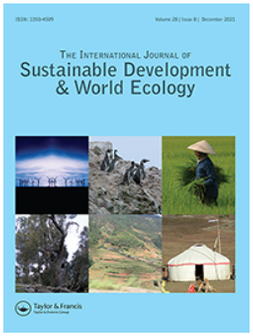

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Social innovation for sustainable development: assessing current trends

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ABSTRACT

Innovation is believed to be a key driver of societal and economic well-being. In many cases, it has also led to more sustainable lifestyles and a more efficient use of natural resources. But despite the relevance of innovation as a tool to support sustainable development, there is a need for research that analyses current trends in order to guide future efforts. The present paper addresses this research need. It examines existing methods and tools for fostering social innovation in matters related to sustainable development, within the framework of the SDGs. By means of an online survey undertaken among sustainability and innovation experts in a sample of industrialised and developing nations, this study has identified some of the means via which social innovation is being pursued, along with its applications and limitations. A number of case studies showing examples of sustainable innovation have been mapped to demonstrate its usefulness. A causal loop diagram, which links the factors associated with social innovation within the context of the UN Sustainable Development Goals, is also presented, offering a greater understanding of their interconnections. The paper concludes by outlining some measures that may help to take better advantage of the many opportunities offered by social innovation that put the principles of sustainable development into practice.

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Social innovation; sustainable development; survey; SDGs; barriers; case studies

1. Introduction

In the literature, the discussion on the definition of innovation concerns originality (an idea new to the world or imitated, but new to an organisation), the scope (product and business process innovation), and its relevance to technological, economic or social spheres. The concept of innovation was introduced to the scientific literature by Joseph Schumpeter (1939), who defined it as the first application of a given solution, i.e., the introduction of new products, processes, technologies, resources, and a new combination of production factors. These revolutionary new ideas emerge as a result of a creative destruction, which could disrupt the existing state of economic equilibrium and boost economic development (Schumpeter 1934, 1939). The Schumpeterian approach has been widely accepted in the literature, but the concept of innovation has evolved and new definitions have emerged.

Percy Ronald Whitfield promoted a broad definition of innovation and argued that innovation is a series of complex actions related to solving problems, which result in the creation of a comprehensively developed novelty (Whitfield 1975). Such an approach was also supported by Philip Kotler and Everett Rogers, who claimed that innovation is any product, service or idea perceived by an individual as new (Kotler 2000, p. 355; Rogers 2003, p. 12).

A narrow definition of innovation was proposed by Christopher Freeman, who similarly to Schumpeter, defined innovation as the first commercial use of

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a new product, system, device or process (Freeman 1982, p. 57). The concept of innovation was expanded by Peter Drucker, who not only claimed to treat all novelties as innovations (including finding new users for an already existing product), but also noted that innovation can refer to social phenomena. In his opinion, economic and social innovations are as valuable as technological innovations (Drucker 1993, 2004). With this in mind, Michael Porter analysed innovation from both perspectives – technical and social – and linked innovation with the gaining of competitive advantage by states and enterprises (Porter 2008). Innovation can be analysed from various perspectives with regards to their outcomes and impacts. These include the business sector, the general government sector, non-profit institutions, households and individuals, with the business sector being the most common one (OECD, 2018).

Innovation drives economic development, but the socio-economic relevance of innovations depends on their diffusion and uptake (Ziegler 2017; OECD, 2018, p. 44). By definition, innovation does not need to be beneficial for the firm or bring a positive value to society. It can lead to better financial performance, improvements in market position of a company, sales increases, or benefits to customers. It can also solve environmental, safety or health problems, which may not increase a firm's sales but will bring benefits to users (OECD, 2018, p. 69). Thus, innovation should not only be perceived by looking at its outputs and outcomes, but also by seeing it in the context of the accompanying social processes (Ziegler 2017, p. 2).

Due to contemporary trends related to citizen engagement in innovation, co-creation, and co-production, the focus of innovation solutions shifted to both cutting edge technologies and solving social problems. Therefore, social innovation has received a growing interest during the last decade (Cajaiba-Santana 2014; Voorberg et al. 2015; van der Have, Rubalcaba, 2016; Yan et al. 2019; Foroudi et al. 2020). In principle, social innovations aim to improve the welfare of communities or individuals (Young Foundation 2012; Mulgan et al. 2013). These are also seen as new approaches to dealing with a problem or addressing a social need (Nicholls, Dees, 2015), as new, goal-oriented social practices aimed at stimulating the macro-quality of life (Periac et al. 2018), as innovations that meet the yet unmet social needs and create new models of social relations and cooperation (Manzini 2015), and as products and services that facilitate the development of more sustainable, cohesive and inclusive societies (Grimm et al. 2013). Social innovations are also considered to be a suitable way to solve challenging problems faced by contemporary society (Eichler, Schwarz, 2019; Cuntz et al. 2020).

Since the definitions allow for a broad interpretation of social innovations, there is the need to research and describe the means via which social innovation is being pursued and its applications and limitations in order to characterise current trends and guide future efforts. This research aimed to explore social innovation practices by carrying out a survey and collecting a sample of case studies from 36 countries.

This paper is organised as follows. Section 2 presents an overall recognition of the concept of social innovation from a sustainable perspective. Section 3 describes the applied research methods and the analysed sources. The findings are discussed in Section 4. Finally, Section 5 highlights some final remarks, including contributions and limitations of this analysis as well as further developments for future research.

2. Innovation in a sustainable development context

Change is a crucial element for organisations, communities, and stakeholder networks in order to progress towards sustainable development (Silvestre and Ţîrcă 2019). Sustainability trajectories are the specific paths taken by organisations, communities and stakeholder networks to change and progress towards sustainable development (Silvestre 2015). Sustainability trajectories are defined by contextual, historical aspects and related decisions made by groups and individuals (Martin and Sunley 2006). Therefore, contextual and historical aspects are crucial for the implementation and study of innovations for sustainable development (Silvestre and Ţîrcă 2019). The academic literature helps in the understanding of these contextual and historical aspects.

One of the most recent and perhaps comprehensive literature reviews that focuses on innovation for sustainable development suggests that there are three key periods in the literature, and each period is characterised by specific keywords (Vatananan-Thesenvitz et al. 2019):

1985 to 2005, keywords: industrial ecology, sustainable cities, and city planning.

2005 to 2012, keywords: environmental management, cleaner production, competitiveness, corporate social responsibility, and eco-efficiency

2012 to 2018, keywords: Sustainable Development Goals, Eco-Innovation, Social-Innovation, CSR, and Entrepreneurship

The three periods show a shift from cities and industry to environmental management and social responsibility and then to sustainable development. This movement shows a progressive integration of social, environmental and economic aspects in the area of innovation for sustainable development.

The top 5 countries in terms of total academic publications are: the United Kingdom, China, the United States, the Netherlands, and Germany (Vatananan-Thesenvitz et al. 2019). Also, there is evidence of collaborative research between different countries, especially between the top countries with more publications (Vatananan-Thesenvitz et al. 2019). These characteristics of the literature suggest that the literature on innovation for sustainable development has been mainly published by authors based in industrialised and developed countries.

The diversity of publications and journals where the literature on innovation in sustainable development is published shows the different facets of this topic (Vatananan-Thesenvitz et al. 2019). The topic is focused on areas such as sustainability, business and management, education management, management and strategy, as well as innovation and natural science (Vatananan-Thesenvitz et al. 2019). The top types of journals for innovation in sustainable development are journals in the general business and management field and journals in the ecology and environment sector, as well as in general energy consumption, followed by journals covering education and sustainability, and technology and research policy journals. Most papers are written in the sustainable development business context (Vatananan-Thesenvitz et al. 2019).

The most co-occurring keywords in journal articles that are focused on innovation for sustainable development are: planning, education, environmental protection, environmental management, economics, decision-making, economic growth, and climate change (Vatananan-Thesenvitz et al. 2019). These keywords represent the conceptual space of innovation for sustainable development in the academic literature (Vatananan-Thesenvitz et al. 2019). The high co-occurrence of the keyword planning shows the importance of this concept in innovation (Vatananan-Thesenvitz et al. 2019). Therefore, the aspects of the literature discussed above show the emphasis of research with an environmental and economic focus in the context of organisations. Furthermore, this suggests that the focus on social innovation and less formal communities could be developed further in the literature.

In order to yield the expected benefits, innovation requires willingness from staff, senior management and communities as well as mind-set changes and planning in order to be implemented (Silvestre and Ţîrcă 2019). The UN has recognised that the delivery of sustainable development relies on social innovation (Millard 2018). The academic literature has focused mainly on the technological innovations in the context of sustainable development, rather than those orientated by people (Adams et al. 2016). In addition, the main SDG that focuses on innovation – SDG 9: Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation (UN, 2015) – has a strong technological focus. However, the literature on innovation for sustainable development has recently started to shift its focus towards socio-technical lenses (Adams et al. 2016). These lenses provide a more people-centred perspective.

Moreover, innovations have been traditionally driven by economic rather than social and environmental considerations (Silvestre and Ţîrcă 2019). Social innovations have the societal aspects as the primary focus, whereas green innovations focus primarily on the environment (Silvestre and Ţîrcă 2019). An innovation for sustainable development requires the social, environmental and economic dimensions to be considered simultaneously and in balance (Silvestre and Ţîrcă 2019).

Innovations for sustainable development have also been conceptualised as sustainability-oriented innovation (e.g., Altenburg and Pegels 2012; Adams et al. 2016; Goodman et al. 2017).

> Sustainability-oriented innovation involves 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. (Adams et al. 2016, p. 1)

As well as the balance between societal, environmental and economic considerations, sustainability-orientated innovations can have an impact within and beyond organisations (Adams et al. 2016). Within organisations, it is possible to find stand-alone innovative interventions for sustainable development (Abernathy and Utterback 1978; Adams et al. 2016). This can take place within specific teams, departments, functions, products or services. Recently, however, innovation for sustainable development is becoming a more strategic aspect in organisations (OECD 2009). The more strategic approach can become integrated throughout organisations, such as through environmental management systems (Adams et al. 2016). These can aid behaviour change and transformational processes towards sustainable development (Adams et al. 2016). Figure 1 introduces some of the dimensions of social innovation for sustainable development to illustrate the complexity of this topic.

Another dimension of innovation for sustainable development relates to an organisation's view of itself as embedded within a network of other actors, or if the organisation tends to act while focusing on itself (Adams et al. 2016). When innovation for sustainable development is orientated mainly inwards, it is referred to as insular (Adams et al. 2016). On the contrary, if an organisation is working on innovation for sustainable development in a systemic way, the organisation will try to positively affect social, environmental and economic systems beyond its organisational boundaries (Adams et al. 2016). Organisations can therefore contribute towards sustainable development

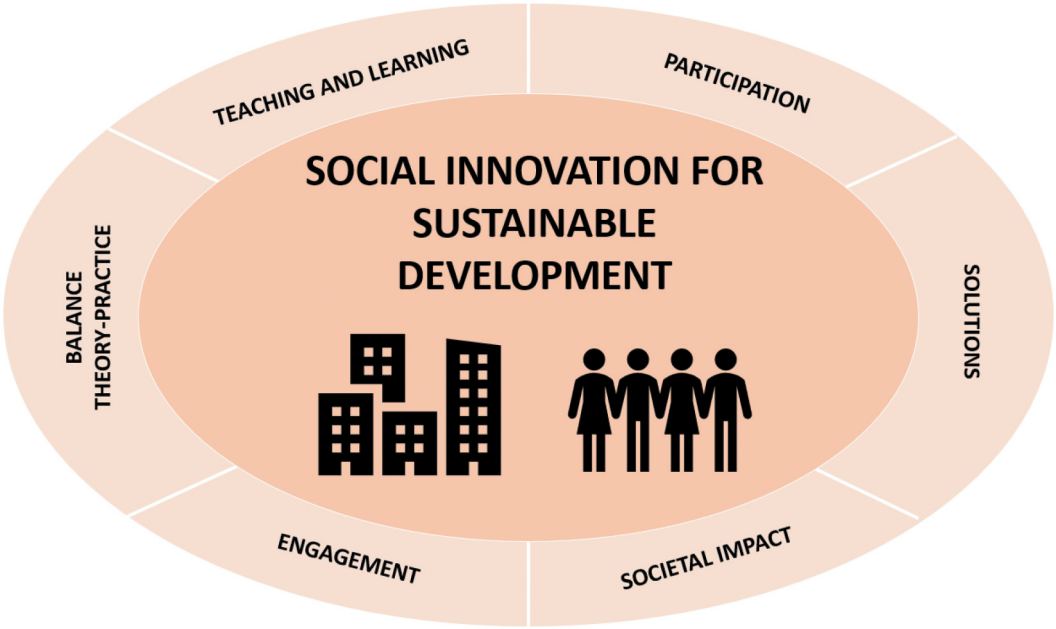

Figure 1. Some of the dimensions of social innovation for sustainable development. Source: the authors

through systems building innovation beyond their regions and countries. For instance, the concept of social innovation is starting to be used in the context of sustainable development both in developing and developed countries (Millard 2018).

The engagement between different actors in respect of innovation for sustainable development has been conceptualised in the literature through the 'triple helix' model. The 'triple helix' model of innovation includes three interconnected sources of innovation: government, the private sector and research institutions (Millard 2018). The 'triple helix' explicitly acknowledges the importance of knowledge production through academia (Carayannis et al. 2012). Due to this, some argue that it is compatible with the knowledge economy (Carayannis et al. 2012). Therefore, the model has been developed to include civil society and is called 'the quadruple helix' (Millard 2018). The 'quadruple helix' highlights the need for an integrated development of knowledge economy and knowledge society in the context of sustainable development (Carayannis et al. 2012). Civil society as a source of innovation in the model has been emerging in parallel with the development in academic discourse and use in policy frameworks of the concept of social innovation (Millard 2018). The most recent iteration of the innovation model is the 'quintuple helix' (Carayannis et al. 2012). The 'quintuple helix' includes biological and ecological systems as another source of innovation in the model (Carayannis et al. 2012). This model thus includes the socio-ecological perspective and is likely to be the most appropriate to address sustainability challenges and contribute towards sustainable development (Carayannis et al. 2012).

In conclusion, social innovation for sustainable development is an area of the literature that could be further developed. Particular areas that could be further studied include the stakeholder engagement in innovation within and outside organisations and communities, the role of engagement in systems building innovation for sustainable development (i.e. society, environment and economy equally considered), and tools and methods to foster social innovation for sustainable development.

3. Methodology

This work aimed to examine the existing methods and tools for fostering social innovation in matters related to sustainable development, within the framework of the SDGs. To address the established goal, an extensive literature review was followed by cross-sectional descriptive research carried out through the quantitative method approach, by means of a survey applied to a sample of social innovation practitioners and scholars.

As stated by Fisch and Block (2018), a literature review is a basic component of every scientific research study, insofar as it is considered essential for advancing knowledge, facilitating theory development and understanding specificities on mature or novel research areas. This phase provided insights about the dynamic of social innovation and its core determinants.

According to Saunders, et al. (2009), the purpose of descriptive research is to portray an accurate profile of studied events or situations in order to describe the research domain accurately and thoroughly.

Table 1. Sections of the survey.

Part 1 -respondent Background	Composed of 5 variables related to demographic characteristics (country, age, gender, level of education, and position in respondent's university)
Part 2 – involvement in social innovation	Composed of 4 variables (role played; type of involvement; period working on social innovation; and citizen profile of the respondent)
Part 3 – Pursuing Social Innovation	Composed of 6 variables (type of work on social innovation; the main beneficiaries; type of empowerment; outcomes; how social innovations address challenges of SD; connection with SDGs)
Part 4 – Challenges and potentialities	Composed of 3 variables (hinder elements; driver elements; interest in collaborating with a case of social innovation)

Source: The authors

To accomplish the objective of this work, after the literature review the following four steps were undertaken to design a survey and to collect and analyse the data.

(1) Design of data collection instrument: a survey was designed to identify the main initiatives employed to foster social innovation on matters related to sustainable development and its relations with the SDGs. The survey was divided into four sections, as summarised in Table 1. These sections covered the more important social innovation initiatives described in the literature review topics.

4. Results and discussion

The survey collected 105 responses between September and November 2020, and it was mostly answered by researchers and professors who are familiar with the subject. Regarding the sample characteristics, the respondents represented 36 different countries, as shown in Figure 2. Among these, Brazil (27.62%), Italy (11.43%), Portugal (11.57%), Spain (3.81%), United Kingdom (3.81%) and Ghana (3.81%) had with the highest number of respondents. There was a balanced representation of developed (n = 52) and developing countries (n = 53) in this study.

This sample is adequate for two main reasons. Firstly, it has a broad geographical distribution, being one of the most comprehensive studies on the topic, whereby insights from many countries are gathered. Secondly, it entails countries from where very little information is usually available, and this has brought evidence from these nations to light. Finally, the respondents are those familiar with the topic, which adds a degree of robustness to the responses provided.

Regarding the respondents´ age, 40% were over 50 years old, 45% were between 36 and 50 years old, 12% were between 26 and 35 years old, and 3% were between 18 and 25 years old. Additionally, 94% of the sample had completed a post-graduate level of education. Considering the experience in social innovation, 30% of the sample have been working for more than five years in the topic, followed by 19% and 18% of respondents with between 3–5 and 1–3 years of experience, respectively. Only 4% of the sample indicated that they have been working within the social innovation context for less than one year. Even though they have had contact with the topic, 29% of the respondents do not work directly with social innovation.

When questioned about the role their institution plays in social innovation, the respondents could indicate more than one activity. The European School of Social Innovation assumes that academia has multiple and overlapping roles in the practice of social innovation (ESSI, 2019). Most parts of the sample indicated the supporting role (77%), and the same number of respondents indicated the enabling and transforming role (47%). A few respondents (3%) indicated other roles: analysing, criticizing, and a combination of promoting, orchestrating, and coordinating. Supporting and promoting innovation are expected key roles of academia (Ankrah and Al-Tabbaa 2015), developing, for instance, participatory research to create knowledge and new possibilities for innovation (Cohen et al. 2002; Reichert 2019). Reichert (2019) mentions that academia has the role of orchestrating and coordinating multi-actor innovation networks.

Almost half of the sample (44%) described their citizen profile regarding social innovation as someone who 'observes, collects, reports and analyses information'. Angelidou and Psaltoglou (2017) classified this type of citizen profile as a 'sensor citizen', who contributes by 'crowdsourcing, collecting and sharing environmental data and helping detect problems and challenges, through theoretical and empirical investigation'. Considering that most of the sample is composed of professors and researchers, it was expected that the respondents would identify this type of profile to represent them regarding social innovation. The profile of one who 'participates in open communities to interact with citizens' was selected by 27% of the sample. 'The collaborative citizen' contributes to sustainability by discussing, finding and testing solutions in open communities (Angelidou and Psaltoglou 2017). 'Entrepreneurial citizen' was indicated by 14% of the

respondents, as someone who 'creates a business that makes more efficient use of resources and is socially inclusive'. 12% selected 'offers goods and/or services no longer needed', and 3% indicated 'other' actions.

Regarding the type of innovation mechanism linked to the respondents' work, the options were based on five broad uses of the term social innovation, according to The Young Foundation (2012): societal transformation, organisational management, social entrepreneurship, governance and capacity building, and new product, services or social development programmes. The respondents were allowed to assign more than one option, and this is the reason for the sum of percentages to be higher than 100%. More than half of the sample (53%) indicated 'societal transformation', which refers to the 'role of civil society in social change and the role of the social economy and social entrepreneurs in delivering economic growth and social inclusion' (The Young Foundation 2012). Several studies have been investigating the transformative potential of the practice of social innovation (Wittmayer et al. 2019; Pel et al. 2020; Krlev et al. 2020). Both 'organisational management' and 'governance model for decision-making' were mentioned by 36% of the sample. Considering the respondents who assigned 'societal transformation', 34% mentioned also 'organisational management' and 32% indicated 'governance model for decision-making' as another option. It is worth highlighting that the respondents consider that, besides the transformation of society as a whole, they are promoting 'changes in human, institutional and social capitals that lead business strategy' and are enabling 'interrelationships between actors and their skills, competencies, assets and social capital' (The Young Foundation 2012). The mechanisms of 'new product, service or social development programmes' and 'social entrepreneurship' were indicated by 28% and 25% of the respondents, respectively. In addition to the options presented for the respondents, five other mechanisms were identified by 5% of them: 'measuring effects of social innovation', 'encouraging innovation and knowledge transfer to provide transferable skills', 'community capacity building', 'civic education' and 'empowering grassroots-based communities'.

Based on studies by Bria et al. (2015) and Hostick-Boakye (2014), Angelidou and Psaltoglou (2017) identified the beneficiaries of initiatives who increased autonomy, power and influence capacity by means of social innovation: academia/research, business, citizens, foundation/charity, grass roots organisations, government/public sector, and social enterprise. As presented in Figure 3, for most of the respondents (74%), the main beneficiaries of their actions/work on social innovation are represented by 'academia/research', followed by 'citizens (community of interest/practice)' (67%) and 'government/public sector' (32%). Considering this question was multiple choice, 63% of the sample assigned both 'academia/research' and 'citizens (community of interest/practice)' as beneficiaries. Considering 'academia/research' and 'government/public sector', 37% pinpointed both beneficiaries, and 36% chose 'citizens (community of interest/practice)' and 'government/public sector'.

In relation to the empowerment generated by social innovation, most of the respondents (73%) indicated 'sharing information and resources', which is in line with their answers about the main beneficiaries of their actions ('academia/research') and important for citizen engagement in social innovation (Davies and Simon 2012). 'Identifying and/or solving problems' was

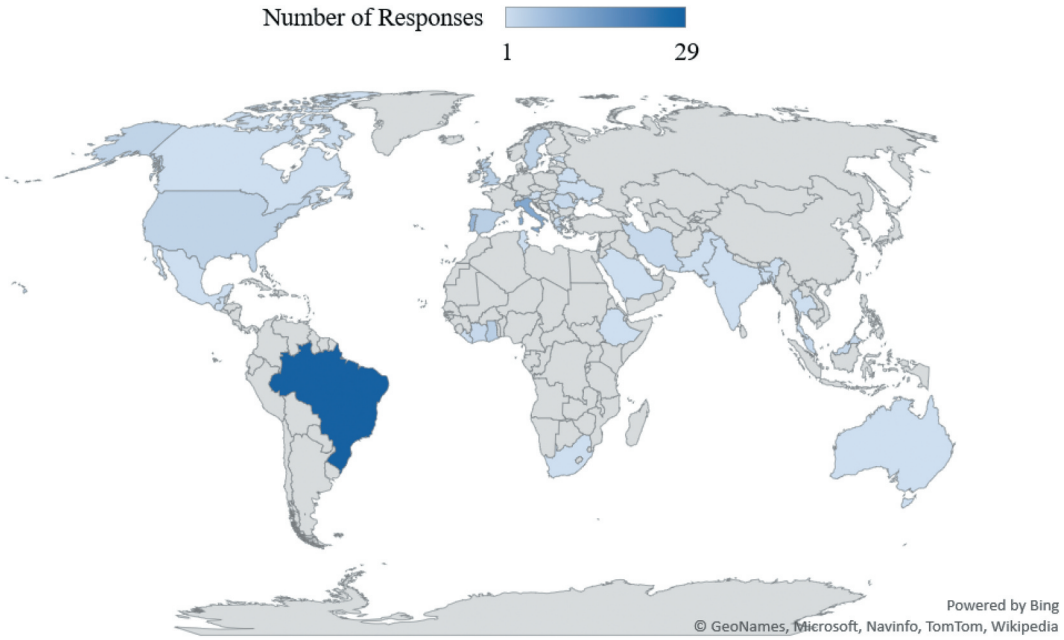

Figure 2. Characterisation of the sample in terms of respondent locations.

Figure 3. Main beneficiaries of respondents' work on social innovation.

the second most mentioned type, indicated by 67% of the respondents, followed by 'shaping and influencing decision making and policy design', indicated by 46%. 'A sense of possible' and 'education for sustainable development' were also mentioned.

These findings are aligned with the action/work social innovation outcomes, since most of the respondents (68%) identified the 'new knowledge/idea'. 'Service' (40%), 'collaboration platform' (35%), 'process' (31%), 'social movement' (25%), and 'institutions' (23%) were also expressed. 'Business model' (16%), 'technology' (14%), 'organisational form' (14%), and product (13%) were other social innovation outcomes mentioned. 'Piece of legislation' and 'raising awareness' were mentioned in the option 'others'. These responses reinforce the view of Cajaiba-Santana (2014), supporting a broader view of social innovation that does not focus exclusively on an instrumental or material view.

When asked about the social innovation content addressing sustainability challenges in their respective institutions, several initiatives/applications were mentioned, as illustrated in a VOSViewer map (Figure 4; to set the map, full counting was used with 5 minimum occurrences), following the 20 subjects indicated. As it is shown in Figure 4, two clusters were established. Cluster 1 comprises the subjects 'air', 'biodiversity', 'economy', 'educational action', 'energy efficiency', 'human nature relationship', 'nutrition security', 'resource efficiency', 'spur food', 'waste collection', and 'water pollution control'. Cluster 2 encompasses

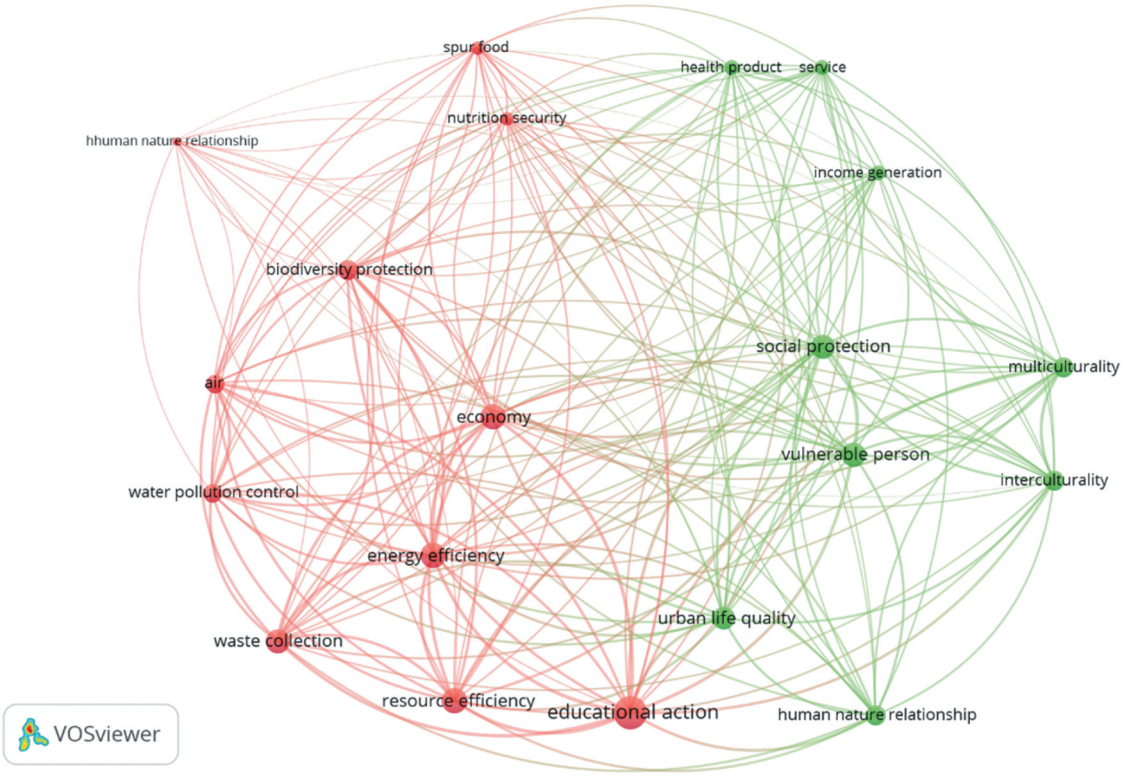

Figure 4. Spatial map of the initiatives performed and respective subjects.

the subjects 'health product', 'human nature relationship', 'income generation', 'interculturality', 'multiculturality', 'service', 'social protection', 'urban life quality', and 'vulnerable person'. Analysing these clusters, it is possible to establish that Cluster 1 is more closely related to SDG 4 (Quality Education), SDG 7 (Affordable and Clean Energy), SDG 12 (Responsible Production and Consumption), SDG 15 (Life on Land), SDG 2 (Zero Hunger), SDG 6 (Clean Water and Sanitation), and SDG 3 (Good Health and Well-being), while Cluster 2 is more related to SDG 1 (No Poverty), SDG 8 (Decent Work and Economic Growth), SDG 10 (Reduced Inequalities), SDG 11 (Sustainable Cities and Communities), SDG 17 (Partnerships for the Goals) and also SDG 3 (Good Health and Well-being). Another interesting aspect in the map is that almost all subjects are connected with each other, which discloses that many initiatives are performed in an integrated manner by institutions.

There are three elements mentioned above that mirror the historical progression and current trends of the academic literature focused on innovation for sustainable development (Vatananan-Thesenvitz et al. 2019). Firstly, this study shows that there is a wide range of subject foci of social innovation initiatives and applications. Secondly, the subject foci of these initiatives and applications provides coverage across the SDGs. Finally, there is integration in the implementation of initiatives and applications between the different subjects. These results therefore provide further evidence of the implementation of sustainable development and the SDGs through social innovation, as well as the links between social innovation and integrative approaches to sustainable development implementation. This is important, because one of the key issues in the implementation of sustainable development is the lack of integration between social, environmental and economic aspects and the difficulties associated to the range of issues related to these (WCED 1987; Baker et al. 1997; UN, 2015; Kravchenko et al. 2020). Therefore, this study, in conjunction with others, suggests that social innovation is a unique and important tool to address sustainable development implementation issues. More research is required to develop insights into why and how this occurs.

Respondents were also asked whether the initiatives have connection with the SDGs. Just two responses indicated no connection, while all others indicated one or more goals, as shown in Figure 5. The Sustainable Development Goal on Quality Education (SDG 4) was the most cited one, indicated by 66% of the respondents. The second most cited goal was SDG 11 (Sustainable Cities and Communities), indicated by 61%, followed by SDG 13 (Climate Action), indicated by 48%, and SDG 3 (Good Health and Well-being), indicated by 47%, while SDG 14 (Life below Water) was the goal with the least number of indications (16%). For Eichler and Schwarz (2019), a systematic literature review indicated that the SDGs most frequently connected to social innovation are SDG 3, SDG 17 and SDG 8, so this study expands the list by highlighting quality education, sustainable cities and climate change as other important subjects in the practice of social innovation.

The reason for SDG 4 being the most cited goal can be easily understood, since most of the sample is composed by academics. When analysing SDG 4, it is possible to verify that besides considering the need to ensure 'inclusive and equitable quality education and promote lifelong learning opportunities for all' (UN, 2015, p. 19), this goal also considers the need of establishing Education for Sustainable Development (ESD) (UN, 2015). In this sense, SDG 4 presents a central role in the 2030 Agenda, preparing new generations to work towards the other goals (Vladimirova and Le Blanc 2016; UNESCO 2017). Considering the cognitive, socio-emotional, and behavioural domains of the learning objectives, UNESCO (2017) highlights relevant connections of these learning objectives with all SDGs.

An interesting finding about elements that hinder the efforts of social innovation for sustainable development at universities (Figure 6) was that the 'lack of funding/financing instruments' presented the highest rate of response (69%), which shows

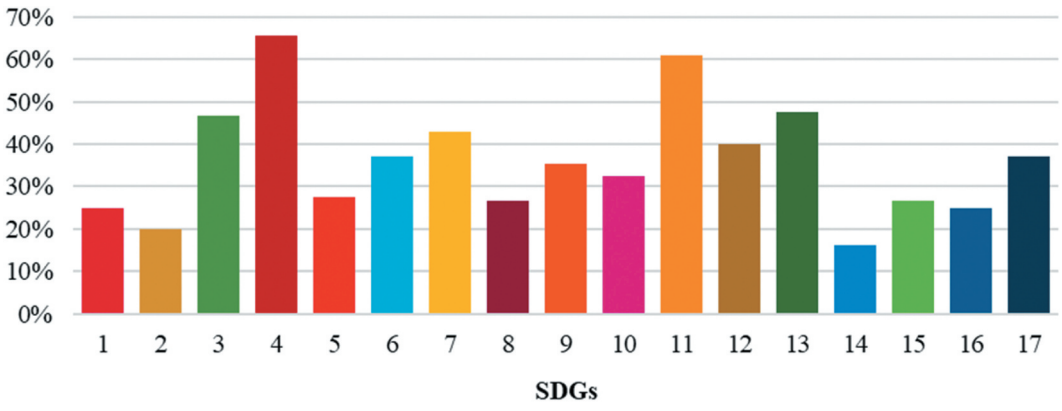

Figure 5. Number of occurrences for each SDG.

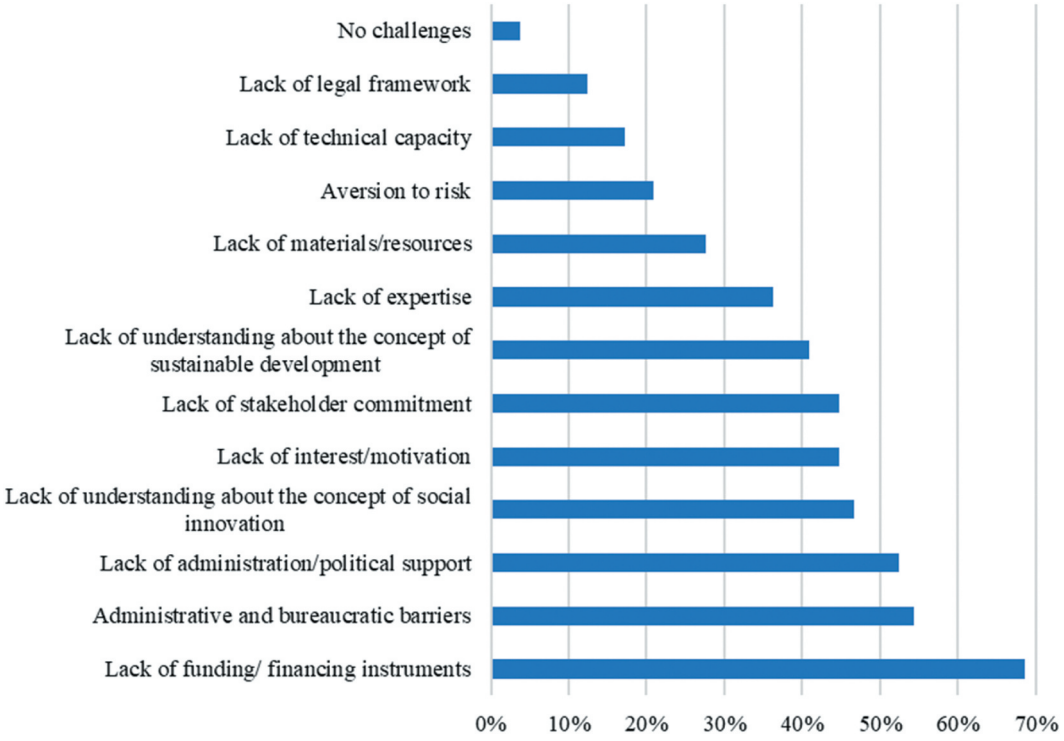

Figure 6. Elements that hinder the efforts of social innovation for sustainable development at universities.

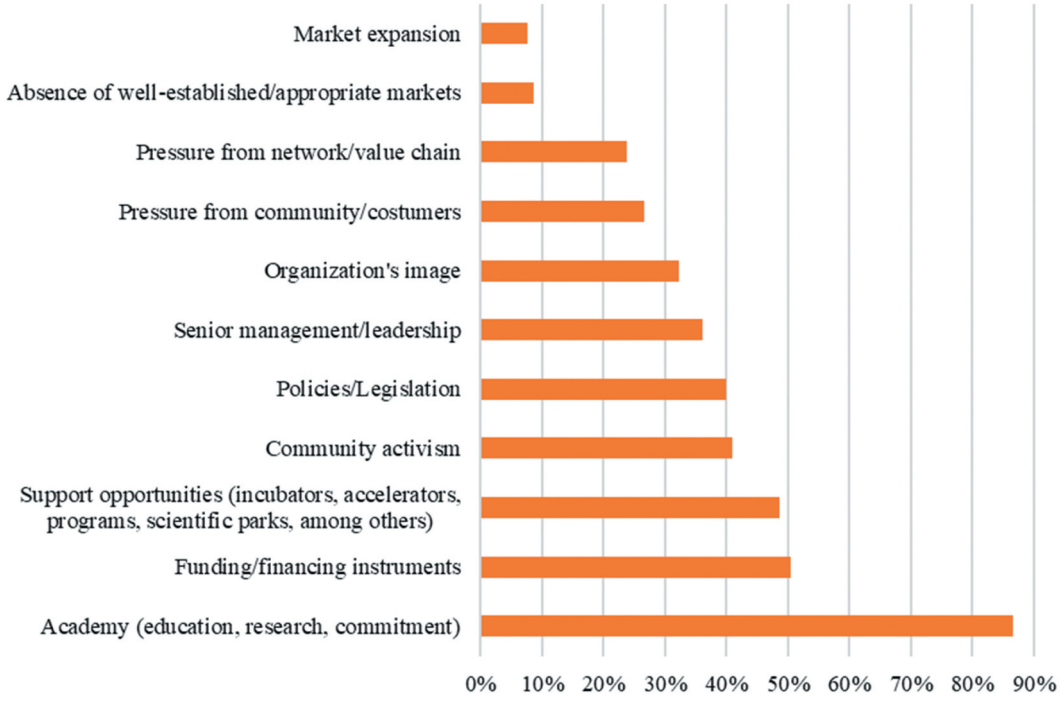

Figure 7. Drivers for the implementation of social innovation for sustainable development at universities.

the need for more investment in this area. The second most indicated challenge was 'administrative and bureaucratic barriers', indicated by 54%, followed by 'lack of administration/political support' (52%), and 'lack of understanding about the concept of social innovation' (47%). Just 4% of the respondents indicated 'no challenges' for the practice of social innovation.

Where drivers of social innovation for sustainable development at universities are concerned, the aspects of education, research and commitment ('academy') were indicated, in Figure 7, by most of the respondents (87%). 'Funding/financing instruments' was the second driver most cited (50%), and 'support opportunities (incubators, accelerators, programs, scientific parks, among others)' was indicated

by 49% of the respondents. These findings also show the relevance of the universities' alignment with social innovation for sustainable development, combining 'interdisciplinarity' and 'transdisciplinarity' (Bammer et al. 2020) as well as responsiveness to current problems with the ability to engage in long-term research and education (Reichert 2019), reinforcing their role in the quadruple innovation helix with society, government, and business (Monteiro and Carayannis 2017).

According to the sample, it is evident that funding and financing are important factors for social innovation, since their lack may be a threat or a challenge, in the same way that instruments for funding and financing may enable and/or enhance the initiatives, fostering social innovation in the analysed context.

5. Conclusions

This research paper has examined appropriate methods, tools and factors that can play a critical role in shaping the relationship between social innovation, sustainable development and the SDGs. To achieve this, an online survey was conducted among experts in social innovation and sustainable development endorsement. In this respect, a number of case studies were examined in a sample of 36 industrialised and less developed countries. The experts comprising the sample have considerable experience in social innovation and sustainability-focused issues (i.e. >3 years).

Our findings indicate some considerable management and policy development implications, which contribute to the relative literature of social innovation and sustainable development (Eichler and Schwarz 2019). A primary insight gained from the survey implies that the majority of the respondents place emphasis on the key role and unique position of their institutions to create enabling conditions for developing social innovation structures and/or products-services. Thus, they have analysed various key features regarding the role of their institutions in creating social innovation, as they are involved in the supporting and transforming procedures. Crucially, they analysed the suitable context provided by their institutions to produce new knowledge and innovation. Another significant insight into the promotion of social innovation that emerged from the respondents' profile pertains to the concentration on mainly collecting and analysing relative information by participating in open communities and undertaking entrepreneurial efforts with high social impacts. Likewise, the study's outcomes indicate that many of the respondents place relatively more emphasis on innovation mechanisms through civil society and social entrepreneurship activities for creating social innovation. Moreover, the survey shows that the main beneficiaries from social innovation initiatives are academia-researchers as well as citizens who obtain greater autonomy, power and/or influence capacity. The majority of the respondents also pointed out benefits that arise from creating social innovation through procedures of information dissemination and resources, as well as from solving pressing social problems.

Other critical lessons learned from the survey refer to the underlying nexus that describes social innovation and the promotion of sustainable development/SDGs. Essentially, a number of initiatives have been undertaken in the respondents' institutions in an attempt to respond to and address several sustainability management issues, such as biodiversity decline, air quality, energy efficiency, resource efficiency, waste collection and pollution control. In this context, a significant implication surrounding the SDGs' implementation is that the emphasis is placed on the promotion of quality education, sustainable urban and community planning and development, climate mitigation-adaptation, and human health and well-being for modern societies. Lastly, another point that emerged from the relative efforts of higher education institutions to promote social innovation and sustainable development are that there are some important barriers, such as the lack of funding resources and related instruments, the large administrative and bureaucratic requirements, a lack of strong political support, and the absence of an overarching definition regarding social innovation. Moreover, findings suggest that academic institutions also face considerable barriers to stimulating certain interactions between social innovation and sustainable development due to the lack of suitable support opportunities from decision-makers and market actors.

Like other similar studies, our research has some limitations. One of them is the fact that it was undertaken over a pre-defined period of time, so it could not capture the opinions of people not available during the time the survey was undertaken. Also, respondents were associated with some sustainability networks, so it could not gather opinions from persons not associated with them. Another limitation refers to the structure of the sample, which consists mostly of academics, and as to be expected, their responses place relatively more emphasis on specific social innovation, educational and/or sustainable development issues. Despite these constraints, the study provides a welcome addition to the literature, in the sense that it sheds light on the strategically important subject matter of social innovation for sustainable development and has a wide geographical representation. Also, the study provides a set of insights into how innovation and sustainable development are perceived, synthesised from respondents in multiple scientific areas from 36 countries with different socioeconomic and cultural backgrounds.

As to the future, this study provides fertile ground for future research, which could identify further features of innovation in a sustainable development context and describe some of the tools that may be deployed in order to better capitalise from its potential in building a more sustainable world.

Disclosure statement

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