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From best practices to bridges for a more sustainable future: advances and challenges in the transition to global sustainable production and consumption

Introduction to the ERSCP stream of the Special volume

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ABSTRACT

This stream of the special volume addresses advances being made towards, and challenges for sustainable production and consumption. The article presents a variety of papers that document leading examples of recent developments in understanding and knowledge, before assessing gaps within current progress and posing questions and challenges for future research and practice. An overview framework is constructed to categorise the papers, and to illustrate key actors and factors for sustainable production and consumption. The themes covered include specific examples of progress in areas such as sustainable production, covering topics such as eco-efficiency, waste management and the use of renewable resources, as well as sustainable consumption and the role of consumers. Supporting actions and themes are included, showing recent advances in design and innovation for sustainability and the role of assessment and benchmarking. Finally, contributions that consider how to connect production with consumption, and upscaling and bridging, are examined. The article concludes by proposing that continued progress is reliant on further connecting production and consumption, and ensuring that consumer and user perspectives are integrated into innovation and design processes so as to overcome hindering factors such as rebound effects. A call for further progress is issued on what needs to be done to go beyond 'good examples' and on what actions and strategies are able to share and spread success stories of sustainable production and consumptions to different contexts and settings.

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1. Introduction to conference and topics

Current modes of production and consumption have resulted in unsustainable economic, social and environmental outcomes (Clark, 2007). Many Earth system processes, ranging from climate change and biodiversity losses to mismanagement of the nitrogen and phosphorous cycles, have reached or have surpassed their

biophysical limits due to human activities (Rockstrom et al., 2009). We have also undermined the resource base our industrial system relies on with severe material scarcities foreseen in the near and medium-term future with significant implications on the manufacturing capacity (Gordon et al., 2006; Schoolderman and Mathlener, 2011). Although the recent financial crises may have contributed to lower economic activity and lower environmental impacts in the developed world, they have hampered sustainable development initiatives, with the levels of inequality between and within nations rapidly becoming more extreme (United Nations, 2013).

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The current unsustainability of modern systems of production and consumption requires a substantial transition in order to become sustainable (Grin et al., 2010). Changes and progress will be required in a wide variety of disciplines and approaches (Reid et al., 2010). New and improved production techniques and processes are demanded, and the businesses and organisations that control them must change the manner in which they operate (Michaelis, 2003). This will have to include new business models and advances in management approaches, including new ways to judge business performance and success (Loorbach and Wijsman, 2013).

Innovations at all levels are essential to help to catalyse and support these advances and improvements, and they must also be examined when considering a transition to more sustainable forms of production and consumption (Leach et al., 2012). The tools and methods required will include new assessment and measurement approaches and techniques that effectively document inefficient and unsustainable aspects of production and consumption and support their replacement by policies (Perrini and Tencati, 2006; Rotmans, 2006). These approaches are required to support production and consumption patterns that are sustainable and equitable.

The need for changes has led to new thinking and approaches in terms of transitions; these include how best to conceptualise and understand the way different systems undertake change and the role of different factors, such as innovations or policy, play in these processes (Elzen et al., 2004; Geels, 2005; Smith et al., 2010). Such approaches allow large-scale systemic changes, in areas such as energy and food or transport, as well as addressing how social and technical developments interact (Elzen et al., 2004). This had led to the development of co-evolutionary frameworks, that attempt to consider how technologies, business models and user practices change together, and the multi-level perspective that seeks to consider changes at the micro, meso and macro levels, gaining prominence in both policy and academic discourses (Foxon and Pearson, 2008; Geels, 2005; Smith et al., 2010).

The papers selected for this stream of this Special Volume (SV) of the Journal of Cleaner Production provide contributions in many of the areas requiring such transitions. The papers included address particular aspects of sustainable production and consumption. The themes of this SV stream are introduced, and the key contributions of each of the papers within each theme are highlighted.

The papers are divided into those that address the production side, those that focus upon the consumption side and those themes that support the transition to sustainable production and consumption; i.e. by looking at production and consumption activities as closely interlinked elements of a system. The divisions are illustrated in Fig. 1, and include:

- The production side, including examples of *eco-efficiency*, *waste reduction* and the use of *renewable resources*. The theme dealing with *firms and organisations* is also situated here;
- The consumption side, including the drivers for the consumption of green products by *consumers*;
- The role of *design and innovation*, as well as those processes that seek to enhance user perspectives in design and innovation via the *connection of production and consumption*.
- The role of *assessment and benchmarking*; and
- A theme addressing actions that are able to spread examples of sustainable activities via *bridging and upscaling*.

Starting on the production side, the first theme provides examples of advances in the sustainability of production processes and of the products produced; this area deals with the concepts and practices of eco-efficiency, waste management and renewable resources. Then the firms and organisations, which control and

implement the processes and services, are addressed. These contributions highlight new ways of thinking about firms and organisations for sustainable production and consumption, and the role that firms and organisations play in the transitions.

On the consumption side are papers that consider motivations for sustainable consumption. Linked to this theme are several papers that deal with how to connect production and consumption, including through the integration of user perspectives into design and innovation processes.

Design and innovation processes themselves form a specific theme within this stream of the SV, covering issues such as drivers for eco-innovation and methods for integrating sustainability criteria into design processes. The key questions addressed by the authors in this group of papers focus on ways to incorporate sustainability criteria and objectives into the design and innovation processes of sustainable products and services.

Separate from these themes, but in many ways linked to all of them, is the issue of assessment and benchmarking. We conceptualise assessment and benchmarking as supporting the other themes in providing the information and data on the impacts and results of new designs and innovative processes. The monitoring of products, processes, systems and organisations is a key requirement for learning processes that are essential for catalysing the transition to sustainable production and consumption.

The last theme that is addressed in this portion of this SV is focussed upon bridging and upscaling; the papers within this topic focus on methods for spreading examples of actions that enable sustainable outcomes, either between/among actors or organisations or between/among regions or societies. This theme considers questions focused on how to take good examples of progress towards sustainable production and consumption and to build upon them. This can be seen in two senses, firstly expansion via upscaling and secondly, in terms of transferring these examples to new contexts and settings via bridging. A map of the main themes addressed in this SV stream are presented in Fig. 1.

2. Key themes and factors for sustainable production and consumption

The contributions within this SV stream cover a wide variety of themes and topics, which are, nonetheless, inter-connected (see Fig. 1). The figure shows the interconnections among the themes in a simplified way by highlighting the interlinked roles and positions of firms, organisations, consumers and the supporting processes of design, innovation, assessment and benchmarking.

The transitions that are required to achieve more sustainable production and consumption systems will need advances across all these themes, including technological, managerial, organisational and behavioural aspects.

Products and process advances are required across countless areas, such as energy, transport, food systems and waste management; examples of these are illustrated first, using key concepts such as eco-efficiency and covering core topics such as agriculture, water and waste. These represent specific aspects of production, which were controlled and instigated by companies and organisations. Changes are also necessary here, in terms of how we conceive and theorise about organisations and in our understanding of how they select technologies or instigate eco-innovation. Businesses and organisations, responsible for the design and production of products and services, are increasingly sensitive to Corporate Social Responsibility (CSR) related reputation risks and are engaging with sustainability to an increasing degree, both internally and in their supply chains (Kolk et al., 2008; Kovács, 2008). Although much of this engagement is likely to be symbolic rather than substantive, it does represent a shifting of expectations

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