

SUSTAINABLE BUSINESS MODELS, SUSTAINABLE INNOVATION, AND COMPETITIVENESS: A REVIEW

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Abstract:

Radical and systematic innovations are the need of the hour for sustainable development. These innovations could be efficiently created and effectively studied while building on concept of business models which provide firms for creating a holistic structure to envisage and put into practice sustainable innovations. Such concepts give an analytic tool for researchers, allowing them to appraise the relationship between the different aspects that firms hitch together to create ecological, economic, and social value. Moreover, the concept of business model gives a link between the individual firm and bigger productions and consumption system in which it operates. This study offers insights into the promise of the business model concept for understanding and advancing sustainable innovation. The study brings out the definition of sustainable innovations and business models and then summarizes how sustainable business models are linked to innovation research. Finally, this study leads to fruitful discussion on how sustainable innovation links to competitiveness at different systemic levels.

Keywords: Sustainable Development, Sustainable Business Models, Radical and Systemic Innovations, Sustainable Innovation, Consumption System, Sustainability, Competitiveness.

Introduction

For more than a decade, there has been increasing interest in the aspects of sustainable innovation and economic performance (Aghion et al., 2009; EC, 2010; Montalvo et al., 2011). Quite a lot of forces of historical relevance contribute to this interest. Firstly, it is obvious to note that significant numbers of long-term challenges are there in the world. Such challenges include a total change in the climatic conditions, ageing populations, deforestation, desertification, drought, lack of fresh water resources, water crisis, pollution, and critical raw materials scarcities (Montalvo et al., 2006). Secondly, the economic context at the international level has moved to

new rules of the competitive games which are being reset. The emerging, leading economies and newcomers into global markets are countries like Brazil, Russia, India, China and South Korea. Not only, these countries have mastered the know-how technology for cost-driven competition (Contractor et al., 2010), but also they have become creative in high-tech sectors (Montobbio et al., 2010). Various firms seek to set apart themselves to turn out to be inspiring leaders in international trade via innovation and smart specialization (Foray, 2009). Thirdly, after the 2007-08 economic meltdowns, there are numerous policy agendas in place which ensures the societal welfare and employment. The financial crisis of 2008 has made it evident as it might cause global economic, ecological and ethical crises. Short term-profitability mindsets, policies and actions of individual firms mostly operate on business models that are not sustainable.

In the policy disclosure, doing things differently is need of the hour to find solutions to emerging challenges as the preferred mechanism are the generation of new knowledge and innovation (European Commission, 2009; European Commission, 2010; OECD, 2011). Future competitiveness is primarily due to the creation of new markets which are strengthened and underpinned by innovation (Montalvo et al., 2011). When it comes to sustainability challenges in the areas of new business models, sustainable innovation is over and over again positioned to be win-win situation (Porter and Kramer, 2011). As a result of it, there is a huge interest in sustainable innovation which is rapidly increasing. This is mainly due to series of consequences of the number of un-sustainability issues which are so large and invasive across the world that the sole idea of transforming challenges in the business arena into transforming as business opportunities. Moreover, the new markets have also ignited fundamental interest in the business community and this kind of interest is becoming more and clearer from the large increase of capital flowing into sustainable innovations. For an instance, Ethical Market Media (2011) report pointed out as a report that \$2.4 trillion cumulative worldwide investment in eco-innovation has taken place during the period 2007 – 2011. Inadvertently, sustainable innovations are roping in new global markets, allowing some regions and giving governments politically comfortable long-term horizons for policy action.

Sustainable production and consumption through innovation

In the last two decades, it is seen that the term 'sustainable innovation' has been widely used. But then, the definitions used in the academic literature are limited. Carrillo-Hermosilla, et al. (2010) has done a review and listed out the definitions of innovations that focus on ecological sustainability which clearly speaks of eco-innovation and environmental innovation. Having gone through several write-ups and journals articles, Carrillo-Hermosilla et al. (2010: 1075) came out with their definition of eco-innovation as "innovation that improves environmental performance".

Working on the same concept for several years, the European Commission (EC, 2008) finally defined eco-innovation as, "the production, assimilation or exploitation of a novelty in products, production processes, services or in management and business methods, which aims, throughout its lifecycle, to prevent or substantially reduce environmental risk, pollution and other negative impacts of resource use (including energy)".

The definition of sustainable innovation was introduced from the definition of eco-innovation by Carrillo-Hermosilla et al. (2010) as "innovation that improves sustainability performance which includes ecological, economic, and social criteria". Whenever and wherever the criteria differ primarily due to the result of spatial, temporal and cultural embeddedness, sustainable innovation also differs in its meanings and characteristics in different contexts. Hence, there is a lot possibility of different sustainability challenges and as a result of this, a clear distinction can be made between developed consumerist economies, emerging economies (the countries like Brazil, China and India) and so-called Base-Of-the-Pyramid economies (most of the countries in African Continent) (Tukker et al., 2008; Hart and Milstein, 1999).

Most importantly, the innovations that are requisite for sustainable development actually need to go beyond incremental adjustments. Sustainable development requires the transformation of larger parts of production and consumption systems entails and further necessitates sustainable development (Boons, 2009). Incremental innovations might lead to further gradual improvements of sustainability performance, but at the end, it normally does not lead to a globally optimal system configuration in a multi-dimensional production and consumption system space (Wagner, 2012; Schwoon et al., 2008; Schaltegger and Wagner, 2011).

Having understood the vital differences between radical and incremental innovation (Henderson and Clark, 1990), we could easily distinguish various types of innovations as a product, process and service. Specifically, innovations engage and entail the production and consumption at the organizational, sectoral, and business systems level which comprises of function-oriented innovation. (Truffer, 2003; Kirschten, 2005; Tukker and Tischner, 2017).

Innovation literatures clearly speak of the label, architectural innovation which is referring to a change in the way in which sets of product components are inter-connected. Hence, it involves a changed linkage between unchanged components, which points out noticeably that as larger parts of socio-technical systems are involved in the innovation, the 'systemness' of the effort will be larger, leading to system innovations. (Elzen et al., 2004; Grin et al., 2010).

The radicalness of an innovation is important as well. Markides and Geroski (2004) defined radical innovations as, "those that are characterized by creating new-to-the world markets that are disruptive for both customers and manufacturers". They further argued that such innovations are basically the outcome of R&D organizations and scientists. They are unlikely to have strong lead users to promote them and therefore, as a target, they firstly aim at small niche markets. that are unattractive for larger firms. On the other hand, lead-users are also necessary, as can be learned from car-sharing (Truffer, 2003), organic foods and eco-housing (Smith, 2007).

Radicalness has explicit insinuation in terms of the actors involved, as well as the need to establish new markets. Henderson and Clark (1990) have revealed evidently that when innovation is architectural, larger incumbents do not execute well. Disruptive innovation frequently has an effect on incumbents who are not open enough for technological changes (Christensen, 2003).

Sustainable innovation is characterized by systemness and radicalness. By and large, sustainable innovations move beyond regular product and process innovations are future-oriented (Charter et al., 2017).

Apparently, sustainable innovation includes social objectives and is also associated with the holistic and long-term process of sustainable development. Sustainable innovation is defined as: “It is a process where environmental, social, and financial considerations are integrated into company systems from idea generation through to research and development (R&D) and commercialization. This applies to products, services and technologies, as well as to new business and organizational models” (Charter and Clark, 2007)

Linking sustainable innovations to business models

To a large extent, most of the existing literature on sustainable innovation deals with developing products and services with a significantly improved sustainability performance. Furthermore, much of the literature deals with the analysis and management of system transitions. Here the focal point is on changing whole systems. Sustainable business models are the best options and suitable link in addressing the gap between radical and systemic sustainable innovation and firm strategies.

The concept of a business model clearly exposes the fact that the firm needs to combine the elements such as (i) the value proposition, (ii) the configuration of value creation and (iii) the revenue model (Boons and Leudeke-Freund, 2013). Only then, the firm will be successful.

Business models were related to sustainable innovation and sustainable development in two different ways in the late 1990s. In recent times, business models have become fundamental in electric mobility (Kley et al., 2011), in order to reduce the battery cost to end-users. But, in spite of a focus on applying different business models by authors Tukker and Tischner (2006), Kley et al. (2011), and Okkonen and Suhonen (2010), a conceptual exploration of sustainable business models is comparatively novel and the latest.

Boons and Leudeke-Freund (2013) provide a business model concept which draws attention to three aspects, leading to sustainable innovation.

- a) The value proposition makes it open and clear that the relationship between the firm and its customers is built only by the exchange of value. The value that comes out of a

business model needs to be exchanged and assessed critically, because what is considered to be valuable is frequently taken for granted. When it comes to sustainability, the equal balance between ecological, economic and social value comes into center of attention and the main focus. The needs expressed by consumers and the function executed by the products and services could be seen as basic categories to appraise in an analysis of sustainability.

- b) The pattern of value formation and creation straightforwardly points towards the larger system where the activities of the firm are embedded. In the larger system, the firm is part of it, both socially and technically. Finally, the fundamental parts in this system are the consumer interface and the supply chain.
- c) The distribution of costs and rewards provide concreteness to the value definition, especially in terms of distribution across involved actors and communities.

Innovations system, socio-technical systems and transition management at the macro level

As clearly mentioned, sustainable innovation links the activities of the firm to the larger system. For this, rich literature could be contributed in dealing with (i) innovation systems (Coenen and Díaz López, 2010) and (ii) socio-technical systems (Jacobsson and Bergek, 2011) and transition management (Vanden Bergh et al., 2011).

In the systemic approach to innovation, the special emphasize is laid on the role of actors, networks and institutions. In the innovation system approach, the key actors are the firms, mainly making use of knowledge and technologies to develop competitive products and services and introduce them to the market. (Coenen and Díaz López, 2010; Hekkert et al., 2007).

When it comes to sectoral innovation systems approach, the key focus is pointed towards innovation as a source of competitiveness to firms and industries (Malerba, 2002). Here, the research actors' contribution is to proffer knowledge for incremental innovation and also radical and architectural innovations for the next generation. Almost in all industries in the world, this includes R&D on 'green(er)' technologies (Iles and Martin, 2013). On the other hand, establishing sustainable innovation necessitates greening knowledge production and greening sectoral innovation systems which could be moved towards as a transition.

In the technological innovation system approach, the core emphasis is much laid on the enablers of successfully developing sustainable technologies and diffusing them into society. The nature of such research on innovation system has clearly pinpointed to the significance and relevance of consistent government support. Having gone through the comparative analyses of innovation system in various countries, it clearly reveals good practices as beautifully reported by Kamp (2008), who illustrated that the development of the wind energy innovation systems in Denmark was more successful than that of in the Netherlands primarily due to better firm facilitation of the Danish government and better interaction and learning among relevant actors in the innovation system.

Sustainability transitions and system innovations are rapidly growing fields which have both an analytical and an action-oriented branch (Grin et al., 2010; Geels, 2005; Foxon and Pearson, 2008; Van den Bergh et al., 2011). They mainly focus on (i) making societal domains like mobility to be sustainable in the long run and (ii) on the study of past transitions (Geels, 2005; Grin et al., 2010).

The research of past transitions has shown that it has received less attention with regard to business models (Loorbach and Wijsman, 2013). One way of establishing the linkages to firm's strategies is through long-standing foresight and visioning exercises not only at the level of firms (Nattras and Altomare, 1999) but also at the level of a certain societal domain and socio-technical system by means of transition management (Loorbach and Wijsman, 2013)

The link of competitiveness to sustainable innovation at different levels

The policy discussion is emphasized on using sustainable innovation in quest of arriving at 'win-win' situations where economic performance and sustainable development are advanced at the same time. This formulation presumes that sustainability has to be confronted well with ecologically and socially sustainable performance.

Competitiveness is truly an attractive word and expression, as it provides an estimation of the success of firms relative to competing firms. The strong linkages between competitiveness and

sustainable innovation expose the early work on environmental regulation and competitiveness, whereby regulation negatively impacted on the cost structure of firms, making them less competitive (SQW, 2006).

Green and environment are the source of competitiveness to firms (Porter and Van der Linde, 1995). At present, it is learned from numerous empirical researches that the role of regulation on innovation and competitiveness is positive at the firm level (Wagner and Llerena, 2011; Montalvo, 2012). The vast majority of literature on the issues of ecological sustainability reports are the outcome at the firm level but has mostly ignored the spill out results those environmental policies and regulations have had in national economies through the creation of new economic sectors. Regarding this, Lund (2009) confirmed the positive and sound effects of renewable energy policy and regulation on industry expansion in several European countries.

Recent days, the attention has completely moved towards how the firms are able to create and add value to their products and services through innovation (EC, 2010; Porter and Kramer, 2011). Every country is taking suitable steps not only in devising policies and also promoting them to enable their firms in competing for leadership in these new markets wherein sustainable innovation is playing a significant role as a strong enabler and multiplier of sustainable economic development.

The competitiveness of nations is commonly appraised in terms of the capacity to keep up a position of surplus in the international trade balance (Ezeala-Harrison, 2005). For more than two decades, it was known that innovation has been playing a key role in the international competitiveness of nations (Freeman, 1987, 2004). Moreover, other factors such as domestic market demand, industrial organization and structure, and firm strategy, structure and level of competition have been found to be important for industrial organizations that deal with international competitiveness (Porter, 1990).

Further, Zanakis and Becerra-Fernandez (2005) and Ezeala-Harrison (2005) continue to uphold that competitiveness is mainly linked to R&D investment levels, productivity trends and trade balance, while Jochem (2004) practically performed a test for national competitiveness based on

interrelated factors such as resources, technologies, organizational efficiency, product market characteristics, external business activities, institutional framework and government activities.

The link of international competitiveness to sustainable business models dwells in two key factors such as entrepreneurs and governments who are on the lookout for to establish markets for sustainable innovations at the national level but try to find distribution at the global level. Hence, competitiveness is absolutely dependent on the capability of governments to design and put into practice appropriate policies and framework conditions to support entrepreneurs for carrying out new sustainable business models with the help of new technologies and services.

Empirical studies carried out for more than a decade clearly signify that the leading countries like US, Europe, Japan are presently well positioned in the world markets. These leading countries alone are primarily accountable and answerable for a large proportion of the global environmental technologies market (Henzelmann et al., 2007; OECD, 2011; Montalvo et al., 2011). The common strategies in OECD countries are underlined by the belief that innovation improved competitiveness and growth. There will be no sustainability without innovation which is agreed by the leading countries (Aghion et al., 2009; EC, 2010).

Conclusion

This study provides a detailed assessment of the literature on sustainable business model innovation. We present actual data from the literature, as well as interpretations and working definitions of essential underlying concepts, as well as a stimulating discussion of how sustainable innovation relates to competitiveness at various systemic levels. By mapping the necessary essential tasks, anticipated hurdles, and available resources, this assessment could assist companies in their business model innovation process. Its goal is to increase the adoption of more sustainable business models as well as the success rate of sustainable ventures and start-ups.

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