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Beyond unsustainable eco-innovation: The role of narratives in the evolution of the lighting sector

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ABSTRACT

The discourse of Sustainable Development has reinvigorated the idea that technological innovations are inescapable to sustain economic development and simultaneously achieve environmental sustainability. In this paper, we propose a framework to describe six possible combinations of innovation and demand/consumption levels that constitute in turn six *narratives of sustainability*. We argue that the present global trend is set out for a dominant narrative, what we call 'Green Growth', which is rooted in the idea that economic growth – and thus technological change – is a prerequisite for environmental sustainability. By way of example, we use the case of the lighting industry to show that this narrative cannot assure an absolute reduction of the present levels of energy consumption. We therefore propose to embrace a different narrative of sustainability that encourages at the same time the development of eco-efficient technologies and the reduction of demand/consumption. This alternative narrative is linked to the development of the concept of '*useful light*' and to a paradigm change in which the lighting sector is no longer framed around the electric bulb. This transition would require a new class of Lighting Service Companies (LISCO) and of new functional business models based on the sale of 'useful light'.

1. Introduction

Since the 1970s, the discourse of environmental sustainability has gained a central role in the international public debate and political agendas. From the rise of environmentalism, conservation of the ecosystems and development of the human economies have been seen as two irreconcilable enterprises. Economic growth entailed environmental degradation and environmental conservation constituted an unacceptable constrain for business (Porter and Van Der Linde, 1995; Kemp and Andersen, 2004).

A number of scholars even questioned the concept of limitless growth of the economic sphere in a planet with finite resources (Boulding, 1966; Georgescu-Roegen, 1971; Daly, 1973; Meadows and Randers, 2006). This position was fiercely opposed by those who argued that the limits to growth could be overcome by the endless potential of innovation and technology (Sandbach, 1978; Mol and Spaargaren, 2000; Bardi, 2011). The well-known concept of 'sustainable development' (Brundtland, 1987) became an important milestone in the effort to overcome this impasse between economy, technology and environment. Brundtland's report introduced the idea that economic growth is limited by the present state of technology and therefore it is possible to stretch these limits on the condition that technology seamlessly evolves. One of the consequences of Brundtland's perspective was that the discourses of technical change and innovation became hybridised with elements that come from the discourse of sustainability (Freeman, 1996). In the after-Brundtland world, a new conceptualisation of innovation based on the idea of eco-efficiency – i.e. the process of minimizing energy, raw material and

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pollutants per unit of production – gained popularity as a way to integrate environmental and economic goals (Carrillo-Hermosilla et al., 2009) among an increasing number of scholars and practitioners (Adams et al., 2012). The eco-efficiency discourse is based on the '*decoupling argument*' i.e. the possibility provided by technological innovations to diminish the amount of materials, energy and waste per unit of GDP (Jackson, 2009). Economic growth and environmental sustainability are compatible as long as decouple effects counterbalance the increase in consumption of services and goods. This approach has been stretched up to the idea that economic growth is not only *compatible* with environmental sustainability, but it is also an indispensable *incentive* to it. Only economic growth, indeed, creates the conditions in the market that fuel the development of new greener technologies (Beckerman, 1992; World Bank, 1992).

Other studies have questioned the eco-efficiency approach to sustainability by highlighting the intrinsic link between economic growth and material consumption (Jackson, 2009). For example, the literature focused on the study of the 'rebound effect' demonstrated that the increase of the efficiency of extraction and utilization of natural resources may lead to an increase in their consumption (Birol and Keppler, 2000; Alcott, 2005; Herring, 2006; Polimeni et al., 2008; Saunders and Tsao, 2012).

This paper applies the method of Discourse Analysis, which only recently has been operationalized with reference to sustainability and environmental politics (Hajer and Versteeg, 2005), to make two major contributions. First, we propose a conceptual map that positions and operationalizes a number of alternative narratives of sustainability and innovation in order to show that the focus on eco-efficiency is only one of the possible interpretations of the relationships between human economies and the surrounding *natural environment*. Second, we apply this map to the evolution of the lighting sector to show how different narratives may lead to the transformation of the sector by changing the action of the main players in the industry and their business models.

Two conclusions follow. First, the eco-efficiency perspective may ease the purse for environmental sustainability but it is neither needed nor sufficient; therefore demand-side measures are required. Second and consequent, business models that follow the eco-efficiency perspective, like the sale of more efficient lighting bulbs in the lighting sector, may be inadequate to achieve environmental sustainability because they discourage demand-side measures. We therefore suggest an alternative model that we define as *Lighting Service Company* (LISCO) that integrates measures designed to combine eco-efficiency with the reduction of energy consumption.

The article is organised as follows: section one introduces Discourse Analysis and indulges in a brief description of the notion of *frame* and *narrative* to characterize the discourse of sustainability and eco-innovation. The section ends with the introduction of a map that shows how multiple discourses can be debated along two key factors: demand/consumption and innovation. Section two illustrates the case study of the lighting industry focusing on past and current dynamics. Section three analyses the narratives of sustainability of the lighting industry indicating the dominant trajectory, the alternative proposed one, and the frictions that potentially might hamper the transition towards countervailing narratives in the sector. Section four concludes by discussing the limitations of the present work and suggesting future lines of research.

2. The construction of the narratives of sustainability

The study of *language-in-use*, also widely known as Discourse Analysis, has become increasingly popular among those scholars interested in researching the intersection between science, technology, society and politics (Nicolini, 2012). More recently, the study of logics and the role of language in environmental politics have gained a relevant position in the Science & Technology Studies (STS) debate (Hajer and Versteeg, 2005; Feindt and Oels, 2005; Dryzek, 2013). This section introduces the notion of discourse, frames, and narrative that, we argue, are crucial to understand the origin and the evolution of the modern concepts of environmental sustainability and eco-innovation.

2.1. Discourse, frames and narratives

The word *discourse* in the common language refers to the mundane use of language in social interaction. The word usually describes an articulate discussion or treatment of a subject in the form of speech or writing. At the same time, the term discourse also refers to the ways in which people integrate linguistic and non-linguistic features '*to enact or recognize certain identity […] give the material world certain meaning, distribute social goods in a certain way, privilege certain symbols systems and ways of knowing over others*' (Gee, 2011, p. 13). This second meaning has been developed and analysed by several disciplines including linguistics, psychology, politics and history among other social sciences (van Dijk, 1985; Gee, 2011). The importance of this kind of analysis has gained momentum during the last five decades since an increasing number of '*researchers developed the idea that discourse is, first and foremost, a form of action, a way of making things happen in the world, and not a mere way of representing it*' (Nicolini, 2012, p. 189). As a form of social practice, discourse always belongs to social groups, cultures and institutions (van Leeuwen, 2008). So when one enacts a specific kind of discursive practice one also sustains specific social group(s), culture(s) and institution(s) (Gee, 2011).

The practical implications of discursive practices are evident in the allocation and distribution of social goods, such as sustainability, defined as all the goods (e.g. products, services, values, relationships) that people value. For instance, Hajer and Versteeg (2005) highlight that the discourse analysis applied to environmental politics has contributed to the debate of environmental sustainability adding three crucial dimensions. First, discourse analysis showed that the notion of Nature and Environment is not objective categories but socially constructed and historically situated concepts (Morton, 2012). Second, the various discourses of sustainability limit the range of policy options, thus serve '*as precursors of policy outcomes*' (Morton, 2012, p. 179). Third, the analysis of discourse provided a solid basis to understand the strategies deployed by powerful actors engaged in environmental disputes to override competing countervailing discourses that potentially might jeopardize their hegemonic positions (Hajer and Versteeg, 2011; Stevenson and Dryzek, 2012; Hajer and Strengers, 2012).