

Editorial

Introduction to Special Issue “Advances in Sustainability-Oriented Innovations”

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Abstract: This Special Issue focuses on the study of Sustainability-Oriented Innovations (SOIs). Our purpose is to shed light on the SOIs literature regarding their determining factors, implications and new challenges for the future. In this editorial, we are delighted to present the three papers included in this Special Issue. Each of them tackles different issues related to SOIs having important academic and managerial implications. Two papers analyze the influence of SOIs on urban development and resource productivity, respectively, and the third studies SOIs determinants, in particular, cooperation networks. Moreover, two of the papers analyze SOIs considering territory (cities or countries) as their unit of analysis while the third focuses on firms. This denotes that SOIs’ actions are important whatever the level of analysis and as either a determinant or a consequence.

Keywords: sustainability-oriented innovations (SOIs); sustainability; urban development; productivity; cooperation networks

1. Introduction

The nature and determinants of the process of firm innovation is one of the most fertile fields of research in business and management [1]. To date, research has explored the dynamic relations between the institutional framework, industry structure and firms’ innovative behavior [2]. At institutional level, previous authors have highlighted the influence of environmental dynamism, and regulatory, normative, social and cultural factors on innovation activity [3]. At industry level, there is plenty of empirical evidence on the way in which certain factors representing industry structure—degree of concentration, market size, technological opportunity, and vertical integration, amongst others—determine the development of innovative activities [4]. At firm level, there has been a broad range of literature improving knowledge on the way in which firms’ characteristics—size, resources, strategy and organizational practices, amongst others—affect innovative activity [1,5].

Recently, an aspect that has become important in research in the field of innovation management are the social and environmental dimensions of firms’ innovation strategy. To refer to this dimension, the literature increasingly uses the term “sustainability-oriented innovations” (SOIs). The concept of SOIs has been developed to stimulate research on innovations driven by environmental and social sustainability concerns, as well as economic returns [6]. Unlike eco-innovations (e.g., eco-design, cleaner production) which focus solely on eco-efficiency, SOIs incorporate ecological and social aspects into products, processes, and organizational structures [7]. Specifically, these types of innovation “involve making intentional changes to an organization’s philosophy and values, as well as to its products, processes or practices to serve the specific purpose of creating and realizing social and environmental value in addition to economic returns” [8] (p. 180).

An increasing number of descriptive and prescriptive works have been published which focus on these kinds of innovation process (for systematic explorations of this literature, see [8,9]). SOIs have gained recognition as a priority area for empirical studies [10,11]. Some research has found empirical

evidence of relations between SOIs and dynamic capabilities [11], stakeholder engagement [12], product development [13] and sustainability performance [14], among others.

However, a critical reading of previous literature relating to environmental management, sustainability and innovation reveals that what is known about SOIs is deficient [8]. For example, within the existing literature it is still uncertain precisely what sustainability means or how it can be achieved. There is a variety of conceptualizations [15,16] as well as a confusing array of labels applied to aspects of the phenomenon, including, among others: corporate social responsibility; green innovation, eco-innovation or ecological innovation; social environmental management; and responsible innovation [17,18]. Moreover, previous studies tend to treat sustainability dichotomously (sustainable/not sustainable) and often overlook the social dimension of SOIs [9]. Scholars have also identified specific firm capabilities for sustainable innovation [19]. According to Zollo et al. [20], these capabilities are not unlike other firm capabilities for innovation; the difference lies in how firms try to develop such capabilities to adopt inclusive, sustainable and multi-stakeholder models. The literature on SOIs is growing, but we do not yet have a full picture on the connection between firm capabilities, SOIs and the evolution towards sustainable business [11].

The purpose of this Special Issue is to present evidence on SOIs from two different viewpoints: new factors and capabilities that may explain the development of SOIs and the implications of these social and innovation actions; addressing the deficiencies highlighted in the previous literature. Improving current knowledge about SOIs and their determinants and consequences is important for academics, policy makers and society as a whole.

2. Overview of the Contributions to the Special Issue

We are delighted to present the three papers finally included in this issue that successfully negotiated the standard Sustainability review process. While they are quite diverse in terms of topics, theoretical perspectives, fields/disciplines and methodologies, they also relate to one or more of the themes we identified above.

The first paper, “Cooperation networks as a driver of sustainability-oriented innovation” by Alberto Melane-Lavado and Agustín Álvarez-Herranz, attempts to shed light on the possible network differences for companies that, with and without foreign direct inversion (FDI), are looking to undertake SOIs. It focuses on the knowledge framework and geographical scope stemming from cooperation that lead to successful sustainable developments. It includes three research questions: (1) Does participating in cooperation networks encourage companies to carry out SOIs? (2) Will network diversity have a differential impact on SOIs? (3) Can better SOI performance for companies with FDI be associated with greater absorptive capacity as compared with their national counterparts? On the basis of these three questions, the authors formulate three hypotheses that are tested in a panel data sample of Spanish firms for the period 2009–2016. This paper provides considerable evidence that cooperative development through cooperation networks including diverse external stakeholders has positive effects on SOIs. The network links of companies with FDI also have a differential impact on SOIs because cooperative development is undertaken through European and global cooperation networks, while their national counterparts use a national cooperation network. Moreover, to integrate sustainability, a high absorptive capacity is required. Similarly, the capacity of companies with FDI to obtain knowledge on a global level and better manage heterogeneous partnerships with improved SOI performance is a result of having highly qualified human capital, which has developed multicultural skills and interacted across borders, and of the better practices and organizational methods typically found in other countries. From a theoretical perspective, this is a pioneering study, in that it offers a review of the literature with the aim of integrating sustainable innovation concepts, FDI, cooperation networks, and absorptive capacity.

The second paper, “Artificial intelligence in the urban environment: Smart cities as models for developing innovation and sustainability” by Anabel Ortega-Fernández, Rodrigo Martín-Rojas and Víctor Jesús García-Morales, starts from the idea that innovation is key to achieving sustainable

cities. Specifically, it analyzes different models of Smart Cities implemented in Spain (e.g., Madrid, Barcelona, Valencia, Malaga, and Santander), contrasting them with the specific case of one city that is not yet a Smart City (Granada) to discuss strategic technological actions to be implemented in different topical areas of action. Firstly, it presents real problems that large cities are suffering today such as overpopulation, pollution, new illnesses, and squandering of resources (greater expenditure on energy consumption). It then analyzes the minimum factors needed to transform a conventional city into a Smart City: economic competitiveness, quality of life, sustainability, and mobility. Based on these dimensions, the authors formed the notion of Smart City and formulated five research questions. To answer each of these questions, the paper analyzes the different factors that determine the position of an average European city, taking the case of Granada as a reference and target city for transformation into a Smart City. To evaluate the degree to which a city fulfills the requirements to be a Smart City, they use 42 of 46 indicators of the International Standards Organization (ISO), ISO 37120. The analysis shows Granada's deficiencies in the scores for digital government, accessibility, public transport efficiency, and mobility, among others. Finally, the data obtained demonstrate the need for an integrated dashboard with different proposals in the strategic areas analyzed in order to achieve the transformation of conventional cities into Smart Cities.

The third paper, "Sustainable consumption and production: Exploring the links with resources productivity in the EU-28" by Gustavo Pineiro-Villaverde and María Teresa García-Álvarez, aims to identify fundamental constructs that define sustainable consumption and production (SCP) in the European Union (EU), links with resource productivity, and the role of governments and companies in improvement through investment on research, development and innovation. In particular, it analyzes the effect of the circular economy and of SCP patterns on resource productivity as one of the main traditional indicators for achieving SDG 12 (Responsible Consumption and Production in the EU). A principal component factor analysis is first carried out to identify the constructs considered as actions or innovations with a social and sustainable perspective. The regression analysis performed for a sample of EU-28 countries in the period 2001–2018 suggests that only two factors (circular economy and resource consumption) have a positive and significant impact on resource productivity. The results obtained in this paper have a number of implications for policies aiming to achieve the sustainable development goals. It seems to be essential that the public administration, industries, and homes make a decisive commitment to the development of circular economy practices, that is, recycling and reuse. The final effect would be a reduction in imports of raw materials and in waste generated that cannot be incorporated back into the production chain. These results imply that governments and firms should increase their investment in research, development and innovation, focusing specifically circular economy practices, since these are supported in part by continuous technological improvement of processes, from design to manufacturing and ultimate recovery of materials.

The three papers have in common the central concept analyzed, that is, the importance of carrying out innovative, sustainable and social actions. However, they differ in their level of analysis and focus: the first one is an analysis at firm level with SOIs as the dependent variable, while the other two are at macro level—cities and countries—with SOIs as the explanatory variable. The first paper studies one of the determining factors of SOI development, that is, cooperation networks. The other two focus on the implications of developing innovative, sustainable and social actions in cities and countries.

3. Challenges for Future Research

Prior research suggests that the organization's philosophical mindset and behavior regarding innovation are critical factors in the management of SOIs [21]. SOIs are rendered uniquely complex by the requirement to integrate diverse economic, social and environmental considerations. This makes them an information and learning challenge which requires both new knowledge and knowledge management [8]. Improving knowledge about the mechanisms or factors that encourage the development of SOIs can be beneficial for both firms and society [22].

SOIs, as well as traditional economic innovations, are embedded in a larger innovation system and are therefore influenced by a multitude of factors including firm creativity [13], alliance capabilities [23], technological progress and market forces (e.g., customer demand) [24], government regulations (e.g., environmental protection acts and subsidies) [25], and the activities of non-governmental organizations, societal initiatives and the media [26]. Exploring in depth the specific determining factors of SOIs (as in the first paper of this Special Issue) opens the door to future research.

In addition, another trend of literature has analyzed how SOIs may affect firm behavior. The development of SOIs aims to improve firms' eco-efficiency [14]. It has been stated that firms may be able to improve their competitive position by "creating shared value" [27]. SOIs can also contribute to a higher level, that is, to technological progress [10], improved environmental conditions and enhanced wellbeing for society [17]. In general, SOIs are intended to provide solutions to sustainability issues [13]. However, the additional consideration of socio-ecological impacts occurring throughout life cycles makes it particularly complicated to predict and assess SOIs effects and, above all, to ensure that these effects will be positive in the long term [28]. As a consequence, related effects must be thoroughly monitored in order to ensure that SOIs actually do lead to sustainability-related improvements [13]. Research exploring the possible positive or negative effects of SOIs is still needed, and we thus call for further research into this matter, in line with the second and third papers of this Special Issue.

Finally, understanding how policy, government and institutions can encourage and support innovative companies is fundamental, as this will help to find innovative ways to address environmental, social and economic sustainability challenges, and to set up beneficial collaborative partnerships between business, government, universities and users [29]. Therefore, collaboration between institutions, firms and consumers for the development of SOIs should constitute another promising line of research in this area.

In closing, we wish to express our appreciation and thanks to the Sustainability Journal for agreeing to host this Special Issue on Advances in Sustainability-Oriented Innovations. We are also very grateful to contributors for their enthusiasm and efforts in producing their papers, despite significant time constraints. Finally, we would like to thank to each paper's reviewers for their careful revisions.

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