnover, as well as fragmentation of work (larger jobs are divided into micro-tasks), changing working conditions and insufficient social security guarantees. The study contributes to expanding the scope of the knowledge on the flexibility of the labour market that is currently the subject of national and European policy debates.

## Is it automation and IT replacing the workforce?

Dr Arjeta Hallunovi

University Aleksander Moisiu Durres, Durres, Albania

### Abstract

In an age dominated by the consumer, implementing technology that can track, measure and respond to the key shifts in consumer behavior could well make or break a business. Automation and IT are supplementing the workforce to provide greater levels of efficiency an insight and consumer obsession on the foundation of organizational success in 2019. Digital transformation on the agenda of the organizations for years and in 2020 it is predicted to be a crucial time for leaders to plan for and implement it across industries. So, what does the future hold for digital transformation and what do leaders need to take into consideration in order to plan for its development and implementation? When it comes to a timeframe, [85% of key decision makers](#) feel they have only 2 years to get to grips with digital transformation. While the past few years have seen some movement in digital transformation, there's now an urgency, and considering that 59% of business leaders worry that it's already too late for them to adapt, time is of the essence.

By preparing for these changes, business leaders will be able to remain one step ahead of the consumer, retaining the capabilities to form long-lasting relationships that stand the test of time. It seems the time to strike is now. Is it necessary for the organizaions to acquire the knowledge they need on emerging digital technologies understand? How their plan will affect the business as well as the end user, leverage data to their advantage, inspire others to move in the right direction? How they will avoid being left behind?

In this paper will be done an analyse if is it necessary the upskilling of the staff with relevant digital courses by giving them the tools, time as well as resources to keep building upon their talents. If the organizations will ensure that digital transformation remains at the core of their business strategy?

**Keywords**—Economic Effects, Developing Strategies, IT, Leaders, Organizations

# **7. Social-economic Aspects of Sustainability**

## **7c. Sustainable economic models**

## Controlling rebound effects: Green growth, decoupling and post-growth

Dr. Thomas Hahn

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### Abstract

The European Environment Agency has recently addressed the need to move beyond GDP growth: “Could the European Green Deal, for example, become a catalyst for EU citizens to create a society that consumes less and grows in other than material dimensions?” (EEA 2021). In this paper we explore decarbonisation trajectories which are not contingent on GDP growth, hence we take post-growth approach, including “a-growth” and degrowth (Van den Bergh & Kallis 2012, Parrique et al. 2019). We critically and constructively analyse the EU green deal from a short and long term perspective. The EU Commission presents its Green Deal as “a new growth strategy that will transform the Union into a modern, resource-efficient and competitive economy, where there are no net emissions of greenhouse gases by 2050, economic growth is decoupled from resource use, and no person and no place is left behind.” We agree that one challenge is to catalyse technological development and innovations to accelerate decarbonisation and maximise decoupling, understood as the difference in rate of change between GDP and CO<sub>2</sub> emissions. Hence, decoupling means increased efficiency and is a necessary part of any climate policy. However, rapid decarbonisation also requires that we control rebound effects. Global decadal average decoupling has historically never exceeded 2.7% (Holz et al. 2018) and the most optimistic scenarios for decoupling may be 4 percent annually, assuming aggressive possible abatement policies (Hickel & Kallis 2020). In the EU, GDP has lately (2014—2019) increased by about 2% annually. If this is expected to continue, then 4% annual decoupling will only result in 2% annual decarbonisation. This jeopardises the absolute emission cuts needed to meet the Paris goals and SDG 13.

Method: We first start with a review of the literature of green growth, decoupling and rebound effects. Second, we develop scenarios following IPBES ECA (2018) which go beyond the green/sustainable growth paradigm, which we regard as an adaptation within the GDP growth regime, not a real transformation. Third, we conduct a discourse analysis (Gee 2014) on the paradigm of green growth and decoupling, which seem to constrain not only policy development but also the policy discourse. We conclude that post-growth narratives can only become attractive visions if sustainability transformations are combined with economic security and fairness which enable more liberty, equality, leisure and security concerning both individual and global risks.

Although the analysis focuses on decoupling and rebound effects of CO<sub>2</sub>/GDP (SDG 13), the post-growth approach has been endorsed by the IPBES (2019) and a key leverage point is “steering away from the current, limited paradigm of economic growth... reducing overconsumption and waste” (p. 10). Hence it’s also relevant to SDGs 14-15. The reduced stress and increased equality, embedded in visions for post-growth, also address several other SDGs. I will use powerpoint presentation.

## Sustainability aspects of the low-key bioeconomies

Dr Irene Sotiropoulou, Professor Pauline Deutz

University of Hull, Hull, United Kingdom

### Abstract

This paper discusses the bioeconomic processes of small production and small distribution modes in East Yorkshire, UK. In particular, the focus is on whether and how this small-scale bioeconomy is connected to sustainable practices and in what way those practices are supporting the local ecosystems, including the human ones.

The paper is related to the wider debate about the character of the bioeconomy as a sustainability initiative. We take a critical position concerning this issues. We do not consider the bioeconomy in general as an inherently sustainable way for organising production and distribution of goods and services. Within this framework, we investigate in our research project, whether small production and small distribution as bioeconomic processes include any practices that can support both environmental and social sustainability.

The paper (part of the Research England funded THYME project, dedicated to the bioeconomy in the North East of England) focuses on farmers' markets in the East Riding of Yorkshire. Using data from interviews and observations we present and discuss findings about the local small markets and how the producers, traders or even consumers involved with them are linking their market activity to greater sustainability efforts.

The major finding is that at least the food part of the small markets in East Yorkshire is very locally embedded. The nomadic character of the market traders and producers means that locally produced goods reach small places without the customers needing to concentrate in a nearby big trade centre, like a city market or a big supermarket. At the same time, the traders and producers try to avoid wasting produce as much as possible by adopting various practices, including sharing, non-monetary distribution and donations.

The paper contributes to the discussions related to SDGs 2 (zero hunger), 11 (sustainable cities and communities), 12 (responsible consumption and production), 13 (climate action).

**Keywords:** bioeconomy, farmers' markets, sustainability, small production, small distribution.

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## Niche innovations in international organizations: The beginning of the end of economic growth

Svenja Quitsch

Kassel University, Kassel, Germany

### Abstract

#### Abstract

The concept of economic growth is arguably the most defining feature of twentieth century economics. In the twenty-first century however, the harmful consequences of ever more growth have become a danger to planet and people. And while the dominant role of growth in the economic system has always been criticized, those voices used to be few and far between. Yet, in recent years critics of growth have not only become significantly more vocal, the debate has also reached international organizations (IOs). And while no IO has abandoned growth as a major policy objective yet, it now usually comes with a qualifier such as “green”, “sustainable”, “inclusive” or “balanced”. Moreover, there are organizational niches in which post-growth already exists, including ideas on “beyond GDP” approaches, wellbeing economics and the reduction of the EU’s material and consumption foot print. This paper conceptualizes this emerging ideational change within IOs as niche-regime interactions and traces the concept of degrowth within the European Union (EU) using a combination of desk research, document analysis and participant observation. Combining the literature of post-growth with insights from transition studies, the article analyzes the evolution of degrowth within the EU. It thus contributes to a better understanding how post-growth ideas are currently perceived and also presents a new approach to the study of ideational change in organizations.

#### *The Post-Growth Transformation and the Sustainable Development Goals (SDGs)*

Since post-growth thinking not merely envisions a world without economic growth but an entirely new configuration of our current socio-economic dynamics, such a transformation obviously concerns goal 8 “decent work and economic growth” but also touches on questions of inequality (SDG 10), gender relations (SDG 5), production and consumption (SDG 12), communities (SDG 11) and of course our relationship with the natural world (SDGs 13-15). This is in line with the holistic approach of the SDGs and the principle of indivisibility enshrined in the framework because it addresses the interactions and interdependencies between the different goals. .

Acknowledging that further economic growth is not compatible with the ecological carrying capacity of our planet therefore means acknowledging that the SDG framework is inherently contradictory, particularly concerning goal 8 and goals 13-15. The findings of this paper thus also offer insights into how the prioritization and scope of implementation of the goals may change in the future. With converging crises that includes a global pandemic, staggering levels of inequality, climate change and biodiversity loss, reaching the SDGs rather sooner than later is of utmost importance.

#### *Presentation Approach*

The paper will be presented in a format that is suitable for virtual meetings. Ideally, the presentation would include visual aids via the screen-sharing function of most digital conference tools but can also be adapted to an audio-only format if necessary.

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## **Circular business models framework for the construction products, focused on the end of life phase of their life cycle**

Zuzana Prochazkova<sup>1</sup>, Carmen Jaca<sup>2</sup>, Jordi Roviras<sup>1</sup>, Felipe Pich Aguilera<sup>1</sup>

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### **Abstract**

The construction sector is considered to be the least efficient sector, using around 50% of all extracted materials and responsible for 35% of total European waste production. Greater material use efficiency in the sector could save more than 80% of these emissions. The Circular Economy Action Plan released by the European Commission, within the part dedicated to the construction sector, suggests to extend the life cycle of an asset. This approach does not only consider to increase the durability of these assets. In construction sector, the life cycle of a construction, and the systems and products integrated in it, depends on multiple aspects. Some of these aspects are adaptability at different scales (building, system, component), and reusability (system, component). Durability is considered as a parameter essential to achieve this potential. This paper is focused on identifying sustainable economic models for construction systems and products, taking into account the before mentioned characteristics, as parameters of the potential to extend their life cycle.

In order to identify suitable business models (BM), the circular business model (CBM) references were collected from the scientific literature but also from relevant reports and publication from the construction sector. These models were cross-referenced with the circular resource efficiency strategies, in order to determine which of the BMs are applicable by the producers of the construction products and are related to the analysed product characteristics. Some of the identified BMs were then further analysed in 7 case studies, through semi-structured interviews with construction product producers.

Multiple potentially suitable CBMs were identified, giving a base for further research in this particular field. The BM case study analysis suggested that the actual implementation of these models is still not feasible in the construction sector, even if there is will on the side of the producers, and confirmed the presence of the barriers encountered in previous research. More detailed study of the BM patterns and BM innovation in the field is needed in order to help to overcome these barriers.

This paper is related to the SDG nr. 8 Decent work and Economic Growth, nr. 9 Industry, Innovation and Infrastructure, 11 Sustainable Cities and Communities, 12 Responsible Consumption and Production, 13 Climate Action and 17 Partnership for the Goals. The conference theme “Accelerating progress towards SDGs in time of crisis” is closely related with the topic of this article as it aims to propose further research and innovation to set up new CBMs in the construction sector, with the objective to speed up the CE uptake within the sector.

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## Sustainable Development at the Crossroad: Comparing policies and performances towards the SDGs in China and Europe

Associate Professor Mario Biggeri<sup>1,2</sup>, Dr. Leonardo Borsacchi<sup>1,2</sup>, Dr. Luca Bortolotti<sup>3</sup>, Dr. Andrea Ferrannini<sup>2</sup>

<sup>1</sup>Department of Economics and Management, University of Florence, Firenze, Italy. <sup>2</sup>ARCO (Action Research for CO-development, research Lab), Prato, Italy. <sup>3</sup>University of Turin, Turin, Italy

### Abstract

Most policymakers, aware of the economic and social imbalances and environmental pollution, have reacted by proposing a political strategy oriented towards more sustainable form of development. However, the commitment of big players, as Europe and China, towards the UN Agenda 2030 for Sustainable Development is crucial. Both Europe and China are launching one after the other policies towards a more sustainable development.

In Europe, on the one side, the efforts devoted by the European Commission (EC) for sustainable development started during under the Juncker presidency (2014-2019) as well as in the new political guidelines and priorities currently pursued by the von der Leyen presidency (2019-2024). The former include the EU Sustainable Development Strategy and the related monitoring system, along with its implementation actions, such as the European Pillar of Social Rights, the Investment Plan for Europe, the Horizon 2020 programme, the Circular economy action plan, the EU plastics strategy, ect... . The latter embrace striving to be the first climate-neutral continent (through the European Green Deal which includes a new industrial strategy as one of its multifaceted elements), promoting social fairness and prosperity in our economies, empowering all people through new technologies, ensuring equality of opportunities and strengthening democracy, among others. In 2020, the EC announced “A New Industrial Strategy for Europe” for driving a twin transition towards both digital leadership and climate neutrality as well as, the new “Next Generation EU” (NGEU) recovery plan was adopted in response to the coronavirus pandemic, leveraging on the green and digital transition (EC, 2020).

On the other side, although Chinese development outcomes recorded impressive economic achievements and progress across social domains, but this progress achieved to date has not always been harmonious because of unsustainable features, rising inequality, environmental pollution and strong provincial disparities. Environmental and social sustainability have become part of the domestic political debate only more recently (Kuhn, 2016). Recently, Xi Jinping introduced in his Chinese Dream project the realization of a “moderately prosperous” society, a target widely mentioned in the National Development and Reform Commission reports (2019, 2020).

The aims of this paper are two. The first is to explore Chinese and European policies. The second is to measuring and comparing their progresses towards SDGs.

The Chinese dataset is based on official statistics from the Chinese Statistical Bureau (various sources) and consists of 42 variables measured at provincial level covering all the 31 provinces for the period 2010–2017. These variables are grouped into the 17-undimensional SDGs domains. The data are

comparable with the European countries and regions data from Eurostat. The Multidimensional Synthesis of Indicators (MSI), a new method for aggregating SDGs performances, is used to capture synergies and heterogeneity of results over time.

The empirical analyses provides Chinese and European policy-makers a better understanding on how policies may influence positively or negatively different SDGs and offer further monitoring tools to shape policies - at country level for Europe and provincial level for China - in line with the Agenda 2030 for the humanity and its common future.

## **Ecosystem Collaboration in the Energy Transition: Building cooperation through multiple value creation**

Dr Larissa Shnayder, Prof Hans van Kranenburg

Radboud University, Nijmegen, Netherlands

### **Abstract**

In the energy industry, energy network providers are crucial to the transition to sustainable energy. But these firms do not work alone. In fact, they are constantly collaborating with governments, communities, and other firms in their environments. As such, it comes as no surprise that Jonker and Faber (2019) take the stance that “impactful sustainification, either in value chains or closed loops, and a simultaneous realization of social inclusion is, by definition, the result of a collective inter-organizational effort.” In the context of the energy industry, this means that the only way to achieve impactful and sustained change towards a more sustainable energy grid is via inter-organizational collaboration.

To further investigate the processes that allow for such collaborations, we must take a close look at the business models involved. As they work towards joint sustainability goals, organizations must function within a structure that allows them to be an active and contributing member of their greater ecosystem. Currently, the business model literature focuses on fragmented improvements and individualized solutions meant to address acute challenges. These types of solutions may work in the short term but do not address the structural issues that lead to these challenges in the first place. Jonker and Faber (2019) point out that conventional business models are inherently organization-centric, making it challenging to deal with wicked problems, which are inherently complex and inter-organizational.

To address these so-called wicked problems, we employ the concept of multiple value creation – using single means to obtain multiple goals. Multiple value creation demands collaboration between a variety of constituents. Could this mean that we are looking at a transition from the long-time dominant organization-centric model? Organizations are embedded in ecosystems. Ecosystems focus on modularity and complementarity, building on ideas that encourage adaptation and collaboration. As previously described, collaboration is crucial to the energy transition, which is rapidly evolving, requiring organizations to adapt. In this way, the ecosystems perspective can serve as a complement to the dominant business model literature, particularly in the energy transition context.

In light of emerging evidence for the need for inter-organizational collaboration, a new generation of business models is already emerging – business models that are specifically constructed to address, through multiple value creation, the wicked problems that comprise societal challenges through inter-organizational collaboration. However, it is yet unclear how this new generation of business models can benefit large incumbents, who are currently already operating under existing old-school business models. Furthermore, it is unclear how these incumbents can identify and seize opportunities for multiple value creation to improve their collaborative efforts without the high risk of failure associated

with redesigning their business models from scratch. This paper seeks to develop a tool for established firms to better collaborate on energy transition initiatives, focusing on multiple value creation.

## Explaining pre- and post-1970 Changes in Energy and Economic Trends via the HARMONEY model

Sajed Sadati<sup>1</sup>, Carey King<sup>2</sup>

<sup>1</sup>Postdoctoral Research Associate, Energy Institute, The University of Texas at Austin, Austin, USA.

<sup>2</sup>Research Scientist & Assistant Director, Energy Institute, The University of Texas at Austin, Austin, USA

### Abstract

### Background

In the 1970s OECD countries transitioned from a period of increasing to one of steady (or declining) per capita energy consumption, and in the 2000s they reached a constant level of total primary energy consumption. Many social and economic changes occurred directly from this transition. To understand possible transition to clean energy and an equitable economy, we must understand how and why the energy-related constraints in the 1970s preceded declines in income equality and increased private debt. Only in this way can we avoid continuing these trends in the current and future clean energy transition.

### Methods

This work uses an existing long-term economic growth model, HARMONEY (Human and Resources with MONEY), to explain relationships among biophysical and economic variables. The model consists of two industrial sectors, namely *Goods* production and *Extraction* of natural resources. It uses a stock and flow consistent post-Keynesian framework compatible with ecological economic principles. Thus, model tracks physical and monetary flows associated with resource extraction and consumption by capital and people. As the natural resources deplete faster, extraction costs increase, causing a negative feedback on growth, and ensuing changes in distribution of money among banks, owners of industrial capital, and labor.

### Key Findings and Implications

We use the HARMONEY model to discuss how the distribution of economic proceeds changes when the economy moves from the period of increasing to one of constant resource extraction. For example, when resource extraction reaches a steady state, because investment in new capital requires physical resources, investment is restricted. Subsequently, given resource consumption constraints, if wages remain indexed to inflation, then wage share increases (or remains constant), and capitalists settle all debt but maintain zero profits. However, this pattern was not observed in the OECD countries, particularly in the U.S. where income inequality started increasing in the 1970s. Thus, we are able to demonstrate, considering resource constraints, the capitalist imperative to maintain profits by reducing labor costs by (1) no longer indexing wages to inflation and (2) increasing the labor force, via globalized investment, a larger labor force translated to a lower employment rate which again pushes wages down. Additionally, we show how resource depletion, and the lack of exponential growth in resource extraction leads to rapid increases in private debt that pushes wages down further, even when

consumption continuously increases. While these factors of loss of “bargaining power” and debt are generally accepted as drivers wage cutbacks in many OECD countries, formal discussion of these factors, explicitly via a growth model, is often separate from economy’s biophysical and ecological basis.

We also use HARMONEY to discuss insights in the global economic trends on decoupling of energy consumption from GDP. Thus, this paper demonstrates the important linkages among resource consumption and depletion to economy’s financial (private debt) and real (productive capital, labor) aspects.

This work is relevant to the following SDGs: 7-Affordable Clean Energy, 8-Decent Work and Economic growth, and 10- Reduced Inequalities. We have internet access to present this work live via Zoom, as the likely conference platform.

## Complementary economics – greater sustainability by learning from nature’s ecosystems

Professor Øystein Nystad<sup>1</sup>, Associate professor Astrid Marie Holand<sup>1</sup>, Trainee Ingrid Schistad Berg<sup>2</sup>

<sup>1</sup>Nord University, Bodø, Norway. <sup>2</sup>Iris Produksjon AS, Bodø, Norway

### Abstract

To reach the UN Sustainable Development Goals, fundamental changes in dominating political and economic thinking are needed. This paper demonstrates how complementary economics, a concept that emphasizes the importance of economic systems functioning like ecosystems, can be a necessary extension of the current economic understanding to achieve the SDGs and a sustainable future. The benefits of a complementary economic understanding are illustrated through the example of *O matt Gjenbruksverksted* in Bodø, Norway, a workshop that repairs and resells waste electrical and electronic equipment.

The business model of *O matt* was developed in interaction between several actors to address their unmet needs; local business, local government and with a volunteer organization as a coordinator. Two of the authors of this paper have actively contributed to developing and testing the business model in practice, and from this experience with the project, we are developing some more theoretical perspectives on complementary economics.

*O matt Gjenbruksverksted* arose organically to answer specific, observed local needs that set the direction for how the business model was developed, which is a key element of complementary economics. Much like in ecosystems, the project partners all have different needs that must be fulfilled. At the same time, they have resources that can be useful for other actors. By working together, potential or “sleeping” assets are realized and activated, and thus greater value is created, both in economic, environmental, and social terms. A complementary economic approach is well-suited for mapping needs and resources of cooperating actors, and the model of analysis has great transfer value to other cases.

Complementary economics is an economic order that already exists, that has historical roots, but that so far has not got the recognition it deserves. The goal is mutual benefits through wise connection of resources, as a result of cooperation and interaction across sectors and between levels. Such an approach seems necessary for society’s sustainability – or robustness – in meeting future challenges. The ability of each individual company, organisation, and community to adapt will be decisive for the common ability to reach the UN SDGs. That is why a complementary economic approach, with interaction across sectors and between levels, is the way to go.

SDG 17 Partnership for the goals is especially relevant for the paper, as it describes an economic order in which cooperation and reciprocity is key. Also other goals are relevant for the case studied, in particular SDG 12 and 8. The paper relates to the conference theme by presenting a new way of organizing the economy in order to meet future challenges and achieve the SDGs. The paper will preferably be presented orally on the conferences’ chosen digital platform, supported by a power point presentation.

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## Tourism's socio-economic contribution: A UN-SDG perspective

Kai Kronenberg, Prof. Dr. Matthias Fuchs

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### Abstract

Studying the economic impact of tourism with *Input-Output* (IO) methodology and extensions, like *Computable General Equilibrium*, is widely established within tourism science (Comerio & Strozzi 2019). However, the analytical focus of the majority of impact analyses remains on aggregated indicators, such as total output, employment and income, respectively. However, this reductionist view in line with economic orthodoxy provides an oversimplified and biased perspective on regional development missing out important socio-economic issues (Gallagher et al. 1999). In particular, the concept of sustainability has not (yet) played a prominent role in estimating tourism's economic impact. Though, the UN Sustainable Development Goals (SDGs) explicitly address *decent work* (SDG 8) as well as *reduced inequalities* (SDG 10) (UN 2021). Accordingly, a growing number of tourism scholars argue that regional tourism development should focus on the principles of steady-state economics by prioritizing local communities as well as employment-related issues, which are widely neglected by debates and works on sustainable tourism (Baum et al 2016; Higgins-Desbiolles et al. 2019). In the same way, we argue that traditional economic impact measurement approaches contributed too little to address sustainable regional development. Therefore, we extend the traditional practice of tourism economic impact measurement by considering '*new monetary measures*' beyond growth-focused aggregates (Söderbaum and Brown 2010). More precisely, our IO-based regional impact study estimates economic leakages, import shares as well as taxation effects from tourism over a 10 years period (2008-2017). Most importantly, we dis-aggregate employment and income effects into diverse occupational areas (Daniels 2004). This allows us to study tourism's contribution to decrease sectoral income inequalities among particular occupation types. As a narrow view on monetary indicators risks to dis-embed markets from its underlying rules and social institutions, socio-economic impacts can hardly be understood solely by numbers. Accordingly, our study also considers the perspective from major tourism-related institutions, like branch associations, labor unions and regional public institutions. A mixed-method approach, finally, complements quantitative findings from IO with additional qualitative insights thereby obtaining a holistic understanding on the socio-economic impact of tourism in the region of Jämtland Härjedalen with a focus on tourism employment- and income. As highlighted by the UN-SDGs, the proposed analysis broadens the view of conventional tourism economic impact approaches in tourism.

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# **8. Social Foundations of Sustainability**

## **8a. Gender, inclusivity and human rights**

**BREAKING THE BARRIERS OF INEQUALITY: A ROAD MAP TO ADVANCING GENDER EQUALITY IN SUSTAINABLE DEVELOPMENT GOAL**

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**Grace Emmanuel Kaka**



**Dr. Muhamad Helmi Md Said**



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## **Abstract**

### **Abstract**

Gender equality has been a global menace ravaging almost every country of the world. Though untackled, yet human right concern and a key to advancing human progress in the United Nations Sustainable Development Goal (5) (SDG 5). Gender equality is a state where one's gender does not determine one's opportunities, freedom or importance rooted in gender parity and gender equity. However, despite existing international and local frameworks to curb gender inequality, still it remains a global challenge to sustainable development. The aim of the research is to examine the barriers to gender equality and how to break these barriers in other to achieve peace, stability, and prosperity. In doing so, recent literatures on the subject matter sourced from Web of Science, Scopus and google scholar were analysed alongside commentaries, repositories, reports, etc. It was discovered that culture, social norms, religion, law, and the state constitute the barriers to achieving equality between the two sexes. These barriers have kept women in abject poverty which has continued in cycles from generations hampering economic development. And to achieve a healthy society, reduce poverty and promote health, education, protection, and well-being of human beings irrespective of gender, advancing gender equality is key. Thus, the suggestion for the need for an action plan and/or policy by all at the international and national level towards equal opportunity, equal responsibility, equal expectations, equal commitment, equal rights and equal relevance between girls and boys to advance gender equality in the sustainable development goal by 2030.

**Key words: Gender Equality, Sustainable Development Goal, Education, Barrier, Poverty.**

### **FINAL SECTION (Relevance of Research)**

This research falls within SDG (5) on gender equality and SGD targets focusing on people, prosperity, and peace.

Also, it is hoped that at the end of the research, the following issues would be addressed” health and societal health, poverty eradication or reduction, insecurity, economic development as well as peace and development of a nation. This is because when there is peace in the home, it transients to the society.

It will also directly address three key 2030 agenda in the five pillars of SDG’s target – people, prosperity and peace and indirectly address partnership and the planet.

In conclusion, one would realize that in accelerating progress towards sustainable development goals during crises, finding solution to gender inequality is inevitable as that would bring about peace and economic development.

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## **Effect Of Village Seed Entreprises (VSEs) Project On Women Empowerment And Social Capital In Abia and Akwa Ibom States, Nigeria.**

Miss Bridget Alegieunu, Dr Wale Olayide

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### **Abstract**

#### **Effect Of Village Seed Entreprises (VSEs) Project On Women Empowerment And Social Capital In Abia and Akwa Ibom States, Nigeria.**

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Globally, women empowerment and entrepreneurship issues have been a key factor in the development process and poverty alleviation. Empowerment has different meanings in different socio-cultural and political contexts. In its broadest sense, empowerment is the expansion of freedom of choices and action. Women involvement in agriculture contributes positively to the growth and development of a country. Efforts at empowering women have encountered setbacks both theoretical and empirical levels due particularly to the seeming vagueness in the definition and analysis of the word "empowerment" (Swain & Wallentin, 2008). In Nigeria, a significant deficit in food production causes food insecurity and malnutrition, particularly for poor and vulnerable households. A nation-wide shortage of certified high-quality seeds is one of the main obstacles keeping farmers from increasing their production. To address the huge gap between the demand and supply of certified seeds, scientists have introduced Village Seed Enterprises (VSEs). The Building an Economically Sustainable Integrated Cassava Seed System (BASICS) aims at contributing to empower and sustain seed system in Nigeria. Its major target is to strengthen all components of the cassava value chain and seeks to empower village farmers to increase productivity, income, and supplying farmers with high quality planting materials of new, improved and/ or existing varieties produced from certified basics seeds. Hence, empowerment and social structure of the VSE is to initiate improved production and empower more women. The aim of the study is, to determine the level of women empowerment in Abia and Akwa Ibom states of Nigeria, measure the level of social capital among women and to analyse the effect of VSE on women empowerment and social capital. The research employs both quantitative and qualitative methods, data presented in the study are obtained primarily which was collected directly from the respondents using questionnaires and interviews and focus group discussion with about 250 respondents. It is hoped that this study will inform farmers and mostly women about the importance of empowerment through agriculture. Preliminary results reveal that VSEs has positive effects on women empowerment and social capital in the study areas.

This topic relates to SDGs 5 which is to achieve gender equality and empower all women and girls. And target 5:5 states that, to ensure women's full participation and equal opportunities for leadership at all levels of decision-making in political, economic, and public life.

Women empowerment is a crucial factor for achieving sustainable development, because to achieve a sustainable developed country there is need to have a fair representation of women across different levels of decision making.

Hence, women's contribution in accelerating progress towards SDGs in times of crisis is through empowerment in agriculture thereby contributing positively to the growth and development of a country.

**Keywords:** Women empowerment, Cassava, Productivity.

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## Gender path in Italian universities: evidence from University of Salerno

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### Abstract

#### Purpose

The existence of gender asymmetries within society represents an ethical, social and economic problem, contrasting the values of equality and social cohesion.

At the international level, raising women's educational levels has helped promote their participation in the labor market and feed their expectations of personal fulfillment and professional success. However, in Italy more than in other democracies, women find it difficult to translate the success achieved in education into the workplace.

In particular, in the academic world there are many difficulties that women encounter in accessing a university career which are then reflected in all the governing bodies of universities.

The current health emergency from COVID-19, by reshaping the times of life and work and the same urban geography, has further aggravated this female situation and tragically highlighted the weaknesses of our family welfare system.

This study analyzes the main criticalities that emerged in times of crisis and the initiatives undertaken by the University of Salerno, in Italy, aimed at enhancing the gender difference and preventing it from continuing to be a source of potential discrimination. In fact, the University recently adopted, as a part of the European R&I PEERS project (ID 788171), a plan for gender equality that outlines a series of concrete actions aimed at ensuring full participation of men and women in scientific research and in the organizational life of the university. A project that ensures equal opportunities improves people's well-being and, finally yet importantly, makes the University of Salerno a model of "best practice" on a national and European level.

#### Methodology approach

The study followed a research approach that combines qualitative and quantitative techniques. This includes data deriving from questionnaires administered to all staff of the University of Salerno with documentary analysis and internal process data. The questionnaire, in particular, is aimed at investigating how women experience this period of emergency from a personal and social point of view.

This is to understand what the needs of the university community are and formulate proposals aimed at improving their condition.

### **Preliminary results**

This study confirms that organizations that adopt gender equality plans and employ flexible organizational solutions, implementing exchange modalities between professional and private spheres, express forms of synergistic collaboration between male/female workers and organizational needs. Thus a space for co-empowerment and strengthening of the individual-organization relationship develops, which can only positively influence the enhancement of human resources: an increasingly strategic asset and one of the main sources of competitive advantage.

### **Conclusion**

The efforts made at the University of Salerno see corporate welfare devices as a fundamental element for the affirmation of an innovative model of management of human resources, culture and business processes, with a view to equal opportunities. A management model capable of generating social value at a systemic level and which can offer a powerful contribution to resolving the gender gap.

**Keywords:** gender equality, organizational well-being, conciliation.

### **SDG+target 5.c**

**The proposed contribution helps to accelerate progress towards SDGs- goal5 in times of crisis presenting inspiring examples to drive change.**

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## **To be Included – an Exploration of Visual Strategies at Government Agencies in Sweden**

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**Senior Lecturer Karina Goransson**



**Senior Lecturer Anna-Sara Fagerholm**

### **Abstract**

A well-functioning democracy is based on the fact that there is confidence in organizations in the public sector (Gromark & Melin, 2013). Access to information is important for maintaining an organization's legitimacy and can thus be seen as a foundation of democracy. The opposite, that people do not have

access to equivalent information, can instead result in inequality and other forms of discrimination. In Sweden, there is a new law to secure that information on public websites must be accessible and possible to perceive (2018: 1937). Legitimacy and trust in the authorities and governmental works is governed, among other things, by norms, rules and principles for what is right and wrong communication (Fredriksson & Pallas, 2011). Public trust is presented as a process and result of publicly generated trust in publicly visible actors (Bentele and Seidenglanz, 2008). On this basis, credibility is related to communication processes in a context of inclusivity. Here, visual strategies are important since it can be used to influence opinion (Wong, 2016), change attitude and behavior (Frascara, 2006) and for transformation and social change (Buchanan, 1998; Bichler and Beier, 2016).

Against this background, the purpose of this study is to explore how communication professionals at government agencies in Sweden plan their visual communication in a digital context from a inclusivity perspective.

In order to answer the purpose, a literature review was done, and interviews were conducted. The sample of this study focuses on *government agencies* in Sweden, i.e. authorities controlled by the Swedish government.

In the results, we first describe how communication professionals at government agencies in Sweden plan their visual communication in a digital context. Second, the result focus on visual strategies as an assessment tool in a communication planning process from a inclusivity perspective.

With this study, we hope to provide a better understanding of visual strategies in the communication planning process, contributing to knowledge about how to create inclusion in visual digital communication. This is in line with global goal number 16; Peaceful and inclusive societies – Promote peaceful and inclusive societies for sustainable development, ensure that everyone has access to justice and build effective and accountable and inclusive institutions at all levels and also 16.10: Ensure public access to information and protect fundamental freedoms – Ensure public access to information and protect fundamental freedoms, in accordance with national law and international agreements.

At times of pandemic and restrictions in society with limited possibilities to visit government agencies in the same way as before the crises, access to digital information is of great importance. This is relevant for an inclusive, democratic and sustainable society, not excluding citizens. COVID-19 has acted as an accelerator for the need of inclusivity included to prevent inequality.

## Exploring new waters for sustainability: gender equality in European seaports

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### Abstract

Ports have been working towards becoming more sustainable. Although gender equality (SDG5) is very important within the 17 United Nations Sustainable Development Goals, it is ranked almost at the bottom of port priorities. The aim of this research is to provide insights into how ports have been addressing gender equality in their efforts to contribute to sustainability. Twelve semi-structured interviews were conducted with directors and sustainability managers from six European countries. The responses from interviewees were analysed using Grounded Theory's constant comparative analysis.

The findings show that European ports have engaged in measures aimed at contributing to sustainability through gender equality classified in five stages: (1) Gender segregation, which needs to be overcome, and is, in many cases, the starting point; (2) Compliance with national laws and regulation, e.g. in recruitment and salaries; (3) Gender equity, reducing barriers to entry and compensate for the historical and social disadvantages that women had previously suffered from; (4) Gender equality, guaranteeing the equal treatment of men and women in all processes; and (5) More sustainable ports. Achieving gender equality is a *sine qua non* to make ports more sustainable, i.e. integrating social issues of sustainability with economic and environmental ones. Internal and external forces affect each of the stages, where thrust forces help ports reduce gender segregation and advance towards becoming more sustainable and drag forces slow or block the efforts and may lead to returning to a previous stage. The findings were used to develop a "Gender equality for sustainability in ports" framework.

This research is especially related to SDG5, target 5.1 (End all forms of discrimination against all women and girls everywhere), and 5.5 (Ensure women's full and effective participation and equal opportunities for leadership at all levels of decision-making in political, economic and public life).

Ports, and other traditionally male-dominated industries, could capitalise on women's holistic perspective and higher engagement to better contribute to accelerating the progress to make Europe more sustainable, especially in these testing times.

## Accentuation or leveling? Gender implications at higher education institutions in Germany during Covid-19

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### Abstract

It is not new that women are struggling to achieve the status of a full professor. Blithe and Elliott's (2019) findings show that "women in academia continue to experience extreme workplace hostilities and stressors, and that these stressors vary by rank". Furthermore, the Covid-19 pandemic highlighted the centrality of care work (childcare, care of relatives, and household activities of all kinds) in managing crises. Germany's extensive shutdown of daycare centers, kindergartens as well as schools in spring 2020 and winter 2020/2021 relocated an increasing amount of such care work to private households. Especially working parents mostly have to arrange care themselves. But managing care work and gainful employment connected with a heavy shift to remote work at the same time poses a major challenge for many families. Unfortunately, women continue to shoulder the greater share of unpaid care work during the pandemic, which seems to be a major roll-back. However, the proportion of men who are more involved in childcare has increased significantly during this period, which in turn appears to be a leveling of gender inequality (Globisch & Osiander, 2020).

Aiming to explore if the corona crisis is affecting gender inequality in German academia, our research is driven by the following questions: *What is the impact of the Covid-19 pandemic on scientific staff at universities? What roles do gender, parenthood, and rank play here?* In order to answer these questions adequately and investigate this contemporary phenomenon, a qualitative approach was chosen. We integrated the qualitative experiment technique of transformation, reduction, and adjection (Kleining, 1986) into interviewing. After transcribing our data were analyzed with MAXQDA using qualitative content analysis through the lens of gendered organizations and neoliberal academia. First findings suggest that there is a significant influence of parenthood and rank but not gender to the impact of the pandemic on scientific staff.

Our empirical study relates to the SDG 5 (gender equality) with its targets 5.4 as well as 5.5. We hence investigate current trends and implications for the social dimension of sustainable development in German academia. The crisis confronts higher education institutions (HEIs) with new challenges, which imply both opportunities and risks. HEIs respond to the new conditions and develop a variety of coping strategies, which can have long-term effects on individuals as well as organizations. However, the longed-for desire to "get back to normal" harbors the risk of reinforcing gendered structures and discarding positive advances. Therefore, HEIs should combine the changes resulting from the pandemic with all SDGs.

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## Gender in sustainability transition studies: Theoretical perspectives, blind spots and future orientations

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### Abstract

In order to cope with the aggravating global social-ecological crisis of our times, theoretical frameworks are needed that can help to interpret and navigate complex societal transformations towards sustainability. Over the past decade, the field of sustainability transition (ST) studies has rapidly grown in response to this call. Today it forms a widely cited source of concepts and heuristics for understanding path-deviant socio-technical change - including for other fields, policy and practice (cf. Köhler et al., 2019). However, despite their broad inter- and transdisciplinary constitution and explicit concern for re-shaping societal systems, ST studies have so far largely failed to engage theoretically with the crucial role of “gender” in sustainability transitions, relegating it to questions of impact or ethics.

Drawing on the rich legacy of theoretical propositions made by feminist approaches for understanding relations between gender and societal change, our contribution aims to illustrate the remarkable gender blindness of ST studies, but also advocates a conceptual way forward to address this. We do so by first outlining how “gender” essentially structures social interactions as well as societal relations and organizes symbolic orders. Hence, it not only constitutes a vital factor in shaping technologies, but also lies at the core of norms, cultures, institutions and practices, both enabling and impeding socio-technical change. Using these insights we then discuss the results of a systematic literature review focused on the role of “gender” as an analytical category in ST studies (2010-2020). Our findings show only marginal engagement as well as theoretical vagueness, while recognizing weak signs of a recent increase in relevant contributions, especially dealing with the Global South.

Against this backdrop we suggest using a conceptual prism derived from feminist approaches to systematically explore and expose the role of gender in sustainability transitions. Considering the three overarching orientations of ST studies at understanding “regimes”, “niches” and/or niche/regime relations and their respective dynamics, it positions “gender” as *identity*, *structure* and *symbolism* in each of these perspectives, thereby anchoring its multidimensional character in the epistemological core of the field.

In conclusion, we reflect on the deep implications this conceptual extension may have for understanding and guiding sustainability transitions, for inter- and transdisciplinary research designs conceived for this purpose, as well as for future (research) policy. Our contribution thus focuses on accelerating progress towards SDG 5, while highlighting its entanglement with all other SDGs, and in particular SDG4 and SDG16 in terms of a broader adoption of the suggested comprehensive gender perspective.

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<https://doi.org/10.1016/j.eist.2019.01.004>

## **Necropolitics in the Brazilian Mining Sector: a critical analysis of a corporate environmental crime in a mining-dependent community**

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### **Abstract**

Mineral exploration in Brazil goes back to the time of colonization, bringing slavery, indigenous genocide, poor working conditions, and poor income distribution. Minas Gerais is one of the states responsible for this natural wealth, being the birthplace of mining company Vale, a mining corporation considered genocidal and ecocidal by social and environmental movements that try to establish resistance in the face of mineral exploration. Since its foundation in Itabira, Minas Gerais, the Vale do Rio Doce Company has been responsible for several work accidents and, as if that were not enough, it is also possible to register several indigenous deaths during the construction of the Vitória-Minas railroad. In addition to this impact, a fundamental characteristic of mining remains the economic dependence of the explored cities, which we can call “Mining-Dependence”, since the installation of mining enterprises hinder the development of other development activities such as agriculture and tourism, making the municipality depend solely and exclusively on these activities.

The colonialism can be discussed through the eyes of Cameroonian philosopher Achille Mbembe (2015). Using a reinterpretation of the European biopower concept of control and conservation of life proposed by Foucault, Mbembe decides to appropriate a phenomenon experienced by the countries that were colonized by the Europeans: that of the conscious and systematic extermination of the original or enslaved peoples by the colonizer. Therefore, “making you die” is inaugurated, the basic epistemology of what Mbembe calls Necropolitics and Necropower. This ability to decide on the limits of life or death is the key factor in exercising sovereignty and power relations.

To investigate the approximations between the Necropower and the colonial Necropolitics of Mbembe in modern times and in Brazil, this article will use a case study of mining based on the practices of the company Vale S / A in the city of Brumadinho, state of Minas Gerais, Brazil. In 2019, a mining dam rupture killed more than 250 people and destroyed the vegetation, animals and the river Paraopeba. This environmental and labour corporate crime happened in Brumadinho, in a Vale’s mining.

This relationship of socio-environmental conflicts arising from the economic interest in modernity can also be found in Acserald's (2002) writings on environmental justice. The scenario is that mining corporations absorb the positive fruits of the initiatives (In Minas Gerais / Brazil, the high profit and positions of power) and the population remains burdened with the risks (unemployment, precarious work conditions, dam collapse, expropriation of land and air pollution, lack of water).

This article is derived from research that takes on the characteristics of a case study to understand Vale S / A's forms of action on the actors in the territories in which it operates. To make this possible, we conducted a documentary research in order to understand the mining work relationships,

through electronic sites and reports on the daily life of mining territories, anthropological studies on the foundation of the company, analysis of water grants, statistics accidents at work in Minas Gerais / Brazil and participation in affected movements.

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## Women With Mental Illness: Stigma and Career

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**Ph.D. candidate in Administration Bianca Spode Beltrame**



**Ph.D. candidate in Administration Marcos Vinicius Dalagostini Bidarte**

### Abstract

Estimates by the World Health Organization (WHO) show that depression and anxiety have a global economic impact of one billion dollars a year and that around 450 million people worldwide meet the

criteria for the diagnosis of some type of mental disorder, of which 80% live in low and middle-income countries. This study aims to investigate how the stigma of mental illness impacts the insertion in the labor market and the development of women's careers. For this, the Sustainable Development Goals (SDGs) was taken into consideration, especially SDGs 5.1 and 5.5 (by 2030, achieve gender equality and empower all women and girls); 8.5 (achieve full and productive employment and decent work for all women and men, including for young people and persons with disabilities, and equal pay for work of equal value); and 10.2 (empower and promote the social, economic and political inclusion of all, irrespective of age, sex, disability, race, ethnicity, origin, religion or economic or another status), when seeking to contribute with accelerating progress towards the SDGs in times of crisis. The context of the Covid-19 pandemic and its social isolation measures are considered, as this directly affects the health and well-being of the people involved, their families, and society in general. A systematic review of the recent literature was carried out, analyzing the articles indexed in the Scopus and Web of Science databases, following the recommendations of the Prisma method. The results revealed low academic production on the theme, with the discussion being circumscribed in the Health field and the countries and institutions of the Global North. Results from the corpus of the analysis indicate that the consequences for women who suffer from stigma related to mental illness are serious and their discrimination causes innumerable damages, such as low self-esteem, low self-confidence, and low quality of life. We know how impactful these damages are, as they usually end up reflecting on an entire family, often headed by this woman. It is thus needed that society changes its outlook and practice, aiming at the acceptance of diversity and social inclusion through work. Based on the identified gaps, a research agenda on the topic in the field of Administration is proposed, especially focused on the area of Human Resources Management and Labor Relations.

**Keywords:** Mental Illness, Stigma, Career, SGDs, Women

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## IMPACTS OF THE COVID-19 PANDEMIA TO COOPERATIVE LIFE CYCLE: CASES OF HOZAT AND OVACIK TOWNSHIPS

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### Abstract

Cooperative activities usually scrutinized under the normal life cycle—however, current climatical changes and disasters force them to widen analytical perspectives. Disasters have been evaluated under the light of global decisions like Yokohama, Hyogo, Istanbul declarations, and Sendai Framework for Disaster Risk Reduction 2015-2030 to aim holistic disaster risk management at all levels. However, decision-making at the global level sometimes does not work along with local and other global issues. The COVID-19 pandemic creates socially, economically, and politically unexpected processes and completes examining the particular local, national, and international formal and informal social relations and applications. Cooperative activities are not distant from that examination. Disasters are approached as a situation that prevails underlying inequalities during their occurrences and related processes. This study takes grants this approach and evaluates the life cycle of cooperative activities from December 2019 and to the current time.

Moreover, it aims to reveal changes following a pandemic and the impacts of COVID-19. The study consists of four sections—introduction, methodology, findings, and conclusion. The introduction section evaluates the importance of assessing cooperatives and gender presence and changes at the time of disaster and in the case of Pandemia. This section will be discussed in the light of the conceptual and theoretical frame. The methodological section will be revealing the focus of the study. The fieldwork carried on 2019 and observations of the developments following year in Turkish two townships are the study's main base. The methodological frame will be evaluating worldwide findings on gender income generating activity changes at the time of crisis and disasters. Then, it focuses on Hozat and Ovacik cooperative experiences in the province of Tunceli during COVID 19 Pandemia. These evaluations will be under the light of SDG's, especially with Goal 11b.

The findings reveal that cooperatives' life cycle in two townships differs concerning social, economic, and management conditions and activity types. The agricultural production and usage of digital platforms support the requirements of the Ovacik cooperative. But there are increasing race between other newly established agricultural cooperative and the formal support changes. However, the movement of one of the cooperative activator of Hozat Hobe baby production Cooperative and the shift in the approach of the new local governor to support agricultural production puts stress on the continuity of the cooperative. Hobe dolls' organic doll production is losing formal importance, and transfer support of the newly emerged agricultural activities and cooperatives in Hozat township develops. But possible production of dolls at homes eases formal stresses. It survives through local close-knitted relations, supports the cooperative's continuity, and activates new local leaders to gain a formal recognition process. So women's income-generating activities in both townships have been going through some similar and some different difficulties. However, their strategies to overcome these difficulties differ as well. The final section covers a conclusive evaluation of the global and local findings.

**Keywords:** Gender, Turkey, Cooperative, Tunceli, COVID-19

## **THE EFFECTS OF STREET HAWKING ON ADOLESCENT GIRLS IN OGBOMOSO NORTH, OYO STATE, NIGERIA.**

Miss Rebecca Oyegoke

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### **Abstract**

THE EFFECTS OF STREET HAWKING ON ADOLESCENT GIRLS IN OGBOMOSO NORTH, OYO STATE, NIGERIA.

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### Abstract

This paper work focused on the causes and effects of street hawking on adolescent girls of Ogbomoso North in Oyo State. The study identified the causes of street hawking; examined the effects of street hawking on adolescent girls in Ogbomoso. The descriptive design was chosen, both quantitative and qualitative data were collected. The instrument used for collecting data was questionnaire as a primary source, the internet, journals, books etc were visited as secondary sources of data collection. Software Package for the Social Sciences (SPSS) was used to analyze responses gotten from the questionnaire. Findings revealed that those who hawk on the street or by the road side do not always think of the dangers they are exposing their lives to, most especially, those of adolescent age. Suggested recommendations include: parents should be encouraged to reduce the number of children they give birth to, so they would be able to give birth to the ones they can take care of. Free education should be made compulsory for children especially girls of school age. Incentives like being fed at least twice before leaving school daily should be added to the free education, this would make children to be willing to go to school and stay in school. This research work is related to the following SDGs: SDG 2 - Zero Hunger, SDG 3 - Good Health and Wellbeing, SDG 4 - Quality Education , SDG 5 - Gender Equality, SDG 8 - Decent Work and Economic Growth, SDG 9 - Industry, Innovation, and Infrastructure, SDG 10 - Reduced Inequalities, SDG 11 - Sustainable Cities and Communities, SDG 16 - Peace and strong Institutions and finally, SDG 17 - Partnerships for the Goals. This work relates with the topic of the Conference "ACCELERATING PROGRESS TOWARDS SDGs IN TIMES OF CRISIS" as it is one of the critical issues that need germane consideration even before the time of crisis. Adopting the recommendations made would on one hand, help one know how to curb street hawking, while on the other hand, speed-up the progress in achieving the Sustainable Development Goals in due time, thereby making a given environment more safe and conducive to live in giving regards to the wellbeing of its inhabitants.

Summarily, reducing street hawking among adolescents would help prevent or reduce crisis that might result from such menace in any given community in Africa and the whole world at large.

## Women Participation in Tourism Development in Nigeria: An X-Ray of the Place of Women in an Emerging Industry

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### Abstract

The tourism experience was perceived traditionally, in terms of products, destinations and consumption patterns. Women have contributed greatly to tourism development, promoting transport development and encouraging hotel progress, which help in reducing or eliminating poverty. This study sheds light on the extent of women participation in tourism development. The specific objective of the study is to examine the factors affecting women participation in tourism development and how tourism industry benefits women.

This study collected qualitative and quantitative data from respondents. Primary and secondary sources of data collection were used. Data was collected by using two methods: oral interview and administration of structured questionnaires, which were randomly administered at the various study area sites. The data were analyzed by using descriptive statistic, simple percentages, bar-chart, pie-chart and chi-square respectively. Results obtained revealed that 90.8% of the factor affecting women participation in tourism development, include: lack of financial capital, poverty, illiteracy, traditional perception, religious factor, child bearing and career development issues.

The findings also indicated that 88% of the respondents are of the opinion that policies such as tourism education, trainings, internet marketing, and formation of business network for self-support and municipality support can be employed to improve women participation in tourism development.

**Keywords:** Women participation, employment status, economic benefits, traditional perception, equal benefits, Tourism Development

# **8. Social Foundations of Sustainability**

## **8b. Communication for sustainability**

## Communicating Environmental CSR towards Consumers: The Impact of Message Content, Message Style and Praise Tactics

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**Dr. Yijing Wang**

### **Abstract**

Climate change entails a direct or indirect human-evoked change in climate that impacts the constellation of the global atmosphere. Factors such as emissions of greenhouse gases and plastic pollution impact the climate to the extent that the system is in danger of becoming irreversibly out of balance, causing sea level rises, increasing temperatures, ocean acidification, forest degradation, biodiversity loss and desertification. How pressing the issue of climate change really is has arrived in the global public consciousness over the last several years. Given the global context, businesses' commitment to preserving the planet is demanded by more and more stakeholders across the globe. As a consequence, many companies have voluntarily engaged in socially and environmentally responsible behaviors. These practices are described by scholars through a container concept – corporate social responsibility (CSR). CSR continued to garner business attention in last decades because of increased pressure from climate organizations, stakeholder's demands enhanced by communication technologies, as well as possible long-term profitability of engaging in CSR for businesses. In relation to the pressing socio-political debate on climate change, this study focuses on how environmental CSR communication affects consumer perception and behavior. We examine the impact of message content (neutral vs. two types of environmental CSR), message style (greenhushing vs. uniform vs. greenwashing) and praise tactics (consumer praise vs. company praise) on consumer trust, purchase intention and consumer advocacy. We also investigate the moderating role of attributed intrinsic and extrinsic corporate motives on engaging in environmental CSR in the proposed relationships. An online experiment (N = 304) revealed that a uniform message style outperforms the other two styles, whereas greenwashing is found

to be least effective. In addition, attributed intrinsic corporate motives moderate the impacts of environmental CSR communication on consumer trust, purchase intention and consumer advocacy, respectively. In contrast, no moderation effect was found for attributed extrinsic corporate motives. The findings provide important implications for effective environmental CSR communication with respect to specific message styles and attributed corporate motives.

## How sustainable are media and communication studies? On the contribution of the media and communication sciences to achieving the SDGs

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### Abstract

In times of climate crisis, ecological deterioration, and related social and health problems, sustainability has evolved from the "buzzword" of the last decade to a fundamental concept in finding a new balance between ecosystem and society. As one of the main challenges of our time, sustainability, and the achievement of the 17 SDGs have also reached the field of media and communications studies. Sustainability communication is considered an emerging, interdisciplinary field, constantly challenged by the increasing amount of communication *about, of, and for* sustainability (Newing et al., 2013), and by the need to communicate "inconvenient truths of de-growth and abandonment" (Weder et al., 2021b). Therefore, sustainability communication needs on the one side to improve its information and knowledge sharing process, while on the other side to establish a communication process on what kind of values should lead societal development and stimulate stakeholder engagement, by linking the idea of sustainability to different areas of society.

Here, education can play a decisive role due to its ability to (de-)construct paradigms and drive societal change through scientific breakthroughs and the education of the next generation leaders. In the sense of a comprehensive responsibility, educational institutions must recognize current and future social relevant issues and integrate them into their teaching programs. To this purpose, the study at hand examines to what extent sustainability and its core aspects are integrated into media and communication's curricula of European post-secondary institutions. Thus,  $n = 1068$  bachelor and master's degree programs and their related curricula from 28 European countries were analyzed through content analysis.

Looking at curricula is relevant from a heuristic perspective and helps verify whether Humboldt's ideal model of education is maintained in tertiary education. Furthermore, if we understand communication as a core dynamic of social behavior and take into account the importance of (mediated) communication in the attempts to achieve attitude and behavioral change, as well as to convey inconvenient truths, then the investigation of how sustainability is integrated into media and communication curricula should be seen as essential.

Results show that the curricular integration of sustainability aspects in media and communication science is low (14%) and drops to very low (6%) on module level. Here, sustainability is understood either in its environmental dimension or remains an abstract guiding principle, a buzzword among many others. This can indicate the difficulty of operationalizing such a concept as sustainability, which is experienced by higher education institutions and policy and society as a whole. Besides, the results leave space to reflect higher education institutions' social and educational responsibility and the self-conception of media and communication sciences. Sustainability (communication) should be more

institutionalized, both in terms of integration in the curricula and in the sense of a consolidation of the object area, to meaningfully contribute to sustainable development. By illustrating the underlying problem and suggesting steps needed, the study contributes to the conference's overall theme and directly relates to SDG 4 Target 7.

## Corporate activism trends and public relations strategies for the UN Sustainable Development goals

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### Abstract

The COVID-19 pandemic challenge reinforced the fact that, for the UN Sustainable Development goals to be achieved, a global collaborative response is needed: governments, the private sector, civil society and the general public.

One of the main challenges activist groups face is the scarce resources available to invest in a strategic communication management that allows them to increase the public visibility and legitimacy of the causes they defend. On the other hand, economic interests have already realized the importance of civil society organizations in defending certain interests and the legitimacy they can confer on them in the public arena. Therefore, the alliances they establish can be a way to accelerate progress towards SDG's in times of crisis.

Cases of corporate political advocacy as the Ben & Jerry's support of the Black Lives Matter movement (Ciszek & Logan, 2018) are not so common. Yet, either through public advocacy or through the so-called "lobbying for good", corporate activism is one new dimension of influence management that has all the ingredients to become a relevant area to companies CSR and reputation (Peterson & Pfitzer, 2009; Monaghan & Monaghan, 2014).

This article intends to advance knowledge on how the engagement between private business sector and human rights activists is, or can be, a trend in communication for social change in Portugal. Using the case study of [GAT - Treatment Activists Group](#) we will explore how the worlds of strategic communication and human rights activism position themselves regarding the possibility of a closer proximity between activists and private companies in Portugal. GAT is an NGO that "advocates for legal and political changes" in the scope of human rights and the 2030 Agenda (GAT), namely the third objective, "Establish Good Health and Well-Being". The history of GAT's achievements in AIDS prevention and treatment is closely related to strategic partnerships with the pharmaceutical industry.

The article is based on an ethnographic approach on GAT's communication dynamics between January and March 2021, complemented by in-depth interviews with GAT's Director and strategic communication experts from three Portuguese communication agencies (LLYC Lisbon; ATREVIA Portugal; Wisdom Consulting) and two communication boards from the energetic and health sectors (GALP and Novartis).

Ethnography has been presented as a methodology that brings relevant developments to public relations research, namely within the scope of sociocultural traditions (L'Etang, Hodges & Pieczka, 2012; Everett & Johnston, 2012; Xifra, 2012). With the ethnographic approach to the communication dynamics of GAT, we intend to understand whether there is openness, or not, on the part of human rights activists for this type of association with private companies and the underlying reasons. We also intend to find out in which particular issues or campaigns these associations occur, or could occur, and with what types of organizational cultures and business sectors. With the interviews to communication specialists from agencies and companies, we intend to examine the perspective of experts working in the area of strategic communication, mainly in the private sector, on the trends of corporate activism in Portugal.

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## The evolution of the sustainability story in corporate communication

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**DR. FRANZISCA WEDER**

### Abstract

The United Nations state that “the world is making progress towards Goal 7, with encouraging signs that energy is becoming more sustainable and widely available” (UN, 2021). In this presentation, the authors carve out the central role of strategic communication for the emergence and evolution of sustainable development as a narrative of the future in the communication of the 15 biggest global energy corporations over the past 30 years.

Narrative approaches seem to be fruitful to grasp the largely amorphous concept of sustainability that gets bent into many different shapes in organizations and the wider public (Author et al., 2019a; Dimitrov, 2018). We mainly refer to Frank (2017), who explains that “if we can change narratives, we change something fundamental in the moral and political constitution of the society; thus, it is in narrative that new visions of sustainable living begin” (Frank, 2017, p. 312).

Thus, from a critical and constructivist communication perspective, we assume that over a certain period of time, there is a transition in corporate reporting from the ‘old story’ of climate change, telling us about human mastery over nature, ecological destruction, growth, individual consumerism and related struggle and resource scarcity to a new story of sustainability, of inter-being, co-creation of

ecocultural identity, inter-being and harmony as well as post-growth. As guideposts to follow this process of transition or evolution of the new narrative we chose the characteristics of evolution: variation, inheritance, time, and adaption (Darwin, 2017; Pirlet, 2005).

With these characteristics, we analyzed 30 years of corporate “Environment(al) Reports” (1990-2000), “CSR Reports” (2000-2015) and “Sustainability Reports” (since 2015) of internationally operating *energy companies* (n = 15). This explorative content analysis (Bryman, 2016; Mayring 2014) supports the theory of the evolution of sustainable development as new narrative in corporate communication. In the 1970ies/80ies until the early 90ies, corporate reporting was characterized by debates about environmental problems, global warming and climate change – and possible solutions. “Corporate Citizenship”, “Environmental Responsibility” and “Future Generations” were the key words. In the second phase, from the mid 1990es to the introduction of the SDGs in 2015, a stronger political and mainly economic discourse started and discussions about “non sustainable developments”, globalization, and the concept of sustainable development found their way in corporate CSR strategies and related communication. The key terminology used was “people, planet and profit”, “public-private partnerships” and “doing better than others”. Today, we are in the third phase, the phase of radical social change and crisis, calling for new approaches dealing with anthropogenic environment problems – and with improving humanities ability to coexist in the world: sustainable development is seen as pathway of innovation, progress, transformation and even “re-birth”, “re-definition”.

The talk finishes by discussing the potential of the ‘evolutionary’ approach and the future of sustainability as moral framework for mainly SDG #7-related activities and communication.

## Public deliberation and responsible innovation in artificial intelligence: the role of AI developers

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### Abstract

While many challenges for ethical AI are not entirely new—and closely resemble those found in more established fields such as bioethics—recent research discusses the unique role of ‘epistemic concerns’ in AI, such as *explicability* and *scrutability* (Floridi et al., 2018), which highlight the need for AI developers to contribute to explainable and accountable systems. Correspondingly, frameworks for ethical AI now place principles of ‘transparency’, ‘explainability’ or ‘traceability’ front and centre. These works, however, focus primarily on what ought to be, rather than making propositions on *how* these principles should be realized in practice and, more specifically, how responsible AI developers should contribute to this in engaging with citizens and policymakers (Hagendorff, 2020; Morley, 2020).

To address this question, we draw on literature on deliberation and responsible innovation (Lidskog, & Elander, 2010; Stilgoe, Owen, & Macnaghten, 2013; Voegtlin, & Scherer, 2017). Specifically, draw on work conceptualizing forms of governance that emphasize the role of corporate actors (e.g., Scherer, & Palazzo, 2007; Scherer, & Palazzo, 2011; Scherer, Palazzo, & Baumann, 2006), such as AI developers. We argue that ‘epistemic concerns’ pose a distinct meta-challenge in the responsible governance of AI. Linking current debates in AI ethics to a deliberative framework for responsible governance of innovation, we specify the role of AI developers in deliberation for responsible innovation, addressing epistemic inequalities (expertise) as a particular issue which can be tackled by considering the deliberative potential of *different venues* for deliberation (i.e., AI expert discourse, the public sphere at large, and ‘pure’ AI publics as ‘minipopuli’).

As such, our paper hopes to relate and contribute to two main fields of debate: First, we contribute to the recent discussion on deliberatively engaged business in responsible innovation (cf. Scherer, 2018; Voegtlin, & Scherer, 2017), exploring prospects and challenges of AI innovators’ participation in public debate and substantive reasoning. We specify ways for principled AI developer engagement based on deliberative ideals and discuss the capabilities of distributed venues and temporal instances of deliberation in approximating these deliberative ideals in light of particular epistemic challenges with AI.

Second, we add to the current discussion on AI ethics by going beyond the common focus on principles of explicability, transparency, and scrutability to address these principles as questions of *AI governance* and the role of AI developers therein. Specifically, we address the related ‘epistemic challenges’ in AI as a problem of locating AI developers’ and other actors’ expertise within deliberation. This allows to tackle current questions on how to enact principles for ethical AI and AI governance with particular sensitivity to related problems of public rationality and judgement. The debate on AI governance has specifically been criticized for lacking a discussion of ‘political visions and values’ for responsible AI (Cath et al., 2018). Our investigation may offer arguments that allow to gauge the eligibility of the ideals of deliberative democracy in making a ‘bid’ for entering this normative gap.

## From Data to Discourse: How Communicating Civic Data Can Provide a Participatory Structure for Sustainable Cities and Communities

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### Abstract

Civil society organizations (CSOs) in cities and communities have used available civic data by citizens and for citizens to tackle local pressing issues, e.g. on mobility issues. To make civic data actionable, however, civic data collection alone is not sufficient: data needs to be made actionable and communicated as part of new participatory structures. To this end, CSOs have also developed new narratives and models of public communication, creating broader ecosystems of collaboration around their data with various actors (Assad et al., 2017; Chen and Aitamurto, 2019; Foth and Brynskov, 2016; Raetzsch et al., 2019; Foth et al. 2011). Such ecosystems can ensure access, usability, and usefulness tailored to “a diverse and mobile urban population” (Foth et al., 2011, p.2) and foster socially inclusive sustainability transitions of cities and communities.

The purpose of this study is to revisit the role of communication for situating civic data in cities and communities in the context of a democratic participatory structure (SDG 11.3.2). By applying a mixed-methods approach, i.e. social network analysis and critical discourse analysis, this study explores how Civil Society Organizations (CSOs) have leveraged civic data to facilitate a democratic participatory structure for sustainability transitions around the case of bicycle counters in three US cities over a ten-year period (Seattle, San Francisco, Portland). We identified that CSOs have played crucial roles in public discourse by (1) sustaining long-term public issues through shaping affective as well as analytical discourses and (2) fostering citizens’ sense of ownership and contributions toward sensor devices and the data they generate by contextualizing them through local civic life as well as connecting issues to actors in other cities.

This study contributes to 11.3 and has a strong connection to the conference since we revisit the roles of communication by leveraging civic data and digital civic initiatives emerging in cities and communities.

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## **Sustainable development and producer-consumer communication in global food networks. A participatory video experiment with South Indian farmers and UK-based consumers**

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### **Abstract**

**Theoretical context:** The paper explores the role of communication in sustainable food production/consumption in the context of communication and information sharing between food producers and consumers across the globe. Communication is approached in a two-fold way. First, it concerns farmers' representation through marketing and educational material that is typically used by organizations such as Fairtrade to connect Southern producers and Northern consumers. Such material reproduces stereotypical images of Southern producers, silencing their voices and commodifying their livelihoods. Second, it concerns the role of farmers' representations for consumers' connection to and awareness about sustainable food production. The paper argues that in both cases, farmers' stereotypical representations can have implications for sustainable food production and consumption. Stereotypical images not only provide limited meaningful information to consumers, encouraging them to construct their role as benevolent saviours and perpetuating neo-colonial inequalities; they also undermine farmers' confidence and capacity of self-management since farmers are led to believe it is 'poverty' and 'victimhood' that keeps them in the fair trade market (Hassan, 2013; Dolan, 2008; Taylor, 2002; Varul, 2008). The paper advocates for more inclusive and dynamic producer-consumer communication solutions that bring the voices of Southern producers into marketing and educational material about food production.

**Method:** The paper employs a novel experiment that connects a South Indian farming community with a group of consumers in the UK through short videos created by the farmers. The data presented in this article was collected through focus groups with 76 farmers in India, a collaborative video-making project led by the farmers, and focus groups with 50 consumers in the UK.

**Findings:** The findings demonstrate that when farmers construct their representations on their own terms, they engage in reflexive and dialogic processes that increase their sense of empowerment and self-esteem. This is crucial for their sustainability, as they feel motivated to continue with their organic, traditional and natural farming methods, and to also educate their local community about the environmental benefits. From the side of the consumers, the visual images and information about production methods portrayed through the farmers' videos gave consumers access to valuable new knowledge about the material reality of food production across the globe, challenged consumers' perceptions of the 'distant' farmer and encouraged a shift from a consumer to a citizen mind-set.

### **SDG-targets**

2.3: agricultural productivity of small-scale food producers

2.4: resilient agricultural practices

10.2: social inclusion

10.6: representation/voice

12.8.1: global citizenship education and education for sustainable development

**Relevance to conference theme:** This paper brings into focus a less obvious aspect of sustainable development, which lies in the farmers' need to communicate with the world; and their sense of empowerment when their voices are heard. This need is becoming more pressing during the Covid-19 pandemic, when farmers in places like India become more isolated, due to the lockdown measures that have disrupted activities such as their self-help group meetings. Discovering innovative ways for farmers to stay 'connected' with the world and the community becomes an integral aspect of their efforts towards sustainable development.

## Times of crisis – times for innovative participatory communication for sustainable development

Dr Maria Touri<sup>1</sup>, Dr Fani Galatsopoulou<sup>2</sup>, Dr Clio Kenterelidou<sup>2</sup>, Dr Ioanna Kostarella<sup>2</sup>, Dr Epaminondas Christophilopoulos<sup>3</sup>

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### Abstract

**Introduction:** This paper studies the nexus between communication and sustainable development through the context of citizen's participation in environmental, social, and economic future policies and decision-making. It focuses on the region of Western Macedonia in Greece, a region in the transition from lignite to clean energy that has the highest unemployment rate in Greece. The financial, unemployment and pandemic crises have a strong negative impact on citizens' wellbeing and the region's sustainable development. The paper argues that sustainable futures require strengthening citizen's capacity to contribute to environmental, social, and economic policies through innovative participatory communication methods. We propose that participatory (future-oriented) workshops offer such an innovative tool, enabling citizens to engage in co-shaping the future of the region in a collective and creative way.

**Method:** We present findings from a pilot virtual participatory workshop, entitled 'The city of Kozani, 2040' that took place in December 2020. The workshop was organised by the UNESCO Chair on Futures Research FORTH/PRAXI Network, in collaboration with the Regional Development Agency of West Macedonia, Greece (ANKO SA/Enterprise Europe Network) and the School of Journalism & Mass Communications of the Aristotle University of Thessaloniki, Greece. Twenty-five members of the public and civil society participated in virtual collaborative, experiential actions and discussions about sustainable development and societal change in the future. Role games allowed the participants to imagine and project possible futures for their lives and their region and communicate their thoughts, expectations, and ideas for a common just future. Participants' comments and contributions during the workshop were shared and stored in the MIRO platform and analysed with an inductive, thematic content analysis.

**Findings:** The data revealed innovative ideas pertinent to issues of environmental, social, and economic sustainability that can be implemented by local networks and regional authorities. It also indicated participants' enthusiasm for being able to have an active role in the region's future and decision-making process. The paper highlights how new tools and communication methodologies can contribute to participatory communication for sustainable development by enabling citizens to develop skills for

future transformations, and to co-shape the societal partnerships for sustainable development and resilience.

### **SDG-targets**

11.a strengthening national and regional development planning

12.8.1 education for sustainable development

16.7 inclusive, participatory, and representative decision-making at all levels

17.17 public-private and civil society partnerships

### **Relevance to conference theme**

First, the paper highlights the need for citizen participation in environmental, social, and economic policies and for inclusive and bottom-up action and decision making. Public engagement and participation in decision-making becomes ever more pressing during times of environmental and health crises, especially when citizens disapprove of government handling. Second, by introducing an innovative method for enabling/facilitating remote collaboration between citizens and local authorities, the paper presents a solution to the current restrictions imposed by the pandemic, and a tool for future, more sustainable modes of working and sharing understanding.

## **Lobbying, Strategic Communication and Sustainability - Some Remarks for the 21s Century**

Lobbying, Strategic Communication and Sustainability - Some Remarks for the 21s Century João Simão

Faculdade de Ciências Humanas - Universidade Católica Portuguesa, Lisbon, Portugal. CECC - Research Centre for Communication and Culture, Lisbon, Portugal

### **Abstract**

It's intended, with this communication, to understand what is the relationship between Lobbying and the field of Public Relations and Strategic Communication. We defend and define the activity of Lobbying as persuasive communication in favor of a legitimate interest, which can allow more information on different decision making. And this is specially important in today's VUCA (volatility, uncertainty, complexity, and ambiguity) world. Organization's are understansing even more the importance of Sustainability and social responsible actions to face crisis and to better project their identity to several key stakeholders.

At the same time, when defining Strategic Communication as a communication directed towards a certain outcome that generate organizational and societal changes, it's also importante to understand that the lobbying activity must be seen and perceived as an area of intervention of communication professionals in this area. Different interests and perspectives on certain subjects lead to the need to establish understandings in favor of certain subjects, specially sustainability issues, and the activity appears as an important tool for organizations to defend their different interests and, also, make their voice known.

Thus, through a theoretical and bibliographical survey of the main authors in the field of Public Relations and Strategic Communication, we try to understand the different associations made between this area, the activity of Lobbying, and organizations activities and interests in Sustainability and CSR. Also, we try to understand why communication professionals must develop skills about communication for social change.

The results suggest that these three areas (Public Relations, Lobbying and Sustainability) can be an integral part of the core business of most communication professional. Being a legitimate practice in the service of organizations' communication, Lobbying (as well as Strategic Communication), has its own body of knowledge and specific professional skills and can be important for organizations defend their interests and actions.

## **Pandemic Stories: How COVID Life Changed Consumption Habits for Greater Sustainability**

Dr. Donnalyn Pompper

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### **Abstract**

#### **Introduction**

Undergirded by Postmodern Theory, this critical essay explores findings of interviews with U.S. citizens who described their lived experiences and changes in their consumption routines throughout the pandemic that forever may alter their purchase behaviors. Use of social media channels for information seeking heightened awareness of sustainable options useful for developing greater awareness about sustainable development. Findings reveal how some people made more strategic purchases given that working from home afforded greater flexibility to fully consider their own ecological footprint and that of their favorite brands.

#### **Method**

Formal in-depth interviews (N=25) have been conducted with U.S. citizens who volunteered to engage in a discussion about “how has pandemic life impacted your consumption practices?”

#### **Findings**

Patterns/themes emerged from in-depth interviews which shed light on U.S. citizens’ increased consciousness about environmental issues that is influencing amended consumption behaviors.

This essay will offer five important lessons for manufacturers as they map new messages for strategically communicating with stakeholders post-pandemic.

#### **Discussion**

As viewed through a postmodern values lens (e.g., Featherstone, 1991), findings suggest that manufacturers and service providers face new realities after pandemic life that must be considered to revise their sustainable development goals and amend traditional messaging with consumers. Change is a constant state (Lyotard, 1988, 1992, 1993) and because so many organizations acquiesced to stasis

pre-pandemic, the spread of COVID-19 was supported by silenced voices, crumbling infrastructures, and decay in decision making due to strongly held differences in opinion.

Findings explored in this essay offer key insights into revising sustainable development goals during the second decade of the century in the aftermath of the COVID-19 pandemic; a crisis for which the planet's policymakers had been entirely unprepared. Economic development must be conducted without the depletion of natural resources. Hence, as decried in the title of this conference, we must quicken our response to sustainability goals, revise them, and replace indecision with action.

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## Local or Global Climate Consequences - The Role of Communication on Sustainable Consumption Regarding Environmentally-Relevant Nutrition

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### Abstract

Animal-based food generates 24% of global greenhouse gases (Risku-Norja & Kurppa, 2009). Individual yearly meat usage is at 43.2 kg (FAO, 2019). For sustainable consumption at most 15 kg yearly is suggested (EAT-Lancet Report, 2019). Which role can the most used social media platform Instagram (Beisch, Koch, & Schäfer, 2019) play in informing about environmentally-relevant nutrition to contribute to sustainable consumption (SDG-12)?

One relevant communication strategy in other environmental communication contexts (e.g. Dahlstrom, 2012; Jones, 2014) are narratives, content presented as a story instead of facts (Green & Clark, 2013). Narratives can be effective due to mental immersion into the story (*transportation*; Green & Clark, 2013), which increases emotional processing (Green & Brock, 2000). As Instagram is mostly used in entertainment-based contexts (Beisch, Koch, & Schäfer, 2019), portraying the relevance of consumption choices via narratives might lead to better reader engagement than a portrayal as facts.

Another strategy to present information in media is *framing* (Entman, 1993), making specific aspects salient. As in other environmental communication, nearby instead of distant locations have triggered higher concern (Swim et al., 2009), framing local instead of distant climate consequences – *local framing* – seems to be relevant within environmental communication. Local Framing showed as effective in various communication contexts (e.g., Shih & Lin, 2017; Zhang, Ritchie, Mair, & Driml, 2019). Guilt (Nabi et al., 2019) and responsibility attribution can be triggered and contribute to sustainable behavior (Ferguson & Branscombe, 2010).

Consequently, for an Instagram post on reducing animal-based nutrition, narratives rather than factual portrayals combined with framing of spatially close versus distant consequences are expected to foster environmentally-conscious attitude and behavioral intentions.

A 2 (narration vs. facts) x 2 (spatially close vs. distant framing) between-subject online-experiment was conducted (144 participants: 56.3% female, 18-39 years,  $M = 22.89$ ;  $SD = 3.46$ ). As in Bilandzic and Sukalla (2019), climate consequences are narrated as a future scenario – here by an Instagram user reporting consequences of current animal-based nutrition from a future perspective – or presented by the user factually. Framing is spatially close (recipients' country) or distant.

Two-factorial ANOVAs showed no effects on attitude and behavioral intentions ( $ps > .05$ ) (Appendix A). Mediation analyses showed significant effects of narratives via transportation on attitude (a) and behavioral intentions (b) (Appendix B). No significant mediation effects were found for local framing via guilt or responsibility on attitude or behavioral intentions.

Results show narratives as stimulating mental immersion, but narration and local framing as overall not persuasive. Effects might be inhibited on Instagram, as authenticity and similarity, relevant for parasocial interaction, might be impeded by the future perspective, and a younger Instagram-sample might experience lower location-connectedness. Parasocial interaction processes should therefore be incorporated more strongly into Instagram narratives and the audience's location-connectedness analyzed further.

Contributing to fostering sustainable consumption (SDG-12) via informing the public to consider this information in their consumption choices could help effectively reduce emissions and global warming, as demonstrated in the introduction. The role of communication for target 12.1, 12.2 and 12.3 should therefore be further analyzed.

## Communication professionals as social change agents in times of uncertainty

Ph.D. Renata Matkevičienė, Ph.D. student Lina Jakučionienė

Vilnius University, Faculty of Communication, Vilnius, Lithuania



**Ph.D. Renata Matkevičienė**



**Ph.D. student Lina Jakučionienė**

### Abstract

The role of PR/communication in times of uncertainty due to the pandemic situation is significant: communicators inform, bring facts, facilitate dialogue, and create shared meaning that enable organizations, and individuals, communities to respond to the crisis and move forward in a balanced and sustainable way (Zerfass et al, 2020), but there is not much research to identify the activities of

PR/communication professionals as agents of social change in an organization, community, or society during crisis.

Many of today's organizational leaders are more connected to the publics beyond customers, employees, and stockholders in ways they were not in years past (Brunner, Smallwood, 2019; Gelles, 2017), and society in a broader sense, forcing attention to the changing narrative created by the PR/communication specialists. Increasing role and responsibility of PR/communication to resituate public interest as a central tenet in public relations (Brunner, Smallwood, 2019) stress the aim to respond to the public interest and the needs of the society more actively pushing forward communication and actions about the social responsibility and sustainability. Public interest as a requirement from society is a strategic asset of communication to strengthen strategic partnership between organizations and stakeholders, society, as Taylor et al (2019) state, „what makes dialogue unique is its capacity to serve both organizational and public interests“.

**Research questions.** How do PR/communication professionals see and assess their role in social change? Do PR/communication specialists seek to create positive social changes not only in the organization, but also in the business environment, in the community and in society in general? It is assumed that the top PR /communication managers in the organizations act as social change agents earning trust and reputation and fostering goodwill for the organization and community they operate in and society in general (Brunner, Smallwood, 2019).

**Methods.** Qualitative in-depth interviews were chosen to collect of experts' opinions, but also to identify challenges faced or which might be faced by PR/communication professionals in the near future to achieve the strategic goals of an organization by searching for solutions of public interest.

**Key results.** We believe our results will show that the top PR/communication professionals are those who help organizations and their leaders to realize the innovative ideas, take themselves the lead in tackling current sustainable development issues and thus create social change on behalf of an organization.

The study reinforces the statement that PR/communication professionals are those who not only prepare and communicate the role of an organization as an agent of social change, but in times of radical disruption and uncertainty are becoming themselves as social change agents. In relation to SDGs the study will cover SDG9 “Industry, innovation and infrastructure” (impact of digitisation to professional, and how it shapes the profession especially in developing societies) and SDG17 “Partnerships for the goals / strategic partnerships” (through the main goal of PR/communication – sustainable mutual understanding and collaboration with various stakeholders – PR /communication professionals can be seen as the key drivers for communication and actions for social change).

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## Plastics in the World Ocean: How numerical model-based communication can help address the global problem of marine litter

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### Abstract

Numerical models that depict complex scientific phenomena can capture people's interest and provide them with foundational knowledge in ways that raw data or narratives alone cannot. They allow us to visualize robust datasets that otherwise would be unwieldy or incomprehensible to many audiences. Narratives (audio-visual and written) can also explicate impenetrable data. Further, narratives joined with numerical models can expand their capacity to translate scientific and/or societal material for lay audiences, potentially increasing perceived salience and intent to act on the information.

A World Ocean model of marine litter, developed by a research team at the Center for Ocean-Atmospheric Prediction Studies (COAPS; Chassignet et al., 2021), provides actionable information in support of four resolutions passed by the U.N. Environment Assembly that address the marine litter initiatives. SDG 14.1 also recognizes marine litter as an emerging threat to global environmental health and SDG 4.7 seeks to ensure that the knowledge and skills needed to promote sustainable development through "(i) global citizenship education and (ii) education for sustainable development." Thus, the proposed presentation aligns well with the SDGs and the conference topic.

The Global Model for Monitoring Marine Litter (<http://marinelitter.coaps.fsu.edu/>) simulates the motions of debris in the oceans and test marine litter scenarios. The model specifically looks at the origins and fate of mismanaged plastic waste. It shows the flow of marine litter from one country to another or its concentration at sea (e.g., the Great Pacific Garbage Patch). As communication liaison for the project, I have explored ways to complement the model with audio-visual and text narratives that expand its appeal beyond scientific audiences. Recently, our team was approached by NOAA's Marine Debris Program to incorporate the model into Science on the Sphere ([https://sos.noaa.gov/What\\_is\\_SOS/](https://sos.noaa.gov/What_is_SOS/)), a projection system that presents high-resolution video on a three-dimensional globe. This led to a coordinated effort between NOAA, COAPS, and a digital communication team. Once completed, I will investigate the efficacy of three communication approaches (1) the model alone, 2) the model integrated into Science on the Sphere, and 3) the Science on the Sphere integration as the basis of a 3-5 minute 1-D video presentation. In order to expand the utility of scientific model-based communication, this study seeks to identify the ways in which inclusion of audio-visual and text narratives influence the impact of a numerical model approach on viewers' perceived salience and intention to act on information.

In my presentation, I will discuss how numerical models, such as COAPS's marine litter model, not only allow scientists to investigate some of our most pressing sustainability issues, but also to efficaciously share their findings with decision makers and the public. I will demonstrate how well developed narratives in conjunction with these models can help them resonate with non-scientific audiences and support transformational change at the individual, community, or societal level.

Chassignet, E. P., Xu, X., & Zavala-Romero, O. (2021). Tracking marine litter with a global ocean model: Where does it go? Where does it come from? Manuscript submitted for publication.

## Sustainable development in the media: a literature review

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### Abstract

Sustainability and sustainable development are increasingly common concepts in the public and political spheres, but their vagueness is still a big obstacle for its understanding by the general public. But vagueness of meaning cannot be confused with vacancy, in reality the SD is a concept with a strong political charge. There are different visions of SD, from maintaining the status quo to reform or transformation. The press has a fundamental role in defining these terms, making them accessible to the lay audience and setting up the political agenda. Understanding how SD is being reported, the dominant narrative and which ideological vision it is based on may help to predict the evolution of policies for sustainability in a given area and also to identify the weak points of current communication.

The written press gains special importance in this analysis, as it is a more in-depth form of journalism and has a great influence on the media and political agenda. The press is not only a mirror of the public debate, but actively contributes to filtering what is and is not discussed and how, simplifying complex scientific concepts for the general public. It also serves as a politics and policies evaluator.

A growing number of scientific articles have been focusing on how the media treats SD, using data mining to select suitable content. This literature might become the base of a future sustainability communication framework.

Our paper aims to find the most relevant articles published so far, and identify their main results and conclusions. This should enable us to recognize common patterns across certain geographical regions (e.g. industrialized versus developing countries or Europe versus North America), ideological lines (left versus right leaning titles) or type of newspaper (tabloid versus broadsheet) and how this coverage has been evolving along time.

This research relates especially with SDG 16, as journalism is an essential tool to hold institutions accountable, and specifically with the target 16.10 of ensuring public access to information. The current sanitary crisis only made SDGs more urgent and the press can have a crucial role in accelerating the needed progress.

Keywords: sustainability, sustainable development, press, information

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## Collaborating on crisis communication to manage the COVID-19 crisis

Professor Catrin Johansson, Assistant professor Kristina Jämtelid

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### Abstract

Large scale societal crises, like the COVID-19 crisis which is classified as a global pandemic, demand collaboration among organizations in order to manage the crisis. A community's ability to recover from such a crisis and enhance resilience depends on organizations coordinating their crisis communication and collaborate on establishing adaptive capacity through activity coordination (Jahn & Johansson, 2018). The scale of emergency and technology development influence what new approaches to developing community resilience are implemented. Also, the division of responsibility among involved organizations may hamper activity coordination. This study focuses on the activity coordination of crisis communication in Sweden during the first months of the COVID-19 crisis in spring 2020. A large number of telephone conferences with organizations coordinating their crisis communication are analyzed together with selected interviews of organizational representatives from public health organizations, national crisis management organizations, regional and local organizations. The results illustrate the challenges these crisis managers face when coordinating their crisis communication and the success factors of effective crisis communication coordination. The study contributes to enhance our knowledge on crisis communication coordination as a means of crisis management in order to establish resilient and sustainable communities.

## Crisis Communication Leadership for sustainable organizing

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### Abstract

Crisis communication is important to manage crises and enhance resilience in order to organize for and achieve sustainable communities. In public health emergency responses, communication skills were an important attribute for crisis leadership together with the ability to inspire trust, coordinate diverse participants across different disciplines, decisiveness with flexibility, situational awareness and competence in public health science (Deitchman, 2013). Leaders are responsible for and expected to minimize the impact of crises, enhance crisis management capacity, and coordinate crisis management efforts. In essence, crisis leadership is a communicative process, in which leadership actors communicate to fulfill a common goal (Johansson, 2017). However, existing crisis communication research more often focuses on organizational leaders' communicative management of the organization's reputation (e.g., Coombs, 2016; Littlefield & Quenette, 2007; Ngai & Falkheimer, 2017; Waymer & Heath, 2007). Hence, the research record predominantly reduces crisis leadership to managing organizations' images, with the notable exception of discourse of renewal research, which focus on establishing resilience post crisis (Seeger, et al., 2005; Ulmer, et al., 2007). As Wouter, Dücker, and van der Velden (2016) noted, "much remains to be clarified in terms of how actual leadership tasks are undertaken and balanced by way of crisis management" (p. 56). This study answers that call and focus on the process of communicative crisis management by leaders. The study develops a new framework for effective crisis communication leadership based on an explorative study including 40 interviews with Swedish and U.S. government officials, addressing: (1) How crisis leaders communicatively create resources, organize and prepare for crisis management, (2) How crisis leaders develop communicative strategies for crisis management with internal and external stakeholders, (3) How crisis leaders communicatively enable inter-organizational collaboration in order to organize for sustainable communities.

# **9. Governance, Power and Institutions and Weakness of SDGs**

## **9a. Peace and sustainable development**

## Challenges of Achieving Access and Benefit Sharing through a Private Collaboration or Access and Benefit Sharing Laws

Dr Rohaida Nordin<sup>1</sup>, Prof, Dr Zinatul Ashiqin Zainol<sup>1</sup>, Dr Muhamad Sayuti Hassan<sup>1</sup>, Dr Izawati Wook<sup>2</sup>

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### Abstract

Access and benefit-sharing (ABS) mechanism, a concept under the Convention on Biological Diversity (CBD), if appropriately applied, would create a win-win situation for both the user and provider of biological resources. In reality, this goal is not easy to achieve without a strong domestic legal framework to regulate any ABS initiatives. Using a 1988 case study on the Calanolide discovery in Sarawak, this article evaluates the success in attaining a fair and equitable benefit-sharing arrangement and the protection of indigenous rights as defined in the CBD, via a private collaboration agreement. The case study demonstrates that a private collaboration agreement is not a suitable mechanism in achieving the ABS goal for developing states like Malaysia. This article further argues that comprehensive ABS law such as the Malaysian Access to Biological Resources and Benefit-Sharing Act 2017 may provide a better mechanism for attaining a fair and equitable benefit-sharing arrangement. And examine if the protection of indigenous rights is compatible with the CBD standards and there is a strong implementation mechanism. The findings of this paper should motivate developing States to formulate a comprehensive ABS law to regulate access to their genetic resources and ensure benefit-sharing and adopt effective implementation of such law. Through effective implementation of an ABS law, States' conflicting interests could be reconciled to achieve sustainable development at the international level. Additionally, State will guarantee the protection of rights, dignity, and capabilities of the indigenous peoples or tribes involved through relevant domestic institutions. Arguably, attaining a fair and equitable benefit sharing and protection of indigenous rights will facilitate the attainment of SDG goal 16 in promoting just, peaceful and inclusive societies. Discussion in this paper establishes the relationship between sustainable development and peace, including security and reconciliation, particularly SDG 16, which promotes peaceful and just societies and builds effective and accountable institutions. Finally, the findings and recommendations of this paper will assist developing states like Malaysia, in making accelerating progress towards sustainable development goals.

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## **The Nigerian Political Elites and Covid-19 Pandemic's Management Deficits: Implications for Nigeria's Sustainable Development Goals**

Olawale Akinrinde

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### **Abstract**

The impact of the novel covid-19, otherwise known as the corona-virus on the entire spectrum of Nigeria's national life, as elsewhere, remains yet indelibly unquantifiable at present. No thanks to the Elite culpability in the management of the corona-virus epidemic that has now rendered the entire Nigeria's national life halted and, on the brinks of spontaneous discontinuity. Conceptualized in this study to mean negligence of duty, this study unpacks how the Nigerian political Elites and leadership's inefficiency has contributed inversely to the eventual outbreak, sporadic rise and the negative consequences of Covid-19 on the entire populations' Nigeria's economic and sustainable development goals. Drawing from David Hume's theory of causation, this study discovers that leadership and Nigerian political elites' failure in the management of the Covid-19 pandemic, before and during its eventual outbreak and manifestation in Nigeria triggered the incident Covid-19 case in Nigeria, and its manifold effects on Nigeria's prospects for the actualization of her economic and sustainable development pursuits.

## **Harnessing Big Data in Health Sector: A Dichotomy between Sustainable Development Goals and Preserving Rights of Privacy?**

Professor Nazura Abdul Manap, Associate Professor Mohamad Rizal Abd Rahman, PhD Candidate Siti Nur Farah Atiqah Salleh

National University of Malaysia, Selangor, Malaysia

### **Abstract**

This article draws upon a legal concern towards the rights of privacy of health data in Big Data applications and its dichotomy. The Sustainable Development Goals (SDGs) generally aim to strengthen universal peace and humanity. This stands under one of the pillars of sustainable development; the social pillars. The dependency on big data technology and health data is proven to be extremely important to achieve sustainable development by the year 2030. Big data technology has so many potentials for organisations or institutions to develop the health economic sectors i.e to enhance data sharing among institutions, improve the decision-making process, and others. Nevertheless, the application of this technology had raised the issue of privacy of health data. The privacy of an individual or patients is of utmost importance. In this article, we instill the idea by suggesting for privacy rights of health data within big data application to be included within the framework of universal peace and humanity and to propose a jurisprudential understanding to harmonise the dichotomy between SDG and privacy rights of health data and Big Data. The methodology applied in this study is a legal analysis of selected works of literature and jurisprudence analysis by analysing the General Data Protection Regulation 2018 of European Union a model with a comprehensive data protection law system This article found that the limited interpretation of this issue could be expanded specifically through Goal 9 and Goal 16 of the SDGs. This paper also proves that it does not amount to dichotomy and merely inconsistency that should be harmonised.

**Keywords;** Sustainable Development, SDG, Health Data Privacy, Big Data.

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## **Hope: a necessary condition for reintegration and reconciliation of ex-combatants in Colombia. How a positive view of the future life adds to sustainable peace.**

Dr Eduardo Wills

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### **Abstract**

The SDG movement has stated its Objective 16 as the promotion of just, peaceful and inclusive societies. Conflict, weak institutions and limited access to justice constitute one of the most important threats to the idea of sustainable development. Without peace, protection of human rights, and governance systems based on the rule of law, it will not be possible to achieve sustainable development. This is particularly true for countries and societies that have suffered from prolonged periods of social and armed conflict as in the case of Colombia. After an armed conflict that have lasted more than sixty years, and that have involved large parts of the population and regions in the country a peace agreement was finally negotiated between the Colombian government and the guerrilla group of FARC. The peace agreement includes initiatives to implement an integral rural reform, to combat illicit crops in conflicted regions, to assure political participation to the demobilized guerrilla group and excluded sectors, to compensate victims through a truth, reconciliation, reparation and transitional justice system. One of the most controversial issue discussed so far is how to demobilize ex-combatants and how to solve the grievances that exist among groups in society. ¿How the demobilized ex-combatants face their futures life's and which are their expectations for a better life once they are reincorporated. It is a critical issue to be considered. In this article we discuss the importance of hope as a crucial variable for a successful reincorporation of ex-combatants. Hope seems to be an existential need in every life situation (Bloch 1959) particularly in extreme crisis. Hope is a prerequisite to live in dignity and to experience a fulfilling life (Beck et al. 1990).

Hope is principally based in human agency and connected to people's individual goals, motivation and cognitive capabilities (Snyder 1994).

I discuss in this article a reliable measure that was developed to measure hope, Then, I present how hope can be related to the idea of sustainability and present the results of a survey applied to a group of ex-combatants. Those results are compared with ordinary citizens. Finally, I develop a discussion of how hope is an essential variable to be considered for a successful reincorporation process that can sustain peace and add to sustainable development.

# **9. Governance, Power and Institutions and Weakness of SDGs**

**9b. Collaboration and co-creation for sustainability,  
SDG initiatives and scale of governance**

## THE WORLD IN THE POST-PANDEMIC: THE NEED FOR GOVERNANCE FOR SUSTAINABILITY

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### Abstract

Sustainable development permeates the intellectual production and the political agenda of the contemporary world, combining a balance point between economic growth, social equality and environmental protection, and should guide public and private conduct in order to create a network of partnerships in favor of quality of the environment. Hence, the importance of creating new solutions through governance with expanded participation. In this context, the Millennium Development Goal 8, of 21 Agenda, and Sustainable Development Goal 17, of 2030 Agenda, both from the United Nations, are extremely relevant in order to implement a sustainability support network, taking into account that it is necessary to reframe the SDGs to face the challenges of a complex, plural and post-pandemic Risk Society, that is, it is essential to rethink how to face the global challenges for the achievement of Human Rights with the pandemic of COVID-19, which led to a public, economic and social health crisis, which imposes the necessity of a joint effort, with the adoption of multidisciplinary measures provided by governance to create a more resilient, sustainable and inclusive future, with respect for the human rights of the future generations. Thus, it is necessary to resize the principle of intergenerational solidarity, in order to restructure the SDGs of 2030 Agenda for a post-pandemic world.

In this line of reasoning, this article aims to address (through a dialectic-deductive method, done through a critical analysis of the bibliographic reference on the subject), sustainable development from the point of view of its mandatory implementation. Then, it analyzes MDG 8 and SDG 17 to demonstrate the need for partnerships for sustainability through cooperation mechanisms carried out by governance among all stakeholders, according to actors and subjects of International Law, as well as indicating examples of such systematic applied in Brazil, such as: a) partnerships of companies for health: from the distribution of basic food baskets to the concession of alcohol to enable thousands of sanitizers; b) around technology and health: with the creation of applications to guarantee the safety and health of people when returning from bars and restaurants; the "Day After Project" which promotes conversations related to mental and emotional health as well as the relationship with alcohol during the pandemic; or, still, projects related to urban waste (such as the "Voluntary Delivery Point", which is concerned with the global goal of collecting more plastic, processing the waste with the acquisition and use of recycled resin, or, "Give the Hand to the Future", focused on personal hygiene and cleaning); c) training: of the national industry to reduce environmental impacts and maximize social values, focusing on the product life cycle, among other projects.

Finally, this article indicates that cooperation is essential in the world pandemic scenario, for the creation of strong, effective and resilient institutions (according to SDG 16) with the objective of facing the current health crisis, with a view to enabling sustainability in a post-pandemic crisis context for future generations.

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## Governance factors and their inter-relationships to promote sustainability in organisations

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### Abstract

Organisations have recognised that they need to become more sustainable and better address global challenges. A key element for this, and to implementing sustainability into organisations, is governance. Most of the research on governance for sustainability has been on corporations, with limited research on civil society and public sector organisations (PSOs). Seven governance factors were identified (vision and mission, policies, reporting, communication, the board of directors, sustainability department, and person in charge); however, their importance and interrelations are still under-researched. In this study, empirical data was collected from 5,299 organizations (including corporations, civil society, and PSOs) from which 305 responses were received. These were analysed by using descriptive statistics, rankings, comparison between organisation types, correlations, and centrality.

The results provide insights into the ranking of the seven factors, where vision and mission, person in charge, and reporting were the highest ones ranked. The results show a more complete picture of the interrelations of the governance factors, which are complemented by the centrality analysis. The comparison between organisation types shows statistical differences in five of the seven factors. The analysis shows that the whole, organisations, behaves different than its parts, the organisations types, where communication plays a key role in implementing sustainability. This research highlights the importance of recognising the governance factors that have the highest importance and influence for each type of organisation, in order to encourage them and make the structures of organisations more sustainable. Each factor and its relation to other factors can contribute to better governance for sustainability, and better governance can contribute to a more holistic implementation of sustainability in organisations and enhances all sustainable development goals (SDGs), directly or indirectly.

This study contributes to achieving SDG 16, Target 16.5 (Substantially reduce corruption and bribery in all their forms); Target 16.6 (Develop effective, accountable, and transparent institutions at all levels); Target 16.7 (Ensure responsive, inclusive, participatory, and representative decision-making at all levels); and Target 16.8 (Broaden and strengthen the participation of developing countries in the institutions of global governance; Promote and enforce non-discriminatory laws and policies for sustainable development).

A better understanding of governance factors and how they interrelate to each other can provide organisations with better structures to accelerate their progress in contributing to the SDGs.



## Addressing Partnerships for the SDGs Goals Through "BEKAL Pemimpin" Nurturing Emerging Environmental Leaders of Indonesia.

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**Dr rer nat Rina Mardiana**

### Abstract

This paper will show the first initiative to nurturing Indonesia's emerging environmental leaders towards equitable, sustainable, and locally rooted natural resource management. The program is so-called BEKAL Pemimpin that BEKAL is an acronym from Bersama Kelola Alam Adil Lestari, meaning managing natural resources together with justice and sustainability. Besides Pemimpin meaning is leadership. In the 2019's first cohort of BEKAL Pemimpin participants, it is carefully curated to assemble a "microcosm" that replicates Indonesia's natural resource management complexity. Therefore, the 58 participants who comprise the first cohort represent 19 provinces and the various sectors with direct influence on Indonesia's natural capital. They work in equally diverse fields such as terrestrial, maritime, coastal, and cross-cutting issues. This microcosm then becomes a holistic training ground where participants hone their leadership capacity to address complexity through their interactions with one another —in a controlled environment and equipped with various tools to transform together. This microcosm also provides a rich source of learning, giving participants access to the many perspectives, paradigms, and practices that shape Indonesia's natural resource management's complexity. Afterward, in the last three months of their learning journey, the participants were invited to exercise and actualize these leadership capacities to address natural resources management's real challenges. Hence nine prototypes are borne out of the genuine intention of BEKAL Pemimpin to transform their realities, supported by their peer as consultants and coaches, who convene out of their authentic callings. These prototypes are the next training ground for the participants. Those prototypes then become a new

laboratory to generate solutions and other actors in the system, transcending sectoral and institutional boundaries. BEKAL Pemimpin initiative will accelerate the progress towards the 17 Partnerships Goal of SDGs, particularly in crisis times. Furthermore, this Indonesia experience for nurturing an agile and adaptive environmental leadership in the context of VUCA (volatile, uncertain, complex, and ambiguous) shows to what extent the exercise of U-Theory and transdisciplinary multi-stakeholders co-creation worked. The result of the first year of BEKAL Pemimpin saw the journey of BEKAL Pemimpin as a seed for systemic transformation is just starting, and the capacity building seed will not flourish if not supported by good stewardship and good soil and/or climate. Therefore, the 2019 pioneers replicate the transformation and multi-faceted approach in the coming years for much larger systemic ecosystem leadership.

Keywords: sustainability, transdisciplinary, natural resources governance, co-creation, leadership

## Parcel delivery by shared economy in trust

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### Abstract

The spread of the sharing economy initiative in recent years has had a significant impact on various industries, including logistics. Creative solutions have been developed to share resources for individual cost reductions, supported primarily by platforms developed by start-up companies. Platform-driven resource sharing has resulted in unprecedented collaborations between ordinary people (e.g., car sharing). Various companies have teamed up to ensure that the bicycles, scooters and electric cars are used as much as possible in the cities. The opportunities inherent in the concept of the sharing economy are still untapped and in addition to private people, there are also opportunities for companies and institutions. Parcel delivery, i.e., last mile delivery, is one of the best researched areas of the logistics profession as companies want to operate as cost-effectively as possible in the face of increasing competition. Environmental regulations, increased traffic and parking problems are causing additional problems for last mile providers. In the field of parcel delivery, various solutions have been developed as an alternative to delivering parcels to the customer. Large number of consumers requesting home delivery; therefore, service providers have an interest in developing different solution. In such situation, the last mile delivery providers have been forced to cooperate. The concept of cooperation is not unknown in the logistics industry, although it is more typical of classical transportation. Cooperation between last mile delivery providers, while not unprecedented, is not typical. The forced closures caused by the Covid-19 pandemic in 2020 have further increased the already strong upward trend in e-commerce, placing an increasing burden on parcel deliveries, along with the environment, traffic and the quality of life of ordinary people. Sharing resources in order to reduce environmental and traffic burdens, and last but not least to increase efficiency, almost requires cooperation between horizontal service providers.

The lack of collaboration is thought-provoking and certainly encourages researchers to map the underlying causes. The lack of cooperation between last mile delivery providers can be due to a number of reasons, such as inflexibility, fear for cultural reasons, mistrust, and the need to perpetuate competition. Cooperation is definitely based on trust. This article primarily examines the question of what is the reason of not collaborating each other and seeks the answer to the question of what influences the willingness to cooperate; if trust really plays a role. Furthermore, this article studies the creation of a digital platform that will help last mile providers to collaborate and to have more flexible capacity planning, faster service to the customers and reduce cost. To build the platform, the conditions should be known under which service providers would be willing to cooperate, which also requires an understanding of their current motivation and their trust level, especially in a digital environment.

## Platform-based business model for sustainable last mile delivery

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### Abstract

#### Background

The sharing economy has been a research topic for decades, which has come to the fore in the context of the 2020 COVID-19 epidemic. The growth of e-commerce over the years has intensified even more in 2020. With the growth of e-commerce, parcel delivery related to freight transport have also increased. Increased parcel delivery imposes additional freight traffic on the roads, generates even more traffic and at the same time further pollutes the environment. The logistics industry in the field of parcel delivery is characterized by alternative solutions rather than collaborations. Collaboration is a well-known concept in the supply chain, but for some reason it only happens in negligible cases in parcel delivery. The increased volume of packages and the changed expectations of customers are forcing the parties involved in parcel delivery to cooperate. In the spirit of the sharing economy, horizontal collaboration is gaining new meaning. Platform-based collaboration is effective among the public, therefore the platform could enable logistics providers to perform transportation tasks more efficiently. In the interests of sustainability, they must not only take into account cost reductions, but also participate in the implementation of environmental regulations. For package transport providers, reducing environmental challenges means reducing the number of vehicles, the mileage, achieve better capacity utilization, etc. In recent decades, several alternatives have been tried, in some cases even collaboration. The situation during the 2020 epidemic has highlighted that business models to date need to be rethought and ones that focus on optimization first and foremost. This article presents a new model of platform-based horizontal collaboration through a comprehensive literature review and argues that collaboration is essential for the future of parcel delivery.

#### Implications

The parcel industry is facing serious challenges, exacerbated by the 2020 Covid-19 epidemic through increased e-commerce. The parcel industry is characterized by the fact that, in addition to the industry and the customer, it has an impact on ordinary people, traffic trends, pollution and urban management. In the interests of sustainability, it must take into account all the actors involved, in addition to its own cost-cutting interests. Despite its challenges, the industry has not been creating collaborative business models for decades. This article showed that under certain conditions (trust, competition, etc.), service providers are able to cooperate. Collaboration is platform-based and supports collaboration between actors who are competitors to each other in a given segment. The cooperation not only meets the efficiency expectations of the service providers, but also represents a higher level of interests. As a result of the platform-based cooperation, the number of vans in the downtown areas will be decreased, which will also reduce the level of pollution and at the same time improve the living conditions of the local population.

Comment 1: SDG 9 and SDG 11

Comment 2 - As a PhD student, my research topic is developing a sustainable business model for parcel delivery providers. The current operating model is unsustainable for every stakeholder.

Comment 3: Microsoft Power Point presentation will be provided

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## **On the way to new forms of governance for environmental planning and protection? Administrative decentralisation in Portuguese coastal municipalities.**

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Center for Environmental and sustainability research - CENSE, Lisbon, Portugal



**Mrs. Lina Arroyave**

### **Abstract**

Appropriated forms of governance are crucial for transformative change. In governance studies, transferring competences from central to local government is called Administrative Decentralisation (AD). AD is highly recommended for increasing autonomy and it offers new ways for achieving equity. AD affects all spheres in human and non-human agency and its implementation requires consensus between central and local government.

As transformations to sustainable development entail profound structural changes and reforms of institutions, implementing AD could also address climate crisis and earth-system transformation by catalyzing climate neutrality, equitable use of biodiversity and population development, through collaboration, co-creation of sustainability visions and transformation policies. Consequently, AD can contribute to the achievement of the SDG's through integration of transformation policies within local strategies (SDG13), protection of ecosystems and biodiversity in oceans and on land (SDG14 and SDG15), increased access to drinking water (SDG6) and transition to sustainable urbanization following demographic trends (SDG11).

This study aims to analyze to what extent the process of AD influences key issues in earth-system transformation from local government and expert's perspective.

Portugal was selected as a case study since it is a centralized State; it began its decentralisation process in 1976, being enacted in 2018/2019 and partially postponed to 2022. Portugal has two layers of subnational government on its mainland (municipalities, parishes) elected by universal suffrage. Portuguese political and economic power is found on the mainland, specifically on municipalities geographically-located on the coastline, where most of its population is concentrated.

Municipalities were the unit of study selected; each one has a different capacity for implementing the competences transferred from central level; however, the competences are being transferred with no regards to municipality capacity and to the asymmetries within Portuguese mainland territory.

This analysis is the first qualitative approach and an introductory section into a wider innovative study relating AD and earth-system transformation. It is organized in two phases: *i*) interviews with experts in environmental management, governance, social geography, and in urban planning for proposing a list of competences and functions; *ii*) voluntary online-surveys to municipalities geographically-located on the coastline for understanding their perspective about AD and earth-system transformation.

This analysis allows to understand the different perspectives each municipality has about competences and functions to be transferred, and its own identification of the main earth-system transformation on their territory, which vary from each other: heatwaves, floods, livestock affluents, recycle of raw materials, access to drinking water, mismatch between biodiversity conservation and urban planning, pollution accumulation, among others. Overall, it is necessary to recognize AD as a factor in socio-ecological systems facing earth-system transformations, as it allows to anticipate which competences, related to environmental planning and protection, should and could be transferred to each municipality.

Since AD is a complex process, each municipality must be strengthened through combined approaches. Each municipality has closer links to people and detailed knowledge about their territory. Therefore, scientific evidence and advice must support municipalities for rethinking new and objective transformative changes, co-creating sustainable plans and advancing innovative competences to be transferred towards transformative governance.

## Investigating Indian Parliamentary Questions and Answers on SDGs

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### Abstract

Sustainable development, insurance for our future generations, to survive and thrive, has come to the center-stage for governments around the globe as exemplified by the adoption of the SDGs in 2016. The biggest challenge in achieving sustainability is inherently a political one, especially in transitioning and developing economies. In India, the world's largest democratic nation, the government has played a leading role in the country's multi-dimensional development in social, economic, and environmental aspects through various programs, missions, schemes, and legislation.

Building sustainable ecosystems, political commitments, and parliamentary actions shall determine the success rates of accomplishing such a humongous task of achieving these goals in their true spirit. However, due to SDGs' relatively recent inception, hardly any academic work has been undertaken to study the political (parliamentary in particular) discourse surrounding SDGs. In this context, the paper looks at the Sustainable Development Goals (SDGs) related questions raised by peoples' representatives in the Parliament and the responses received thereof.

This study provides a benchmark for political discourse analysis towards key-issues using parliamentary discussions. We find that the concerned parliamentary discussions in Q&A sessions have evolved from its nascent stage. However, we find significant skewness in participating gender, aspects of SDGs discussed, and discussions targeted only towards a few particular goals. Moreover, it identifies opportunities for parliamentarians to fill the gaps in political discussions towards SDGs. Thus, India has a long way to bring rapid and robust efforts to fulfill the SDG Goals by 2030.

**Keywords:** Sustainable Development Goals (SDGs), Discourse analysis, *Lok Sabha* (Lower House), *Rajya Sabha* (Upper House), Indian Parliament.

## Co-creation process for indicator-based sustainability assessment of river basin regions

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**Dr. André Batalhão**



**Dr. Mahsa Mapar**



**Dr. Tomás B. Ramos**



**Dr. Denilson Teixeira**

### **Abstract**

Sustainability assessment tools are currently influencing sustainability strategies and activities across the world to improve evidence-based decision making in different sectors. Using indicator-based assessment methods as compared to other assessment approaches seek to achieve the integration of all sustainability issues by consolidating the goals of sustainability-related policies as a powerful decision-making tool as well as evaluate and manage the actual status of sustainability. By providing open access data on social, environmental, economic, and institutional dimensions, Sustainability Indicators (SIs) aim to build the knowledge and capacity of regions to improve the level of actions towards sustainability. However, there is still a lack of research on assessing the sustainability level of river basin regions in Latin America. Also, current SIs used for the river basin region rarely develop based on the co-creation process by involving different groups of internal and external stakeholders including policy makers, citizens, and NGOs and so, the existing indicators have low effectiveness while assessing the practices and performance towards sustainability. In this sense, co-creation was explored to help in the

collaborative development of new values related to sustainability together with stakeholders and experts, as a form of collaborative innovation. This paper aims to develop a set of SIs for the river basin region by using a co-creation process Sustainable Development Goals (SDG) into practice and foster the path of their operationalization for the stakeholders and other experts in this field. A large river basin region of Brazil was used as a case study. The SDG conceptual framework offered the possibility of a more balanced and integrated approach to monitoring regional sustainability. In the same measure, additional research is needed to understand how to adapt the indicators to SDGs targets, considering the specific contexts of a river basin area. Then for each selected indicator, the relevancy was evaluated through applying the BellagioSTAMP approach including its principles. The findings demonstrated that the implementation and effectiveness of this proposal at regional levels are limited and filled with challenges. Also, the social indicators were the most selected to the final list (from SDG 1, 2, 3, 4, 5, 7, 11, and 16). This demonstrates the predominant concerns of the 2030 Agenda, which is social justice as the greatest global challenge, and an essential requirement for the actualization of the sustainable development implementation. This paper provides an overview of the issues surrounding the SIs selecting-process, as well as the constraints on stakeholder engagement as some of the main challenges faced. A sustainability assessment structure should depend on integrated conclusions from, identifying gaps and priority policies for regional sustainability. The transferability potential of the proposed co-created SIs is high and it will be also applicable to Basin committees, public environment organizations/ ministries/ agencies, and governments as well as not only at the regional level but also at the local or national levels to increase the effectiveness of sustainability initiatives through a participatory process, hence contributing to continuous progress towards SDG 17, particularly target 17.17.

## The COVID-19 Pandemic not only Puts Challenges but also Opens Opportunities for Sustainable Transformation

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### Abstract

The COVID-19 pandemic has affected humankind worldwide, slowing down and even reversing the progress made in achieving Sustainable Development Goals (SDGs). It has negatively impacted most SDGs but with positive impacts on a few. We discuss some initial impacts observed and explores potential impacts on the achievement of SDGs for Nepal. The study followed a knowledge co-creation process with experts from various professional backgrounds, involving five steps: online survey, online workshop, assessment of expert's opinions, review and validation, and revision and synthesis. We conducted online surveys and workshops with experts from various professional backgrounds. Afterward, we assessed expert's opinions articulated in the surveys and workshops. The experts reviewed and validated our assessment. Then, we revised and synthesized the assessment. The pandemic has restricting impacts on the progress of most SDGs. However, it has also opened a window of opportunity for sustainable transformation. Many of the negative impacts may subside in the medium and long terms. The negative impacts on SDGs resulted from factors linked to the pandemic or the measures taken to control it. The key five impending factors are lockdowns, underemployment and unemployment, closure of institutions and facilities, diluted focus and funds for non-COVID-19 issues, and anticipated reduced support from development partners. The generated transformative opportunities are lessons learned for planning and actions, socio-economic recovery plan, use of information and communication technologies and impetus to the digital economy, reverse migration and 'brain gain,' and local governments' exercising authorities. For sustainable transformation, the window to grasp these opportunities is short-lived and will get narrow over time, i.e., before rebounds

occur following the past trajectories. Key insights and learnings from the Nepal case study may also be applicable in other parts of the world, particularly in the developing world contexts. More specifically, the pandemic's perception as a challenge and an opportunity to reset priorities, resources, capacities, and planning can be useful elsewhere in devising appropriate pathways for sustainable transformation.

## **The contribution of Digital Transformation to the Accomplishment of SDG: Implementing a collaborative cloud computing based platform to promote efficient drinking water resources management.**

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### **Abstract**

Defining and implementing adequate sustainable development strategies for a certain territory in order to assure SDG achievement is a very difficult task to undertake.

It requires knowledge over several domains and the ability to define and evaluate different scenarios, combining economic growth with natural resources preservation. It involves integrating different equally valuable perspectives and interests, support each strategy and alternative definition and monitor its implementation to assure the effective accomplishment of desired goals.

Water is essential for human survival and crucial for economic growth. Being so, it is one of the most relevant issues within the SDG. Water allocation is always aligned with land use and other human activities. Integrating water management into a development strategy taken for a particular area, considering all the existing and programmed initiatives is therefore essential.

It requires taking into consideration the expected developments in terms of water availability, distribution, and needs over time and space while aiming to(?) prevent water stress; it entails permanent knowledge update, the availability of vast amounts of data, an adequate legal framework, knowledge based responsible government involvement, and participation of many stakeholders.

To address this problem, an innovative artificial intelligence Matrix dashboard is proposed, created to support and develop water and land use planning and to help monitoring land or water plans and programs implementation, thus seeking an evaluation "*on the fly*" of the SDG accomplishment progress.

This "co-laboratory" integrates land search engines, decision schemes and decision trees, mailing lists, internet forums, as well as user profiles and ISO based data structures and profiles. It will be based on cloud computing, integrating tools able to access analyse and combine quality known data with raw data and performing data analysis based on location.

Using all different available communication channels, this "co-laboratory" matrix will allow to share responsible science based perspectives and promote open and responsible discussions.

Once exported to a cloud based environment, it will promote the development of new applications, aligning private and public sector aims, promoting economic development, creating opportunities for remote collaboration and opening new perspectives even for less developed countries.

The “co-laboratory” matrix is presented as a demonstration prototype created to support Castelo de Bode watershed reservoir, which it is integrated in Tagus River watershed and it is crucial for drinking water supply.

It combines water with land use management, registers changes in land use and water allocation, integrates water stress concerns within final decision making.

The platform allows users to combine the Matrix available datasets and develop applications align with water preservation. It can be explored within the gaming industry or used for education and training. Users inputs are always evaluated before integrated in the co-laboratory tools, or datasets.

This approach clearly demonstrates the advantages of digital transformation in order to extend the knowledge and involve users in SDG achievement, creating an open, responsible and cooperative environment.

## Towards the exploration of the Sustainable Development Goals (SDGs) interlinkages: A review of the clustering frameworks

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### Abstract

The Sustainable Development Goals (SDGs) are characterized as the most widespread policy framework in the area of sustainable development. Each goal interlinks the different aspects of sustainable development including social, economic, environment, as well as institution, cultural, and technical, among others. The integrated nature of the SDGs is of crucial importance in ensuring that the purpose of the new agenda 2030 is realized. Several studies have shown that SDGs outcomes are interdependent and interlink. They have proposed different conceptual and methodological frameworks for categorizing the SDGs by considering the interlinkages between the goals and their relevant targets. These approaches mainly developed based on different target audiences and show how the SDGs are an intertwined framework instead of a group of siloed goals.

However, in terms of conceptual aspect, some SDGs targets might not be properly translated into policy actions due to the conceptual complexity. Also, in terms of operationalization, the data for assessing the interlinkages between the SDGs in a comprehensive manner are not always available. So, the policy makers and academia are still considering how to integrate SDGs implementation and how the SDGs interdependencies and interlinkages can be organized into some limited sets of policy actions. This paper aims to critically review the diverse mapping approaches towards the SDGs interlinkages and interdependencies as well as the related clustering frameworks and explore whether the interactions are synergistic or trade-offs. It can provide ideas of how to move from the generic form of SDGs to the critical policy action nodes to advance SDGs implementation.

To do so, a combined approach was adopted including (i) a critical review of the existing scientific literature as well as grey literature (e.g. sustainability reports and the international guidelines); and (ii) snowballing of relevant references considering the most cited and recent publications as well as the most innovative approaches and frameworks on the reports. Then a qualitative content analysis was applied based on a set of criteria such as the type of target audiences, context and characteristics of each framework, credibility, innovation, collaboration, and implementation.

The findings showed that the analytical clustering frameworks adopt a rather technical approach towards conceptualizing SDGs. The main focus of the clustering was more based on their systemic functions of the SDGs and the network of their targets since various SDGs targets address similar themes but within a different context. Also, the results demonstrated the cross-cutting role of SDG 17 and in some cases SDG 16, since they are partly transversal to the other clusters and considered as underlying goals for means of implementation and the governance-related issues.

By identifying the nodes of interaction between SDGs, the synergies and trade-offs can be made more apparent to policymakers and influence their option-taking and policy coherence. Selecting such focus areas will be also required for reasons of communication and can be framed to tackle the sustainable development challenges in the future.

**Keywords:** Sustainable Development Goals, Clustering framework, Interlinkages and interdependencies

## Sustainability-oriented labs: Towards implementing a transformative learning space at a Portuguese Higher Education Institution

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**Dr. Antje Disterheft**

### Abstract

Sustainability is inherently linked to questions of relationship: How do we relate to ourselves and to the world around us, and how can we enhance our transformative capacity to thrive within the planetary boundaries? In the current times of multiples crises, e.g. the climate crisis, the pandemic due to COVID19, as well a global crisis of trust, the aspects of intertwined inner and outer care are highly relevant: The personal care for ourselves (physical, emotional and mental care) will impact and reflect the care for our communities and environment and draws on the social-ecological system perspective (Fischer et al. 2015). With the aim to focus on the links between care and sustainability, an inter- and transdisciplinary learning space shall be created at a Portuguese higher education institution (HEI) as a space for transformative capacity building, combining in particular aspects of inner and outer sustainability (Pereira et al, 2018; Ives et al., 2020). This initiative, envisioned as a “care-lab for people and planet”, seeks to integrate participatory action research, experiential learning and co-creation in order provide meaningful training opportunities and reflections on personal development as cornerstones for capacity building. The overall concept of a caring mindset shall serve as an umbrella to inspire the activities to unfold in such a space. This paper presents an integrative literature review on sustainability-oriented labs and transformative approaches relevant for the design of the care-lab, as well as the first methodological steps for implementing such a space. While the overall idea of the presented initiative strives for general awareness for the SDGs, this research relates in particular to SDG 4, target 4.7, and SDG 12, target 12.8. The outcomes of this research can contribute to a better

integration of the holistic perspective on sustainability at different levels: By strengthening personal inner resources and competences for collaboration, people's capacities for their own agency of change can be enhanced, eventually multiplied, and accelerate also institutional transformation of HEIs.

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## Social Innovation and Local Sustainable Development: A Systematic Literature Review

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### Abstract

People and communities have always tried to find answers to their own problems, individually and collectively. The recent focus on the concept of social innovation and its appropriation by entrepreneurs and government officials, seems to encompass a set of new civil society abilities to address both old social problems, such as unemployment or quality education, as well as the most recent challenges related to digitalization, climate change and environmental sustainability. In this perspective, social innovation, as a development proposal based on intersectoral partnerships and entrepreneurial initiatives with social and environmental impact, can be considered an instrument for sustainable development, namely in the fulfillment of the Sustainable Development Goals contained in the 2030 Agenda published by the Organization of the United Nations in 2015. In the European context, Portugal played a pioneering role in the development and implementation of the concept through a public program to promote social innovation, mobilizing European Union funds for this purpose. Evidence suggests that this initiative had a significant impact at the local government level, mainly in investment strategies, with outcomes in local sustainable development, resulting from a new and dynamic relationship between the public sector and civil society. Thus, social innovation constitutes a collaborative and co-creation model for sustainability. Nonetheless, there is still little research on how social innovation addresses the 2030 agenda, namely on the fulfilment of Sustainable Development Goals at a local level. This article proposes a systematic literature review on this relationship, focusing on collaborative and co-creation practices for sustainability at local governance. Furthermore, an analysis grid is proposed to identify the motivating factors for entrepreneurial social innovation initiatives and the motivating factors for municipality investment decisions in those initiatives, with reference to the 17 Sustainable Development Goals. Social innovation projects address one or a set of social problems, and by doing so, they address a particular goal and target, although they can be generically referenced to SDG 8.3 (promote development-oriented policies that support productive activities, decent job creation, entrepreneurship, creativity and innovation, and encourage the formalization and growth of micro, small and medium-sized enterprises, including through access to financial services) and 10.2. (by 2030, empower and promote the social, economic and political inclusion of all, irrespective of age, sex, disability, race, ethnicity, origin, religion or economic or other status). It is aimed to bring new clues on how community-based social innovation can contribute to local sustainable development.

Keywords: social innovation, local sustainable development, local governance.



## Sustainable for Whom?: Critical Assessment of Competing Priorities of Individuals and Sustainable Transport Goals

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### Abstract

With promotion of sustainable transport, United Nations places “access” to transport at the core of all development – social well-being, economic development and environment (Bamwesigye & Hlavackova, 2019). However, by treating it as a global concept, local individual needs are compromised, which is incongruent with the ontology of sustainable development.

Like cultural imperialism coerces dominant viewpoints over minority groups with contentious realities (Gibson & Selinger, 2005), neglectful – and misinformed – imposition of 2030 agenda of transport does not cater to diverse national contexts. Top-down approach of many governance structures is inefficient to address the complex social issue of sustainable transport. Rothman and Grant (1987), through concepts of felt versus unfelt needs, posit that perceptions of facilitator (or policymakers) about problems and priorities (therefore solutions) do not necessarily concur with those experienced or envisioned by the community. Implementing well-intended solutions for urban development (macro-level goal) based on future sustainability without considering and/or supporting individual-level priorities of vulnerable populations, do little to advance sustainable development goals.

Particularly in countries grappling with large populations and poverty, human displacement, and displacement of in/formal economies individuals depend on, are by-products of transport planning. Transport development activities may not only induce displacement but also reinforce “patterns of social-spatial segregation” (HLRN-India, 2017; Hernández García et al., 2018). In this scenario, none or inadequate compensations or rehabilitation processes with ephemeral benefits aggravates the living conditions of such displaced individuals (Van der Ploeg & Vanclay, 2017). Also, discrimination against informal livelihoods, such as street vendors, for promoting transport infrastructures perpetuates unjust power relations (Recio et al., 2019) catapulting them further into a “vicious circle of poverty” (Nurkse, 1954). Thus, it is imperative to be cognizant about needs of transport “users” and “non-users” to ensure a holistic and multidimensional planning of sustainable transport.

Effectiveness of sustainable innovation depends on public attitudes paired with behavioral intentions, which in turn impact uptake. Escobar-Salazar and Wendorf Muhamad (2018) found that community

members often resist innovation(s) when they feel excluded from design and implementation phases. Therefore, it is critical to examine the relationship between micro (individual), meso (community), and macro (societal) level needs and sustainability efforts, particularly among the most vulnerable where tension between priorities may exist. Using findings from primary survey, we delineate experiences related to (quality of life, satisfaction) and perceptions about [sustainable] transport of an inclusive and robust group – service providers, general public (users and non-users) and other stakeholders. The study geography includes two cities with indispensable public transportation, Barranquilla (Colombia) and New Delhi (India). Informed by these findings, we propose recommendations for innovative transport planning that perpetuates democratic processes – widening the scope to include socioecological factors – thereby creating agency and access.

The abstract is related to SDG/Target 11.2. We establish that neglecting the needs of “non-users” can be an erroneous judgement during orchestration of transport activities, and with the onset of pandemic, may aggravate their hardships. The study includes those who are impacted by transport infrastructures but may not be directly using them. By undertaking holistic assessment of needs of both “non-users” and “users” of transport, it suggests ways to realize true sustainable transport system.

# **9. Governance, Power and Institutions and Weakness of SDGs**

## **9c. Public participation and the role of stakeholders**

## **Towards sustainable regions: Stakeholders' engagement in environmental assessment**

Dr Alexandra Polido

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### **Abstract**

Global challenges, such as climate change, biodiversity loss and social inequity, urges the need for a paradigm shift. This shift is necessarily linked with the understanding of the challenges, decision-making processes, and governance issues, in urban systems. Scholars have pointed out that some instruments and techniques applied in this domain, such as Environmental Assessment (EA), have the potential to deliver a shift towards sustainability. EA is an environmental policy integration tool that promotes and integrates sustainability into decision-making processes. It analyses the decision-making effects on the environment and the communities. It is a systematic, strategic, and participated approach. Previous work showed that EA advances sustainability in context-specific territories through governance and community empowerment. Even though the dominant EA scholarship focuses on rationality and process effectiveness to achieve sustainability, the empirical reality is that EA processes have a strong political, institutional, and cultural dimension that is affected by different stakeholders. This research aims at understanding how the stakeholders affect EA towards sustainability through the analysis of the public participation component of the EA process. The empirical studies explored a form of impact assessment commonly known as Strategic Environmental Assessment (SEA) which deals with the ex-ante appraisal of policies, plans and programmes (PPP). It was used a case-study research design using the Portuguese Regional Operational Programmes (2014-2020). In particular, the SEA processes were scrutinised through qualitative content analysis to the SEA report. The analytical framework entailed the type of public participation using Arnstein's ladder of citizen participation, the number of participations, typology of actors, and the type of contribution (process or substantive). Preliminary results show that public participation is still developed through tokenism instead of stakeholder empowerment, there is overall low participation and is mainly done by entities with environmental responsibilities. It is necessary to improve mechanisms to strengthen cooperation between stakeholders, and empowerment of practitioners and local stakeholders. Overall, this research contributes to the enhancement of knowledge of environmental policies, planning and sustainability within SEA processes. This research is closely aligned with the Agenda 2030, and may help achieve SDG 11.a (Support positive economic, social and environmental links between urban, peri-urban and rural areas by strengthening national and regional development planning), SDG 16.6 (Develop effective, accountable and transparent institutions at all levels) and SGD 16.7 (Ensure responsive, inclusive, participatory and representative decision-making at all levels). Also, proposes a contribution to understanding the state and perspectives of the integration of environmental, social and economic issues in decision-making and their interrelations with stakeholders.

## Promotion and partnership for SDGs - Catholic Church engagement project example

dr Katarzyna Cichos

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### Abstract

In the time of crisis, the role of close participation and cooperation of different stakeholders and its deep understanding what SDGs really mean and how important for society transformation they are, is even more important than it time of prosperity.

There are several groups of stakeholders, that even if officially support the concept of sustainable development, their representatives at local level have very different (or even lack of understanding) perspective and attitude.

One of such, which is very influential in many countries, including Poland, is Catholic Church. Their representatives (priests, bishops, etc) have a huge impact on local communities and even state policy. Their very conservative and distrustful attitude towards Agenda 2030 significantly reduces the interest in this topic in the conservative societies.

At the Cardinal Stefan Wyszyński University in Warsaw I invited and coordinated the group of 55 researchers from seven different research discipline and coordinated project, which result was the book “Sustainable Development Goals and the Catholic Church

Catholic Social Teaching and the UN’s Agenda 2030” published by Routledge (link: <https://www.taylorfrancis.com/books/sustainable-development-goals-catholic-church-katarzyna-cichos-jaros%C5%82aw-sobkowiak-rados%C5%82aw-zenderowski-ryszard-sadowski-beata-zbarachewicz-stanis%C5%82aw-dzieko%C5%84ski/e/10.4324/9781003053620>).

The aim of this monograph was to identify both the common points and differences between the *2030 Agenda*, with its contemporary sociopolitical concepts, and Catholic social teaching in terms of achieving SDGs, and to indicate the complementarity of cognitive perspectives and paradigms in the content of the 17 SDGs. Individual SDGs were discussed in the 17 chapters of the monograph in order consistent with the *2030 Agenda*.

In each from 17 teams was the representative from catholic church (researcher specialised in Catholic doctrine or philosophy) and from two or three fields related to certain SDG. Its’ aim was to find the bridge between the Agenda 2030 and Catholic Social Teaching and answer the question if cooperation in certain areas is possible. Eventually each group found the space for cooperation and dialog.

The paper will present the methodology, main assumption, research questions and the process of our work, including obstacles and difficulties, and final results that were delivered in the book. The project

and its results might be helpful to other leaders and organisations working on SDGs implementation and give some examples how to work with other societies, religious, philosophical or cultural groups, which are stakeholders that still have a huge impact on decision making process and societies (and in general its role increase in the of crisis). It will also help to deal with SDGs 16b and 17.17

## End-of-life Vehicle (ELV): Links and Impacts on SDGs

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**Associate Professor Dr. Rasyikah Md Khalid**

### Abstract

The increasing number of abandoned end-of-life vehicles (ELV) causes persistent challenges in countries that have not strictly regulated the ELV. These vehicles become total losses or written off, and create tones of waste, which require proper disposal regulation to avoid hazards to public health and the environmental. ELV abandoned by the streets is also a perfect place for vandalism and sometimes linked to crime. Taking stock of these issues, this article aims at examining the link and impacts of ELV on sustainable development goals (SDG). Doctrinal analysis are made on relevant documents and articles on ELV and SDG. This article found that ELV is connected to SDG 1, 2 and 3 as its waste is a source of wealth for the poor that are needed to sustain their health and livelihood. A proper vocational training on ELV handling is a technical knowledge beneficial to the community (SDG 4) and will be able to close gender gap (SDG 5) when woman is capable to learn and handle technical matters of ELV. On the chemical sides, ELV waste produces leachate that seeps into and harm underground water (SDG 6). A proper regulated ELV industry will require more technicians and increase innovation while reducing inequality. Cleaner city from ELV will also create safe city, while promotes sustainable production and consumption patterns that reduce, reuse or recycle waste. With all benefits towards achieving SDGs that can be achieve through a regulated ELV industry, strong partnership is needed between government, the industry and the community to support the proposal for regulating ELV.

## **Corporate allies or guardians of public interests? Examining the counter-hegemonic role of civil society in the Albanian oil industry**

Dr Sara Persson

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### **Abstract**

Several critical management scholars have emphasised that a heterogeneous civil society with the ability to represent and guard public interests is of vital importance as a counter-hegemonic force to corporate definitions of sustainability (Whelan, 2013; Rhodes, Iain and Pullen, 2020; Barthold and Bloom, 2020). This is in line with the theoretical framework of political discourse theory (Laclau and Mouffe, 1985/2014) and the political concept of pluralistic agonism (Mouffe, 2013) where hegemony is conceptualized as a never-ending struggle to define what society is and should be. However, critical management scholars have also emphasised that civil society actors are at risk of being coopted through corporate-civil society collaborations and thus included in hegemonic formulations of sustainability dominated by corporate agendas (Burchell and Cook, 2013; Fooks et al., 2013; Dawkins, 2015). Accordingly, this study examines the role of local civil society actors when sustainability agendas are formulated by foreign investors in the Albanian oil industry. The question is whether Albanian civil society actors take on a counter-hegemonic role in such contexts, where corporate agendas and sustainability regimes tend to dominate, or if they rather become aligned with corporate interests through corporate – civil society collaborations. The study is based on empirical material from an autoethnographic exploration of the Albanian oil industry and includes interviews, autobiographic accounts, social media and news agency material. This context shows that formal civil society organisations who collaborated with the dominant oil company in the region tended to align their programs with corporate agendas and lost their trust among local communities. At the same time self-organised local protests played an important counter-hegemonic role to raise community concerns and protest corporate activities. These results show that the debate regarding the role of civil society as a counter-hegemonic force to corporate domination and exploitation needs to consider both formal and informal civic action. The results confirm previous studies of civil society action in Central and Eastern Europe (CEE), which emphasise self-organised civic action as a core feature of the CEE context (Jacobsson & Korolczuk, 2019; Císar, 2013). In addition, the results also point to the need for further explorations of how such civic action functions to mobilise counter-hegemonic definitions of sustainability that take local needs into account.

This abstract is related to SDG 9, target 9.2, to promote inclusive and sustainable industrialisation. Extractive industries have often been developed in non-inclusive and unsustainable ways and the role of civil society as a counter force to such developments is key to reach this target. In addition, the abstract relates to the overall conference theme of “accelerating progress towards SDG’s in times of crisis” by emphasising the key role of local stakeholders in industrialisation processes, especially since extractive industry contexts often entail localized crises for communities directly impacted by industry development.

## Sustaining society with less markets and State

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### Abstract

A vision for sustaining society with less markets and State is an outcome of the 2018 statement by BlackRock, the biggest investor in the world, wanting, “A new model for corporate governance” and that “companies must benefit all their stakeholders”. The idea of firms delivering value to all stakeholders was reinforced in 2019 by 180 other CEOs of the US Business Roundtable. Corporations who delivered benefits for all stakeholders become what Ostrom describes as Common Pool Resource (CPR). Ostrom described how competing interest for shared life sustaining resources become self-regulating by adopting a polycentric form of governance. Polycentric governance is illustrated by the bottom-up stakeholder-governed firms in the US, UK & Europe and also in sporting and civic organisations including two designed by the author. These examples are used, with the insights of system science, to reformat the Ostrom design principles for incorporated organisations. Self-funding tax incentives and other rewards are suggested to encourage corporations to introduce self-governance to best suit their specific operations while maintaining shareholder primacy. This new way to govern corporations reshapes and spreads their ownership and so democracy by providing citizens with benefits and voice from the bottom-up. These can provide contributions to a universal wellbeing income while enriching the quality of democracy. In addition, the size, cost and involvement of government can be reduced while enhancing the protection and promotion of a sustainable world.

The tax incentive would provide investors with a bigger profit, sooner with less risk in return for them transferring their equity to a stakeholder class of shares over say the life of a patent. Fiduciary investors with a duty to maximise profits would obtain a duty to approve changes in corporate constitutions to endow stakeholders to become shareholders. This allows welfare to be privatised from democratising corporate ownership and control that also enriches democracy. Shareholders fading out with a profit would require all profits to be distributed as dividends and obtain rights to re-invest in “offspring” corporations used to expand the businesses. This process would also keep corporations to human scale. Such “endowment” corporations avoid shareholders being excessively overpaid with “surplus profits” in a way that accounting doctrines cannot report.

Democratising the wealth of nations in this way funds the universal wellbeing income to directly contribute to SDGs 1, 2, 3, 4 and 10. Converting corporations into CPRs promotes global common goods like reducing pollution of land, sea and atmosphere to directly contribute to SDGs 6, 13, 14 and 15. Stakeholder voice and governance promotes SDGs 5, 8, 12, 16 and 17. Indirect contributions are made to the four remaining SDGs 5, 7, 9 and 11.

## How deliberative spaces strengthens peoples participation in governance and contributes to SDG

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### Abstract

Rural India is characterized by diverse and multiple developmental challenges. The situation has especially exacerbated for the rural community with the onset of COVID-19. Besides livelihood loss, food insecurity, reverse migration and increasing pressure on natural resources; there exists an institutional vacuum and resultant governance deficiency at the grassroots level that needs to be addressed effectively. This governance deficiency is the absence of deliberative spaces, lack of cooperation between actors and formal/informal institutions located horizontally and vertically that are operating in silos at multiple scales and levels. This gap of democratic/deliberative engagement impacts the socio-economic and environment progress in the rural hinterlands and prevents the ability of local communities to leverage benefits of favorable policy measures. Over the years, FES has played a significant role in highlighting the value of nesting local action within the larger scales of landscapes in the context of natural resource management through cooperation with local institutions, government departments, CSOs to improve governance challenges. It involved capacity building, crafting structural spaces to enable effective community participation including women and marginalised and placed rural citizens as active agents of sustainable development through Multi Actor Platforms (MAPs). MAP aids in collective action by bringing together diverse stakeholder groups who represent the 'whole system' while ensuring equity and social justice. Such informal deliberative spaces have proved efficient in mobilising the community to adapt to external shocks induced by the pandemic. In this case study, we present 6 stories from Rajasthan and Odisha, to understand how communities across different spatial locations leveraged MAPs to secure livelihood, ensure the sustainability of natural resources and contributed to SDG in response to COVID. Due to FESs earlier intervention to promote collaborative interaction between various stakeholders, the community members and leaders were able to effectively respond to the looming livelihood crisis by enrolling the incoming migrant workers in MGNREGA job scheme, providing Community Forest Rights titles under FRA, undertaking work on common lands for NRM asset creation by mobilising women. Efforts were made by the local community to harness technology to bridge the information asymmetry, access social security schemes by the vulnerable groups and migrant families, circulation of public health information, undertake campaigns to fight food and water insecurity and raise awareness and take measures in response to resource depletion. We unpack the theory of change using MAP as an institutional approach that helped in mobilising the community by taking up local stewardship initiatives to reach the intended outcomes.

## Involving Africa's Youth into Africa Union Agenda 2063 and Sustainable Development Goals

Mr Abideen Olasupo<sup>1</sup>, Mr Abdullahi Aborode<sup>1,2</sup>, Mrs Taibat Hussain<sup>1</sup>

<sup>1</sup>Brain Builders Youth Development Initiative, Ilorin, Nigeria. <sup>2</sup>Oli Health Magazine Organization, Research and Development, Kigali, Rwanda



**Mr Abideen Olasupo**

### Abstract

**Introduction:** Outside the international development sector and the government sector, few youths are aware that world leaders have come to a historic, far-reaching agreement to improve the lives of people and the planet by 2030 as well as aspiring for a better continent by 2063. If both Agenda 2063 and SDGs are adequately disseminated to African young people in their languages and without the international development jargonistic terms, surely African young people can be partners in communicating the development agenda to their communities at the local level, as well as across countries and regions.

**Method:** The research study encompasses related previously published peer-reviewed and blog articles. The literature search was conducted on Google Scholar, SDGs sites, Researchgate, and semantic scholar for articles published from 2017 to 2020, and the search result showed 12 articles respectively. Search keywords are Africa, Africa Union, SDGs, and Agenda 2063

**Discussion/Conclusion:** The research should be a reminder to African governments, the private sector, international development agencies, and youth development stakeholders that Africa is abundantly blessed with a youthful population that can leapfrog Africa's development. Extensive work is needed now to make African youth the engine that drives Africa's development. More actions, as opposed to

policy pronouncements, is needed. The current political commitment from all actors regarding youth development needs to be supported by funding and improved follow up actions and reporting. Youth development stakeholders should be reminded that youth contributions to SDGs and Agenda 2063 present an opportunity for Africa.

## The National Green Tribunal Model to Ensure Access to Justice and Public Participation

Mr. Masrur Salekin

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### Abstract

Environmental courts and tribunals (ECTs) have been established by many countries because of the development of international and national environmental laws and principles, the threat of climate change, and public dissatisfaction with the existing general judicial forums. Among the functioning ECTs, India's National Green Tribunal established in 2011 is highly celebrated because of its comprehensive nature and innovative features. This paper explores NGT's innovative features to see how far those have ensured two very important SDGs, access to justice (SDG+Target: 16.3) and public participation (SDG+Target: 16.7 & 16.10). This paper though acknowledges and examines the challenges faced and controversies created by the NGT argues that NGT model can be used as an example by other countries who are struggling to ensure environmental justice.

In examining NGT's initiatives to ensure access to justice the adoption of various measures will be analyzed. Such measures include Circuit procedure of courts going to people rather than asking people to come to the courts; Expansive interpretation of the term 'aggrieved person' adopted by the NGT allowing any person (citizen and foreigner) directly or indirectly affected or even interested to ventilate grievance in an application or appeal. However, the exercise of *suo moto* power e.g., taking cognizance of environmental matters based on newspaper reports by the NGT will be critically examined because it has created controversies. The latest NGT initiative to ensure access to justice by introducing e-filing will be evaluated to see how far it is helping to accelerate progress towards SDG's during the Covid-19 pandemic.

This paper explores NGT's innovative features i.e. stakeholder consultative adjudicatory process, investigative procedure, and collaborative approach to see how far NGT has been able to ensure public participation. In the stakeholder consultative procedure, both internal and external experts along with the stakeholders are consulted to reach to a solution in cases of wider ramification involving major issues such as river cleaning or air pollution or environmental issues which have a public impact. In the investigative procedure, the experts visit the vicinity and collect information to reach a solution.

This paper argues that in addition to the initiatives adopted in ensuring access to justice and public participation the NGT has certain features which have elevated its credibility as a model for other countries. Such features include the unique composition of having permanent expert members along with judicial members, widespread jurisdiction, independence, the power to order relief and compensation to victims of pollution and other environmental damage, pragmatic problem-solving approach by going beyond the 'courtroom door' and application of international legal principles. However, the paper critically examines the major challenges regarding the NGT with an aim to improve the NGT model for ensuring environmental justice. The challenges include criticisms that the NGT is overstepping its jurisdiction by adopting judicial review power, indulging itself in policy formulation,

trespassing into the domain of other organs, misusing the polluter pays principle, non-implementation of orders and judgments and establishment of monitoring committees.

## Systemic Transformation and Further Improvement of Environmental Public Participation since the Implementation of China's Civil Code

Ran Zhang

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### Abstract

The long-standing China's civil code of China was officially promulgated in 2020, which is a milestone in legal system history and has the epoch-making significance. In the field of environmental protection, the civil code established the green principle as the basic principle for the first time. Moreover, compared with the previous scattered civil laws, the civil code has made a series of improvements in many fields, such as environmental torts.

The traditional mode of environmental protection is led by the government, but the government management is limited by the public financial investment, and there are some deficiencies in information sources, regulatory effectiveness, regulatory initiative and so on. Therefore, in addition to the way of government management, we should pay attention to absorb other social groups and play the role of other governance forces. So the public participation system in environmental protection is particularly important.

For the public participation in environmental protection, the civil code establishes the public interest litigation system, and stipulates that relevant organizations can file public interest litigation. This is conducive to the promotion of public participation in environmental and ecological protection, and in line with the trend of diversification of governance subjects in the field of environmental and ecological protection. "Relevant Organizations regulated by law" is a powerful supplement to the environmental protection led by the government, and also a concrete embodiment of the principle of public participation in the civil code.

This paper will discuss the systemic transformation and further improvement of Environmental public participation in China, especially the changes since the implementation of China's civil code. Mainly from four aspects:

First, why public participation? I will discuss its role from the view of Chinese regional government and the GDP. Second, I plan to talk about the status quo of public participation in China from the relevant laws and regulations, environmental NGOs and public interest litigation. Third, to discuss the changes of environmental public participation before and after China's Civil Code. Fourth, I prefer to talk about further improvement of environmental public participation in China.

## Stakeholder perspectives of the Social Licence to Operate: exploring the governance of shale gas development in England

Ms Charlotte Mummery<sup>1</sup>, Professor Pauline Deutz<sup>1</sup>, Dr. Ludivine Petetin<sup>2</sup>, Dr. Liam Herringshaw<sup>1</sup>

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**Ms Charlotte Mummery**

### Abstract

Energy security, the economic crisis, dwindling North Sea gas supplies are some of the drivers for the development of on-shore gas exploration in England. Shale Gas Development (SGD) has become a divisive issue in recent times; some claim it will bring revenue, jobs and claim it will help us to reach CO<sub>2</sub> reduction targets by acting as a bridging fuel as we transition to renewable energy. Others are concerned about the potential harm to the environment and to human health. Government ministers and industry claim the UK has a 'Gold standard' regulatory regime, however these regulations were not designed for this technology and appear fragmented. Some claim the regulations are inadequate, flawed and difficult to enforce. The aim of this research is to investigate the Governance of SDG in England to determine how stakeholders perceive the regulatory regime, regulators and how they understand the associated risks and benefits. In addition to regulatory concerns, the industry does not appear to have gained a Social Licence to Operate (SLO); an implicit contract between the operator and other stakeholders which may reduce socio-political conflict and challenges to the activities of the SGD company. This research examines which are the important factors regarding the issuance of SLO from a community perspective; this includes perceptions of regulators and governmental organisations.

Using comparative case study methods, this research investigates the SLO and governance in two key SGD areas of England, Yorkshire and Lancashire. Methods include semi-structured interviews with stakeholders such as regulators, operators, Members of Parliament and residents near potential development sites. Participants draw on a multitude of factors when forming perceptions of the risks

and benefits associated with SGD, pro-SGD participants frame their perceptions based on quantitative risk assessment methodologies, whereas anti-SGD participants use their personal experience of the industry, including experiences with conventional gas development. Resident participants consider governance and regulation, in addition to the operator, when considering granting a SLO. Lack of credibility, legitimacy and trust in the regulators is a key factor, not traditionally considered within the SLO framework. For SLO to be a useful tool for industry, and indeed academia, it should be considered from the community perspective, this includes investigating governance in addition to the company seeking to gain a SLO. An additional barrier is that industry and government actors characterise the resident stakeholders as incapable of understanding the discourse, this research found this perception to be erroneous; resident stakeholders are perfectly capable of understanding the discourse, furthermore networks are created to pool skills and knowledge.

# **9. Governance, Power and Institutions and Weakness of SDGs**

**9d. Legal aspects of sustainable development**

## Renewable Energy and International Law: Can a Global Regulatory Framework be Established?

Dr. Imad Antoine Ibrahim<sup>1,2</sup>, Dr. Tivadar Otvos<sup>3,2</sup>, Dr. Paolo Davide Farah<sup>4,2</sup>

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**Dr. Imad Antoine Ibrahim**

### Abstract

Much has been said about the importance of renewable energy in fighting climate change and ensuring the existence of a clean environment. This has sparked the interests of multiple stakeholders including nations, international organizations, civil society organizations, as well as a wide range of actors looking into the possibility, that an entire energy shift may occur the coming years or decades. Moreover, in recent years, scholars and practitioners have started exploring the way the international community can support the development of this sector, as well as fostering cooperation among the different nations. International lawyers have begun assessing the possibility of establishing a global regulatory framework that tackles the problems with renewable energy. Lawyers and scholars attempted to use already existing international regulations addressing either conventional energy or other issues to figure out whether a similar model can be established. While many aspects have been widely discussed and agreements and disagreements have been noticed, one main topic always constituted the principal subject of arguments: whether the establishment of a global regulatory framework, applicable to renewables is needed in the first place. Answering this question is of utmost importance. Therefore, the authors will proceed to examine the different stages of energy utilization, which are relevant to ensure a smooth energy shift from fossil fuels to renewables. The objective is to examine three main different stages through two various lenses. These three stages are energy production, transfer and trade (including aspects of consumption). It is important to examine whether the framework at each of these

three stages is capable to ensure a global shift towards renewables. The assessment will go beyond simply making an analysis of the current reality. Rather the objective is to compare the current situation to what it ought to be at each of the three stages. The first of the two lenses is the “Fairytale” describing an ideal scenario, through which renewables would be used globally and the importance of global rules. The second is the “Reality” that describes the current state of things, the obstacles and challenges that need to be dealt with to ensure that a global energy shift toward renewables occurs, and the role of a global regulatory framework to ensure such transition. The authors will conclude with arguing towards the importance of such a wider regulatory system on a worldwide scale. This paper relates to Sustainable Development Goal 7: Affordable and Clean Energy and its targets 7.1 (by 2030, ensure universal access to affordable, reliable and modern energy services) and 7.2 (by 2030, increase substantially the share of renewable energy in the global energy mix). The proposed contribution suits perfectly the topic of the conference given its focus on accelerating progress toward SDG 7 related to affordable and clean energy.

## **Sustainable Development and Nuclear Power: the unsustainable approach of nuclear-free homeland 2025 in Taiwan?**

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### **Abstract**

Since 2016, Taiwan government is launching the agenda of energy transition and nuclear-free homeland with the target of 20% renewable energy and 0% nuclear power by 2025. Aside from subscribing to the UN's 17 Sustainable Development Goals (SDG), Taiwan has set up an 18th goal of becoming nuclear-free by 2025. However, afterwards, there is a lot of controversies on the increase of coal-fired power plants and the conflictive land use and environmental issues resulted from the development of large scale photovoltaic and wind power. Facing such conflicts, they also motives me to evaluate the compatibility between Taiwan's unique 18<sup>th</sup> SDG and the sustainable development.

The concept of nuclear-free homeland was introduced in Art. 23 of the Environmental Basic Act of 2002. However, due to the lack of substantive definition in the provision, every ruling party can claim pursuing such goal without the massive change of the existing nuclear power policy. Particularly, the existing three nuclear power plants (six reactors) can run until the expiry of generation license of 40 years. Different ruling parties all consider such approach to be pursuing nuclear free homeland. Therefore, the main purposes of this article are to discover the concept of nuclear-free homeland from the legal aspects and from the discussion of legal or policy documents "in the past almost 20 years" and to evaluate if such concept is compatible with the rest SDGs.

Our preliminary finding is that there is a serious conflict between Taiwan's SDG 18 and several existing 17 SDGs. For instance, under SDG7, SDG18 may be helpful in achieve clean energy part of SDG7 but may jeopardize affordable energy due to setting unreasonable high subsidy for renewable energy. The replacing nuclear power with more fossil fuel fired power plants may jeopardize the SDG 13 (climate change) as well. Not to mention, the lack of law and due process to deliberate the fate of nuclear-power and even against the results of nuclear phase out referendum in 2018 may violate the meaning of SDG 16. The original delayed progress towards 2025 nuclear-free homeland goal is further delayed by the outbreak of covid-19, which delayed the development of renewable energy projects.

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## Public Procurement and Sustainable Development

Prof. Raquel Carvalho

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### Abstract

Public procurement has been evolving from an economic instrument into a mixed one with the inclusion of horizontal policies (both environmental and social ones). The latest Directives regarding public procurement have turned some of the previous “suggested” instruments into binding law, namely the sustainability principle, mandatory procedure dematerialization, ecolabels, life-cycle costing as factor within the most economically advantageous tender criterion, social protection of persons with disabilities, specific procedure rules concerning certain social contracts, and innovation as an instrument to achieve sustainability. This legal instrument has been recognised as a strong legal mechanism to achieve the 12<sup>th</sup> SGD goal for promoting sustainable public procurement practices in line with national policies and priorities (target 12.7). Which is why public procurement actors must consider EU determinations such as *The New Green Deal* [COM (2019) 640 final, 11.12.2019], which intends to make EU economy sustainable: “public authorities, including the EU institutions, should lead by example and ensure that their procurement is green” [COM (2019) 640 final, 11.12.2019, §2.1.3]. Since public procurement appears to be an interesting instrument for transitioning from a linear economy to a circular (sustainable) one, the EU has also published the *Circular Economy Action Plan*, the latest dating from March 2020 [COM (2020) 98 final, 11.3.2020] and including a “sustainable products policy” to help both public procurers design procurement and economic operators adapt their business models thereto. Both documents focus on “reducing and reusing materials before recycling”, particularly in resource-intensive sectors such as textiles, construction, electronics and plastics.

While many Member States have been implementing green public procurement (GPP) in several economic fields, studies have shown that procedures still lack common methodologies among other difficulties regarding the LCC factor implementation. In this paper, we will therefore go through several of these national legal solutions and practices to understand how far GPP has been implemented and which methodologies are being applied ([https://ec.europa.eu/environment/gpp/case\\_group\\_en.htm](https://ec.europa.eu/environment/gpp/case_group_en.htm)), dwelling particularly on the latest Portuguese guides concerning GPP, and analyse how far the present implementation meets the requirements of circular economy (<https://encpe.apambiente.pt/content/manuais?language=pt-pt>). This is the first step toward building guidelines for both public procurers and economic operators: as regards the first, in order to help them design adequate sustainable public procurement procedures; as for the latter, to help them adapt their business models accordingly. Sustainable development within public procurement can only be achieved as such.

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## **Sustaining International Law: History, Nature, and the Politics of Global Ordering**

Dr Aaron Wu

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### **Abstract**

My paper investigates how the natural environment is conceptualised in international law. Environmental campaigners typically place great faith in the discipline's ability to restrain the onset of growing 'global' problems: such as species extinctions, clearing of forests, pollution, and climate change. Law has traditionally been a key domain for efforts to regulate, and curb, these problems. While a vast body of existing literature assesses the effectiveness and adequacy of these initiatives, this paper takes a different approach. It explores particular visions of the natural environment that inform such initiatives. I proceed from the premise that international law, rather than merely reflecting the natural environment, shapes how we perceive it. With this in mind, I will investigate a selection of stories that international law tells about the natural environment, and consider the different, competing stories it deprivileges. The key question is: what role has international law played in making certain ways of thinking about nature come to seem normal or intuitive, and how does this affect efforts to curb environmental harms?

Adopting historical and philosophical approaches informed by critical approaches to law, I will show how dominant manifestations of nature are articulated—and sustained—with regard to ideas of mastery and resources, national economies and conservation, the (human) environment, sustainable development, the green economy, and natural capital. I will use insights from radical ecological and postcolonial theory to highlight the ramifications of such conceptualisations. My paper will focus on a series of key episodes in the history of international environmental law, as well as on the work of prominent scholars and institutions in the field of international environmental law.

I will argue that international law is constrained in its efforts to deal with environmental problems insofar as the discipline is itself complicit in the use, abuse, and subjugation of environments. Furthermore, I will contend that the idea of the environment is continually reconstructed and repositioned, in ways that sustain a certain relationship, or form of global ordering. As we shall observe, debates in international fora over the scope and meaning of the environment fostered anxieties about the degree to which it was being adequately protected. Yet, I will suggest, these were neutralised—or co-opted—in ways that reinforced dominant logics. Put simply, international law and institutions have sustained a narrow understanding—or framing—of the environment. Ultimately, it has confined the outcomes of environmental policies to a set of largely predetermined outcomes. This undermines international law's contingency and potential dynamism. Added to this, is the implication that such framings are designed to preserve the power and privilege of a small minority of the world's peoples.



## The legal implication of carbon dioxide removal for the 2060 carbon neutrality goal in China

Dr Haomiao Du

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### Abstract

In September 2020, President Xi Jinping announced at the UN General Assembly that China will aim to achieve carbon neutrality by 2060. The IPCC has already concluded that it is impossible to reach the goal of net zero emissions without negative emission technologies. In the discussion on various methods to achieve the 2060 goal, Chinese scholars and practitioners have been focusing on the transition to renewable energy and the decrease of carbon emissions and energy consumption from fossil fuels, while the development and application of carbon dioxide removal (CDR) technologies to remove CO<sub>2</sub> from the atmosphere has not yet received sufficient attention in China.

CDR, or carbon geoengineering, refers to a series of technologies that artificially increase carbon sink on land or in water, or remove existing CO<sub>2</sub> from the atmosphere by physical or chemical engineering methods. Main CDR methods are BECCS, biochar, enhanced weathering, direct air capture, ocean fertilisation and large-scale afforestation and reforestation.

This article aims to explore the legal and policy status of CDR in China and its potential role in contributing to achieving the 2060 carbon neutrality goal. First, this article will examine how Chinese laws and rule-based policies regulate CDR. One of the main legal issues is the balancing between the encouragement of developing CDR for achieving the 2060 goal and the control of negative environmental impacts arising from the application of CDR technologies. Another legal issue is the mechanisms on technological innovation and transfer of CDR technologies.

Second, this article examines six CDR methods one by one regarding their legal status in China and the main legal constraints. The examination of applicable laws include four parts: climate conventions and treaties to which China is a contracting party, Chinese constitution, Chinese laws and regulations on climate change, Chinese environmental and energy laws and regulations which have relevant provisions on regulating environmental impacts of CDR technologies.

Third, this article will analyse the possible development of CDR in future for achieving the 2060 goal, including the legal principles (prevention principle, precautionary principle, etc.), legal institutions and mechanisms (EIA, ecological compensation, etc.), and the likely relationship between different methods for achieving carbon neutrality goal confirmed by law.

This article concludes that CDR will not play the leading role but still indispensable in achieving the 2060 goal in China. Laws and regulations need to adapt to the requirement for regulating disruptive technologies for climate mitigation.

## Can MEAs contribute to the SDGs? On the need for legal indicators to measure MEAs' effectiveness

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**Professor Emmanuella Doussis**

### **Abstract**

In recent decades, international treaties concerning directly or indirectly the environment have proliferated extensively. These instruments have set new standards and innovations in their topic fields, which range from environmentally-targeted domains (e.g. forestry, wildlife, freshwater and oceans protection instruments) to areas that are at first glance peripheral to the environment but still have important environmental impacts (e.g. trade and investment agreements).

Despite the growing number of such agreements, and multilateral environmental agreements (MEAs) especially, we still know very little of their actual contribution to sustainable development. The existing literature provides little information on the effectiveness of these instruments and scholars even disagree on what effectiveness actually means so that how to measure effectiveness becomes a rather obscure exercise. This state of things leads to having this wide array of instruments not integrated in the state of the environment and/or sustainable development scorecards published regularly by states and international organizations, which report almost exclusively on scientific, economic and social data. Even when MEAs are taken into consideration in formal state-of-the-environment reports, they are not the subject of in-depth evaluations. Therefore, the weight of international environmental law and its usefulness seems to be underestimated.

This paper examines why it is important to integrate effectiveness issues of MEAs in assessing furtherance of sustainable development, in general, and implementation of SDGs, in particular, and how this could practically be achieved. It explores the methodological challenges inherent to designing a set of legal indicators (i.e. quantitative measures of the performance of legal systems) that could be meaningful for multiple agreements and discusses the pros and cons of tailoring the choice of suitable legal indicators for clusters of agreements, either on a natural resources basis (e.g. the agreements on the protection of watercourses) and/or on a treaty-basis (e.g. the Paris Agreement). It goes into considering the feasibility of formulating and testing various types of legal indicators (i.e. structural, process and outcome indicators) based on the envisageable difficulties into collecting data from events-based, socioeconomic and administrative sources, and/or opinion surveys. It argues that, by defining such a common methodological framework, which could serve as a “bridge” between various (clusters of) agreements, legal indicators may serve as operational tools to further contribute towards implementation of SDGs via measuring, and simply communicating information on, progress or regression of international environmental law.

## Re-evaluate water governance: A cross model between law and management

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### Abstract

Freshwater is source of life for human beings and, in the meantime, is characterized by scarcity, vulnerability and - sometimes - a non-equitable distribution. Water is also an important resource, useful for different human activities, interests and purposes. Firstly, water is used in different production processes as fundamental production input in the primary sector (i.e. agriculture, fishing) but also in manufacturing (for instance, textile and paper production) and the third sector (tourism activities and hospitality sector). Furthermore, thanks to hydropower installations water is an important primary source of renewable energy too. In doing so, it contributes to decarbonize the energy sector by reducing greenhouse gases emissions (in particular, carbon dioxide) during the energy production phase. Due to climate change, however, freshwater is becoming scarcer, and a suitable water governance can play a fundamental role for managing its different uses, which may be in competition among each other.

Starting from these premises, this contribution aims to reflect on the three environmental governance pillars - participatory rights for nature: access to information, access to participation, access to justice, through critical legal analysis and the ecological ethics of empathy (ability to enter in communion with the others' emotions), compassion (ability to feel together), and care (ability to take restoring actions). The objectives of the research are to i) redesign the legal response to the ecological challenges concerning water, with a focus on our obligations towards water (rights of water), ii) explore on the role of the different freshwater uses as key components of an improved water resources management.

In the long term, the study is expected to contribute to the scientific progress towards the achievement of the Agenda 2030 Sustainable Development Goals (SDGs), in times of environmental and health crisis, by reflecting upon water governance model that bridges legal and management issues. More specifically, the study scope is linked to SDG 6: *Ensure availability and sustainable management of water and sanitation for all*, targets 6.1, 6.4 and 6.5.

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## Entrenching the intergenerational equity through climate litigation

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### Abstract

Intergenerational equity sits at the intersection between sustainable development and environmental law. It is at once constructed on recognizing the needs and concerns of existing generations while also valuing and protecting the needs and concerns of future generations. In this way, it is arguably an encapsulation of sustainable development at the theoretical level. While the concept of intergenerational equity has become an accepted element of international law, at least in the soft law and aspirational context, it has gathered increasing momentum in the context of climate litigation and climate justice campaigns.

This paper discusses the growing momentum in climate litigation at the national and international level as a method of combining legal parameters of sustainable development law, environmental law and intergenerational equity in order to craft successful arguments regarding natural resources and environmental protection. Building on the findings of, among others, the Supreme Constitutional Court of Colombia in the *Atrato River* case, the Supreme Court of the Netherlands in *Urgenda*, and the Inter-American Court of Human Rights in the Advisory Opinion on the *Environment and Human Rights*, regarding the vitality of intergenerational equity, the paper examines the new spate of cases filed from 2019 onward in jurisdictions across the globe. Some of these cases have already yielded decisions with critical implications for establishing intergenerational equity as binding element of national law, such as the *Friends of the Irish Environment* case. Meanwhile, many others are pending before courts yet contain arguments pertaining to intergenerational equity and its entrenchment in law.

The paper relates to the following SDGs: 13 (Targets 13.1, 13.2, 13.3), 14 (Targets 14.1, 14.2) 15 (Targets 15.1, 15.2, 15.3, 15.4, 15.5, 15.9) and 16 (Targets 16.3, 16.6, 16.7). It connects to the conference theme by presenting the emerging use of climate litigation and climate justice as tools for sustainable development implementation and entrenchment of intergenerational equity as a legal tenet. At a time when the international community is focused on addressing the global pandemic crisis, the paper emphasizes the ways in which intergenerational equity can bridge sustainable development and environmental law to ensure that future generations are not left behind, thus connecting to the SDGs as well.

## **Direct Tax laws for sustained growth: study of legislative and administrative steps in India**

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### **Abstract**

#### Introduction

The sudden occurrence of the Covid-19 pandemic affected millions of lives in India. The Indian Government inter-alia took immediate steps to give relief to the taxpayers under Direct Tax laws to sustain their livelihood and stabilize the economic growth. These steps provided immediate support to the dwindling economic growth due to the imposition of a nationwide lockdown in the last week of March 2020, viz. retaining more money in the hands of the taxpayer rather than remitting to the Government. Post-lockdown, further measures were undertaken to address the genuine concerns and hardships of the taxpayers. The Indian Union Budget 2021 laid down in the Indian Parliament on 1st February 2021 brought more direct tax law reforms for rapid recovery and sustained economic growth for all sectors of the economy. The focal point of the study is to understand the impact of these steps on the sustenance of economic growth in India.

#### Methodology

The researcher shall follow partly the 'Doctrinal' and partly the 'Empirical' methods of research. Relevant legislative, administrative steps and decisions would be analyzed besides relevant Government reports on tax revenues, employment, and GDP data.

#### Findings

The findings would include the critical examination of the various steps taken by the Government under Direct Tax laws for the sustenance of the economic growth, measured in terms of revival of economic output and boosting the falling direct tax revenues needed for funding vital governmental schemes.

## Discussion

It would include the measures taken by the various organs of the State in response to the situation created due to Covid-19 havoc on 1.3 Billion population country. It will analyze various policy decisions taken by the Direct Tax Administration of the Government of India viz. introduction of Faceless Assessment & Penalty Schemes one of the World's unique and faster processing of Income Tax Returns & consequential issuance of refunds, etc.

The suggestions of the OECD on post-Covid handling of the economic growth will also be considered. Suggestions given by some Officers of the Indian Revenue Service in their report known as 'FORCE,' for boosting the tax revenues under Covid conditions, will also be examined. The Government's decision to bear the cost of the Covid vaccine for certain sections/persons would also be examined as proposed Union Budget, 2021. The discussion will revolve around the impact of these efforts on the sustenance of economic growth in India.

## Conclusion

The conclusion will include the way forward for the taxpayers and the Government to promote sustained economic growth and provide productive employment for the eligible workforce.

This paper proposes to relate to Goal No. 8 of the Sustainable Development Goals (SDG), i.e., Promoting sustained, inclusive, and sustainable economic growth, full and productive employment, and decent work for all.

Covid-19 brought an unexpected crisis to humanity. This paper proposes to examine the resolve of the Government of India for accelerating progress in the country inter-alia through Direct Tax laws interventions and thereby endeavoring to achieve the SDG in the time of crisis.

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## **Equality among the Community for Participation in the Efforts to Prevent Bribery in Indonesia**

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The National University of Malaysia, Selangor, Malaysia



**Mrs Tinuk Dwi Cahyani**

### **Abstract**

This study aims to examine the fundamental issues regarding the importance of public participation in efforts to prevent corruption in Indonesia which has its own character in the form of bribery. This study uses a normative legal research approach that is: a conceptual approach, statute approach, case approach. The research results can be concluded, namely: first, on the report in the form of information, suggestions, and opinions as public participation, the community has the right and responsibility in obtaining services and answers from law enforcers. Second, in carrying out participation in the prevention and eradication of corruption, the public has rights and responsibilities whose implementation adheres to the principles or provisions stipulated in the prevailing laws and regulations and by obeying religious norms and other social norms. Third, in order to guarantee protection for whistleblowers for their participation in the eradication of corruption, confidentiality is also stipulated for the reporter. In order to be an effective control, people must be smart, know and understand their rights and obligations as citizens, who have a nature of the concern for the future of their nation and country. This research is expected to be able to contribute to anti-corruption activists as required by Sustainable Development Goal 2030.

## Inspired by Law? – Contractual Approach on Closed-Loop Supply Chain

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### Abstract

In the ongoing pandemic, options for repair and recycling face challenges. Instead, takeaway options have become the preferred – albeit often the only available and thus not entirely voluntary – choice. Contractual frameworks for a closed-loop supply chain are required as they may facilitate recycling even in pandemic times. The paper will pursue a contract-chain approach combining both top-down and bottom-up approaches. The contractual relations involved along a closed-loop supply chain (manufacturer-retailer-logistic service provider (3PL)-costumer) will be examined from a contractual perspective. Taking into account the operational processes, it will be assessed to what extent contractual and policy-related improvements are possible to achieve a closed-loop supply chain. For that purpose, international uniform law and German law will provide the main legal basis. The current COVID-19 situation has led to a boost in e-commerce and challenges the target of sustainable production and consumption. For commercial parts of an international supply chain, either national law or international conventions on the transportation or sale of goods apply. None of the currently applicable rules pay attention to sustainable production or consumption. The sales contract – between manufacturer and retailer or retailer and costumer – is an agreement with a definite duration and with a designated end-of-life product status. There are no rules on whether the 3PL, the retailer or the manufacturer is obliged to take back the goods to recycle them. Exercising a right to cure after several months is not combined with pick-up and packing services. This contradicts the desired decrease in packaging waste. Defect-unrelated return systems for end-of-life products are not included in sales law. Ensuring a closed-loop supply chain will also require securities or insurances along the supply chain to combat insolvency risks and compensate for the unavailability of individual participants. The paper will discuss at which points along the contractual supply chain new duties should be implemented and where regulatory measures may be required. One way could be to extend the logistic contract between the retailer and 3PL to a return service. This may even offer advantages to retailers attempting to prove the poor condition or quality of goods to their respective partners and to seek remedies. An alternative would be to include “buy-back” or “pick-up for recycling” options or “recycling guarantees” in the contracts between retailer and manufacturer or costumer and retailer. Further, renting or lending packing container or package that conveys the goods (“packing units”) could reduce waste in the transit of goods. The options could be combined with, for example, a “reward-penalty” approach to make a closed-loop regime also economically attractive to all participants. The topic relates to SDG 12 (Responsible Consumption and Production) and notably to targets 12.5 and 12.6. Furthermore, it addresses the question of how contractual models can offer incentives for recycling despite pandemic-related restrictions.

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## Differences in the national regulation of management of protected areas as limitations for transboundary cooperation for nature conservation: case of the Pasvik – Inari Trilateral Park (Norway, Russia, Finland)

Ekaterina Vasilenko<sup>1</sup>, Ekaterina Bliznetskaya<sup>2</sup>

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### Abstract

The IUCN considers cross-border cooperation between countries, as well as the creation of transboundary protected areas, as one of the most effective mechanisms for preserving the environment and biodiversity, which is also in line with SDG 15 – Life on Land. The Pasvik – Inari Trilateral Park is an example of such cross-border cooperation. Located in three countries (Norway, Russia, Finland), the park is “renowned for its cultural values and rich nature”.

Nowadays in the territory of the trilateral park one of the sites have a high degree of protection (the joint Norwegian – Russian Pasvik Nature Reserve), in which any economic activity is prohibited, in other parts (Øvre Pasvik National Park and Øvre Pasvik Landscape Protection Area in Norway), tourism and other economic activities, including reindeer husbandry, are allowed. This leads to environmental problems in the Pasvik – Inari Trilateral Park – domesticated reindeer from Norwegian part destroy the ecosystem on the Russian territory of the park. Attempts to resolve this issue at the intergovernmental level were unsuccessful.

This case raises the following questions: why does one natural territory with similar characteristics in different countries have different conservation status? What factors influence the assignment of the territory of a protection status? To answer these questions, first of all, the categories of protected areas in Norway and Russia that currently exist was considered. Then using the triologue model of governance, the role of government, society and a scientific community in the creation and management of protected areas in Russia as well as in Norway according to current legislation was analyzed.

This research revealed that despite a number of general characteristics (similar approaches to the classification of protected areas, the key role of the government in decision-making, limited participation of society and scientific community), the management systems of protected areas that have developed in both countries will rather hinder than help to resolve the situation in the Pasvik - Inari Trilateral Park. The reform carried out in Norway in 2009 may complicate possible negotiations between the Russian and Norwegian parties on the change of agreements at the international level regarding the Pasvik - Inari Trilateral Park. According to this reform decision-making on protected areas has been moved to the local level, there often environmental protection issues vie with the needs of landowners, resource users and tourist businesses.

Since the triologue model of governance is based on a balance between three actors, a possible solution to this situation may be the active involvement of the professional and scientific community, both in the negotiation process and in the management of protected areas, since professional expertise in nature conservation is characterized by the use of scientific arguments, the definition of issues in technical, non- political terms and by processes on the bureaucratic arena. Moreover, a similar approach may contribute to solving other cases related to use and management of natural resources.

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## **Innovative environmental governance of rivers: comparison of the legal personhood governance structures of three rivers in New Zealand, India and Bangladesh, and the underlying motivation.**

prof tineke lambooy<sup>1</sup>, master in law and philosophy alex putzer<sup>2</sup>, dr laura burger<sup>3</sup>

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**prof tineke lambooy**

### **Abstract**

**Purpose:** Recently, three important rivers in Asia and Oceania were acknowledged as legal persons. In 2019, the Bangladesh Supreme Court declared that the Turag River be regarded as a legal person. The High Court in the Northern Indian state of Uttarakhand ordered in 2017 that the Ganges and its main tributary, the Yamuna, be accorded the status of living human entities (which has been disputed by the Uttarakhand government before the Supreme Court of India). In 2017, the New Zealand government granted legal personhood to the Whanganui River. This paper explores the motivation behind these innovative ways of environmental governance. Next, the paper analyses and compares the new governance systems as outlined in the legal documents that created these Rights of Nature in the three jurisdictions.

**Methodology:** Employing doctrinal research, thereby examining original legal documents, academic papers and grey literature concerning these Rivers. The authors also have contacted scholars from the three jurisdictions to contribute to this project.

**Results:** The analyses reveal different reasons for proposing these innovative legal structures. They include: providing people access to clean rivers for drinking water, sanitation, transportation and agricultural purposes; preventing that the river disappears; addressing the issue of pollution and toxicity

of river water; acknowledging the divine status of the river; and honouring indigenous rights to the area of the river. Also, different ways of governance have been chosen by the New Zealand legislator and the two High Courts of Uttarakhand and Bangladesh for establishing legal personhood of the three Rivers and their representation. Each of them is discussed in the paper in a comparative analysis.

**Conclusion:** The findings need to be evaluated in the larger context of the UN Harmony with Nature programme (<http://www.harmonywithnatureun.org/>), which contains an overview of cases in which Rights to Nature were granted as well as initiatives to that end. It is important and necessary to carefully and systematically examine each of these cases and initiatives in order to reveal and understand the different ways in which Rights of Nature are being established and how each of such ways functions.

## Conservation litigation could remedy biodiversity loss

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### Abstract

(We hope to please be considered for both track 9d and 3a.)

Anthropogenic biodiversity loss, driven by actions such as illegal wildlife trade, deforestation, pollution, emissions and mining, is responsible for cascading ecological, social, and economic harm. These impacts place growing demands on legal systems to tighten regulations, improve safeguards and standards, and hold relevant parties responsible. Importantly, these impacts increase the need for additional legal pathways to remedy harms to biodiversity.

Laws in many countries allow lawsuits to hold parties liable for harming the environment, typically through civil and administrative law—including in Brazil, Indonesia, the United States, France and other European Union members, the Democratic Republic of Congo, Mexico, India, China and the Philippines. Landmark cases, such as the Exxon Valdez and Deepwater Horizon oil spills, held responsible parties liable for undertaking clean-up, restoration costs and compensatory payments to victims. Similar lawsuits could help address widespread harm to biodiversity, including threatened species. We propose that such conservation litigation could provide new remedies, creating avenues for justice, and financial support for conservation. However, the body of precedent cases, expert guidance, and necessary experience to expand lawsuits to address a broader range of harms is nascent.

We explain conservation litigation from a multidisciplinary perspective, in terms of three key dimensions: 1) defining the harm that occurred, 2) identifying appropriate remedies to that harm, and 3) understanding what remedies the law and courts will allow via lawsuits. The aim is to create an accessible understanding of what lawsuits seeking remedies for harm to threatened species could look like. We do this by drawing on legal principles and comparative international law, while focusing on the specific example of civil lawsuits in Indonesia. We draw on a hypothetical case involving the illegal trade of one Bornean Orangutan, and explain how litigation in a civil lawsuit is possible.

We lever this example to create a generic framework for developing lawsuits that seek to provide remedies for threatened species. We argue that these types of cases merit greater cross-disciplinary cooperation and attention, as an important response to contemporary biodiversity loss.

Relationship to Conference topic: The abstract links to accelerating progress towards SDGs in a time of crisis by proposing legal approaches that can help with environmental restoration and justice, and providing guidance on implementation. The framework we outline is applicable across jurisdictions. It is designed to simplify the complex interdisciplinary topics of creating damage claims into something achievable, to promote greater legal action.

## A Global Environment Trust to Combat the Ecological Crisis

Aleksandra Balyasnikova-Smith

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### Abstract

I present a case for the global environment trust which imposes fiduciary duties on States in managing the global commons. My argument is two-fold. First, to ascertain the existence and content of the principle of trust as a general principle within the meaning of Article 38(1)(c) of the *ICJ Statute*. Second, to apply the said principle to the global environment. I thus introduce the 'general principle of trust' and 'global environment trust' as innovative approaches for the sustainability law. I mainly employ doctrinal and comparative methodologies, while also canvassing a potential impact of the said principles on accelerating the progress towards the Sustainable Development Goals ('SDGs'). Specifically, these principles can inspire the creation of global and domestic institutions to protect the environment and inform international and national policies on the matter.

My findings illustrate that the general principle of trust is ascertainable from national legal systems representing diverse legal families and regions of the world. These include the civil law, common law, customary law, mixed legal systems and Muslim law legal families as present in the regions of Africa, Asia, Europe, Latin America and the Caribbean, Northern America and Oceania. Additionally, I show that the principle of trust is transposed to the international level through its embodiment in various forms such as Global Environment Facility, International Seabed Authority, United Nations' Trusteeship system, etc. The common principle shared by the diverse legal system provides that trust arises where one person (trustee) holds, possesses or controls property or rights (trust assets) and administers them for the benefit of another (trust beneficiary), or with a view to achieving a specific purpose.

Consequently, the general principle of trust binds States as an unwritten source of law and applies to various fields including the global environment. In the latter case, the said principle gives rise to the global environment trust which: (i) imposes fiduciary obligations on States as trustees to act in the sole interest of humankind as trust beneficiaries, (ii) renders States accountable for their administration of the global environment as trust asset, and (iii) gives the trust beneficiaries a legal interest in the trust assets, substantial and procedural rights, as well remedies for the breach of trust. This illustrates the value of the global environment trust in the potential long-term legal protection of the global commons for present and future generations.

This Abstract specifically relates to (i) SDG 12 + Targets 12.5, 12.6, 12.8, (ii) SDG 13 + Targets 13.1, 13.2, 13.3; (iii) SDG 14 + Targets 14.1, 14.2, 14.C; and (iv) SDG 15 + Targets 15.3, 15.4, 15.5. Although my paper primary focuses on the environmental protection, it potentially impacts the interconnected economic and social dimensions of sustainable development. This abstract is also directly relevant to the topic of the Conference because my paper proposes a legal pathway to clarify and heighten the responsibility of States with respect to the global environment.

**THE HUMAN RIGHTS CRISES AND THE ECONOMIC IMPACT: MALAYSIAN EXPERIENCE ON COVID-19 CONTAINMENT MEASURES IN THE CASE OF FOREIGN WORKER**

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**MRS MAFUZAH MOHAMAD**



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**Abstract**

In the National Transformation 2050 Plan, Malaysia aims to become the 20th best nation in the world in economy, happiness, creativity, and innovation. This strategy relatively has a significant impact on the workforce. Undeniably, foreign workers are making a major impact on the Malaysian economy. In reality, the addiction and reliance on the foreign workforce are escalating, and this country has been hosting millions of foreign workers for decades. Prior to the outbreak of COVID-19, Malaysia is already muddled with the treatment of the foreign workers and part of the government containment measure in flattening the curve of the COVID-19 pandemic. Malaysian is seen to be at the lowest point in its effort in handling the crisis. Although the government promised not to detain illegal workers during the screening process, the decision is overturned, and as a result, all undocumented foreign workers are being detained in immigration depot regardless of their status. This decision has hindered the process of containment, as exercising physical distancing is impossible in the cramped detention centre. Moreover, the health facilities provided in the detention centres are not at par with what been enjoyed by the local citizen. This scenario had gained global attention as it violates human rights law. The protection of labour rights is parallel with the Sustainable Development Plan 2030 in Sustainable Development Goals (SDG) 8 as in Target 8.8. Furthermore, the outbreak has a causal impact as it has impaired the economy since most Malaysian workforce relies on foreign workers. This paper reviewed the containment measures adopted by the Malaysian authorities using the secondary data's content analysis and literature reviews. The focal point of discussion emphasised the containment measures adopted by the government, the human rights law that comes with it, and its effect on the economy. Malaysia is determined to achieve economic growth as in Target 8.1 and strives in enhancing production by diversification, technical development, and innovation as in Target 8.2. Economic stability must be the government priority as of now, and along the way, the suppression matters must be exercised carefully by not violating any legal provision. This paper offers several immediate solutions to curtail the virus's spreading, namely an advance screening test to foreign workers to allow those who are positive to be isolated besides immediately review the entry protocol of illegal immigrants into the Immigration Detention Depot. The government is also urged to legalise undocumented foreign workers' status. Since their presence distorts the economy, the government agreed to remove an earlier cap on recruiting foreign workers to secure local employment in most industries. Thus, they would be confined to involve in construction, agriculture, and plantation sectors only. Indeed, the planning cannot be materialised without the holistic approach and cooperation from all government machinery and society at large.

**Keywords:** COVID-19, pandemic, human right, foreign worker, economy, containment

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## The legal identity of social enterprises in the Netherlands: what determines the choice of the legal form

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### Abstract

**Purpose:** This study aims to examine the way social enterprises are organized in the Netherlands in terms of legal form, while using the Dutch legal system that does not provide supportive legal forms to social enterprises. Furthermore, legal developments concerning new legal forms for social enterprises in the Netherlands are provided and explained. In that context, the study identifies the factors that drive social entrepreneurs in the Netherlands to choose for a specific legal form.

**Theoretical framework(s):** Economic, organizational and sociological theories are considered to indicate in which way legal aspects of entrepreneurial organizing interact with economic and organizational aspects.

**Method:** This study employs desk research and an empirical mixed method research design which comprises the use of qualitative and survey methods for the collection and analysis of data. The examined sample includes social enterprises which operate in different sectors, with different sizes, legal characteristics, social objectives and organizational activities.

**Findings:** The findings demonstrate the variety of legal forms, structures, and ways of organizing that Dutch social enterprises currently undertake. The prevalent preferences of social entrepreneurs in the Netherlands for certain legal forms as well as the dominant way of legal structuring and organizing of Dutch social enterprises is provided. The factors that determine the social entrepreneurs' choice of legal form are identified.

**Conclusion:** This study contributes to the discussion concerning the development of regulatory environments and formal institutions that facilitate and/or inhibit the activities of social enterprises.

## MONITORING INSTITUTIONAL CAPACITY ON THE ELVs DEREGISTRATION POLICY FOR SUSTAINABLE ENVIRONMENTAL EFFECTIVENESS

Assoc. Prof. Dr. Jady Zaidi Hassim, Dr. Muhammad Helmi Md. Said, Prof. Dr. Hasani Mohd. Ali, Assoc. Prof. Dr. Rasyikah Md. Khalid, Ms. Norhafizah Zainal Abidin, Ms. Nurhafizah Ngatiran

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### Abstract

A proper deregistration policy for ELVs is essential in ensuring the proper implementation of sustainable waste and recycling processes. Besides policy, the comprehensive design of the monitoring system for local authorities and governmental agencies should also be created according to the specific procedure for environmental effectiveness. Considering such environmental problems arise from improper deregistration of ELVs, the study aims to examine the federal government's task to monitor the institutional capacity as provided by Rules in section 66 of the Road Transport Act. ELV deregistration policy can be designed most effectively and efficiently in line with the Sustainable Development Plan 2030 on SDG 12 (sustainable consumption and production) for three reasons: to empower the local authorities and governmental agencies to execute such a task; to improve the monitoring system on the institutional capacity, and to ensure the improvement of sustainable environmental effectiveness. The study reviewed the designed Rules using content legal analysis, literature reviews, and comparative case study. In order to control ELV generation and its recycling process, the discussion emphasised that (1) the amendment of law seeks to explain the provision that empowers the Minister to set a procedure for deregistration of the vehicle and to improve the process of vehicle deregistration for any practical purpose; (2) the deregistration requirement should be strictly regulated to achieve specific targets under SDG 12 which includes: environmentally sound management of all wastes throughout their life cycle (Target 12.4); substantially reduce waste generation (Target 12.5); and compliance with the national policies and priorities (Target 12.7). Upon compliance, both deregistration certificate and institutional authorisation have significantly improved the capacity control of ELVs flow, ending up with proper recycling process; and (3) a monitoring system that requires interoperable data related to deregistration, statistics of scrapped ELVs, and steps to improve the environmental performance of ATF dismantlers or recycling facilities for proper adherence to the designed Rules and Agenda 2030.

Keywords: ELVs Deregistration Policy, Environmental Sustainability, Monitoring Effectiveness.

## Sports Dispute Resolution: Is Malaysia serious towards achieving Sustainable Development Goals by 2030?

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### Abstract

*As the internationalisation and development of sports continue to evolve, disputes in sports are also rising globally, and Malaysia is not an exception to this trend. This article addresses the urgent need for a comprehensive study of the relationship between sport dispute and the Goal No 16 Sustainable Development Goals enshrined in the 2030 Plan for Sustainable Development, the global development platform of the United Nations. Therefore, the question arose as to whether the current Sports Dispute Resolution in Malaysia is in line with the Sustainable Development Goals 2030 to ensure justice in support of effective, responsible, and inclusive institutions, transparent and fair practices are essential for ensuring people's trust in the administrative body and government. However, due to conflict, insecurity, weak institutions and limited access to justice remain threats to sustainable development. In 2019, the number of people fleeing war, persecution and conflict exceeded 79.5 million, the highest level recorded since these statistics have been systematically collected. The COVID-19 pandemic threatens to expand and exploit instabilities across the globe. The article aim is to examine the legal position under the Malaysian Sports Development Act 1997 to what extent it protects Malaysian athlete's interest. The legal study conducted by using content legal analysis, literature reviews and comparative case study. The results indicated a need to amend the sport resolution dispute for better protection to Malaysian athletes. This article will benefit the Malaysian Ministry of Youth and Sport to formulate a policy, guidelines, and legislature in realising its Kementerian Belia dan Sukan (KBS) Strategic Plan and to all stakeholders in sports industry. Recommendation for improvement is proposed as it is not only timely needed but also to advocates good governance for the sport structure industry and improves its ecosystem. Upon improvement as this article proposed, it is expected that it will bring huge relief to all stakeholders in sports industry for proper adherence of SGD 2030 and will also offer the sustainability law for institutional change and government policy towards future generations. The paper concludes that the legislation in force seems ineffective for ensuring a proper level of protection. In order to achieve SGD 2030 goals, the discussion emphasised(1) the need to amend the current Malaysian Sports Development Act, and (2) the demand to harmonise the Act with the National Governing Bodies constitution in order to ensure justice for all (Target 16.3).*

## Assessing the effects of the Directive 2014/95/EU on Nonfinancial Information Reporting: Evidence from Italy and Spain

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### Abstract

This paper explored the effects of the Directive 2014/95/EU on the disclosure of nonfinancial information (NFI) in two European countries, Italy and Spain. Content analysis was performed to verify the sustainability indicators disclosed by Italian and Spanish companies before and after the Directive's publication, and its implementation into the two national legislations. The level of NFI disclosure was scored using a disclosure index. The comparative analysis found a progressive reduction in the Italian companies' disclosure levels differently from the Spanish ones for which an expansion of the disclosure was detected. The Italian response to the new requirements can be interpreted in different ways. It might result from a process of rationalisation supporting more effective communication; from a prudent approach to disclosure induced by the provision of mandatory assurance of NFI (Raucci and Tarquinio, 2020; Tarquinio et al., 2020); from a “tick-box” mentality under which companies exhibit an apparently responsible behaviour (Caputo et al., 2020). The increase in Spanish disclosure levels, on the one side, could be the expression of the positive attitude toward compliance that generally drives companies operating in countries with prior regulation (Venturelli et al., 2019). On the other side, given the ineffectiveness of the previous regulation (Luque-Vílchez and Larrinaga, 2016), it might represent an attempt to fill the information gap still existing in Spanish reports. Findings also reveal a reduced gap between the quantity of NFI reported in the two countries, supporting the hypothesis that regulation can produce harmonisation (Caputo et al., 2020).

SDG 12.6 encourages companies “to adopt sustainable practices and to integrate sustainability information into their reporting cycle”. By measuring and disclosing their social and environmental impacts, companies can assess their contribution to sustainable development and establish new strategies in this direction. The EU Directive has significantly contributed to fostering corporate transparency and accountability on several SDGs topics (Pizzi et al. 2019). Consequently, evaluating the impact of the new requirements on NFI can help understand the European path towards the achievement of SDG 12.6.

(SDG + Target: 12.6)

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## “Sustainable” financing in times of crisis: the role of securitisation in advancing SDGs

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### Abstract

The Sustainable Development Goals and the Paris agreement have paved the way for the progressive integration of “sustainability” considerations in financial regulation and investment practices. They have highlighted the pressing need for private cash flows to meet the global objectives in the environmental, social, and governance sphere. Besides, they have also prompted a vivid discussion about the financial risks derived from climate-related events and about the losses and opportunities associated with the transition to a low-carbon economy.

This has triggered a multitude of regulatory initiatives at the national, international, and market level, seeking to steer capital flows in a sustainable direction.

At the same time, investors’ demand for bonds, loans, and other financial instruments which pursue ESG (environmental, social and governance) objectives has skyrocketed: the amount of global financial assets with these characteristics has more than tripled over the last 8 years, leading to \$40.5 trillion in 2020. [\[1\]](#) There is preliminary evidence that the COVID-19 crisis has not halted this trend, but that it has strengthened investors’ confidence in investments in the “social” sphere of sustainability.[\[2\]](#)

In spite of the boom of “green” bonds and loans, which finance environmentally-friendly projects, policy-makers and literature seem to have paid only marginal attention to the potentials of securitisation. It is a financing technique, especially used by larger institutions like banks, which converts credit claims, like leases and mortgages, into tradable financial instruments. Since 2014, there have been only seminal examples of deals embedded with “green” credentials and various practical and regulatory constraints seem to curb the development of the sector.

Against this background, my paper will situate securitisation within the “sustainable finance” debate. It will describe its potential for the political agenda on sustainability. It will also shed light on the need for a robust legal framework to support the growth of the sector. In particular, soft law instruments like standard clauses are needed to establish uniform conditions for such operations.

It is argued that securitisation has an added value compared to other financing mechanisms in advancing the sustainable finance agenda. Wider use of this technique could be a step forward in bridging the SDGs investment gap, a persisting concern in the recovery from the COVID-19 crisis.[\[3\]](#) Pooling together different credit claims allows originating entities to mitigate their default risk. Therefore, securitising “green” and “brown” assets could protect companies against the severe losses caused by climate-related events (13.1). Besides, the issuance of capital market instruments could facilitate access to finance for energy-efficient improvements (7,3, 9.4). It could also mobilise investors in support of climate activities (13.1) and innovative projects which step up renewable energies (7.2).

[1] Bloomberg, *'The evolving S in ESG'* (24 September 2020) <https://www.bloomberg.com/company/stories/the-evolving-s-in-esg/>

[2] UNEP, *'Implications of the COVID-19 Pandemic for Global Sustainable Finance: an initial framework for response strategies'* (2020) Working Paper

[3] UN, *'The Sustainable Development Goals Report 2020'*

## CONSTITUTIONAL CLIMATE LITIGATION IN COMMON LAW (Working Title)

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### Abstract

In 2009 Rockström and his colleagues introduced the theory of planetary boundaries. They affirmed that, anthropogenic pressures on the Earth System have reached a scale where abrupt global environmental change can no longer be excluded. These planetary boundaries are interdependent and, transgressing one or more of them may be deleterious or even catastrophic due to the risk of crossing thresholds that will trigger non-linear, abrupt environmental change within continental- to planetary-scale systems. Furthermore, the social impacts of transgressing boundaries will be a function of the social–ecological resilience of the affected societies.

This theory provides a helpful concretisation of the ecological limits within which economic development must be allowed to occur. Furthermore, it helps put into focus the moral need to establish and enforce the right of a healthy environment; since Earth’s natural resources constitute the sustenance, shelter and energy of human civilisation and must be preserved for future generations. The paper analyses the recent phenomenon of grassroots constitutional climate litigation to limit and to redress the ecological disasters and the socio-ecological harm caused by climate change.

It first provides a theoretical overview of how nonviolent civil resistance, specifically youth-led movements, use adversarial legal tools to attain the articulation of new rights [New rights for communities in the form of a climate change recovery fund, and new rights for the environment in the form of a recognition of juridical personhood]. It does so by using the history of the NAACP as a paradigmatic example of using constitutional litigation to achieve social and political change.

Then, it provides an in-depth analysis, using the case study of *Juliana v. United States*, of constitutional legal actions from grassroots youth-led organisations protesting governments’ inaction on climate change and their support for fossil fuel industries.

The paper concludes highlighting the difficult debate of who own the Earth natural capital and it poses that at the very heart of these lawsuits stands the question of who owns the Earth resources and, to what extent the general public can claim the services that the Earth provides as common property. Finally, it provides some ideas on how these new types of litigation could establish important precedents for any future constitutional climate litigation.

The contribution relates to the topic of the conference because it analyses from a legal point of view how the use of legal tools by grassroots organisations could be a useful method to achieve the recognition of a right of intergenerational justice, and to establish new legal principles for a more sustainable use of the Earth resources. For this reason this abstract relates to **SDG Goal 13: Take urgent action to combat climate change and its impacts, and it especially relates to target 13.2.1.**



## Legal and Judicial Aspects of Sustainable Development in Nepal: A Bird's Eye View

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**Mrs. Rupa Basnet Parasai**



**Miss Kripa Shrestha**

**Abstract**

Nepal has recently promulgated a federal Constitution in the year 2015. This new Constitution comes with new facets, endorsing various international environmental law principles, mainly the polluter pays principle, precautionary principle, inter-generational principle and principle of sustainable development. It is a paradigm shift from rhetoric constitutions of 1990 and 2006. The present Constitution is a progressive constitution that has embraced these well-established principles in Article 30 of the Constitution along with defining the duties of each citizens to protect the environment.

Promulgation of new Constitution recognizing and upholding these international environmental principles, shows Nepal's sincerity in maintaining a balance between right to development and right to clean and healthy environment, as was discussed for the first time in Stockholm Conference in 1972. Sustainable development as defined in Rio Conference of 1992, is keeping a balance between development and environment protection to meet the needs of the present as well as that of the future generation. Paradoxically, with the slogan of "Prosperous Nepal, Happy Nepali" of the current Nepalese government, the main focus is economic development. Nepal being a least developed country, development is a necessary, but it is also important to evaluate the impact of these state desired mega projects on the environment. However, the legal development over the last few years show that Nepal is committed to maintaining this balance. The very notion of sustainable development and its elements such as polluter pays principle and precautionary principle has been encapsulated in the Constitution 2015. Further, these principles have also been incorporated in recently enacted Environment Protection Act 2019, an umbrella Act encompassing the provisions of protecting environment with the objective of sustainable development. With the recognition of the need of sustainable development in the Constitution and in environment protection laws, the judiciary of Nepal has also played a pivotal role in explicating the term sustainable development in Nepalese context. Even before the term "sustainable development" was coined in international arena, Nepalese judiciary had already pioneered the concept by giving decision providing for safeguarding of the environment while also promoting developmental activities.

The apex court in many environment-related writs has established the need for sustainable development as well as give value to other principles of environment law. Infrastructure development and incorporation of the principle of sustainable development indeed remained a precursor in concurrence of it as legal principle, in the context of Nepal.

The authors argument would be on the applicability of sustainable development under the Constitution, highlighting the judicial decisions that the Supreme Court has propounded. The arguments will further be based on the SDG Goals number 6, 7, 9, 13, 14, 15, 16 and 17.

Nepal being a least developing country, there is still a bitter debate ongoing about economic development versus environment protection. The recent ongoing debate is the construction of an international airport in the Nijgadh area by cutting down almost 2.4 trees in the area. This Article will thus be relevant in viewing the debate in a legal and practical viewpoint.

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## **River Pollution: Issues in Securing Water for All in Malaysia**

River Pollution: Issues in Securing Water for All in Malaysia Nurul Aini Yaacob, Rasyikah Md Khalid

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### **Abstract**

Malaysia has developed many policies and laws ensure water resources sustainability under le Sustainable Development Goals (SDG) 6 and 16. However, river pollution remain a problem and has caused water disruption and discomfort to city dweller. In 2020, four major pollution incidents in Selangor has caused water supply disruption for over one million consumers, while pollution from pig farming in Penang and chicken farming in Johore have caused bad odor and discomfort. This paper employs a doctrinal research to review related laws policies and laws in Malaysia, as well as articles and commentaries on the subject. This analysis reveals that water resources are matters under the state government jurisdiction; hence, each state should review and enforce pollution related offence under their respective state enactments. The sources of pollution also varies and the licensing authorities must monitor the activities to avoid continuous pollution, and not leave this duty to the state water resources authorities. Attempts have been made to impose higher fines to deter the polluters, including using The Security Offences (Special Measures) Act 2012 (SOSMA. Based on the reviews, legal measures against water pollution are adequate, but lack of coordinated.

Keywords: SDG 6, SDG 16, river, pollution, laws, Malaysia.

## **SAVING THE FOREST: LEGAL ISSUES IN CATCHMENT PROTECTION IN MALAYSIA**

Saving the Forest: Legal issues in catchment protection in Malaysia Amilin Ruzman, Saving the Forest: Legal issues in catchment protection in Malaysia Rasyikah Md. Khalid

Universiti Kebangsaan Malaysia, Bangi, Malaysia



**Saving the Forest: Legal issues in catchment protection in Malaysia Amilin Ruzman**



**Saving the Forest: Legal issues in catchment protection in Malaysia Rasyikah Md. Khalid**

### **Abstract**

Demand for water is rising due to population growth, urbanization and industrialization. However, the availability of water resources decreases because of deforestation and destruction of water catchment. This, together with illegal logging, has increased sedimentation and caused river pollution. There is no

specific laws on water catchment in Malaysia and leads to inadequate protection of water catchment. Doctrinal analysis on the laws and policies on forest and catchment protection reveals overlapping jurisdiction between the State and Federal government in this matter, hence resulted in inconsistent catchment management. A comparative analysis on other jurisdiction demonstrate that the law and regulations on catchment protection are needed to ensure strict enforcement and protection. This paper recommends the importance of the role of government and stakeholder in protecting water catchment and provide better information to authorities for creating a more sustainable forest and catchment development in the future. This will also enhance sustainable development goals no. 6 on water security, whilst ensuring sustainable life below water (SDG 14) and life on land (SDG 15). Forests are also the green lung for the earth and will reduce the impact of global warming and climate change (SDG 13).

**Criminal Offender With Disable Abilities: Call For Fair Treatment In Pre-Trial Process**

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**Mdm Alizah Ali**



**Dr Muhammad Helmi Md Said**



**Assoc Prof Dr Ahmad Azam Mohd Shariff**

### **Abstract**

World Health Organization has reported that 10% population of each country are persons with disable abilities. In Malaysia, it was reported about 497,390 persons are registered as persons with disabilities in 2018. Even though the amount is quite big, they are treated as a normal person when it involves the pre-trial process for criminal offences. This is not in line with the sustainable development goals as they aim to reduce the inequalities and to provide peace, justice and strong institutions which is referred to judiciaries institution. Therefore, this paper aims to examine and analyse the issue of fairness while treating criminal offender with disable abilities in Malaysia during the pre-trial process. The doctrinal analysis is adopted by analysing the current primary and secondary materials which include case law, statutory provisions, and other legal and non-legal literature. Furthermore, the comparative analysis refers to the system of the judiciary for treating persons with disable liabilities in United Kingdom, New Zealand and Australia. Consequently, the criminal pre-trial process in Malaysia is found to be conducted without any difference between a normal offender and offender with disable abilities. Because of the special characteristic of the offender with disable liabilities, there is a possibility that lead to injustice process and judgement. Therefore, it is suggested that the Governement of Malaysia should have a standard operation procedure in dealing with disable offender in the process of pre-trial to cater the special needs and treatment for such offender.

*Keywords: Criminal Offender, Disable Abilities, Reduce Inequalities, Sustainable Development Goal, Standard Operation Procedure.*

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## **The Human Right of Migrants As An Accused Person in Malaysian Syariah Court: A Critical Analysis**

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National University of Malaysia, Bangi, Malaysia



**Miss Multazimah Rafie**



**Associate Profesor Shahrul Mizan Ismail**

### **Abstract**

Abstract

The rights of an accused in a criminal proceeding is a fundamental human right for everyone regardless of whether he is a citizen or a migrant. This protection is provided in several legal instruments as a guarantee of fair justice for all. Despite the rising number of migrants accused of Syariah criminal offences in Malaysia, there are neither specific standard operation nor specific provisions in any Syariah Criminal Procedure regarding this matter for migrants. This may expose migrant accuseds to harmful acts and may affect his rights during proceedings. This paper aims to investigate how Syariah Court protects a migrants' right as an accused in criminal proceedings. On top of that, this paper identifies migrant offender rights in Syariah Criminal Procedure Enactment, constitutional provision of Malaysia and the manual procedure of Syariah court. In doing so, it will analyse the respective manual for investigation, and procedure for pre-trial, trial and post-trial used by Syariah Courts in Malaysia. This is a qualitative study which utilises documents analysis approach in its data collection. The study found only general protection provided in the respective Syariah Criminal Procedure Enactment and Standard of Operation regarding migrant offender rights. This study will recommend an amendment of syariah law in this regard, and an improvement for standard of operation for Syariah Courts in Malaysia . This study is to ensure rights of migrant accused in Syariah Court and to improve application of Syariah law from human right perspective.

Keyword :

migrant rights, Syariah criminal procedure, right of accused

## Partnering with Indigenous Peoples for the SDG: Addressing Issues and Challenges of Free, Prior And Informed Consent (FPIC) in the ASEAN Member States

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**Dr Muhamad Sayuti Hassan**

### Abstract

Free, Prior and Informed Consent (FPIC) is one of the most critical principles that can safeguard indigenous peoples' right to participate in the decision-making process. It is rooted in the right to self-determination of indigenous peoples as enshrined in Article 3 of the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP). Irrespective of any current recognition in international law, the indigenous peoples in the ASEAN Member States including those of the *Orang Asli* in Peninsular Malaysia, Indigenous Cultural Communities (ICC) in the Philippines and *Masyarakat Adat* in Indonesia, face a lack of recognition of their right to customary land and participation in the decision-making process, marginalised and dominated by the majority due to conflicting interest over natural resources and the rights of indigenous peoples over their territories. It is self-evident that a lack of legal recognition in the decision-making process and FPIC is profoundly disruptive to the attainment of Sustainable Development Goals (SDG) 2030. Therefore, the main objective of this article is to critically analyse the law in theory and practice on FPIC as part of the right to self-determination of the indigenous peoples in ASEAN by looking at standards in international law. As the study focuses on the experience of indigenous people in the ASEAN Member States, it evaluates the issues and challenges in applying the principle of FPIC in Malaysia, the Philippine and Indonesia pursuant to domestic law compared to the international law standards. This article is a socio-legal study and adopts a qualitative approach. The study found out that the FPIC in the ASEAN Member States remains to be a regime of

unfulfilled promise. This article suggests several legal and institutional reform to improve the recognition of FPIC as part of the right to self-determination of the indigenous peoples and will substantially complement the realisation of SDG 16 in promoting just, peaceful and inclusive society. Ultimately, the proposed legal and institutional reform will be of great significance and relevance to accelerate the recognition of indigenous peoples to participate in the decision-making process at all levels, especially in the unprecedented challenges of pandemic Covid-19. It is vital to advance the right of indigenous peoples, thus assisting the ASEAN Member States in achieving Target 16.7 and 16.10 of SDG 16.

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## Health, Human Rights and the SDGs: Inter-Linkages in Times of Crisis

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### Abstract

The global Covid-19 pandemic has impacted implementation and achievement of many Sustainable Development Goals (SDGs) and will doubtless result in changes to the ability of States to fully implement their commitments under the SDGs by 2030. This paper will examine the inter-linkages between health and human rights law as reflected in the SDGs and the ways in which these inter-linkages have been and will continue to be tested by governmental and international community responses to the Covid-19 pandemic.

The paper will begin with a discussion of the way in which human rights and health were related under the Millennium Development Goals in order to provide an understanding of the relationship that transferred between the MDGs and the SDGs in 2015. It will then review the SDGs which reflect the inter-linkages between human rights and the SDGs. This review will necessarily focus on SDG 3, but will also address more nuanced areas of connection, such as the nutrition and food security aspects of SDG 2, and the clean water and sanitation elements of SDG 6. Following this, the paper will address the impacts of the Covid-19 pandemic on State implementation of the SDGs as reported in the Voluntary National Reviews filed in 2020 and 2021. While knowledge of the pandemic and associated impacts changes on a near-daily basis, even the VNRs filed at the outset of the pandemic provide insights into the impacts felt on SDG implementation and the shifting in priorities. For example, although the VNRs often demonstrate an increase in funding for health systems, this funding is limited to the Covid-19 context and frequently comes from the reallocation of funds meant for other critical healthcare programs, resulting in a crisis of health and human rights concerns. Finally, the paper highlights the challenges for and gaps in the implementation of the SDGs in the context of health and human rights due to Covid-19.

The paper relates to the following SDGs: 2 (Targets 2.1, 2.2, 2.4), 3 generally, and 6 (Targets 6.1, 6.2). It connects to the conference theme by discussing the ways in which health and human rights concerns are connected to the SDGs and the potential issues for the achievement of SDGs associated with health and human rights due to the Covid-19 pandemic, in order to create dialogue around the processes needed to accelerate the implementation of these SDGs in a time of crisis.

## Should We Call It Moral Money?: Institutional Ownership and Board Diversity

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### Abstract

The debate around the merit of stakeholder capitalism partly ignited by the Study on Directors' Duties and Sustainable Corporate Governance prepared by Ernst Young for the European Commission Directorate-General for Justice and Consumers in 2020 has motivated a deeper reflection on corporate purpose and the transformative power of corporate governance. Corporate governance can afford practical value to stakeholder capitalism if corporate governance rules are based on appropriate standards such as the ones provided by the Sustainable Development Goals (SDGs). To that end, some potential measures afford themselves to empirical inquiry. Some of those measures are creating a regulatory framework that enables the representation of stakeholders such as non-governmental organizations and other pressure groups through the attribution of voting and veto rights and their members' nomination to the management board. The latter measure is similar to German co-determination by which stakeholders like employees are appointed to the supervisory board. Another step could be to expand fiduciary duties to include the protection of stakeholders' interests, accountability of corporate managers, consultation rights, and additional disclosure requirements. Additionally, the role that institutional investors can play to overcome externalities such as climate change and income inequality, for example, should not be understated. In their study [Corporate Purpose in Public and Private Firms](#), Claudine Gartenberg and George Serafeim utilize [Rebecca Henderson's and Eric Van den Steen's](#) definition of corporate purpose, that is, "a concrete goal or objective for the firm that reaches beyond profit maximization." In their paper, Gartenberg and Serafeim analyzed data from approximately 1.5 million employees across 1,108 established public and private companies in the US. In their words: "we find that employee beliefs about their firm's purpose is weaker in public companies. This difference is most pronounced within the salaried middle and hourly ranks, rather than senior executives. Among private firms, purpose is lower in private equity owned firms. Among public companies, purpose is lower for firms with high hedge fund ownership and higher for firms with long-term investors. We interpret our findings as evidence that higher owner commitment is associated with a stronger sense of purpose among employees within the firm." With institutional investors on the rise, these findings are important because they redirect our attention to shareholders' nature, composition, ownership, and long-term commitment. This paper asks the following questions. Do firm ownership and investor commitment matter for aligning corporate governance with the SDGs? Should investors' money be "moral" money? This piece especially relates to SDG 8, Target 8.3, and SDG 10, Targets 10.4 and 10.5. This paper provides guidelines to surmount the tension between prioritizing shareholders' wealth maximization and corporate purpose. Corporate purpose should consider shareholders' and stakeholders' interests by taking into account the company's governance structure and how it relates to its ownership structure and board diversity as critical dimensions to develop new policies in corporate law and corporate governance. Ultimately, this paper sheds light on the role of sustainability law for institutional change.

## Households' food waste - A Participatory Methodological Approach

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### Abstract

Citizens are increasingly concerned about food waste. It is a transversal theme to the whole society. Food waste is receiving growing attention from the scientific community, due to its economic, environmental, and social implications. The EU- Directive on Waste establishes that member states should seek to achieve an indicative target for reducing food waste at the EU level of 30 % by 2025 and 50 % by 2030. At the EU level, household food waste accounts for over 50% of the food wasted along the value chain.

This paper aims to discuss the measures and actions focused on reducing households' food waste and their contribution to sustainable development. Towards this end, at first, a systematic review of measures and actions is used to understand what has been implemented across the world to incentivize food waste reduction with a focus on households, as they are responsible for a significant amount of waste. This inventory will allow for a better understanding of the types of measures and actions that have been experimented with and that could be articulated and incorporated within integrated food waste management strategies at the local, national, and even the international level. Reference will also be made to the framework of European Legislation (Directive 2007/98 / EC of the European Parliament and of the Council of 19 November 2008) and Portuguese National Legislation on waste and food waste. Secondly, our purpose is, from those previously selected measures and using a participatory methodological approach analyze the choices that the 6 focus groups from the municipalities of Porto and Maia, two cities located in the second largest metropolitan area in Portugal made regarding the most effective in combating food waste in their households. An in-depth content of the focus groups carried out analysis is used to understand whether the Portuguese households are in fact in tune with the measures that resulted from the previous review. The paper will also address the role currently played by legal instruments in fighting food waste and how these could be enhanced, built on the Portuguese case.

The findings indicate that the measures should be applied in a holistic way, that the measures are different depending on the municipality that applies them, and that urban gardens could effectively be a way to reduce food waste by households, at a local level Finally a general concerned about the environment and food comes out of this study people want to live in green and sustainable cities.

## A Deluge of Standards: On the Influence of Abundance.

Mrs Martine Bosman, Mr Bart Jansen

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### Abstract

This contribution concerns the question how private regulatory norms concerning sustainable supply chain management can contribute to closing the gap between legal and political goals concerning sustainable development and the practice of Western-based brands operating in international supply chain of ready-made garments?

The RMG industry is a complex, globalised, and unsustainable industry. Profound change is necessary for the RMG industry to become sustainable. However, the fact that the ready-made garment (RMG) industry -together with many other industries- operates at a global level, implies that there is not one state that can regulate the impacts of the supply chain of this industry. Since there is no such unambiguous national legislative authority, combined with the fact that a solution based on formal international legislation is not realistic soon, other alternatives to the formal judicial order of the old governance are necessary to achieve the essential change. The lack of international regulation and the challenges to the traditional regulatory options fuels the need to examine new regulatory options.

In order to answer to an increasingly compelling call for more sustainability from various stakeholders, Western-based RMG brands selling their garments in the EU adopted quality certificates and private regulation. However, this private regulation in the RMG industry has led to a deluge of quality standards and supplier agreements. The question is whether this abundance of regulatory options has a beneficiary influence on the goal of making the RMG industry operate in a more sustainable manner.

Firstly, this contribution develops a theoretical understanding of the complex effects of private regulation in supply chain relations set against the background of a buyer driven RMG industry. Secondly, the sphere of influence of private regulation in comparison to formal law is scrutinised. The paper then describes the effect private regulation can instigate, based on the information gained from two qualitative case studies in the RMG-industry. In the discussion section the effects of implementation of private regulatory norms in the RMG-industry supply chain are discussed.

The influence of regulation regarding sustainable behaviour is examined through the lens of Lawrence Lessig's social-legal theory, which constitutes the so-called 'New Chicago School' (1998). This theory describes a possibility for formal law (rules) to directly influence informal norms (i.e. self-regulation) which can then indirectly influence human conduct. A critical hermeneutic model is employed to analyse and interpret the findings.

Accordingly, this paper contributes to an understanding of the regulatory and normative challenges of a globalised industry trying to make a transition towards sustainable value chains.

*SDG 12.6 and 17.16*

*Relates to 'accelerating progress toward SDGs in times of crisis' through analysing the interconnectedness and influence of formal and private regulation to sustain new regulatory drivers for change.*

## Sustainability and Market Efficiency: Are They in Conflict?

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### Abstract

The proposed abstract is related to “SDG+Target: 8.10”

The proposed analysis is framed within the perimeter of the financial market. In fact, the progress to SGD goals needs, inter alia, a financial regulation able to reconcile the public interest of sustainability (environmental, economic and social) with the private interest of market efficiency. In this perspective, the paper will focus on the legal incentives for sustainable financial investments, as well as on their impact on the financial stability regulation, on the one hand, and investor protection regulation, on the other.

Specifically, the analysis will aim to investigate:

(a) with respect to Financial Intermediaries (especially their prudential regulation):

- whether amendments to bank and insurance companies' capital requirements for sustainable investments (inclusion of sustainability - environmental, social and governance risks - in prudential requirements for banks and insurance companies; see Directive 2019/2034 and Regulation 2019/2033) could compromise the objective of ensuring financial stability, especially if their portfolio includes non-performing loans;

b) in relation to Financial Investors:

- whether and when the integration of sustainability factors, risks and preferences in the legal framework on financial investors' protection (see the proposal of the European Commission amending Delegated Regulation (EU) 2017/565 as regards the integration of sustainability factors, risks and preferences into certain organisational requirements and operating conditions for investment firms) could compromise financial intermediaries' duty to act in the best interest of their clients;

c) with regard to Financial Products:

- with reference to 'product governance' regulation, whether and to what extent public intervention encouraging 'green' financial products ('green bonds', *i.e.* securities that comply with environmental or low-carbon criteria on the basis of the standard proposed by the European Commission's Expert Group on Sustainable Finance, to which any bond issuer or other debt instruments can voluntarily adhere: see Report "EU Green Bond Standard", June 2019) is compatible with market efficiency.

## Tort liability for unsustainable development

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### Abstract

Since the principle of sustainable development was initially formulated in 1992 much has been said about its legal implications in general. However very little attention has been paid to how, if at all, sustainable development may impact a specific area of law, which is liability law. Recent developments have brought the importance of such principle to the fore in light of the undergoing litigation against certain states for not having done enough to fight climate change. More recently, some municipalities have started suing private companies for contributing to the same. The paper analyzes the role of sustainability within this context.

The purpose of the paper is thus to highlight the huge potential of the sustainability principle to overthrow many existing paradigms of current liability law and to make it evolve into something different and still unknown.

The paper draws upon the theoretical framework surrounding the sustainability principle, from its inception and formulation in the Brundtland Report (*Our Common Future*, 1992) to the Sustainable Development Goals (SDGs) presented in September 2015 at the UN General Assembly and beyond. After having explored the legal implications of sustainable development (on which see Mauerhofer, 2015), the paper focuses on its specific implications for tort liability law, both as regards the states or public administrations and private actors (like oil companies). To that regard, the recommendations by the Expert Group on Global Climate Obligations (2015) and the Principles on Climate Obligations of Enterprises (2018) are examined and critically reviewed.

Liability law has for the most part remained foreign to the legal developments concerning sustainable development. Whereas a whole and powerful discourse was eventually elaborated mostly with regard to the technical or economic sides of the principle at stake, while it slowly kept opening its way with regard to international environmental law, among other areas, liability law managed to keep itself apart as if it was some sort of isolated compartment, with the result that it did not receive any significant relevant influence of the sustainable development principle as such. Yet its implications for liability rule are profound.

Theoretical elaborations on the sustainability principle have not yet had an impact on liability law as such, both including the liability of states from an international perspective and liability of the public administrations or private actors from the point of view of (private) tort law.

By focusing on the plethora of new cases revolving climate change liability litigation, of which the *Urgenda* case is probably the best known example, the potential of the sustainability principle to revolutionise liability law is explored.

## **An assessment of Environment Language in International Investment Agreements**

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### **Abstract**

A network of over 3 000 treaties form part of the international investment legal framework. These investment treaties grant international legal protection to foreign investors including direct access to enforce these legal protections through investor-state dispute settlement (ISDS). ISDS is currently facing a legitimacy crisis where States criticize, inter alia, the outcomes of arbitral decision-making as being unbalanced and favoring investors over States. Against this backdrop, States have undertaken various actions aiming at reforming and rebalancing the international investment system. States have started to recalibrate their IIAs by, for instance, redefining investment protections, restricting investor-state dispute settlement provisions or, by incorporating other objectives than investors' protections, such as the protection of the environment and responsible business conduct. The United Nations Conference on Trade and Development (UNCTAD) highlights that 'modern treaty making include a sustainable development orientation, preservation of regulatory space and improvements to or omissions of ISDS.'<sup>1</sup>

In light of these developments, one question is whether the newly incorporated wording of environmental provisions in IIAs can make a difference ? The paper discusses the different types of environmental provisions found in IIAs and analyzes the relevant Investor-State arbitration case law. This study is relevant in order to assess the potential of the international investment system to assist in the achievements of the Sustainable Development Goals (more specifically SDG 17). Foreign investment, as regulated under IIAs, is an important source of finance for development, especially for low-income countries. If carefully tailored, foreign investment can be conducive to sustainable development. The paper also offers further suggestions for enhancing the synergies between the protection of the environment and the protection of investors in investment treaty making with a focus on State regulatory capacity in times of crisis.

[\[1\]](#) UNCTAD, "Recent Developments in the International Investment Regime," IIA Issues Note, May 2018.

## **The Dutch Programmatic Approach to Nitrogen: Article 6 of the EU Habitats Directive as a unsuspected catalyst for a strong sustainability approach in the European Union**

dr. Hendrik Schoukens

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### **Abstract**

During the past decades, the concept of sustainable development has also become an increasingly popular buzzword. As is widely known, sustainable development has three main pillars: economic, environmental, and social, often informally referred to as People, Planet and Profits. Part of its attractiveness is linked to the fact that sustainable development allows politicians to justify policies which often do little more than minimizing continued environmental decline. This has only intensified after the adoption of the UN's 2030 Agenda, which represents the new global sustainable development framework and sets 17 Sustainable Development Goals (SDGs).

In the wake of this global reassertion of the concept of the sustainable development, also the EU has further committed itself to the concrete implementation of the SDGs. With an increasing rapidity, many scholars have criticized the concept for being overly vague and because of the lack of concrete hierarchy between its constitutive pillars. At its inception, sustainability was interpreted as a requirement to preserve, intact, the environment as we find today in all its forms. However, in practice the concept of sustainable development has often given rise to weak sustainability, which assumes the full substitutability of natural capital. In contrast, the strong sustainability concept highlights the non-substitutability and prioritizes the ecological boundaries which are prone to constrain any type of harmful economic development.

For now, the legal status of sustainable development, remains debatable. The lack of over-arching definition substantially affects its binding nature, limiting its enforceability in court. However, in the context of the EU, several environmental directives can serve as a complementary catalyst for enforcing a more ecological understanding of sustainable development. One recent textbook example is offered by the decision of the Court of Justice of the EU on the compatibility of the Dutch Programmatic Approach to Nitrogen (in Dutch: Programmatische Aanpak Stikstof) with Article 6 of the EU Habitats Directive (Case C-293/17).

Against the backdrop of an overload of nitrogen deposition in the majority of its EU protected sites, the Dutch government came forward with an integral, programmatic approach with a two-fold objective. On the one hand, the programmatic approach set forward additional reduction efforts, especially in the context of livestock farming, and the implementation of future restorative actions in degraded EU protected site. These actions were needed to comply with the EU Habitats Directive. On the other hand, the programmatic approach wanted to create more legal certainty for future economic growth, by facilitating the permitting procedures. While proponents hailed this approach as a progressive illustration of sustainable development, some environmental NGOs claimed the programme merely justified unchecked livestock expansion for uncertain reduction and restoration actions.

Ultimately, both the EU judges as well as the Dutch national courts agreed with the latter criticism. This paper will analyse this jurisprudence and highlight the legal potentialities of Article 6 of the Habitats Directive as an unexpected precursor for strong sustainability within the EU. Amongst others, it reveals that Article 6 requires Member States to prioritize ecological integrity of short-term economic growth.

## Challenging the Public/Private Divide in the Sustainable Development Goals

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**Professor of Comparative Private Law Cristina Poncibò**

### Abstract

#### Challenging the Public/Private Divide in the SDGs

The Sustainable Development Goals (SDGs) have attracted significant attention in legal scholarship in their three dimensions (environmental, social, economic). The SDGs have become a focal point for comprehensive thinking about the future of the world. This is so at least in the area of public international law. With regard to private law, by contrast, there has been less attention, although the SDGs are directed not only to governments, the UN and other international institutions, but also to local authorities, indigenous peoples, civil society, business and the private sector, the scientific and academic community – and all people. Certainly, public action and public law will not be enough if the goals are to be achieved. In particular, in pursuing the SDGs, MNEs' codes of conduct and international supply agreements are relevant where these goals become contractual clauses or declarations that may or may not have a binding effect for the parties. In fact, the topic is still underdeveloped in legal scholarship. Our stance is that the analysis on how to pursue SDGs in private law should not be advanced in isolation from the other legal 'arm' of public law and vice versa. Initiatives and tools must be comprehensively driven to the same achievement, i.e. sustainable development. A hybrid mechanism is necessary, hence an analysis of such combination of soft law, binding and non-binding public and private instruments. In conclusion, our interdisciplinary paper examines whether and how a relationship may be seen between PIL and contract law in pursuing SDGs, questions its goals and pitfalls and its impact over liability issues. Thus, we discuss the interplay of PIL and contract law with the aim of contributing in enhancing our mutual, and comprehensive, understanding of such hybrid mechanism in pursuing the SDGs.

## **SGDs 12 Responsible production and consumption**

## JUST SUSTAINABILITIES AND SDGs: TOWARDS NEW OPPORTUNITIES

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### Abstract

Covid-19 has exposed the vulnerability of our fractured societies, being ill-equipped under-prepared nations. The impact of the virus is global, multi-various, and multi-dimensional. The common prognosis recognises a dynamic and fundamental change in our ways of seeing, experiencing, thinking, planning, organising, and living. It is already established that its negative effect upon the poor and the vulnerable is disproportionate. Post- COVID-19 offers a progressive opportunity to question and change our thinking and relationships with each other and with our planet. The terms 'equity' and 'justice' attract significant attention during the reconstruction processes. This form of thinking and planning is essential for the understanding and effective implementation of the SDGs.

A changing society, not by choice but by necessity, simultaneously creates the space to broadcast a fresh message that allows 'equity and justice' to be moved to centre-stage. Agyeman's theory of 'Just Sustainabilities' (JS) is a bridge, 'joined-up' thinking of environmental justice and sustainability discourses directing society radically into a more sustainable trajectory. JS is as 'an overarching societal value' with an equity-based agenda. In this broader context, sustainability and sustainable development are not simply about the environment. Social and economic dimensions must be recognised as equal partners alongside the environment to implement the SDGs. The SDGs provide a framework of sustainability agenda to 'heal and secure our planet and shift the world on a sustainable and resilient path'.

This paper locates JS alongside SDGs through an 'embedded lens' approach. JS is a paradigm while SDGs offer an international, operational framework. The 'embedded lens' envisions a fairer and inclusive society and provides a plural and comprehensive understanding of sustainability trajectories. The basic message and resolve for 'a just, equitable, tolerant, open, and socially inclusive world' evidence SDGs and JS are integrated to drive a sustainable future. Appreciating JS embedded within the SDGs framework helps re- orientate and clarify thinking, both during and in post- Covid-19 'new normal' times.

Aspects of environmental sustainability within the 'embedded lens' are sited in the context of environmental sustainability, as JS and SDGs are synergetic and complementary. Goals 6 (Targets 6.1-6.3), 7 (Target 7.1) , 12 (Targets 12.1 and 12.2), 13 (Targets 13.1-13.3), 14 (Targets 14.1 and 14.2), and 15 (Target 15.1) specifically and directly focus on environmental sustainability. Core elements and the

relationship between JS and the SDGs are identified by common key terminology and implied meaning. The 'embedded lens' offers an accelerated pathway to sustained, inclusive, and sustainable economic growth within a transformed world.

## Towards land degradation neutrality in Finland

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### Abstract

Land degradation neutrality (LDN) is a relatively new concept globally and almost unknown in Finland. It is, however, an important part of SDG 15 and it should get more emphasis in environmental discussions in Finland, and elsewhere, too. In Finland the information gathering related to LDN has started but there is no political discussion on it yet.

Sub-goal 15.3 reads "*By 2030, combat desertification, restore degraded land and soil, including land affected by desertification, drought and floods, and strive to achieve a land degradation-neutral world.*" According to UNCCD, LDN means "a state whereby the amount and quality of land resources necessary to support ecosystem functions and services and enhance food security *remain stable or increase* within specified temporal and spatial scales and ecosystems".

On the political level in Finland LDN seems to be misunderstood as a desertification problem where as land use change, land sealing, soil pollution and shrinking or deteriorating CO<sup>2</sup> sinks are equally important aspects of LDN. Land pollution is fairly well regulated in Finland. Most other issues, such as land use change and land sealing are not yet being regulated.

Achieving or even striving to achieve LDN would require reversing past and on-going land degradation, as there will evidently be land lost to construction, mining, etc. also in the future. Reversing can mean better management methods in e.g. agriculture and forestry, or reforestation or de-sealing of land. Reaction hierarchy, avoid - reduce - reverse, means that an offset mechanism for land sealing projects should take place.

Some countries, such as Germany, have already integrated e.g. ecological offsets into land use planning law. Yet, in most countries the obligation to offset applies only to specific species or habitats, which does not lead neither to no net loss of biodiversity nor to LDN. Germany is probably the best example of a country that has implemented offsetting widely into land use planning. Germany has the highest levels of land fragmentation in the EU, but Germany has managed to slow down the annual land cover change rate to 0,11 %. In Finland the annual change rate is still 0,35 %.

The speed of urban sprawl in Finland remains stable, with an annual artificial land take rate of about 0.4%, which is slightly above the European average. Sprawl is driven by the extension of mines and quarrying areas, as well as dump, construction and industrial or commercial sites. On the other hand, the extensions of residential and sport and leisure areas, which were major sprawl drivers in the period 2000-2006, show significant decline.

In my presentation I want to discuss the main challenges and how Finland is tackling land use change issues currently - mainly focusing on land use planning - what could be improved. Since there are not much legislation about this issue yet, I would be very interested in getting comments and insights from other countries.

## Addressing Solid Waste Pollution in Sierra Leone: Lessons from Singapore

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**Mr Mohamed Yayah Jalloh**

### Abstract

To ensure the protection of the environment and the people's wellbeing is the responsibility of every government. The issues of waste, especially solid waste, have been challenging for many developing countries, including Sierra Leone. While other countries and their citizens are luxuriously enjoying a green, healthy and clean environment such as Singapore, that has not been the case in Sierra Leone. Sierra Leone has been marred with solid waste due to many factors such as weakness in the existing laws, social issues, regulations, and poor policy implementation. On the other hand, Singapore has been notably known for its stringent rules and policies, with adequate and effective performance. In light of these, this paper examines Singapore's laws or measures to reach such a goal, analyses the current waste and legal issues in Sierra Leone, and taps from Singapore's experience. Thereafter, the researcher finds that, by ensuring good waste management, Sierra Leone will achieve greater protection of life below water (SDG14) and life on land (SDG15).

Keywords: Pollution, Solid Waste, Regulations, SDG14, SDG15.

## **Sustainable Development as a Legal Concept: Introducing the possibility of formulating a Sustainable Development Model Law**

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### **Abstract**

With the beginning of 2021 comes a new opportunity to shape and mould the global understanding of Sustainable Development into something that is both practical and legally sound. Since 2015, the Sustainable Development Goals (“SDGs”) have been visionary goals which countries and institutions have strived to implement. However, realistically, the SDGs are seen as voluntary principles that many countries have committed to executing but have done little to practically achieve the SDGs in a way that is inclusive, practical and encompassing of each country’s unique socio-economic position.

Though countries across the world have made commitments and have often spoken out on achieving the SDGs there are few countries that have made open legislative commitments which citizens can utilize to hold Government accountable. Across the world there have been a few countries have formulated a Sustainable Development legislation and have made known their commitments to the SDGs by means of an Act that creates rights for its citizens. In this way the Government has not been held legally accountable and parties responsible for achieving specific SDGs within the Government have not been identified.

It is important to acknowledge that, although we encourage the use of Sustainable Development legislation to assist in making the SDGs a reality, not every country has the means to fully effect a Sustainable Development legislation. It is therefore crucial to adopt a regional and ultimately a global ideal of how sustainable development can be implemented thus providing a model for the formulation of national sustainable development legislation. If sustainable development truly is a global goal and each country is to responsibly have the chance of successfully achieving development that is sustained, more must be done to guide countries towards success.

In formulating a Sustainable Development Model Law, countries thus have a policy structure which can be followed and adapted to meet the specific needs and resources of the implementing country. A Model Law provides structure and expected principles to include when considering sustainable development. A Model Law acts as a leveler and provides each country within an opportunity for success. Countries therefore have a choice to commit legal in a way that can place Government accountable to its citizens for achieving development that is sustained, meaningful and effective.

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## The Medicolegal Conundrums of Employing Medical Robots

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### Abstract

The sustainability of a nation's healthcare system is dependant on its resources. In the wake of the Covid-19 pandemic, human resources have become particularly invaluable as healthcare workers are battling the pandemic at the forefront. The importance of human resource management became apparent so as to avoid depletion. In this regard, medical robots are seen as a convenient and effective solution. The adoption of robotics in healthcare has been gradual whereby semi-autonomous robots are being used, mainly for minimally invasive surgery, care, rehabilitation and training. Nevertheless, the employment of robotics has been increasingly promoted with the intent of facilitating the healthcare system in this time of crisis. That said, in the face of potential risks particularly to patient safety, underlying medicolegal issues exist which needs to be addressed. The advancement of artificial intelligence and the prospect of autonomous medical robots further create intricate loops on the existing thread of problems. Hence, through literature review of past studies and case laws, this paper aims to examine the medicolegal issues arise from employing medical robots and identify the corresponding legal principles under the common law. This paper attempts to provide comprehensive overview of the legal accountability and liability of the various stakeholders involved; the doctor, hospital, and manufacturer of the robot, and may as well extend to involve the instructor and telecommunication provider. Despite the progress of robotics in healthcare, the development in law to cater it seems to be stagnant, hence it calls for lawmaker's proactive measures to fill the lacuna.

## Assessing Latin American climate change laws under a Sustainable Development Goals' approach

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**Robert Currie Ríos**



**Paulina Sandoval Valdés**

### Abstract

Climate change legislation has developed extensively since the Paris Agreement, emerging new instruments to address this global threat. However, many have fallen short in ambition and establishing

proper conditions to enable climate governance and binding instruments to measure and promote progress, undermining the possibilities of meaningful outcomes.

Often, climate action led by governments has left aside key aspects of sustainability, with a blurry or undetermined role of civil society and the private sector, overlooking the importance of social and economic dimensions, essential to achieve success over time.

In this context, the purpose of our paper is to examine the most common shortcomings and pitfalls in Latin American climate change legislation, offering proposals to overcome identified gaps and achieve related Sustainable Development Goals (SDGs) by surveying comparative law research and pondering on Chile's Climate Change Bill as a case-study.

As the analysis will show, the main gaps identified in such laws are the lack of binding long-term objectives, inadequate instruments to manage climate change, institutional deficiencies, and weak involvement of non-environmental authorities.

Considering comparative law research, we have identified key aspects that should be taken into consideration to overcome those shortcomings, including: a) binding national goals linked to, and updated with, international commitments; b) regulatory instruments to enable climate action, subject to periodic monitoring, reporting, and verification; c) a strengthened climate governance that allows for crosschecking and science-based decision making; d) integrate climate change as a crosscutting issue within all governmental authorities statutory mandates; and, e) involve all relevant stakeholders, with clearly defined instances for public participation in the process of drafting instruments and policies.

Our work concludes that for effective climate change legislation, it is paramount to decentralize climate policy from sectorial agencies and make it part of the agenda of all governmental institutions, with special focus on those sectors that represent a fair share of greenhouse gases emissions (e.g., energy, transport, mining, among others) or are more vulnerable to climate change adverse effects (e.g., biodiversity, water resources, coastal lands, among others). Finally, the involvement of civil society and the private sector will be essential to find both legitimacy and the financial means to accomplish proposed targets, as well as allowing an approach based on sustainability criteria.

In doing so, this paper relates to several SDG's, but primarily to SDG 13 "Take urgent action to combat climate change and its impacts", particularly, to its target of integrating climate change measures into national policies, strategies, and planning (target 13.2). Additionally, it closely relates to the conference theme "Accelerating progress towards SDG's in times of crisis" as many legislative procedures are underway, and timely analysis and consideration of the key elements presented in this work could contribute to strengthen regulation, integrate legal aspects of sustainability, and provide alternatives that could help fast-tracking decision making in climate action.

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## Identifying synergies and trade-offs for regional sustainability in Jämtland Härjedalen

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**Anja Eliasson**



**Dr. Erik Grönlund**

### **Abstract**

Agenda 2030 unifies ecological, social, and economic sustainability, with the Sustainable Development Goals (SDGs) at its heart. The integrated nature of the SDGs leads to complex relationships that can be divided into synergies (progress in one goal favour progress in another) and trade-offs (progress in one

goal hinders progress in another). These interlinkages are important to consider in policy planning and implementation of the SDGs to enhance progress across all the 17 goals. The Swedish government has declared the regional level as being especially important in the fulfilment of Agenda 2030 on a national level, as many of the basic welfare assignments lie within their responsibility. This paper uses the Swedish region Jämtland Härjedalen as an example of how knowledge of synergies and trade-offs can be used in the work with Agenda 2030 by identifying interactions between 15 targets relevant for the region. The assessment of interlinkages between targets are supported by a literature review aimed at finding relevant information based on the geographic context and the specific targets chosen. Synergies and trade-offs were identified using a seven-point typology for scoring. The results are presented in a cross-impact matrix that visualizes interaction between targets and identifies which targets have the most and the least positive influence on the network. The analysis shows that most of the interactions are synergistic which means that progress in one area often makes it easier to fulfil other targets simultaneously. The results also highlight a few important trade-offs, related to land-use and the use of natural resources, that are important to consider to avoid irreversible effects. Displaying interactions between targets alone does not offer any guidance on how to enhance synergies or manage trade-offs but it is an important first step to enhance progress across all SDGs. Knowledge of how different targets relate to each other can offer guidance for where specific attention is needed and where cross-sectorial collaboration is merited. Overall, it can lead to better informed decision-making.

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## The Role of Net Gain Law for Governance of a Sustainable Development

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### Abstract

Governance and Law are intrinsically intertwined in addressing the endeavour to achieve a sustainable development. Latest environmental agendas of the UN and the EU imply global environmental and biodiversity net gains as the ultimate goal for a sustainable development even already till 2030. This chapter strives to assess the role which law can play within the implementation of these latest worldwide and regional policy directions. It does so through outlining as proposed research agenda. Hermeneutic methods are applied such as comparative legal analyses and different types of text interpretation (e.g. historic, wording, rational). The findings identify for this research agenda three major parts, namely

1. the assessment of the interpretation of net gain in connection with law related to the new UN and EU biodiversity and environment net-gain agendas.
2. The analysis how existing and future law can contribute to environmental and biodiversity net-gains by enabling voluntary behaviour (sufficiency), prescribing and implementing binding behaviour (effectiveness), increasing current and future biodiversity's representation (ecological equity) and/or enabling efficiency while ending rebound effects (eco-efficiency)
3. The elaboration of the legal integration among these four criteria assessed in terms of interrelation, decision-making, instrument-and policy mixes as well as geopolitical legal interplay towards environmental and biodiversity net-gains.

The proposed research agenda with these three parts is capable to provide a common basic understanding for environmental and biodiversity net-gains in relation to law as well as a starting point for steering the regional and global implementation of this new international policy objective enabling a sustainable development. The presentation has its focus on SDG 16 as it particular guides SDG 16.3. "16.3 Promote the rule of law at the national and international levels and ensure equal access to justice for all" as well as 15.5 "Take urgent and significant action to reduce the degradation of natural habitats, halt the loss of biodiversity and, by 2020, protect and prevent the extinction of threatened species".

Adopted from: Mauerhofer V. (in press). The Role of Net Gain Law for Governance of a Sustainable Development. In Mauerhofer V. (Ed.), *The Role of Law in Governing Sustainability*. Routledge ISDRS Series on Sustainable Development Research.

## The transition toward mandatory non-financial disclosure: a systematic literature review

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### Abstract

In the current socio-economic context, an increasing number of companies are paying attention to the repercussions that their production activity has on the community and the environment. In the wake of this global trend, the non-financial information that companies disclose to their stakeholders has assumed and is assuming a pivotal importance. For many years, non-financial information disclosure has been conducted on the basis of voluntary initiatives carried out autonomously by various companies; this has led to the spread of different reporting practices and standards, which make the comparison of the different approaches adopted and the related results. Furthermore, this kind of voluntary reporting has not always succeeded in preventing information asymmetries and opportunistic behaviors by the companies' top management. The reasons are mainly related to the fact that, being not mandatory some companies may have decided to report exclusively economic and financial information or, in other cases, they may have omitted information regarding the negative impacts of the organization on the environment and the society. Non-financial disclosure, however, should be aimed to make social and environmental performance easily accessible to investors and consumers, harmonizing it with the economic and financial one. In this context, the European directive 2014/95 / EU, of 22 October 2014, imposes to the company a key novelty, i.e., making non-financial reporting mandatory by law. It is evident that the transition from voluntary to mandatory non-financial disclosure is greatly fueling this line of research. On this point, academics and policy makers have started to discuss the difficulty for companies to adopt a business model based on a mandatory sustainable paradigm.

According to this evidence, this paper aims to analyze the scientific debate which has characterized the recent years. Using co-citation bibliometrics analysis, co-occurrence keywords, chronological keywords analysis this study explores answers to the following research questions:

RQ1. Which channels (authors, journals, and articles) are the most influential in the research of voluntary and mandatory non-financial disclosure?

RQ2. How are articles clustered, and which research streams are likely to emerge in voluntary and mandatory non-financial disclosure? And what has been the evolution over time of non-financial disclosure?

Bibliometrics analysis has been conducted on 323 items (articles, preceding papers, early access, reviews, book chapter, editorial materials) about non-financial disclosure published during the period 1996-2021. For this analysis, we used co-occurrence of keywords, co-citation and bibliographic coupling as indicators. Co-occurrence of all keyword's analysis provided keywords to investigate the conceptual structure of the field. Co-citation analysis allows us to investigate when two articles are both

independently cited by one or more articles, while bibliographic coupling takes place when two articles both cite a third article, indicating a probability that the two articles discuss a common topic.

This study offers valuable results both from the academic and business perspective. The bibliometrics analysis clearly illustrates the different stages of this field of study, as well as the emerging lines of research, which can be studied in greater depth.

## The Implementation Progress of the Biodiversity Protocol to the Carpathian Convention. Achievements and Challenges in Ukraine

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**Bsc. Larisa Semernya**



**Professor Volker Mauerhofer**

### **Abstract**

The Carpathian Mountains are Europe's largest mountain system crossing the frontiers of seven countries, namely the Czech Republic, Hungary, Poland, Romania, Serbia, Slovakia and Ukraine. Owing to its high geological diversity and historical climatic fluctuations, the Carpathian region has evolved to one of the most important biodiversity hotspots in Europe. The rapid political, economic and social developments in the region and the associated intensification of human activity over the last decades have been exerting massive pressure on already fragile mountain ecosystems (e.g. due to climate change). To counteract this pressure, and to ensure sustainable use and development in the Carpathians, the biodiversity conservation issues of the region have been addressed by an international agreement and its respective protocol. In this context, a Protocol on the Conservation and Sustainable Use of Biological and Landscape Diversity was adopted within the Framework Convention on the Protection and Sustainable Development of the Carpathians. In this document Parties to the Convention affirmed to "undertake appropriate legal and administrative measures for ensuring implementation of the provisions of this Protocol, and monitor the effectiveness of these measures". Since then, the Protocol has been signed and ratified by all Member States. The ratification by Ukraine was accomplished in September 2009 and came into force in April 2010.

In this context, this study aims to shed light on the extent to which the Biodiversity Protocol has been implemented by Ukraine. It seeks to identify legislation related to the Biodiversity Protocol, specific actions taken towards its implementation, as well as the players involved at both, the local and the national levels. Additionally, the research will help to uncover implementation gaps and thus the resulting need for action, providing a basis for a minimum implementation of the Protocol. Furthermore, the study analyses the challenges and the determinants affecting the implementation of the Protocol. For this purpose, data will be collected through semi-structured interviews/questionnaires with experts/relevant players. Finally, the study will result in the formulation of possible recommendations for an optimum implementation of the Biodiversity Protocol, based on the comparative analysis with other Parties to the Convention, as well as provide guidance for further research in this field.

The results of the study will contribute to a better understanding of the functioning and implementation mechanisms of the Carpathian Convention and its Biodiversity Protocol at the national level. The knowledge gained will further support and improve the implementation of the Protocol not only in Ukraine, but also in other Member States. The proposed abstract relates to SDG 15 / Targets 15.1 and 15.4 in particular. Furthermore it adds to the implementation of SDG 16.

## The Implementation of the Convention on Biological Diversity in Land Use Planning and Zoning Law: a quantitative and qualitative literature review

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### Abstract

The mutual relationship between the Convention on Biological Diversity (CBD) and land use, zoning and planning law is quite apparent. “Positive” interactions, namely win-win situations are of particular interest in this context. Less apparent is what the implementation of the CBD concretely contributes – unidirectionally – to enhancing land use, zoning and planning law. Particularly, issues of causality of such a potential influence regarding goal and target setting in connection with the implementation of the CBD are hardly taken into consideration.

This presentation assesses how the implementation of the CBD contributes to enhanced land use, zoning and planning law (*de lege lata*) and how far could it contribute (*de lege ferenda*). One hypothesis in this context would be that in countries/regions with well-established conservation legislation, the impact of the CBD on land use, planning & zoning law is low or even negligible. While in other countries/regions it is high/considerable (and these are usually the countries with a higher rate of biodiversity).

The methodology applied is implemented twofold and consecutively interconnected. First, in order to receive a rough overview in qualitative and quantitative terms of UN-documents, the UN-online search tool InforMEA was used by inserting different combinations of the relevant terms in connection with the CBD. A similar keyword search in the two internationally leading data bases - Web of Science and Scopus - was carried out to get the scientific perspective on the influence of the CBD on national implementation, and to identify best practice examples.

The current analysis indicates mixed conclusions. The quantitative analysis by means of the InforMEA database leaves the impression that the search tool in connection with the Adobe Reader DC is only able to bring approximate and unreliable results. The quantitative assessment by means of the CBD database of national reports and NBSAPs also arrives at similar results. The overall results from the literature review indicate that the CBD impacts developing countries and certain “overdeveloped” countries, particularly when other international commitments are widely lacking.

Overall, the findings indicate that the implementation of the CBD contributes to enhanced land use, zoning and planning law (*de lege lata*) and there are many proposals in the literature on how this contribution could be enhanced (*de lege ferenda*). More research could be put into the quantitative side of the implementation of the CBD towards improved land use laws, zoning law and planning law. Additionally, more evidence of the causality between actions taken at the national level and the goals, targets and actions required under the CBD.

The presentation has its focus on SDG 15.5 “Take urgent and significant action to reduce the degradation of natural habitats, halt the loss of biodiversity and, by 2020, protect and prevent the extinction of threatened species”.

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## Can Sustainable Development Goals (SDGs) aid in the implementation of the UNCLOS regarding the protection of the sea environment?

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### Abstract

As the title question already indicates, the presentation will try to answer whether the Sustainable Development Goals (SDGs) can in any way aid in the implementation of the obligations regarding the protection of the sea environment. The oceans produce more than half of the oxygen in our atmosphere and act as sinks for dangerous CO<sub>2</sub> emissions. Additionally, around half of the Earth's population lives in the close proximity of the seas and the industries connected to the oceans contribute to more than 500 billion USD to the world economy. Hence, the prevention of ocean pollution and over-exploitation of the oceans is necessary for the long-term existence of the humankind and the conservation of the Earth's ecosystem. Unfortunately, the awareness of the ocean's importance is lacking, as well as is the implementation of the basic rules on prevention of pollution and over-exploitation defined in the United Nations Law of the Sea Convention (UNCLOS). This presentation will hence contribute to the debate on the relationship between the SDGs (more particularly SDG goal 14) and existing international law norms. There are different opinions in the academic community on the relationship between SDG 14 and UNCLOS. Some authors believe, that UNCLOS itself limits the fulfilment of the SDG 14, while others believe that SDG 14 may aid in the implementation of the UNCLOS measures. Therefore, the focus of the presentation will be mainly on the question whether SDG 14 (and if applicable in special circumstances also other goals) are only a mean of current interpretation of the existing UNCLOS measures or whether more legal weight should be given to them in this particular relationship between UNCLOS and SDG 14? While trying to answer this question the presentation will also concentrate on whether SDG 14 and its targets could be regarded as a toolbox for states to implement the UNCLOS obligations?

## Rule-based and principle-based compliance in Non-Financial Reporting: a possible convergence path?

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### Abstract

In response to the growing stakeholders' pressure towards sustainable development, non-financial reporting continues to gain attention among companies, accounting standard boards, and professionals in Europe and the world.

The urgency to translate ethical and academic stance into real action is remarked by the current crisis: the recovery of the economy requires a deep change in models for pursuing, measuring, and representing the value creation.

Over time, thanks to specific standard-setters (IIRC, GRI, and others), the adoption of sustainable and integrated reports have become widespread among larger companies in Europe [1]. The law is playing a crucial role in boosting the change in production and consumption models (SDG 12), and establishing specific provisions on non-financial information (NFI), which today stand as rules for public interest entities (2014/95/EU Directive on Non-financial Reporting).

In this scenario, in a complex competitive game, the standard-setters, which are mostly nongovernment organizations, are committed to ensuring the diffusion of their guidelines, also through the aid of the lobbying parties [2], and powerful coalitions of actors who can influence the policymakers to allow the adoption [3, 4]. Scholars are focused on clarifying the differences between various standards, in terms of quality, relevance, transparency, verifiability.

In light of the above, we intend to explore how, in conjunction with the transposition of the Directive by each country in local law [5,6] companies are selecting different models for non-financial reporting.

To this aim, the research will collect and analyse data on the adoption of standards suitable to comply with the EU Directive on NFI [7], through statistical analysis, within Europe.

The results of the empirical study, in the frame of the literature background, have many practical and theoretical implications. Possible paths of evolution of guidance and framework for NFR, and of the overlay between the main standards (namely, GRI and <IR> Framework) and others, that ask for armonization and convergence of principles, and also further evolution in legal rules will be envisaged.

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## **Empowering local governments and stakeholders in managing landscapes, seascapes and ecosystems - empirical studies and challenges in Japan**

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### **Abstract**

Local stakeholders play a key role in conserving and sustainably using landscapes, seascapes and ecosystems. In such efforts, financing and benefit sharing are one of the key enabling factors. A pioneering legislation was enacted in Japan in 2015. It was called the "Act for the Promotion of Conservation and Sustainable Use of the Natural Environment in Local Natural Asset Areas" that allows local governments and stakeholder groups to set up councils, develop management plans and mobilize funds from the users and partners to acquire the ownership of the land areas as a part of the natural trust activities. The collection of the entrance payment for Mt. Fuji by the two local governments is the first case. Taketomi Town, Okinawa Prefecture also created a council and started collecting donations from the visitors to the islands of the Taketomi Town. Nonetheless, as the payment was not made as mandatory for all the visitors and was made rather voluntary and optional actions. Thus, for the case of Taketomi Town, the collection rate of donations is very limited. The reasons for the limited collection rate are presumed such as the limited knowledge of such systems and the lack of incentives for the visitors to pay. There was a suggestion to integrate such payment into the boat ride fee. However, as this payment has to be differentiated from the tax in general, it had to be made as voluntary and optional. The Act itself is considered as instrumental in allowing local governments and stakeholder group in identifying key landscapes, coastal areas and ecosystems. For instance, the coastal land can be acquired for a natural asset to avoid industrial, commercial or residential area development. That can help conserving landscapes, seascapes and terrestrial, coastal and marine ecosystems by avoiding the hinderance of views and pollution from the development of the areas. However, the asset value for the size of such areas outweighs the estimated mount of payments that can be collected from the users and benevolent supporters. The local governments are now short of funds particularly in the COVID-19 pandemic impacts. As tourism turned to be dormant due to the COVID-19 pandemic, the estimated amount of revenues from such payment schemes was further lowered. Nonetheless, the Act should be better utilized in order to materialize its original objectives. By comparing the case of Taketomi Town with Mr. Fuji payment schemes, this study is intended to examine the factors determinant to the success in collecting and better utilizing the payments by the visitors and benevolent supporters for the conservation and sustainable use of landscape, seascapes and ecosystems in Taketomi Town. By analyzing key factors, it is aims to demonstrate the factors that are presumed to enable the local governments and stakeholder groups to successfully manage local areas under the conditions that can be newly created by the Act. It is also intended present some perspectives on the potential replication of such schemes not only in Japan, but also in other countries.

## Negative Emission Technologies in the Asia Pacific Region: Legal Principles and Barriers

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### Abstract

In 2015, countries adopted the 2030 Agenda for Sustainable Development and its seventeen Sustainable Development Goals, the so called 'SDGs'. Climate change action is the key driver for the SDGs to be achieved globally. The Paris Agreement also sets a goal of restricting warming to within 2°C of pre-industrial levels, and pursues efforts to limit the temperature increase to 1.5°C. Most emission pathways that are compatible with these goals are heavily reliant on Negative Emissions Technologies (NETs), at a global scale to mitigate CO<sub>2</sub> from the atmosphere such as: Afforestation and reforestation, Land management to increase and fix carbon in soils, Bioenergy production with carbon capture and storage (BECCS), Enhanced weathering, Direct capture of CO<sub>2</sub> from ambient air with CO<sub>2</sub> storage (DACCS), and Ocean fertilisation to increase CO<sub>2</sub>. Therefore, NETs seem necessary in order to reach the Paris targets.

Climate change is a global problem, and thus reducing the Greenhouse Gas (GHG) emissions driving this process is a global challenge. There has been wide discussion on the use of NETs, especially in the EU and the U.S. However, there has been little discussion on the technology in the Asia Pacific Region (APR) where there is an urgent need for a substantial reduction in the GHG emissions to achieve the global target.

This study aims at examining and identifying any relevant legal principles and barriers to developing the future opportunities for NETs in the APR. Concerning this, firstly, this study comprises an analytical framework by using any relevant literature to legal study. Secondly, it applies the framework for the situation in the APR. It then discusses the past, current and future issues with regard to barriers to the legal barriers within the APR. Throughout this study, we have addressed the lack of manageable evidence and guidelines provided by the Inter-governmental Panel of Climate Change (IPCC) for technical and regulatory measures of NETs, as well as a clear mitigation pathway with associated efforts and rapid deployment of renewable energies, land management, and reducing emissions of other GHGs. We have also identified a number of key legal issues in relation to the current political, policy and legal frameworks within the region. This study then concludes with a range of legal principles and barriers to developing NETs in the APR.

This study outcome is strongly related to SDG targets '7. Affordable and Clean Energy', '8. Decent Work and Economic Growth', '9. Industry, Innovation and Infrastructure', '11. Sustainable Cities and Communities', '12. Responsible Consumption and Production', '13. Climate Action', '15. Life and Land' and '17. Partnerships for the Goals'. Furthermore, this study will not only contribute to overcoming future barriers to legal approaches to the NETs development in the region, but can also be applied in other technological development to take urgent action to combat climate change and its impacts

relevant to the Paris targets and SDGs. The study outcome is thus highly appropriate to the topic of the ISDRS Conference (“Accelerating progress towards the 2030 SDGs in times of crisis”).

## Constructing a Legal Framework for Carbon Capture and Storage (CCS) in Japan: Towards a Comprehensive Legislative Design

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### Abstract

The Paris Agreement came into force on 4 November 2016. To achieve the target of keeping a global temperature rise this century of well below 2°C above pre-industrial levels, it is essential to realise a low/zero carbon society both at the regional and global levels. The Intergovernmental Panel on Climate Change (IPCC)'s latest report on 8<sup>th</sup> Oct 2018 also announced that the agreed Paris targets on reducing emissions would not be enough without setting larger and more ambitious targets after 2030 and maximising the capacity of a best mix approach including renewable energy, nuclear and carbon capture and storage (CCS). There has been wide discussion about CCS considered as one of the significant approaches to meeting the Paris target.

Japan, as a developed country, is now facing a challenge for meeting its mid and long-term goals for reducing Greenhouse Gas (GHG) emissions, due to the limited energy sources (e.g. nuclear and renewable energy) after the Great Tohoku Earthquake in 2011 and a trend of relying on fossil fuel energy sources (coal and gas). On 4 October 2020, Japan's new Prime Minister, Yoshihide Suga, announced that Japan is aiming to cut GHG emissions to zero by 2050 and become a carbon-neutral society. Currently, approximately 40% of Japan's carbon emissions come from power companies, and the new target is expected to be achieved by using more renewable sources of energy, while developing emerging technologies using hydrogen, ammonia and other carbon-free resources. The Prime Minister has also acknowledged that CCS technology will play a significant role in achieving the target. However, there has yet to be a comprehensive legal framework in Japan. In this regard, there is an urgent need for designing a legal framework for CCS deployment in this country.

This study aims at identifying a number of the existing legal issues and constructing a potential CCS legal framework in Japan. Our study has addressed a number of legal barriers and options in response to each criterion addressed above, relevant to the context of Japan. This study then constructs various regulatory requirements in order for the existing legal framework to be comprehensive and commercially viable for the state. The suggested key requirements are: a licence system for site-selection; a financial system to cover all the development phases (i.e. injection/storage, monitoring cost for post-closure, and costs for long-term liability and corrective measures and remediation measures); a system for transfer of responsibility; long-term liability; and monitoring potential CO<sub>2</sub> leakage and unforeseen incidents. This study outcome is strongly related to SDG targets '7. Affordable and Clean Energy', '9. Industry, Innovation and Infrastructure', '11. Sustainable Cities and Communities', and '13. Climate Action'. The study outcome is thus appropriate to the topic of the ISDRS Conference ("Accelerating progress towards the 2030 SDGs in times of crisis").

# **10. Special Themes**

## **10a. Sustainability and Africa**

## Towards sustainable energy development in Sub-Saharan Africa: Challenges and opportunities

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**MA Justyna Tomala**

### **Abstract**

Sub-Saharan Africa is considered a region with enormous economic and demographic potential. Many economies are on the path of dynamic economic growth. Sub-Saharan Africa is also characterized by high population growth and young society. This, in turn, contributes to the intensification of processes such as industrialization and urbanization. At the same time, it should be emphasized that the economic and population potential of the region can be used efficiently. With the progress of urbanisation and industrialisation, the demand for energy is constantly increasing. One of the main challenges, included in the “Agenda 2063: The Africa We Want, implemented by the African Union”, is to provide the access to electricity. Currently, 600 million inhabitants of the African continent do not have access to electricity, which is a significant limiting factor for further economic growth and socio-economic development. Moreover, the measures taken by individual Sub-Saharan African countries appear insufficient in face of rapid population growth. The aim of the article is to analyze the opportunities and challenges of energy sector development in Sub-Saharan Africa. This raises the following research question: to what extent a sustainable energy transition can be achieved in sub-Saharan African countries to ensure access to electricity? The study will be based on statistical data from the energy sector. It should be emphasized that the Sub-Saharan African region is exposed to the effects of climate change, which also affects the development of the energy sector and ensuring access to electricity. The study will contribute to assessing the adaptive capacity and transformative potential of the energy sector in the Sub-Saharan Africa. This is particularly important for achieving the seventh Sustainable Development Goal, which relates to building more robust and efficient cable systems, as well as implementing decentralised

versions of energy from renewable sources. This research is crucial to bridge the energy access gap and build a resilient and sustainable economy in Sub-Saharan Africa countries.

**Key words:** Sub-Saharan Africa, access to electricity, energy sector, economic resilience, development economics

## APPRAISAL OF SOCIO-ECONOMIC AND POLITICAL IMPLICATIONS OF COVID-19 PANDEMIC ON THE NIGERIAN CITIZENS; A STUDY OF KOGI STATE

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### Abstract

COVID-19 pandemic determines public health, presenting the biggest threat since the Second World War. All continents, except for Antarctica, are active in battling the pandemic. As other socio-economic and political problems are arising from this crisis, the pandemic cannot only be attributed to health issues. Every nation affected by this pandemic has the potential to witness a devastating social, economic and political backlash that will leave deep, long-standing scars. The World Bank has projected a decline in remittances of \$110 billion and 800 million people will not be able to meet basic needs this year, with the International Labour Organization (ILO) forecasting that over 195 million people will lose their jobs. The paper adopted the documentary/library research approach and was thus of a highly qualitative type. From the findings, it was discovered that in managing this pandemic, there is a need for strategic planning by a government organization through the development of long-lasting policies that will help minimize the impact on individuals and nations. Previous experiences of outbreaks such as Ebola, HIV, SARs, TB and Malaria will therefore be valuable in the development of policies that can help to mitigate the socio-economic and political impact. The solution may lie in contacting the most vulnerable through crowdsourcing to provide them with food, in particular life necessities. Expanded social security may also be an important step in that direction for the disadvantaged and the disabled. Business Continuity Insurance should also be introduced for the most vulnerable in this precarious period. It is possible to introduce creative ideas to young people to allow them to tap into their potential and eventually tackle the current threat. The use of voluntary networks can also be an important tool that reinforces the sense of volunteerism. In addition, to promote the movement of remittances, business and political leaders should be encouraged to create a universal basic income.

## LOOKING AFRICA BEYOND 2030: UTILIZING THE GAP OF AFRICA ISSUES THROUGH SUSTAINABLE DEVELOPMENT GOALS.

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**Mr Abideen Olasupo**

### Abstract

Introduction: Sustainable Development Goals (SDGs) were created by the United Nations (UN) in September 2015. It contains 17 SDGs, consisting of 169 indicator targets, replaced the Millennium Development Goals (MDGs) for 2000-2015 due to lack of Sustainability. SDGs are ambitious and universal, encompassing social, economic and environmental aspects of development in an integrated way. Achieving them in Africa beyond 2030 will require considerable institutional and policy investment at all levels of governance—local, national, regional, and international. This study considers how African countries can leverage science, health, innovations, Sustainable policy, and ideas to achieve the SDGs and the related aspirations of the African Union (AU) as articulated in its Agenda 2063. The study examines strategies to implement national, regional, continental, and international policies and programs to solve issues through SDGs beyond 2030 in Africa. Africa's challenge is how to translate Science, innovations and policies into practical actions, and to effectively implement programmatic initiatives such as those of the AU.

Method: The research study related to previously published peer-reviewed articles. A literature search was conducted on Google Scholar, AU, SDGs cities and Researchgate for articles published from 2015 to 2020, and search results showed 3,210 and 14 articles respectively. Search keywords are Africa, Africa

issues, Africa policy, and Sustainable Development Goals. Articles that contained two or more of the keywords in its topic or abstract and also aligned with the objective of the study were selected. Only 23 articles out of about 4,000 articles that met the inclusion criteria were included in the review.

Results/Conclusion: African countries must improve the quality and relevance of their national SDG policy frameworks to sharpen focus on social and environmental dimensions of sustainable development. In 2016, fewer than half of African countries had adopted SDGs policies, including Algeria, Angola, Botswana, Burundi, Ethiopia, Egypt, The Gambia, Ghana,

Kenya, Lesotho, Malawi, Mozambique, Namibia, Nigeria, Rwanda, Tanzania, Tunisia,

Senegal, South Africa, Swaziland, Uganda, Zambia, and Zimbabwe. But most of them do not consider sustainable development imperatives holistically. Instead, they tend to focus on funding scientific research with less emphasis on technology development, procurement, and innovation. This may stimulate the production of knowledge for short-term economic growth but fails to spur social inclusion and environmental sustainability that are necessary to long term sustainable development.

## Envisioning African Extended Producer Responsibility (EPR) - How can EPR tackle transboundary movement of e-waste?

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### Abstract

The latest research on the transboundary movement of e-waste shows Nigeria as one of the top destinations where European used electric and electronic equipment (UEEE) and waste electric and electronic equipment (WEEE or e-waste) are exported. Some experts argue exported UEEE bridges the digital divide that is crucial to the attainment of sustainable development. Others point out how UEEE exports create a loophole for WEEE exports, challenge the quality of exported UEEE and highlight their social and environmental cost. Regardless, sound management of e-waste is vital for sustainability. Like most African countries, Nigeria lacks the capacity for sustainable management of UEEE and WEEE. In 2019, the Nigerian government in partnership with the United Nations initiated a discussion to create an Extended Producer Responsibility (EPR) system for electric and electronic equipment. To envision robust EPR systems within the African context capable of dealing with UEEE and WEEE imports, this project adapted a Delphi study with e-waste experts in Africa. The study was conducted in three rounds. The first two rounds took stock of the phenomenon of UEEE and WEEE imports and created three different scenarios based on the input. These scenarios representing various levels of circularity/sustainability ambitions of the EPR were discussed in the third round. By looking at the imports of UEEE and WEEE, domestic EEE usage, national and local policies, existing EPR like structure and informal sector in the different scenarios, we argue that EPR can be a solution-oriented tool for sustainably managing e-waste. Based on the results, we argue for the need of designing internationally oriented EPR to manage the imported UEEE and WEEE. The study points how an EPR system focused on value retention, value maintenance and involves the informal e-waste management sector in the EPR scheme can play a role in sustainable transition.

## **Artisanal Refining and Sustainable Development Paradox in the Niger Delta Region of Nigeria: The ‘Livelihood Dysfunction Trap Hypothesis’**

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### **Abstract**

The oil rich Niger Delta region of Nigeria is known to be disproportionately impacted by oil spillages and gas flaring activities which has resulted in wanton destruction of the primary livelihoods of over 70% of the region’s population who largely rely on subsistence farming, fishing and mangrove forest extraction for survival. This has necessitated communities to develop strategies to cope with the associated livelihood insecurities, and key amongst these is the invention of artisanal crude oil refining in the region. In response to this problem, this study explored the advent of artisanal refining and its implication on sustainable development of the region. Anchored on the socio-ecological resilience theory and the qualitative approach, the study was conducted in Rivers, Bayelsa, and Delta States, representing the Core Niger Delta. It relied on In-depth Interviews (IDIs), Focus Group Discussions (FGDs) and observational technique as the primary methods of data collection while the thematic analysis technique was utilized for data analysis. Findings from the study revealed that as a result of dwindling livelihood opportunities arising from large scale environmental pollution, coupled with the poor development realities across the region, communities are adopting artisanal refining as an alternative means of livelihoods. However, the findings also revealed that artisanal refining is rather an unsustainable livelihood activity as it further constitutes environmental degradation and exacerbates livelihood insecurities in the region, thereby resulting in a vicious circle of what the study referred to as “livelihood dysfunction trap”. The study hence concludes that the current livelihood strategies, particularly the proliferation of artisanal refining activities is unsustainable and therefore paradoxically undermines sustainable development of the region. The study hence recommended that to break free from the “livelihood dysfunction trap” and entrenching sustainable development, all polluting activities must be halted while ensuring rapid human and infrastructural development in the region.

Keywords: Artisanal Refining, Sustainable Development, Livelihood Dysfunction Trap, Niger Delta

Relatedness to SDGs: The abstract converges with the Sustainable Development Goal 12, target 2 which advocates efficient use of natural resources. Illegal bunkering and artisanal refining are not sustainable approaches to utilizing crude oil resources in the Niger Delta, hence the widespread environmental pollution across the region and its ripple effects on livelihoods and well-being of the Niger Delta people.

**Assessment of climate change mitigation impact on income inequality in Sub-Saharan Africa: a spatial econometrics analysis.**

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PhD student. **ETSE YAWO DZAKPA**



**Dr. Olawale Emmanuel OLAYIDE**

**Abstract**

The effort to reduce climate change impact in developing countries includes actions that reducing greenhouse gas emissions from fossil fuel combustion, assuring energy efficiency, and avoiding wood

energy consumption. Those actions required could be achieved through renewable and clean energy adoption and could have a direct and indirect effect on poor livelihood. The direct effect such as avoided deforestation will limit poor access to firewood, clean energy adoption for cooking will affect household's income, and improve air quality will affect health. The indirect can be observed through an economy-wide effect such as a change in income inequality, economic growth, etc. Despite the lowest participation in climate pollution, Sub-Saharan Africa (SSA) countries suffer the highest impact of climate change. So, they committed with Paris Agreement to adopt low carbon emissions technologies as a climate change mitigation policy through the achievement of sustainable development agenda for 2030. Thereby, renewable energy is seen as the key solution for both climate change mitigation and affordable, reliable energy access. To date, there is a lack of study analyzing climate change mitigation policy impact on income inequality in Sub-Saharan African countries. This present studying aims to assess this impact by using spatial econometric modeling. The reason for the choice of this methodology is to see whether there exists spatial dependency among renewable energy generation and income inequality in select countries of Sub-Saharan Africa countries. Renewable energy generation (REG) from IRENA renewable energy database will be us as a proxy for climate change mitigation policy and the GINI index from the Standardized World Income Inequality Database (SWIID) will be used to measure income inequality. Other variables such as GDP per capita growth, inflation, unemployment, etc. from the World Bank-World Development Indicators database will be considered as well in this work. The work period will cover 2000 to 2019 according to data availability. We expect a positive impact of climate change mitigation policy on income inequality reduction in SSA. This positive impact could be explained by the fact that the potential effect of renewable energy generation (off-grid solar system) will be in rural areas where it will be used to increase income from agricultural systems. The present work tackle four sustainable development goals (SDGs-targets) such as SDGs-1 No poverty, SDGs-7 Affordable and clean energy, SDGs-10 Reducing inequality, and SDGs-13 Climate action, but we will basically emphasize SDGs-7 and SDGs-10. With the reality of COVID-19, energy services were denoted as the key solution to redress the worldwide economy in the post-COVID. Promote affordable, reliable, and sustainable energy access for income inequality reduction is in line with the Conference topic "accelerating progress towards SDGs in times of crisis."

## EFFECTS OF FINANCIAL INCLUSION ON SMALLHOLDER FARMERS' FINANCIAL PRODUCTIVITY IN BUSOGA REGION OF EASTERN UGANDA

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**Mr Abiodun Akanbi**



**Dr Olawale Olayide**

### **Abstract**

Evidence from several studies show that rural communities are highly underserved by financial services. Financial inclusion is therefore likely to benefit disadvantaged groups such as women, youth, and rural

communities. It is concerned with providing financial services on lower costs to rural people and low section of society. Inclusive financial system plays an important role in the overall strategy to improve the productivity of smallholders, their livelihood and food security while promoting improved agricultural yields. Therefore, this study focused on the assessment of the Project for Financial Inclusion in Rural Areas (PROFIRA) of Uganda. The research questions and objectives are thus formulated to determine the effects of financial inclusion on smallholder farmers' financial productivity in the Busoga region of Eastern Uganda.

A simple random sampling technique was used to select 240 smallholder farmers who are members of the community-based Savings and Credit Cooperatives (SACCOs) in the region. Quantitative data were collected with a structured questionnaire, and the data were analysed using descriptive, inferential, and Ordinary Least Square (OLS) regression analysis. A test of the hypothesis was conducted using independent sample t-test for the significant difference between male and female smallholder farmers on financial inclusion. Using productivity function as stated by the Neo-classical production theory, the financial productivity of the smallholder farmers was expressed as a function of the financial inclusion and their other socio-economic characteristic, which determine the input factors of productivity.

The results of the analyses show that smallholder farmers in the study area enjoy the benefits of financial services from the community-based Savings and Credit Cooperatives society (SACCOs). The regression result indicates that amount of loan received, loan duration, farmland size, labour and farm income have significant positive effects on the smallholders' financial productivity. Also, there exists no significant difference in the financial inclusion of both male and female farmers who are members of the community-based savings and credit cooperatives. It is important to note that financial inclusion of the rural smallholder farmers through SACCOs does not only increase farmers' financial productivity but also have an impact on their livelihoods as the majority are able to gain financial literacy and education being a member of the saving group.

The study concludes and recommends that financial inclusion is an important driver of smallholder farmers' financial productivity. Community-based savings and credit cooperatives (SACCOs) group should, therefore, be assisted and backed up by the stakeholders by officially recognizing them as a group under financial institution dedicated to improving rural productivity. Also, stakeholders should strengthen the information dissemination to smallholder farmers on the usefulness and benefits of joining and establishing the SACCOs group in their community where there is no availability of banking services. This is important in rural areas because access to financial services has a significant effect on the productivity of smallholder farmers. Strategy to encourage financial education should also be developed to draw the attention of the entire rural population to fundamentals of the value of money, the knowledge of financial institutions, and the proper use of credit.

**THE EFFECTS OF COMMUNITY AND SOCIAL DEVELOPMENT AGENCY ON LIVELIHOOD OF RURAL COMMUNITIES OF AKINYELE AND EGBEDA LOCAL GOVERNMENT IN OYO STATE OF NIGERIA**

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**Mr Oyelakin Akinrinde**



**Professor Olanrewaju Olaniyan**

**Abstract**

The rural communities are the poorest places in Nation. The livelihoods of inhabitants of rural communities of Akinyele and Egbeda Local Government in Oyo State of Nigeria has not witnessed significant improvements in recent years as a result of poor intervention services focusing on strengthening rural dwellers in the State. This study show case various efforts aimed at alleviating or reducing poverty among the people as well as improving the Livelihood and well-being of rural communities through the various fundable projects executed by the Community and Social Development Agency(CSDA). This study therefore, examines the impacts of the Community and Social Development Agency (CSDA) on the Livelihoods of Rural Communities dwellers of Akinyele and Egbeda Local Government in Oyo State of Nigeria.

Sustainable Livelihood theory, System theory and Pro-poor growth theory provided the framework. A cross-sectional survey was conducted among three hundred and thirty-five (335) respondents from two purposively selected local governments participating in CSDA intervention programme. The Local Governments areas purposively selected were Akinyele and Egbeda. Quantitative data were analysed using descriptive and inferential statistic at  $\alpha_{0.05}$  and chi-square, t-test and regression analysis were used to analyse the research hypotheses.

Construction of a Primary Health Centre (PHC) was the commonest form of CSDA interventions reported by the participants (78%); less than half reported intervention projects such as – rehabilitation of Rural Roads (45%), Rural electrification (32%), Water boreholes (27%), erosion control (26%), Construction of box culverts/bridges (26%), Construction and Renovation of classroom (23%). These intervention projects; rural electrification, water boreholes, erosion control, construction of box culverts were insufficiently available, while the two projects that receive attention of developmental agencies were Primary health Centre and Road rehabilitation. The beneficiaries stated the provision of CSDA services most prominent constraints as; poor roads (17.6%) and financial constraints (17.6%). For human capital, their livelihood is only influenced by increase in number of safe deliveries [sig=0.002, sig<0.05]. For economic and financial Capital also, their livelihood is not influenced by any of the financial capital intervention programmes. For physical capital, only household's connection to electricity significantly influenced their livelihood [sig=0.002, sig<0.05]. For social capital, increases in the number of people attending PTA meetings [sig=0.04, sig<0.05] and increase in social events [sig=0.00, sig<0.05] significantly influence their livelihood. Also, the difference in the effect of CSDA intervention between the beneficiaries and non-beneficiaries is significant [t = 3.457, df = 298, sig=0.001, sig<0.05].

Having seen that all the four components of CSDA considered in this research were significant to their livelihood, it became important that these four components should be a GUIDE for the agency in delivering their service to the people living in rural areas.

**Key word:** Communities and Social Development, Livelihood, Rural Dwellers, Oyo State

## RESILIENCE CAPACITY OF RICE FARMERS IN NIGER AND OGUN STATES, NIGERIA

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**Mr. Williams Agun**

### Abstract

Rice is important to the Nigerian population as a means of livelihood for the producers and as a major part of urban and rural food consumption and expenditure. In 2017, Nigeria produced approximately 9.86 million tonnes of rice paddy generating more income for Nigerian farmers than any other cash crop in the country. But with the global challenge of climate change particularly to agriculture and rural farmers, attention has been drawn towards the resilience of rice farmers in Nigeria because being in Sub-Saharan Africa, the region is listed as prone to adverse effects of climate change. This has led to the alarming prevalence of food insecurity.

For Ogun and Niger States in Nigeria, using data from the General Household Survey (GHS) of the World Bank, variables required to estimate the resilience pillars and the food security indicators were constructed and fed into the structural equation model for the resilience capacity index (RCI) using the Resilience Index Measuring Analysis (RIMA II).

Results (on a scale of 0 to 100) show that rice farmers generally have low Access to Basic Services (ABS). In 2010, it was 18.953 and 25.704; 7.121 and 21.955 in 2012; and 28.438 and 27.465 in 2015 for Niger and Ogun states respectively. Social Safety Nets (SSN) were 46.471 and 46.503 in 2010; 7.471 and 6.045 in 2012 for Niger and Ogun states respectively. In 2015, it was 0.677 for Ogun state. Assets (AST) was shown to be indices of 2.924 and 0.175 in 2010; 1.090 and 0.307 in 2012 and 1.897 and 0.286 in 2015. Adaptive Capacity (AC) was 22.548 and 27.886 in 2010; 0.203 and 0.278 in 2012 while in 2015, it was

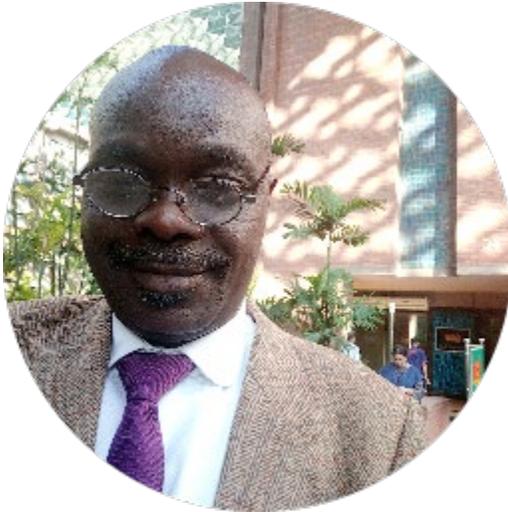
shown to be 31.939 and 34.623 in Niger and Ogun states respectively. Having electricity, independent household members, and higher monthly food expenditure significantly influenced resilience in all the three waves. Having a female household head influence the resilience in 2010; good housing and scholarships influenced resilience in 2012 and in 2015, owning land influenced the resilience of rice farmers in the study area.

This study identified areas for investments and interventions for building resilience of the livelihoods of rural rice farmers in the study area and recommended that programmes should focus on enhancing basic amenities and services, environmental conservation and sustainability, improving the management of natural resources of land and water and promoting equitable access to these resources by every member of the community.

## Poor Resource Governance, Excruciating Poverty and the Prospects of UNIDO Good Governance Standards for Sustainable Practices in Africa

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**Prof Adeyeye Adewole**

### Abstract

The African continent with vast natural and human resources have continued to experience despicable poor resource governance leading to phenomenal economic wastages, gargantuan corruption and low capacity utilisations. The situation has continued to escalate and worsen excruciating poverty thereby making it difficult for the African continent to meet up past global sustainable development agenda 2015 and the on-going SDGs. Against the backdrops of the needs to urgently redress this unfortunate trend, one of the most recent initiatives is UNIDO Good Governance Standards for sustainable practices. Using Nigeria as a case study, the paper examines the prospect of UNIDO Good Governance Standards as a veritable instrument for enhancing resource governance in order to attain sustainable growth and development. The study is significant for two cogent reasons: First, it highlights the challenge of resource governance in Africa as a repugnant threat to attainment of sustainable growth and development. Secondly, it examines the UNIDO global proactive agenda for addressing resource governance distortion in national organizational contexts across Africa towards attainment of relevant sustainable development goals (SDGs in particular and holistic growth in general).

## **PATHWAYS TO LIVELIHOOD RESTORATION FOR THE ENDANGERED LIVESTOCK HERDERS AND FISHERFOLKS IN NIGERIA**

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### **Abstract**

The current deadly massacre of citizens across the length and breadth of Nigeria under the erroneous impressions and culpability of herdsmen calls for new directions guaranteed with effective resuscitation of livestock and fishery sub-sector in Nigeria. This paper traces the history of various agricultural development interventions in Nigeria that have neglected the livestock and fishery sub-sector, identified gaps that resulted in the current plights due to climate change devastation that impact negatively on livestock herders in northern states and fisherfolks in environmentally compromised oil producing communities. The study adopts qualitative approach in discussing and propounding solutions to the identified gaps that is threatening the growth of livestock and fishery sub-sector with attendant implications for the agricultural resources transformation pathways in hunger and poverty endemic Nigeria yearning for emancipation. It highlights the need for a conducive environment for the endangered herders and fisherfolks to maximise the potentials to expand the Gross Domestic Product of Nigeria from non-oil sector. The article proffers solutions to the prevailing crisis between herders and other citizens beyond ethno-religious coloration by the enemies of state which has blurred the future of livestock development in Nigeria and peace and unity of the country. On the whole the outcomes will undoubtedly contribute to accelerating progress towards SDGs in times of crisis in our dear country that efforts like this will mitigate poverty, ensure zero hunger and set affected and afflicted citizens in troubled states cope with the realities of climate change and on the overall engender peace and justice where strong institutional drivers are deployed to rebound the country as a leading light in human service system.

## Local Building Materials for Africa: Availability, Use and Challenges

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### Abstract

The threats posed by the changing climate, environmental pollution and degradation, and loss of biodiversity have increased the importance of embracing sustainable practices across all sectors of the global economy. The construction sector, which is traditionally reluctant to embrace change and evolve swiftly, is now at the heart of global discussions due to the sheer size of its environmental impacts. Construction and operation of the built environment is indeed globally responsible for around 40% of final energy demand, greenhouse gas (GHG) emissions, resource depletion and waste generation.

So far, the rapid increase in urban floor area has relied on a globalised approach to construction with few, ubiquitous materials – such as concrete, steel, and aluminium for instance – being used in every corner of the globe irrespective of their belonging to the vernacular architecture or traditional construction methods of a country. With sustainability in sharper focus, however, there is growing tendency to re-evaluate the extent to which local building materials can support sustainable construction practices and mitigate the effects on climate change and resource depletion caused by materials such as cement, concrete and steel that are characterised by energy- and carbon-intensive supply chains. This is particularly true in a Global South context, where most of the projected population growth and urbanisation will occur.

Existing studies on local building materials, however, do not provide extensive analysis of their use. This paper, therefore, examines the challenges to the use and awareness of the availability and environmental performance of local building materials in South Africa. Based on a literature review, a questionnaire survey was developed and then used to collect primary data from stakeholders in the construction industry. Structural equation modelling was then employed to validate the causality between the constructs. The study found that the negative impacts of the challenges to the use of local building materials significantly reduces if stakeholders are aware of their environmental performance in the South African context. We conclude that the use of local building materials (LBMs) will increase with a corresponding increase in awareness of their environmental performance and availability. Further, the acquisition of the technical knowledge associated with the LBM-based construction and the recognition of the use of LBMs in building specifications and regulations also require parallel development to maximise their uptake and the corresponding environmental benefits.

Given the central role that sustainable urbanisation plays in mitigating several of the global climate crises (resource consumption, sheltering, energy demand and GHG emissions – to name but a few) this paper aims to contribute to the ongoing understanding of sustainable use of resources from in the African context. As such it contributes to several Sustainable Development Goals (SDGs) and their targets: SDG 9.4, SDG11.3, SDG11.6, SDG12.2, and SDG13.3.

# **10. Special Themes**

## **10b. Sustainable development in Latin America**

## Democratizing organizations: worker participation in strategic decision-making

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### Abstract

Democracy is an essential element in building greater transparency and participation by the general population. Considered as elements belonging to society, organizations also combine political elements in the relations between the most diverse social actors, demonstrating the need for democracy in strategic decision-making. As a way of identifying which elements are preponderant for the identification of organizational democracy, a survey was proposed through questionnaires with 80 Brazilian workers using a form made available on social networks during the period from October to November 2020.

It can be considered that companies, as well as society, are organized through power and political relations to characterize decision making (Clegg, Kornberger, and Pitsis 2016). Clegg et. al. (2006) demonstrates that organizational political models are constructed of political antagonisms that cannot be hidden, and it is necessary to identify the political performance of organizations in order to consider them as democratic or oligarchic.

Recent types of self-managing organization such as cooperatives (Borges, Scholz, and Cargnin 2015; Forcadell 2005) or participation in the production process (from Munck and Ferreras 2013) demonstrate that there are possibilities for new perspectives for organizational democracy, leading to the possibility of organizations apply such a model, regardless of the market in which they operate. However, there is no specific model of organizational democracy considering the power relations and the political character of organizations (Alvesson, Bridgman, and Willmott 2009).

Using the mentioned research from 23 variables obtained from the polyarchy model (Dahl 2002) and organizational political performance (Clegg, Courpasson, and Phillips 2006), six major factors responsible for the generation of organizational democracy were identified, being Expression (possibility internal debate and perception of individualization), Direct Participation (hiring by knowledge and decision by vote), Leadership (distance from the leadership and aspects of individual decision), Power (concentration of power by the immediate leadership), Empathy (if put in the other's place at the time of hiring) and Collective Participation (deliberate decision making).

Making decision-making within organizations more participatory offers the possibility of gaining more space for collective bargaining and associations, going beyond the union model currently employed, enabling the safeguarding of workers' rights, especially women, giving voice to the notorious strategic decision making dominated by men, being linked to the SDG+ Target: 8.8.2. Also enabling greater organizational democracy facilitates a more effective approach to sustainability by avoiding decision making based solely on the predatory profitability of the natural and / or social environment.

## Efficiency analysis applied to multimodal infrastructure investment projects for soy transportation in Brazil

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**Dr. Fernando Vinícius da Rocha**

### Abstract

The demand for investments in transport infrastructure is evident in Brazil, especially in the agro-industrial sector. There is also a growing concern with the Brazilian territory's sustainable development to consider impacts in the economic, environmental, and social areas. The relationship between these three concepts of analysis is also an essential issue in the academic literature - in many cases, based on the application of multicriteria analysis methodologies. This work aims to analyze investment projects in multimodal transport infrastructure for soybean haul in Brazil - a total of 26 selected projects. The projects' impacts were simulated based on a model for minimizing transport costs in the soy transportation chain (Network Equilibrium Model), considering the transport operations between producing locations and consumer markets (domestic and international). The potential for cost reduction, the transport CO<sub>2</sub> emissions, the soybean physical losses during transport operations, the potential increase in the regional Human Development Index (HDI) due to cost reduction, and the area of influence of the projected infrastructure are some of the results obtained through the application of this model. Stretches of the Ferrogrão project have the highest potential for cost reduction and carbon dioxide emission reduction. The Malha Norte railroad expansion project and a section of the Ferrovia Norte Sul (FNS) project in the country's southern states have the lowest physical losses during the soybean transport operations. The Ferrovia Norte Sul has the most significant social impacts. Additionally, we used Data Envelopment Analysis (DEA) to compare the sustainability of the projected investments based on the economic (cost of the project, potential for cost reduction, and total cargo loaded by the projected infrastructure), environmental (CO<sub>2</sub> emissions and physical losses in transport

operations), and social variables (project influence area and its potential impact in regional Human Development Index) - constant returns to scale (CCR) and variable returns to scale (BCC) models. The result of the BBC model shows that the most efficient projects among all the cases are: (1) the investments toward the expansion of Malha Norte railway until Sinop (Mato Grosso State) with an efficiency score equal to 100,00%; (2) the expansion of Malha Norte railway until Sorriso (Mato Grosso State) - 99,83% of efficiency; (3) the investments in the viability of a waterway stretch from Marabá (Pará State) to Barcarena Port - 99,04%; and (4) the joint investments in stretches of the FNS and the Ferrovia de Integração Centro-Oeste (FICO) - 98,67%. The CCR model results highlight two scenarios related to the Paraense railway and the Marabá waterway as the most efficient projects - 100,00% and 92,14% of efficiencies. Those mentioned projects should be the priorities in developing an investment infrastructure transport plan for the Brazilian soy production and marketing chain. We highlight that such a combination of analysis methods (Network Equilibrium Model and Data Envelopment Analysis) is valid for the proposed evaluation. It adds crucial subsidies to the decision-making process of public agents.

## Selection of renewable energy source for Brazilian Navy's organizations through the AHP-TOPSIS-2N multicriteria method

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### Abstract

The Armed Forces are permanent national institutions, as provided for Article 142 of the Brazilian Federal Constitution (1988). So, their facilities also tend mostly to remain in the same places for prolonged periods. Considering the diversified Brazilian energy potential, it is evident that the country has conditions to explore the most diverse types of sustainable energy generation. Renewable energy sources have as a great advantage the use of recurrent phenomena of nature as an example the incidence of sunlight, winds and the flow of rivers, but in contrast, current technologies and the generation of electricity in high quantities have as their initial barrier the cost of installation. In this context, the objective of this article is to advise on the choice of a renewable energy generation system to be installed in the Military Organizations of the Brazilian Navy. Considering that sustainable development depends on three components - economic, social and environmental sustainability - and that they need to be arranged, this study considered the wide use and consequent budgetary impact of electricity consumption combined with the growing importance that the concept of sustainability gains in society, in addition to the benefits of renewable systems, presenting, as a result, the hierarchical options. Among the Multicriteria Decision Analysis (MCDA) tools, we applied the AHP-TOPSIS-2N method to analyze the alternatives. This method consists of the Analytic Hierarchy Process (AHP) and Technique for Order of Preference by Similarity to Ideal Solution-2 Normalization (TOPSIS-2N) techniques. The weights of criteria were attributed through research in specialized bibliography and interviews with civil and military Electrical Engineers. In the proposed analysis, we compared to wind and photovoltaic generation systems. After applying the AHP-TOPSIS-2N method, we obtained a projection of expenditures throughout the life cycle of the power generating system compared to the projection of expenditures on electricity in the current model. The importance of this study is justified by the fact that renewable energy sources are not properly exploited in Brazil, despite the energy wealth available in the country. As a result, the photovoltaic system was considered more relevant, presenting a payback after 5 years, and a profit of 5 times greater than the conventional system in the 25 years following the installation, while the non-option for the renewable system does not require an initial investment, but over the course of 30 years will only entail expenses. Notoriously, society will benefit through the national development of these technologies by gaining expertise and the possibility of serving as a model for other public or private institutions.

## Technical and economic feasibility study for the implementation of electric propulsion in passenger transport vessels of the Brazilian Navy

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### Abstract

In the last decades, the economic development of the countries, especially the emerging ones, has been accompanied by the greater consumption of fossil fuels, considerably increasing the emissions of gases responsible for the greenhouse effect, thus intensifying the problems related to climate change and environmental pollution. Due to the growing concern about the impacts caused, these countries have been investing in the development of clean, renewable technologies and studying methodologies to incorporate the socio-environmental variable in making their economic decisions. In this context of economic development combined with the preservation of the environment, the adoption of electric propulsion in ships, whether combined with conventional diesel or implemented in a unique way, has been gaining relevance, establishing itself as one of the most attractive options in the naval environment. However, the decision to adopt new technologies to replace existing ones must be made cautiously, through studies that analyze its impacts in the environment where it will be inserted. Based on the above, in this paper, we applied the Analytic Hierarchy Process (AHP) and Simple Aggregation of Preferences Expressed by Ordinal Vectors - Multi Decision Makers (SAPEVO-M) multicriteria methods, to analyze the technical feasibility and cost-effective way to apply electric propulsion technology using lithium-ion batteries (Li-Ion) for energy accumulation in vessels that carry passengers for the Brazilian Navy. These vessels daily transfer students, civil and military servants to the Admiral Wandenkolk Instruction Center (CIAW), wherein normal routines there are about forty daily crossings and Sunday crossings (weekends and holidays), around fourteen, generating an average monthly consumption of four thousand five hundred liters of marine diesel oil. For the analysis, we collected technical data and operational characteristics of these vessels, requested commercial proposals from companies in the sector. Through interviews with the military personnel responsible for the vessels, we defined the main criteria for the analysis of the propulsive systems: Cost of Implementation, Cost of Operation, Social and Environmental Aspect and Total Gross Mass, being assessed in the light of the aforementioned multicriteria decision support methods. As a result, the study verified the technical and economic feasibility of equipping the proposed vessels with a purely electric propulsion system, which in addition to promoting a substantial reduction in operating costs, is in line with the socio-environmental development. The study may serve as a basis to promote this technology in other vessels in the various districts of the Brazilian Navy, as well as in other sectors and applications in the naval environment.

## **The effects of environmental performance on competitiveness and innovation: A stochastic frontier approach**

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### **Abstract**

The main sources of input for an economy are environmental and natural resources, especially in biodiverse countries. Given this, such resources are associated with competitiveness and efficiency in that natural resources are a factor for production that affects productivity and growth. Moreover, changes resulting from natural resources becoming scarcer must be anticipated to prevent a decrease in competitiveness. Within this context, analysing competitiveness and its relationship to environmental performance is critical, especially for emerging economies with high levels of biodiversity, as a means to promote environmental care, prevent environmental damage and to improve competitiveness. This study evaluates the effects of environmental performance on competitiveness by applying a stochastic frontier approach, the World Economic Forum's global competitiveness index and various environmental variables, and in turn, it elucidates how environmental performance affects competitiveness in Colombian regions, which are characterised by economic and social disparities. The results of this study highlight the importance of environmental performance on increasing competitiveness. Improved environmental performance should lead to an increase in competitiveness. It is important to mitigate regional disparities through the use of political instruments that promote adequate environmental measures and that consider competitiveness and innovation to promote sustainable development and the responsible use of natural resources. The findings of this study will be critical to the design of adequate instruments that consider environmental performance and competitiveness as key elements in promoting sustainability, growth and welfare in Colombian regions.

## **Cities as career drivers: innovation ecosystems, sustainability, and development in urban centers**

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**Dr. Marcia Vaclavik**



**Dr. Janaina Macke**

### **Abstract**

It is known that high levels of human capital are a key element for sustainable development. Cities and innovation ecosystems are spaces that foster different capitals and can act as positive drivers for the

development of human capital, including work and careers. The general context, however, is often seen as a detrimental factor for career development, especially in countries that are not part of the WEIRD group (“Western”, “Educated”, “Industrialized”, “Rich” and “Democratic”). Labor markets and workers are often forced to operate in conditions of persistent adversity. Such challenges are faced by many Latin American countries, highlighted in general indicators that reflect low education level of the population, low workforce and organizations productivity rates, and constant high unemployment rates. A non-virtuous cycle is created, contributing negatively to individual trajectories and the circulation of practical knowledge. It impacts development promotion and improves the quality of life at local, regional, and national levels in a broader way. Since ‘work’ is placed at the center of development discussions and can be seen as a vital issue to innovation ecosystems, investigate the interrelationship between these elements can contribute to scientific, technological, economic, and welfare development in the medium and long terms. Thus, this research aims to promote a theoretical articulation between the concepts of careers, cities, innovation ecosystems, and sustainable development. To achieve the general objective, We analyzed cities as career drivers state-of-the-art and identified key elements, trends, and research gaps relating to innovation ecosystems, sustainability, and development in urban centers. A systematic literature review was carried out using the Web of Science database. By using the keywords (and correlates) “career” and “city” and “sustainability”, “innovation”, “livability”, “smart cities”, “human capital”, “talent”, “employability” and “attractiveness”, the refined search results in a corpus of 45 scientific articles published between 2001 and 2020. Data analysis occurred through content analysis tools and statistical processing of the paper’s abstracts by the Iramuteq software, version 0.7 alpha 2. The results showed four categories that comprise 82.12% of the corpus’s elementary units (e.u.). The first category (27.1% of e.u.) grouped studies on the creative class and cities’ attractiveness. The second brings the perspective of the labor market, particularly the effects of immigration on communities and cities (29.3% of e.u.). The third brings the phenomenon of expatriation, the organizational context, and the barriers to building the career and workers’ identity in unknown territories (15.1% of e.u.). The fourth and final category addresses the relationship between careers, cities, and universities, particularly students’ role as social actors in building local development (28.5% of e.u.). This research provides an integrative approach to understanding the links and dynamics between different socio-ecological systems. By adding the discussion about careers to the debate on ecosystems of innovation and sustainable development in cities’ circumscription, we argue that this research can fill gaps already identified but still treated separately in different fields, contributing to the development of integrated policies and interventions.

## Responsible Tourism: framework proposal based on the experience of the Social Service of Commerce in Brazil.

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**M.Sc. Alberto d'Aurea**

### Abstract

Tourism sector has been showing 4% of growing, which made it responsible for approximately 10% of global GDP. Covid-19 pandemic breaks this growth, although, as soon as the pandemic is controlled, tourism is expected to return to the growth. Data on this paper were collected before the pandemic, representing a tourism growing scenarium and its potential to increase positive and negative impacts on society. The resulting consequences on destinations make it important to study sustainable alternatives to mitigate the negative impacts and intensify the positive ones, focusing on the quality of life of the resident and the value generation for the organizations. This article aims to develop a framework based on the identification and analysis of the Responsible Tourism dimensions through the case study of the Social Service of Commerce (Sesc), a large Brazilian company in the tourism segment that is nationally representative and creates, commercializes, and operates tours and excursions. The study has a quantitative approach: questionnaires were applied to the organization's employees, based on Goffi, Masiero and Pencarelli's research (2018), using seven-point Likert scales. The data were subjected to descriptive statistical analysis, factorial analysis using PCA (Principal Component Analysis), verifying the Kaiser-Meyer-Olkin (KMO) index sample suitability, and confirmation of the internal consistency of the variables through the Cronbach's Alpha. The results, observed through the lens of responsible tourism, showed that the most expressive dimensions were: socio-cultural responsibility (participation and local cooperation, engagement of residents and local businesses); environmental responsibility (use of sustainable accommodation and transport, monitoring of environmental impacts

and reduced tourism groups); economic responsibility (encouraging purchase from local producers and use of local labor); image and reputation of the organization (marketing, reputation, and competitive advantage) and incorporation of sustainability into management (sustainable management and perception of quality). The inclusion of residents as active and remunerated participants and the maintenance of the educational attribute as a transversal axis to clients' tourism activities contributed to raising the averages of the dimensions. On the other hand, the difficulties in measuring the impacts of tourism activity and the high costs of sustainable transportation and lodging equipment influenced them downwards. The framework designed from the empirical results of this study recognizes the complexity of tourism activity and contributes to its responsible management, also establishing a relationship with Sustainable Development Goals (SDG's) 8 and 11, with special attention to the SDG+Target: 8.9 and 11.a. The study provides empirical and theoretical bases to accelerate the progress of these SDG's in times of crisis, as it can help the evolution of the elements on which it is based, that is, the principles of responsible tourism and its value as a support for the development of destinations, tourist organizations and people, from a practical application model.

**Keywords |** sustainable tourism, stakeholders, social responsibility, tourism management.

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**The case study of a biokerosene and renewable platform in Brazil: an alternative to reduce the crisis caused by the inequality virus**

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**Dr. Danilo de Oliveira Sampaio**



**Dra. Rafaella Prata Rabello**



**Sr Arthur Alfredo Nunes Avelar**

## **Abstract**

### Introduction

Brazil is an emerging country with continental dimensions and an abundant nature, however, the ability to implement clean energy in this vast territory, is still far from possible. The use of technology in line with sustainable development, gave rise to the objective of this research - to present a case study of clean energy, related to the production of biokerosene in the city of Juiz de Fora, Minas Gerais, Brazil, through partnerships between the public authorities, private companies, social organizations and universities. In addition to being renewable energy, biokerosene uses cooking oil as its main source, which is reused from leftovers obtained in university restaurants, snack bars, fast food chains and in homes. Biokerosene will be used in the municipality's public fleet, contributing to economic, social and environmental terms. It can be said that in this case study, eco-efficiency is a key aspect, as it promotes the reduction of material consumption and less environmental pollution (WBCSD / UNEP, 1998). By UNESCO's Sustainable Development Goal 7 (2021), clean and affordable energy must be produced to ensure reliable, sustainable, modern and affordable access to energy for all. This research addresses the scope of SDG 7, with citizens with a ticket at a fair price, the environment that will absorb less pollution and companies that can make public transportation at a lower cost possible by obtaining their gains and keeping tickets at an attractive price.

### Method

The methodology used is exploratory-qualitative, through in-depth interviews using a semi-structured script. Content analysis was used as a technique to ascertain the speeches of individuals who are part of the partnership between public authorities, universities, private companies and social organizations (Gil, 2014; Appolinário, 2011).

### Discussions

Clean energy in Brazil is in the process of understanding by private companies, and in the initial phase of policies by the State, however, for citizens, there is a lack of information and education on the subject. It becomes necessary and urgent actions planned to develop with society, that is capable of alerting about the environmental problem that is experienced, as well as questioning the consumption process, so that the individual can, through habits, be more aware in terms of the use of energy in their daily lives. For this, the academy, social organizations, the State and companies, have a fundamental role in encouraging an education focused on conscious consumption.

## Results

Through the interviews it was found that the adoption of blockchain technology through a traceability and certification system and a digital incentive platform can exponential the result of the partnership between the university, city hall, company and social organizations, giving scale to solutions for the problems faced by society, such as reuse of inputs, business viability, environmental education and reduction of pollution through the use of clean energy.

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## **A model for evaluating the sustainability and performance of companies in the Brazilian electric sector based on multicriteria decision and machine learning**

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### **Abstract**

The present study is aimed at proposing a model for joint assessment of sustainability and performance of companies in the Brazilian electricity sector, based on sustainability and performance indicators, aiming at benchmarking companies in relation to competing companies. As these are indicators based on quantitative and qualitative measurements and, most likely, they will incur inaccuracies in these measurements, the model to be proposed will be based on a multicriteria approach with the use of Rough Sets Theory, which allows the mathematical treatment of inaccuracies. From this theory, Decision Tables are then generated considering: condition attributes (sustainability or performance indicators) and decision attributes (sustainability or performance classes).

The sustainability or performance classes are obtained by “grouping” (“clustering”), considering three “clusters” or classes: “high, medium, low”, based on sustainability or performance indexes, respectively. In addition, through Machine Learning (Artificial Intelligence subfield; and classification algorithms), it will be possible to predict the sustainability or performance classes (high, medium, low) based on historical series of indicators and indexes. For each company, an orderly pair (sustainability class, performance class) will be formed, to be pointed out in a “Matrix of 9 sectors”. This positioning obtained by companies in the Brazilian electricity sector will always be relative, that is, it will have as reference the companies best positioned or classified in the matrix. Benchmarking will be carried out over a historical series of indicators and indexes of sustainability or performance for the same company, as well as, in relation to competing companies (not identified). Thus, the use of the proposed model will allow a company to identify and quantify its gaps in terms of indicators and indexes of sustainability and performance in a relative way compared to its competitors. This will provide inputs for strategic planning (action plan; monitoring of indicators and indexes) for the company under analysis, given the set of information gathered about companies in the electricity sector. Information about companies will be exported to a Web platform (World Wide Web), as a means of supporting the proposed model.

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## FOOD ANTI-CONSUMPTION: A SYSTEMATIC REVIEW TO EXPLORE THE REJECTION OF FOOD

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### Abstract

Food is one of the three most critical consumer sectors in terms of impact and harm to the environment, besides its relevance to public health, and potential reduction of poverty and hungry. In consumer behavior, rejection is an aspect still under-explored when compared to choice and acquisition processes. Although recent work has addressed the concept of anti-consumption, there is a gap in terms of studies on the food domain. Rejection of food can lead to new dietary patterns, as vegetarianism, impacting the food market. In Brazil and Latin American countries, the discussion of anti-consumption is relevant because of the size and economic relevance of the consumer market and the impact on food chain production of soy, grains, and meat, especially considering the importance of agriculture and livestock in Latin American economy and overall global trade. Moreover, diet influences health problems like obesity, malnutrition, cancer, diabetes, and other diseases. The present study aimed to understand what type of food people reject, and how and why food anti-consumption occurs. To achieve this, an exploratory study was carried out through a systematic literature review of 30 articles, applying the ProKnow-C protocol. As result, we i) explored the relevant and current literature on anti-food consumption; ii) identified which type of foods are subject to anti-consumption studies; iii) described main characteristics of the manifestations of food anti-consumption; iv) explored the reasons that lead to the rejection behavior, and v) identified relevant research topics to future investigations, focusing in the Latin American context. Findings indicated a predominance of studies with a qualitative approach and conducted in developed countries. Only one study was carried out in Latin America (Brazil). Regarding “what” people reject, meat, junk/fast food, dairy, eggs, soft drink, and frozen food were found as subjects of the studies. However, the anti-consumption phenomena are embedded in particular study contexts, including food waste, dumpster diving, brand hate, and organic and sustainable food. Regarding “how” and “why” food anti-consumption happens, it was possible to identify food intake restriction or reduction, generally accompanied by green, sustainable, ethical, moral, and alternative consumption behavior or voluntary simplicity lifestyle. Insubordination practices emerge when anti-consumption is related to resistance to consumption. Symbolic anti-consumption is mainly connected to the desire to remove an unwanted aesthetic image. Finally, avoidance of a brand, product, or food category appears as a brand hate phenomenon and occurs through boycotts and activist consumption, associated with ideological and country-related reasons. Our study is related to SDG Goal 12 (Ensure sustainable consumption and production patterns), mainly targets 12.3, 12.8, and 12.A. In a time of crisis, as the COVID-19 pandemic, consumers change the consumption patterns, and the study of food consumer behavior is essential to input information to reverse current trends of consumption and production towards a more fair and sustainable economy.

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## Micro-foundations of the sustainability transitions: the relationship between agency and structure in the institutionalization positions process in relation to the Soy Moratorium

Mr. Thiago Quilice

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### Abstract

In the Brazilian soybean socio-technical system, the various positions actors assume in relation to sustainability generate discursive disputes that influence the sector's sustainability transition process. I use position as meaning 'a point of view adopted and held to'. Thus, there is a need to understand the institutionalization of these positions. Multi-Level Perspective (MLP) is one of the main approaches to investigate processes of Socio-technical Sustainability Transitions. However, research has highlighted that this perspective does not provide adequate direction for the study of how the relationship between 'more micro' and 'more macro' levels — micro-foundations — takes place, which, I suggest, is because the agency and structure elements are not carefully considered in the investigation of structuring processes. I believe this limitation is a consequence of the fact that Institutional Theory — widely adopted in MLP — generally, advocates the separation between agency and structure in the study of structuring processes — dualism of structure. This results in the paradox of embedded agency and theoretical strands that (i) do not adequately theorize how the actor chooses a certain action alternative among all those made possible by the structure, (ii) predispose empirical investigations to conceptions of actors that can alter a structure as if they were not under its influence, (iii) predispose empirical investigations to focus on agency or structure, and (iv) do not discuss how the agent uses the structure to act. An alternative to these approaches is the Strong Structuring Theory (SST), which comprises agency and structure in a combined way in the structuring process — duality of structure. To deal with these issues, I propose a conceptual and methodological approach based on the integration of SST into MLP to investigate institutionalization processes in socio-technical transitions. In this sense, the objective is to analyze how agency and structure have related themselves in the institutionalization of positions in relation to the Soy Moratorium, an event that can serve as a paradigmatic case study for other socio-technical systems. Regarding methodology, I intend to use the micro-history approach, which aims at understanding broader social structures and historical patterns through the analysis of a single event. To this end, primary historical sources (documents, reports, news, laws, declarations, publications in social networks and scientific articles) produced by the main actors of each regime of the soybean socio-technical system (industry, clients, science, politics, technology, culture) will be analyzed. Through thematic analysis, I will investigate (i) how each actor positions itself in relation to sustainability and seeks to influence the structure in which it is inserted and (ii) how and which elements of the structure influence these positions. Classification categories defined *a priori* (based on SST and MLP) and *a posteriori* will be used. I believe the adoption of the concept of positioning and the integration of SST into MLP will make it possible to investigate systematically and longitudinally, at less aggregated levels of analysis, the motivations and actions of actors. It would lead to a better understanding of the institutionalization and socio-technical sustainability transition processes — or, of the sustainability non-transition process.

## **Gender, intersectionality and sustainability – controversies and tensions on women representation in current Brazilian advertising. A socioeducational point of view.**

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### **Abstract**

This article explores the gender representation subject in current Brazilian advertising highlighting the maintenance of reductionist, unqualified and excluding symbolic appropriations of the women in social, political and cultural context. Sustainability is understood on its widest meaning, which gender discrimination overcoming turns to be an essential element to the building of a fairer, more equal, harmonical and honest society.

It is highlighted, from this context, that mediatic and marketing productions contribute to the building of imaginary and social representation of the companies sustainability and social responsibility, with its ways of thinking and practices. Therefore the sustainable communication may have qualified and criticizing information, participative dialogue and commitment to promote new practices, trustworthy relationship and active behavior from the companies, according to the new demands and expectations imposed on marketing. Women representation becomes this scenario intersectionality which aims new equal and inclusive approaches.

The advertising agencies have an important role on this speech field as their social range and legitimately enable them proposals on public context, which might question the limits of the ways of production and current consumption unsustainability. They also point out to the lack of sense gaps between the companies speech and practice. Advertising and merchandising are not able to create new values and social meanings. What they do, in fact, is making these elements known by visibility also promoting, disqualifying or condemning and updating them within daily communication and consumption practices. Though, these events do not have a less social importance. On the contrary, they have a remarkable ability to collectively influence either habits, goods and services consumption patterns or the building of imagination, sensibility and contemporary subjectivities. The marketing communication is more and more stimulated to promote the citizens awareness facing the huge current problems, modifying several behaviors and intentions.

The article debates the current advertising role on the context reversion of gender discrimination from two perspectives: i) from outside to inside, in civil society context, and ii) from inside to outside, according to the companies and the people from their marketing communication.

The methodology procedures of this research refer to a systematic review of qualitative and quantitative studies and researches about the theme, accomplished by different Brazilian institutions along the last ten years.

The findings point out to the needs, demands and opportunities of pragmatical changes in the formal teaching and the practice of Brazilian advertising creation, suggesting new creative approaches for a responsive communication, specifically nonsexist, in this case.

## **Colombia and Venezuela border, between diversity, inclusion and equity that Latin America requires. Contributions from public relations and communication management.**

Professor Ana-María Suárez-Monsalve

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### **Abstract**

In Latin America, economic inequality, social discontent, and apathy about politics increase the risks of inequality and respect for diversity. However, as stated by the Economic Commission for Latin America and the Caribbean, the COVID-19 crisis must be transformed into an opportunity to strengthen care policies in the region, from a systemic and comprehensive approach (CEPAL, 2020). Latin American public relations practitioners must take an active critical role in this post-COVID-19 transformation process.

According to the latest Latinobarometer survey (2018), in the 23 years of the research on citizens' perception of progress in their countries, never before has there been such a low perception (20%). In addition to this, or as a consequence of this, there are increasing manifestations of distrust in governments, disbelief in democratic systems due to corruption - as well as lack of action to curb unemployment - and citizens express apathy or even support for autocratic positions.

This chapter will review this situation of risk to inclusion, equity and diversity by comparing information between Colombia and Venezuela, especially in the conditions of the management of constant migration on the border between the two countries.

The methodology is qualitative with a critical analytical approach; decrees, policies and laws in Colombia that have been issued for the attention of the migrant population have been reviewed. With analysis in Atlas TI, categories of analysis have been identified and have been submitted to triangulation with interviews, documents and two cases of analysis.

We have reviewed the policies of the Colombian government showing the risk situation in the topics: inclusion, equity and diversity comparing information between Colombia and Venezuela, especially in the conditions of constant migration management in the border between both countries. The opinions of 10 professionals: 5 from Colombia and 5 from Venezuela, report on the limitations from the public relations management of the organizations to influence these policies. Two public relations campaigns have been analyzed to identify the strategic messages and values they promote.

This paper considers the special topic of the call for papers: 10.b Sustainable Development in Latin America: "Reduce inequality within and between countries" and goal 10.7 "Facilitate orderly, safe, regular and responsible migration and mobility of people, including through the implementation of planned and well-managed migration policies". (Access:

<https://www.un.org/sustainabledevelopment/es/inequality/> and  
[www.un.org/sustainabledevelopment/es/inequality/](http://www.un.org/sustainabledevelopment/es/inequality/))

# **10. Special Themes**

## **10c. Quality management and sustainability**

## The Role of Human Network Systems for Leading Sustainable Quality in Organisations

Professor, retired Karolyn Snyder<sup>1</sup>, Professor Kristen Snyder<sup>2</sup>

<sup>1</sup>University of South Florida, Tampa, USA. <sup>2</sup>Mid Sweden University, Östersund, Sweden

### Abstract

In this paper, we examine the role of networking as a management strategy for organizational development to help leaders create sustainable practices that invite adaptability and responsiveness to emerging internal and external needs. Networking has been identified as one of the ingredients in contemporary organizational development as part of the emergence paradigm in quality management. Yet little research exists on how networks can be used within organisations to strengthen the infrastructure toward agility and sustainable development. We are interested in exploring how leaders can use and develop networks as a management strategy within an organization to foster agile, resilient, responsive sustainable infrastructures as part of the UN Sustainability Goal #9.

In our research we coined the term, “*Human Networked Organization*” to suggest a new organizational prototype to promote sustainable organizational development that occurs when leaders systematically structure the functions of work in a network system, which includes values and culture. This prototype is the result of an ethnographic study of a private school in Tampa, Florida, USA. Data were collected systematically from 2016-2018 through observations, focus groups, informal conversations, document analysis, and a process-map to examine how the leadership team and teaching staff worked. Data were analysed based on social network analysis to examine, understand and illustrate the complex fabric of life in the school. Findings from this study contribute to the conference track focus on understanding the connections between quality management and sustainable development at the organizational level, and the UN Sustainability Goal #9.

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## **Insights from the Pandemic about how to lead and develop sustainable quality in organizations**

Professor Kristen Snyder<sup>1</sup>, Professor Karolyn Snyder<sup>2</sup>

<sup>1</sup>Mid Sweden University, Östersund, Sweden. <sup>2</sup>University of South Florida, Tampa, USA

### **Abstract**

In this paper, a qualitative case study is presented of how a private school in Florida, USA developed innovative responses to the Covid-19 pandemic, while maintaining and sustaining quality, within the school and in relation to global sustainable development goals. The analysis examines the school's leadership, and how strategic decision making, shared leadership, teaming and collaboration, and the school's core values and organizational culture were used to adapt and respond to the crisis. Findings from this case study provide insights to better understand how leaders can develop adaptive systems, built on quality management principles, and to foster sustainable practices that are value-based and customer oriented within the Quality 5.0 era. The paper connects to the track's focus to illustrate and discuss how quality management practices can be used to support sustainable development on the organizational level through adaptability and innovation.

Keywords: Leadership, Networks, Agile, Sustainable, Quality

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## Developing organisational systems that link quality management and sustainability: Moving from theory to practice

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<sup>1</sup>Mid Sweden University, Östersund, Sweden. <sup>2</sup>Mid Sweden University, Östersund, Sweden

### Abstract

Businesses and organisations of all kinds are called upon to re-examine their practices as part of the United Nations 2030 Agenda for Sustainable Development. Whether it is a product or service, business and organisations are part of a larger chain of activities that are now recognized as having direct impact on the planet. The philosophy behind Quality Management, and practices performed in line with that philosophy demonstrate linkages to sustainability. For example, the core values of systems view, long-term thinking and customer focus are central to both quality management and sustainable development theory. However, even if interlinkages between Quality Management and Sustainability exist in theory, little evidence exists of it in practice. For business and organisations to be able to address the UN goals, leaders need to develop organisational systems that transfer the core values into practice.

Among the sectors in which quality management and sustainability naturally meet is education. As part of its educational mandate world-wide, schools aim to help children and youth develop not only subject specific knowledge, but also core values based on democracy and caring for the planet. This can be seen as a direct mandate that interlinks the core value of long-term thinking with quality in education. In response to the UN sustainability goals many educational systems have articulated the importance for schools to help children and youth develop knowledge and skills to respond to current and future challenges in society. To achieve these goals, it is argued that development needs to take place at the organisational level, and that leaders need to develop organisational systems that integrate the values and goals of sustainability into the organisation.

The purpose of this paper is to present findings from a qualitative case study to examine evidence of how school leaders develop organisational systems that integrate quality management and sustainability, and how this is made visible at multiple layers in the organisation. Further, we hope to gain deeper insights into how long-term thinking can serve as a catalyst for integrating quality management and sustainable development in organisations.

The school as a case is chosen because of the built-in mandate to develop practices centred on long-term thinking through the preparation of future generations. By studying the organisational systems within schools, and the actions, behaviours and expressions of leaders, we hope to learn more about the mechanisms and practices that can facilitate interlinking quality and sustainable development in organisations to achieve the goals of Agenda 2030. The Quality Management framework “Cornerstone model” will be used to identify mechanisms and practices that can facilitate interlinking quality and sustainable development in organisations and their presence within the different layers of the organisation.

This paper contributes to the track focus to examine and explore synergies between sustainable development and quality management. Our focus relates most specifically to the topic: Leadership and Strategies for Sustainable.

## **Service quality, gamification and sustainable mobility: an empirical study in Italy on shared mobility**

Maria Giovina Pasca, Roberta Guglielmetti Mugion, Olimpia Martucci, Laura Di Pietro, Maria Francesca Renzi

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### **Abstract**

The present study aims to understand user perceptions of service quality and gamification mechanics in shared mobility services.

In the last years, there has been a growing interest in sharing mobility for the potentiality to generate a reduction in consumption and a greater awareness of environmental issues. In addition, the COVID-19 pandemic had a crucial impact on the actors involved in the transport sector, accelerating interest in issues related to sustainability and Agenda 2030.

The sustainable mobility is recognized as a priority by the Agenda 2030 that directly connects this phenomenon to service quality management practices: develop quality, reliable, sustainable and resilient infrastructures (SDG-9.1); improve safety and quality of the service provided (SDG-11.2); and promote an accessible and flexible solution that reduces emissions (SDG-13).

At the same time, sustainable practices, as sharing mobility, disruptive technologies and quality management work together to pursuing sustainable development. In this regard, gamification mechanics, implemented in mobile applications, emerge as an innovative tool to encourage sustainable practices.

In light of this, the present research investigates the service quality role on user satisfaction on shared mobility services and analyzes whether the intention to reuse these services changed after the pandemic. In addition, the effect of game mechanics on users loyalty and service quality is analyzed.

A theoretical framework is proposed, and an empirical study is developed in Italy by adopting the mixed-method approach. Data are collected by integrating qualitative techniques (in-depth interviews) and quantitative tools (questionnaire). The proposed theoretical model is tested through structural equation modelling (SEM) statistical techniques.

The study highlighted the crucial role of service quality and gamification to promote and incentivize shared mobility. To encourage users to adopt eco-friendly lifestyles, the service quality must be improved considering the needs and expectations of users: convenience, reliability, safety and availability of vehicles and the ease of use and security of the platforms. Gamification mechanics guide and educate users to report broken or badly parked vehicles, generating useful information for mobility operators.

Findings confirmed that service quality, synthesized in quality of means and platform, is an antecedent to user satisfaction, influencing services loyalty. The gamification improves service quality and directly affects users loyalty.

The originality of the paper is grounded on the analysis of the linkage between service quality and gamification. The results provide insights for mobility operators to improve the service quality and for policymakers to promote sustainable mobility and support the recovery from COVID-19. The integration of gamification and the continuous quality improvements paves the way for pursuing sustainable development. Gamification is a useful tool for changing transport habits, generating knowledge of environmental issues by educating and raising awareness among citizens. The use of these mechanics helps to explore citizens needs by highlighting their travel habits. Through mobile applications, the information collected can be used by governments and mobility companies to improve urban strategies and infrastructures to implement a digital transition that favours the achievement of the Agenda 2030 goals.

## Sustainable Development as a driver for customer satisfaction

Love Westin<sup>1,2</sup>, Dr. Jacob Hallencreutz<sup>2</sup>, Dr. Johan Parmler<sup>2</sup>

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### Abstract

The concept of Sustainable Development (SD) has become widely accepted among nations, organisations, and individuals. According to the Brundtland Commission, SD is defined as a development that meets the needs of the present generation without compromising the ability for future generations to meet their needs. SD is today high on the agenda in most organisations as well as on the goals of global development. Recent research has also indicated strong relations between SD, brand image and customer satisfaction. Moreover, recent conceptual models have discussed stakeholder perspectives and SD. Thus, it is crucial to understand how companies and organisations may use SD to strengthen customer relations and affect customers demands, needs, expectations and behaviours, especially in a time of uncertainty and rapid change.

Studying the perception of sustainability, as a driver and guidance tool for organisations to deeper understand customers' needs, can contribute to an extended overall stakeholder value. Thus, this study aims to contribute to a clarification of how the concept of SD could be more understandable, measurable, and manageable through a deeper understanding of customer perceptions. By using customer perception data from the Extended Performance Satisfaction Index (EPSI) Rating database, this study evaluates relationships between customer satisfaction and customers' perception of SD. Data is gathered by computer assisted telephone and web interviews (CATI and CAWI) in a cross-sectional structure spanning over several major Swedish industries. Further, a PLS Path Modelling (PLS-PM) analysis is applied on an extended version of the EPSI model to study how important latent variables, such as the perception of SD, may drive customer satisfaction and other customer related aspects.

The study finds several question items to be used as a standalone construct of perceived sustainability and further provides statistical evidence of its relation, as a driving aspect, of brand identity and possible overall satisfaction, in accordance with the EPSI model.

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## **New ways to better understand the real causes of sustainability problems: Root causes analysis, Traceability and Directed acyclic graphs.**

Phd Ricardo Mateo<sup>1</sup>, PhD Carmen Jaca<sup>2</sup>, PhD David Elustondo<sup>1</sup>, PhD Francisco Guillen-Grima<sup>3</sup>

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### **Abstract**

#### **Introduction**

There is wide acceptance of the need for a more holistic approach to sustainability. However, practical solutions remain elusive and tend to exhibit underlying conflicts between different paradigms. This paper argues the need to wield analytical tools that themselves embody the principles of systemic – focused on organizational and second order cybernetics – that highlights our understanding of the concept of sustainability. Some techniques widely used in quality management as root cause analysis, process traceability and directed acyclic graphs could help in the process to look for and find the principal causes of the environmental problems. It is very relevant in complex, multifactorial and difficult to detect problems to isolate all confounding and moderator variables as it distorts the relationship between the real cause and the effect. In complex problems, such as environmental challenges, the use of statistical models without any consideration about causal basis of sustainability phenomenon must be avoided. The objective of the research is to determine whether sustainability research analyzes properly the causal variables of the problem.

#### **Methodology**

To develop the research, a methodology of literature review and case analysis has been followed. First, a literature review for understanding the use of three techniques Root Cause Analysis, Directed Acyclic Graphs and Traceability in the sustainability field. In all searches, only scientific articles were selected.

Secondly, a focus group based on the analysis of sustainability scientific articles will determine whether the Root Cause analysis, Directed Acyclic Graphs and Traceability methodologies could improve the capability of researches for analyzing the real causes of sustainability problems.

#### **Findings or results**

28,331 scientific articles that include in their title the word sustainability were found from January, 1<sup>st</sup> 2000 to January, 26<sup>th</sup> 2021. In the same period, 15,769, 8,829 and 3,022 included in their topic the word Root Cause Analysis, Traceability and Directed Acyclic Graphs, respectively. Only 25, 49 and 2 articles out of 28,331 published under the title sustainability included in their topic Root Cause Analysis, Traceability and Directed Acyclic Graphs, respectively, which means that most articles have used statistical analyses without any consideration about the causal basis.

#### **Discussion**

This paper encourages researchers to search more for the real cause of sustainability problems than to use statistical models without a good understanding of the causal basis of the problem. Finding the efficient cause allows focusing resources and accelerating the process to solve the sustainability challenge. To find the efficient cause, it is necessary to classify properly the research variables into causal, confounding, moderating, etc. Root Cause Analysis, Traceability and Directed Acyclic Graphs could improve the capability of researchers to better understand the causes and correctly classify the different variables affecting the phenomenon.

## **Conclusions**

The methodologies of root cause analysis, directed acyclic graphs and traceability may facilitate the search for real causes in scientific research, especially in complex, multifactorial and difficult problems such as those related to sustainability.

a. SDG+Target:3.1+6.3+11.5+13.2+14.1+14.2+14.3+15.1+15.2+15.3+15.4+15.5+15.7+15.8

b. Root Cause Analysis, Traceability and Directed Acyclic Graphs could improve the capability of researchers to better understand the real causes of sustainability problems.

## Interaction between the use of environmental management accounting and the environmental budget with environmental performance

Me Denise Isabel Rizzi, Dr. Thiago Bruno de Jesus Silva, Dr. Sergio Murilo Petri, Dr. Hans Michael Van Bellen

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### Abstract

In the current scenario of ecological issues'importance for organizations, having the commitment to the natural environment is relevant to management (Kamel & Elbanna 2016). In this context, the literature addresses the importance of developing strategic mechanisms that integrate environmental issues, which connects environmental aspects to organizational strategy (Henri & Journeault, 2018).

To deepen these issues, this study aims to understand how the interaction between the use of environmental management accounting and the organizational environmental budget with the environmental performance in a timber industry located in southern Brazil.

According to Fierro, Redondo & Wilson (2008) the environmental budget generates information, which promotes the necessary support for the strategic decision making process. Considering that, currently the difficulty is no longer related to include or not environmental strategies, but in how organizations should behave to implement such actions, especially those focused on revenues and investments of the organization (Epstein, Buhovac & Yuthas, 2015). The contribution of the research is to understand the paths that the studied organization is taking for the construction of the management focused on the ecological environment and the results obtained through these actions.

This study applies to a specific company in the lumber industry, which was selected by those belonging to environmentally sensitive sectors (Environmentally Sensitive Industries). The design of this study is with qualitative approach, the objectives are descriptive and the procedures as case study.

In this way, it is expected to understand how the interaction between the use of environmental management accounting and the environmental organizational budget with environmental performance occurs through the application of a study in a timber industry. Thus expressing whether the environmental management controls, when linked to the application of an organizational environmental budget, promote benefits and support decision making in its management process, which can lead to greater environmental performance. In case of a positive relationship between the variables of this study, according to Journeault (2016), it may result in an important support mechanism for environmental implementation within organizations.

Regarding the report on Global Sustainable Development (GSD), this study addressed items 8 (Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all) and 9 (Build resilient infrastructure, inclusive promote and sustainable industrialization and foster innovation), by studying ways that industries can promote environmental care and management, resulting in sustained economic growth through a resilient strategic infrastructure.

This study is in line with the theme proposed for this congress, as it deals with the analysis of accounting management systems focused on environmental care, trying as a return for managers, the identification of the implementation of measures to support decision-making, favoring for a quality management based on sustainability.

## **Building sustainability – understanding, defining, measuring, communicating and leading change**

mr Max Rosvall

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### **Abstract**

Quality management (QM) is in large part about managing and sustaining change to achieve a desired outcome, improved quality. Integrating sustainable development with QM practices, defining a higher purpose for the business activities, and applying systems perspective are three out of five identified research themes of future importance for the field of QM. Moving from the general synergies between QM and sustainable development, this paper explores the concept of building sustainability based on the five-step logic of understanding, defining, measuring, communicating and leading change. The new Swedish regulation, 'klimatdeklaration' (climate declaration), solidifies the well-established sustainability indicator CO<sub>2</sub>-emissions and intends to spur a common understanding for life-cycle thinking along the building value chain. Based on the emerging QM scope of stakeholders focus, people and planet are suggested as key stakeholders and profit, the third part of the triple bottom line, is interpreted as a means to satisfy stakeholder needs. The five-step logic of, understanding, defining, measuring, communicating and leading change is used to explain how actors can move from understanding to leading change. With an emphasis on understanding the concept of sustainable development and defining the interpretation of it, previous studies are used to conclude an indicative lack of understanding for building sustainability. The many indicators used in different sustainability performance rating programs, like BREEAM and LEED, and in the sustainability reports of global companies, indicates an inconsistency that hinders comparative analysis. In measuring building sustainability there is no lack of indicators, the challenge lies with the choice of indicators and providing a clear motivation for the choices based on an explicit interpretation of sustainable development. Finding and uniting around a common paradigm for sustainability, with regards to the higher purpose of an actor along the value chain, is suggested as a key activity in accelerating the transition towards building sustainability.

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## Cement and Concrete - Quality and Sustainability

Associate Professor Raine Isaksson, Mr Max Rosvall

Uppsala University, Visby, Sweden



**Associate Professor Raine Isaksson**

### Abstract

Concrete is the most used human-made product in the world. On a global average each person consumes about three ton per year (WBCSD, 2015). Cement is the glue in Concrete. Concrete is a cheap and convenient building material that is being used globally as a foundation for buildings and infrastructure that contributes to societal construction. The increasing threat from global warming due to global emissions of CO<sub>2</sub> is of high relevance for the future use of concrete. CO<sub>2</sub> emissions from buildings are estimated to about 30-50% over the entire life cycle. Cement contribution to global emissions is about 7-9%. Shelter is a basic human need. How do we provide shelter without cooking the planet? Could the customer needs focus of Quality Management support in making the right decisions? This is done by employing QM logic for assessing the sustainability of cement and concrete.

RQ1: How could we make sense of understanding, defining and measuring sustainability and sustainable development using stakeholder needs focus and process models?

RQ2: How could sustainable concrete development be described?

RQ3: How could sustainable cement development be described?

There are many suggested definitions and interpretations of what a sustainable development looks like and what it means to be sustainable. Identifying people and nature as the main customers or stakeholders and applying the Pareto principle enables to create a simple definition for cement and concrete sustainability based on housing sustainability. Housing sustainability is viewed as value per harm. The application of this logic on housing results in m<sup>2</sup> housing per kg CO<sub>2</sub> and m<sup>2</sup> housing per price. When assessing the current use of concrete to meet the demands of societal construction and infrastructure it becomes apparent that concrete has no substitute. The abundance of the raw material needed for its composition makes it the only viable option for meeting the growing demand for shelter, construction and infrastructure globally.

With the insight of non-substitution of concrete to meet the constructions needs of developing nations research has focused its efforts to find ways of CO<sub>2</sub> mitigation in cement. Among these solutions substituting Portland Cement (PC) with a less carbon intensive product is of interest. An interesting option is supplementary cementitious materials (SCMs). The most common SCMs used today are slag from steel production and fly ash from various industries. A global mapping of their availability shows that both slag and fly ash are already widely used for the current cement production. Three other materials, calcinated clay, limestone fillers and engineered fillers are presented as potential resources that based both on their abilities could reduce clinker content.

In summary there is no known substitution to concrete if global needs for constructions and infrastructure are to be met. The potential for CO<sub>2</sub> reduction lies with the composition of the cement and addition of supplementary cementitious materials. Calcinated clay and engineered limestone fillers and new types of cements, replacing the ordinary Portland cement are showing promising potential to produce a low-carbon concrete to align much needed construction with a sustainable development.

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## **Nourishing Innovation & Quality: How do Independent School Leaders move schools from sustainably good to sustainably great?**

Mr. Michael Johnson

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### **Abstract**

The long-term sustainability of private, independent school education in the United States may be on the decline as the industry faces new challenges and opportunities. One of the reasons for this decline is that the quality of private education is, in many instances, not meeting the high cost of the tuition associated with it (NAIS, 2020). In an ever-increasingly competitive market to recruit and retain private school families, school leaders must find novel, creative, and innovative methods of attaining sustainable and prosperous high-quality, independent schools.

One possible catalyst for change may be found within the United Nations (UN) sustainable development goals (UN, 2020). Using UN goals 4 & 9 as a guide, this body of research seeks to better understand how independent school leaders can ensure high-quality education that promotes lifelong learning opportunities while fostering innovation within schools in an ever increasingly complex world. One such way to frame and understand these questions is by looking to the literature on quality management to create an analytical framework. Quality management may provide valuable insights into how schools can develop sustainable, thriving educational organizations that contribute to the public good (Minh Hue et al., 2018). Service quality, as a concept and approach, has particular application in the private school sector. Parasuraman et al. (1985) defined service quality as the degree of discrepancy between customers' normative expectations for the service and their perceptions of the service performance.

The purpose of this review of literature is to understand how school leaders may leverage the concepts of perceived and attractive quality to create more customer value and contribute to the sustainability of private education in the United States. A systematic literature review was conducted of papers published in academic journals between January 2007 and April 2021. A deductive content analysis was chosen using total quality management values, tools, and techniques as an analytical framework. A review of the literature revealed how current research on these subjects has found positive results in the business and healthcare industries. Applied in the correct manner and context, the theories of both perceived service quality and attractive quality could be found to have positive influences on education. It was also found that quality concepts in conjunction with a school culture that assures customer value creation, are of great importance to the short-term and long-term sustainability of private education.

**Keywords:** Sustainability, Leadership, Perceived Quality, Attractive Quality, Customer Value

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## **Organizational culture for sustainable quality and innovation: How artistic practices can foster adaptation and innovation in organizations as living systems**

Jill Campisciano

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### **Abstract**

The United Nations 2030 Sustainable Development Goal 16.7 calls for the global community to “ensure responsive, inclusive, participatory and representative decision-making at all levels” inviting everyone to the table. Through the use of value co-creation nurtured by artistic practices, quality management is sustained through the innovative and adaptive practices called for by the emergence of 4th quality management paradigm. Towards this sustainability goal, the literature identifies how an organization can benefit from richness of experiences where all stakeholders feel invited to the table. Systems are organic and ever-changing using a customer-valued model versus a hierarchical mechanistic model. For sustained quality and innovation to be supported, it is argued that leadership of an organizational culture is a key component to fostering innovative and adaptive quality management practices. One approach to this is through the application of artistic-based interventions (ABI), which are shown to foster stakeholder involvement and build culture. Artistic practices, such as storytelling, design thinking, dance, drama, and music, are used as co-creative processes in organizations, and are argued to lead to creative reinvention that sustains the system. Known as an arts-based model, transference of artistic skills through storytelling, illustrations, or artifacts are valued as they have been shown to bridge cultures, illuminate concepts, and guide action. Through artistic practices creating inclusiveness, individual’s contributions are unique and valued, so problems become the catalysts for creative improvement. Further, it has been demonstrated that organizations, which foster and integrate the use of artistic interventions, create space that stimulates collaboration to embrace challenges and sustain the organization. Research to support organizational development remains an emerging field. Therefore, it is of great interest to further examine the ways in which ABI can be used by leaders as a co-creative process to engage stakeholders and nurture conditions for sustainable quality development.

The purpose of this paper is to present a systematic literature review that was conducted to answer the question: How can we understand the application of the arts as a tool to sustain quality management? This paper will present knowledge identified in the systematic literature review about quality management and organizational practices following the path of artistic practices supporting value co-creation as articulated by the United Nations to be a challenge for sustainability. The path created by this literature review will guide a qualitative methods study that is grounded in theory answering the question: How do artistic practices lead to fostering innovation and adaptation in organizations as living systems? This research will also seek to unveil the role that leadership has in supporting these practices while meeting ever-changing needs of customers.

This abstract contributes to the track focus of researching the connectedness of quality management and sustainable development. This focus relates to the topic 10C: Organizational Culture for Sustainable Quality and Innovation.



## **Staying power: how stakeholders influence the sustainability and culture of an organization with a focus on retention of employees and customers – A systematic literature review**

Kathryn Smith Rouse

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### **Abstract**

The current COVID-19 pandemic has impacted organizations in new and unprecedented ways. Organizations, more than ever before, need to have a focus on sustainability combined with growth and retention of business. Employees and other stakeholders can positively influence the sustainability and culture of an organization. It is highly regarded that there is a connection between the positive social and economic interactions of employee retention and creating a successful dynamic organization. This includes the retention of both loyal employees and a strong returning customer base. This systematic literature review will assess the latest evidence of the connections between stakeholders, organizational sustainability and culture and retention of employees and customers published between January 2016 and March 2021.

Why do employees and customers stay loyal to certain organizations? Put simply, why do they stay? This systematic literature review will analyze the recent publications regarding retention of employees and organizations. An important ingredient for fostering both growth and retention within an organization are stakeholders. Primary and secondary stakeholders and interested parties hold an influence on what develops with global and organizational sustainability. The current needs and expectations of the stakeholders has a direct impact on the culture of sustainability and quality management.

Findings from the literature review will be used in a doctoral research study that aims to examine the human, social, and cultural elements of organizations that encourages long connections, growth, and the continuous quest for quality. The study is situated with an approach to quality management movement that is seen as agile with the ability to update and evolve. The Swedish report on Agenda 2030 describes quality management being in the fifth generation with a focus on sustainability. Looking towards the future, Agenda 2030 has developed quality management research themes including 1. systems perspective applied, 2. stability in change, 3. models for smart self-organizing, 4. integration of sustainable development, and 5. higher purpose as quality management booster. These themes are providing a focus for research for now and the future. This study will also connect to the UN Sustainable Development Goals for 2030, specifically goal 8 with the promotion of sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all.

This abstract contributes to the Special Themes Track 10C of researching the connectedness of quality management and sustainable development. This abstract relates to the topic: Quality Management and Sustainability.

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## Finland-Sweden 1-0?

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### Abstract

Finland-Sweden 1-0?

For several decades, Finland and Sweden have had similar systems regarding an external and partly state-controlled school inspectorate in order to ensure the quality of the basic school system. Sweden's political intentions have called for a stronger and more centralized school inspectorate, while Finland has gone in the opposite direction where the regional school inspectors have been gradually abolished, which came into force in 1988. Despite the fact that Sweden has expanded its school inspectorate in recent decades and increased funding from 40% in 2009 to 57% in 2013, Sweden shows poorer school results than Finland does in international surveys.

Sustainability can be understood from a number of different aspects and this work is based on Hargreave's and Fink's declaration on sustainability with a focus on the school. *"Sustainable leadership and sustainable improvement in education preserves and develops in-depth learning for all who spread and last, and in ways that do not harm but give positive results for others, now and in the future"*.

A report from the Swedish Schools Inspectorate presents a picture of what is significant for successful principals: The principal is committed, bases decisions on analyzing the connection between teaching patterns and the development of knowledge results, is democratic and involves employees, creates a culture that fosters commitment and encourages skills development.

Offensive quality development consists of six cornerstones:

- 1) Put the customer in the center
- 2) Base decisions on facts
- 3) Work with the processes
- 4) Work with continuous improvements
- 5) Create opportunities for everyone to participate
- 6) Develop a committed leadership

Despite the fact that Finland has a similar funding system with a municipal school as Sweden, there are still large qualitative differences between knowledge levels in the two countries. Finland has provided external quality control and moved towards increased internal quality assurance, while in Sweden the external school inspectorate has been strengthened.

The research questions in this context are based on the principals' attitude to external and internal quality assurance and its connection to the school's primary utility - to educate and educate the students.

Question 1. What has the inspection development been like in Finland and Sweden during the post-war period?

Question 2. How do the principals in each country experience the connection between quality assurance via school inspection processes and the students' actual levels of knowledge?

Question 3. How does leadership in the control and management chain affect students' actual knowledge results based on the principles of quality development?

The research project will be based on the principals' attitude to external and internal quality assurance, and qualitative interviews with principals in three municipalities in each country will be conducted at compulsory schools. The selection will be Swedish-speaking schools in Finland. The expected result of the empirical survey is that internal quality assurance based on the local school's own conditions provides a higher degree of sustainability in the system and that sustainable leadership is based on the principal's close contact with the school.

## **Innovative Sustainable Global Partnerships between Schools and Organizations Provide Quality Education and Value for all Stakeholders, a Literature Review.**

Cynthia Whitney

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### **Abstract**

The purpose of this paper is to present results from a literature review on Quality Management systems and the role of partnership to support sustainable innovative practice. Research shows that partnerships create value for the organizations and are an important component to developing responsive and sustainable systems. In education, partnerships between schools and business and international organizations is showing promise to enhance the quality of education and prepare youth for a sustainable global community as part of the UN sustainable development goals. The primary goal for schools seeking to enter into a partnership with an international organization is to foster the students' growth as global citizens with an international mindset, and to increase and sustain their customer base. The primary goal for international organizations to enter partnerships with schools is to grow as an organization through their outreach into school communities and to foster students' growth as global citizens. This research is important in that it will provide insight into the Quality Management practices taken by innovative sustainable partnerships which follow the United Nations Sustainable Development Goal Target 4.7, providing a quality education that promotes "a culture of peace and non-violence, global citizenship and appreciation of cultural diversity and of culture's contribution to sustainable development." There is a growing need among private schools to create value for their customers by incorporating innovative environmental and sustainability educational opportunities for the students, as global awareness is increasingly growing throughout the customer base. Next steps, following this conference, will include a study which focuses on a private school in the United States that regularly develops and sustains innovative global partnerships. These partnerships are recognized as complex adaptive systems that contain a dynamic network of complex, interconnected pathways of human interaction that evolve and change based on episodes of disequilibrium. The sustainable relationship between the organization and the school depend and develop upon a basic formative structure. As there is a demand for private schools to develop innovative global relationships with organizations, there is also a demand by these schools for a vetted structure that can be implemented in order to develop and sustain partnerships. This topic will be the focus of the research following this literature review.

## **The problem of mathematics placement: a question of quality education and sustainability for society? - a systematic literature review.**

Telma Largent

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### **Abstract**

The United Nations (UN) has developed the 2030 Agenda for Sustainable Development, recognizing that education is one of the main foundations for sustainable development. During the World Education Forum 2015 participants shared their vision: “to transform lives through education, recognizing the important role of education as a main driver of development and in achieving the other proposed SDGs [Sustainable Development Goals]”. To contribute to a sustainable society, students need to learn skills that will prepare them to solve 21<sup>st</sup> century challenges.

Mathematics is known as a major gatekeeper to education. Students from all genders and learning styles need to have equitable opportunities in education. In mathematics education, students are often rewarded for speed and memorization of facts. Many times, placement in accelerated classes is based on procedural knowledge alone. There is evidence to suggest that students who are accelerated without developing depth of understanding tend to drop out of mathematics and forgo the opportunities to pursue STEM (Science, Technology, Engineering, and Mathematics) related careers. This is a fundamental question about quality in education. Addressing this is important to ensure sustainability in the students’ learning progress and add value to their education. Taking into consideration the non-linear structure of mathematics education and seeing mathematics education as a complex adaptive system, may lead to different kinds of decisions on students’ acceleration in mathematics, adding an important perspective about how to enhance quality in mathematics education.

The seven principles of quality management (International Organization for Standardization [ISO], 2015) may guide decision makers through the process of continual improvement. When following the quality management principles, decisions need to be evidence-based and need to meet students’ current and future needs. To enhance its capability to design and deliver a valuable placement system, school leaders need to empower and engage mathematics educators in the decision process.

The purpose of this paper is to present a literature review that will draw from the quality management literature to provide a rationale for creating a placement system that is sustainable for students in their learning, as well as for the sustainability of the mathematics program in education. In particular, the literature review will examine systems and complexity theory, value co-creation, decision making, and sustainability.

This abstract contributes to the track focus of researching the connectedness of quality management and sustainable development. This focus relates to the topic: Synergies between Quality, Quality Management and Sustainability.



# **10. Special Themes**

## **10d. Nordic Bioresources and Biorefinery Technology**

## Environmental performance of bioethanol production based on the BioRen case study

Dr Magdalena Muradin<sup>1,2</sup>, Prof. Joanna Kulczycka<sup>1</sup>, Mr Gilles De Clercq<sup>3</sup>, Prof. Em. Roland Verhe<sup>4</sup>

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### Abstract

Environmental performance of bioethanol production based on the BioRen case study. Significant mitigation of climate change is only possible when the use of conventional fuels from crude oil is reduced in favor of biobased materials production. The efficient conversion of organic waste into biofuels has significant potential to contribute to reducing resource depletion and climate change. The BioRen project funded by the European Commission through its Horizon 2020 research program aims to develop the competitiveness drop-in second-generation biofuels such as bio-ethanol from the organic fraction of municipal solid waste (OFMSW). Conversion of organic fraction consists mainly of residual paper and cardboard residues which cannot be recycled into bioethanol the anaerobic digestion is used. Traditionally in Europe, this waste stream is still being landfilled, incinerated, or incinerated with energy reconversion. This type of BioRen technology seems to have an abundant potential to convert a variety of low-value municipal organic wastes. Once sufficient results have been obtained, the project also involves the ongoing conversion of lignocellulosic biomass to GTBE and isobutanol. However, the economic and environmental results will define the final product in the production chain. The environmental analysis of bioethanol production from OFMSW was carried out to identify the environmental hotspots in a whole production chain. The analysis was based on the Life Cycle Assessment methodology. Regarding the level of advancement of the BioRen project, the Life Cycle Inventory analysis was based on literature and empirical data. The study also compares the results with data found in the literature for different types of biofuels production. The system boundaries include waste sorting and transportation, pretreatment, enzymatic pretreatment, distillation, and hydrothermal carbonization of biomass residues. The functional unit was defined as one liter of bioethanol produced from OFMSW. The results show that the highest environmental impact is caused by electricity consumption and waste transportation. However, the trade-off between effective reuse and conversion of this waste stream into second-generation biofuel is more environmentally preferable than the traditional use of fossil fuels or first-generation biofuels in transportation.

## Improve the competitive advantages of pulp fiber based products over fossil-based materials

Mr. Hafizur Rahman, Professor Per Engstrand, Mrs Siwen An, Ast. Professor Börje Norlin, Dr. Erik Persson, Dr. Faisal Zeeshan

Mid Sweden University, Sundsvall, Sweden



**Mr. Hafizur Rahman**

### Abstract

As there are increasing demands to replace plastics especially as packaging material with renewable, easy to recycle and compostable materials as those produced by paper industry, there is an increasing demand also to improve the fundamental scientific understanding of pulp and paper manufacturing systems. To improve the fiber properties and lower costs in the manufacture of packaging and tissue paper, it is essential to improve the knowledge of the selectivity of cooking process by optimizing the unit operations of impregnation, cooking and washing. Pulp production is based on chips and regardless of chemical pulping process (kraft or sulphite) or high-yield pulp (chemimechanical or semi-chemical pulp), the efficiency of the impregnation is always crucial. To improve impregnation uniformity, we need to study how more even distribution of lignin release down to fiber level via easily impregnated wood chips can be achieved, using classic measures such as; equalized hydroxide ion concentration, increased initial sulfide ion concentration, low sodium ion concentration and low boiling temperature combined with reductive and oxidative environment. That being said, our newly built miniaturized energy dispersive X-ray fluorescence (ED-XRF) scanner using a collimated X-ray source and utilizing energy-dispersive X-ray spectroscopy showed the capability of imaging of S and possibly Na distribution in the fibers of wood chips or in individual fibers in micro scale level. The method we are developing can become useful in mills to improve and control process efficiency, product properties and to find solutions to process problems in future. Moreover, a more even distribution of the sulphonation can reduce specific energy demand in chip refining at certain shive content.

In addition, we studied improved impregnation by selective cooking systems for sulphate pulp in oxidative (polysulfide) and reductive (sodium borohydride, NaBH<sub>4</sub>) environment to understand how the chemicals quickly enter and distribute in the chips. The yield increased from 48% to at best 53%, which resulted in faster dewatering. Increased proportion of hemicellulose gave improved binding properties and increased tensile index at certain refining energy. Moreover, later initiative a new catalytic lignin selective cooking method was challenged as an additional imperative concept in which a large portion of lignin can further use for valuable chemical products like vanillin synthesis. The idea simply was that it will not only advance the selective process to obtain largely lignin free fibers in addition some valuable products and help to reduce the chlorinated chemicals at bleaching stage and thus will protect the adverse effect on environment.

However, our aim is to development of standard measurement method to improve smoothness of fiber properties for packaging and tissue product by saving not only energy but also focusing the reducing chemicals use. It is crucial in striving to reach the sustainable development goal (SDG) stated by the UN at target 9.5.1 *“Enhance research and upgrade industrial technologies-R&D spending”*. So our ultimate goal is to enhance the scientific research, upgrade the technological capabilities of industrial sectors in all countries, in particular developing countries by 2030 over the proper practice of scientific knowledge by increasing R&D activities.

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## **New Sustainable Method to Produce Pulp Fibres - Deep Eutectic Solvent-Assisted Mechanical Pulping**

Associate professor Birgitta A. Engberg, Professor Juha Fiskari

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### **Abstract**

Mechanical pulps are widely used in the manufacture of printing paper grades and also to a lesser extent in packaging materials and hygiene products. An advantage of mechanical pulps in general is the high yield (95-97%) of the production processes, which implies a resource efficient way of producing fibre-based products. A major drawback when producing mechanical pulps for printing qualities is the high electric energy consumption needed. However, the mechanical action associated with the liberation of fibres from the wood matrix can be facilitated if the middle lamella lignin is softened, leading to lower energy input and less fibre damages. The lignin can be softened by chemicals and high process temperatures, like in the chemi-thermomechanical process (CTMP) and the high-temperature-chemi-thermomechanical process (HT-CTMP), where sodium sulphite is utilized. The pulps from these processes are best suited for packaging materials and tissue products.

In this study, an alternate chemical treatment using deep eutectic solvents (DES) was explored. The DES used was bio-based, non-toxic, non-corrosive, and could be recycled. The main goal was to facilitate the refining process and possibly create a new quality of mechanical pulp, not to remove lignin or hemicellulose. Wood chips were pre-steamed and then soaked in DES, to ensure a sufficient impregnation. The conditions of the DES treatment were much less severe than those of a chemical pulping process, i.e. low temperature, neutral or nearly-neutral pH, and a short residence time. The excess DES was removed by washing the chips with water before the chips were fed into a refiner. According to fibre quality analyses, the DES-treated fibres were longer and less damaged than the control. The DES-treated fibres also demonstrated significantly higher dewatering capacity than fibres without DES-treatment produced at the same specific energy input in the refiner. These facts indicate that the fractures during fibre liberation to a higher extent occurred in the middle lamella, similar to when producing CTMP. A maintained high yield of the DES-treated pulp was confirmed by chemical analysis. In conclusion, this initial study shows that DES-assisted mechanical pulping appears to be an interesting alternative for producing a mechanical pulp with different fibre properties. An aim for future work would be to tailor the DES-treatment to alter fibre properties in a more controlled manner preferably so that market shares could be taken from the today dominating low-yield (<50%) processes.