

MANAGING KNOWLEDGE AND INNOVATION FOR SUSTAINABLE MODELS OF BUSINESS: A SYSTEMATIC LITERATURE NETWORK ANALYSIS

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Abstract:

With growing global actions toward sustainability, businesses have to align their course ensuring it as an outcome of their core business strategy. Businesses have to adapt this challenge and create opportunities to integrate sustainability in their goals. This paper provides a brief review of the relevant literature capturing the recent advances in sustainability oriented innovation in business, based on a bibliometric analysis and a systematic review of the highly cited papers indexed by the Web of Knowledge database. The research highlights the links between knowledge, innovation and sustainability in business. The results of this research expand the conceptual background of business sustainability and unveils future research directions in the light of opportunities created by knowledge and innovation.

Key words: Business, Sustainability, Knowledge, Innovation, Systematic Literature, Network Analysis

JEL classification: M1, D8, O3

INTRODUCTION

The first attempt of making sustainability visible was in the 1987 Brundland report as “Sustainable development seeks to meet the needs and aspirations of the present without compromising the ability to meet those of the future”. This statement linked sustainability and development, a causality that continues to impact today’s economic decisions. The report also highlights the role of MNCs in sustainable development in the context of dependence on foreign capital in developing countries and the countries ability to negotiate with MNCs secure terms regarding their environmental concerns. Environmental protection through economic and regulatory measures innovatively applied in businesses placed them in the forefront of the industry and led to the development of new processes, products and hence to competitiveness. The changing social and environmental realities require building up technical capabilities in business to ensure globally shared knowledge for a mutual understanding, resulting in willingness to share resources equitably (UN. Secretary-General & World Commission on Environment and Development, 1987).

Even if MNCs are mentioned in the Brundland report with knowledge and innovation contribution to sustainable development, the general focus is concentrated in the macroeconomic field. There is a limited number of papers that assessed sustainable business models potential to create sustainable development. This paper aims to explore the research landscape on sustainability applied in business through innovation and knowledge.

This paper uses a dynamic literature review method called ‘Systematic Literature Network Analysis (SLNA) which combines systematic literature review and bibliographic network analysis (Strozzi et al., 2017). The aim is to map and evaluate the body of literature, identify potential research problems, and highlight the boundaries of knowledge in an uncovered area where research is required (Tranfield et al., 2003).

METHODOLOGY

Data collection for this paper was carried out using Web of Science database, one of the most popular databases for up to date knowledge on a certain topic or other fields.

This paper uses a dynamic methodology, a systematic literature network analysis which is a method of combining bibliometric analysis with literature review.

Technological, economic and social developments in recent centuries have made scientific research an essential component of progress. Researchers contribution to the community is mainly in the form of publications, with their research efforts eventually being recognised if their ideas are validated. In order to avoid effort duplication, it is necessary to study the globally state of knowledge at the present level (Rădulescu, 2019).

The main collection of articles in the Web of Science (WOS) database was consulted for the SLNA and the following equation was used: Topic "knowledge" and Topic "innovation" and Topic "sustainab*" and Topic "business". For this selection, it was generated a number of 1819 results from Web of Science Core Collection, with publication years between 1994-2022.

The set of selected papers for this research was a number of 30 highly cited papers from the Web of Knowledge database. It was considered that highly cited papers reflects the most accurate landscape of the topics in a systematic literature review. The second phase of the procedure includes a network analysis relying on objective bibliometric analysis from co-occurrences of keywords to co-citation networks using Vosviewer software. Bibliometric analysis is a computer-assisted scientific review methodology that can identify basic research or authors and their relationship by covering all publications related to a given topic. Initially bibliometric analysis was mainly based on author or citation information and examined their intellectual flow and most influential publications. In the advanced stage of bibliometric analysis today, network analysis and sociometric analysis based on titles, keywords and abstract data have been adopted (Bellis, 2009). Bibliometric analysis uses data to measure the "output" of individual authors, institutions and countries, to identify national and international networks, and to map the development of new multidisciplinary fields(Han, 2020). The popularity of bibliometric analysis in business research can be attributed to the advancement, availability and accessibility of bibliometric software such as VOSViewer and Web of Science databases for the purpose of manipulating large volumf scientific data to obtain information for high-impact research (Donthu, Kumar, et al., 2021).

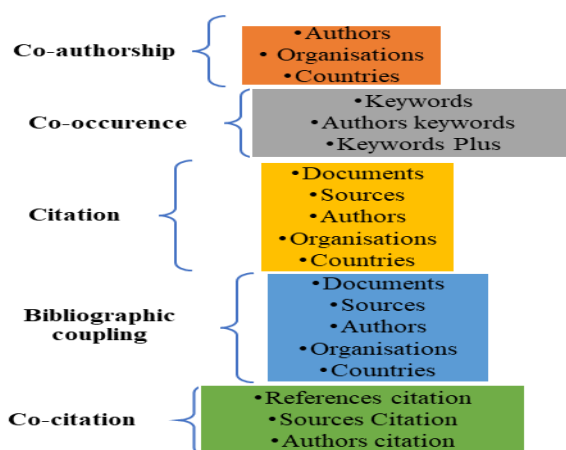


Figure 1. Types of bibliometric analyses performed with VOSviewer

Source: processed by author

SYSTEMATIC LITERATURE REVIEW

Facing the global challenges of the 21st century, businesses require infusing sustainability into their core business strategies. Sustainability integrated into a business generates competitive advantages because of the innovation practices generated. A holistic cognitive approach in business supports open innovation, which uses internal, but also external knowledge in a dynamic environment (Di Vaio et al., 2021). In the present, one of the most globally significant trends is

digitalisation, that will lead to disruption in the life on individuals, in businesses, technologies and networks. A convergent transformation across industries it's expected, in sectors like energy (carbon considerate and decentralised smart grids), transport (autonomous vehicles connected via cyber-physical systems), and communication (online and harvested for data), but not only (Fielke et al., 2020). Businesses realised they have to adapt their products using multiple strategies to increase the number and impact of eco-innovations as a way to achieve competitive advantage. The open innovation activities are a driver of eco-innovation performance (Xu et al., 2002).

Given the importance of sustainability practices to a company's survival, incorporating targeted sustainable measures into a company's strategy is likely to provide a competitive advantage. At the intersection of economic development, environmental protection, and social responsibility, corporate sustainability is attained. As a result, corporate sustainability management is a deliberate and profit-driven corporate reaction to environmental and social challenges produced by the organization's operations (Martinez-Conesa et al., 2017). Changes on one level (product, process, or organizational) are accompanied by changes on another level. Eco-design at the product level, for example, necessitates local sourcing and manufacture, which can result in more secure supply chains overall. Business sustainable strategies begin to rebuild the entire business model on the triangle of environmental, social, and economic elements. It is critical that businesses are put in a position to recognize these innovation potentials at all three levels (Klewitz & Hansen, 2014).

Some authors emphasize the link between circular and sustainable business models, believing that sustainability is an intrinsic part of the circular business model concept. This supports the authors prior findings that some conceptualizations of circular business models emphasize sustainability (Geissdoerfer et al., 2020). Organizations employ a variety of techniques to boost the volume and effect of eco-innovations as a means of gaining a competitive edge. Investigating the role of open innovation activities, particularly those related to market sources, as a driver of eco-innovation performance in part of the business innovation. While previous research has looked at the relationship between these two emergent innovation phenomena in broad terms, whether specific market information sources—clients, suppliers, competitors, and consultants—and their combined use—have an impact on eco-innovation performance (Sanchez-Henriquez & Pavez, 2021).

All present and future stakeholders are interested in sustainable business practices because they help to ensure the business's long-term health and survival, as well as the economic, social, and environmental systems that it supports. Many businesses are facing with the contradiction of shifting their focus away from financial performance and toward strategic performance, which includes social and environmental sustainability. As essential consequences of company sustainability, there are two performance metrics that must be examined. The first is financial viability, or the organization's ability to meet its current and future needs. The second is social sustainability, which includes meeting people's needs and maintaining healthy social ties (Fernando et al., 2019).

Companies that want to be sustainable must include such issues into their daily operations and plans, resulting in long-term good impacts for society. As a result, understanding the primary factors for eco-innovation adoption stands out as a key topic, both theoretically and empirically. Although some of the drivers for eco-innovation adoption may overlap with innovation drivers, they are unlikely to have the same strong influence on the same variables (Bossle et al., 2016).

It could be argued that traditional techniques of measuring market performance are insufficient to capture the success dynamics of items made using an environmentally sustainable strategy, i.e. green products (also known as eco-friendly or environmentally sustainable products). Green products have the ability to provide long-term advantages, alleviate consumer stress, and improve customer environmental responsibility while retaining their beneficial characteristics (de Medeiros et al., 2014). To the classic business model innovation approach, circular economy business model innovation adds a greater goal orientation. While the goal of business model innovation is to improve a company's ability to grab opportunities in its environment with the resources it has, inventing a circular economy business model requires that the end result be an improvement based on circular economy concepts. The resource flow techniques of slowing,

narrowing, and closing resource flows provide guidance on what is needed to improve circular economy in a business model innovation, but they ignore the business model's fundamental purpose: producing, delivering, and collecting value (Ranta et al., 2021).

Environmental preservation and organizational performance improvement have become two of the highest concerns for business and society as a foundation for achieving sustainable development in countries and regions. In this context, new systems are being developed to assist businesses in formalizing and using industrial ecological knowledge in the workplace. As a result, the idea of environmental knowledge has arisen to characterize the interaction between the firm and those systems that connect environmental-related data sets, their analysis, and people for the firm's and society's benefit (Martinez-Martinez et al., 2019). Sustainability principles are used as criteria for business model design in sustainability-oriented business model innovation, which adds complexity to the traditional process. It aims to contribute positively to the environment and society in addition to delivering superior customer value to create competitive advantage and capture economic value (Pieroni et al., 2019).

The direct implications address company-level impacts on their immediate and direct environment, as they relate to the specific innovation concept. (Endl et al., 2021) Eco-innovation is viewed as a broad concept that provides direction and vision for pursuing the societal reforms required for long-term sustainability. Technological eco-innovation is identified as critical to encouraging long-term growth and company innovation, specifically low-carbon energy technology. These are technologies targeted at lowering greenhouse gas (GHG) emissions, energy consumption, and environmental impacts, as well as technology devoted to reshaping the global energy system (Albino et al., 2014). Decentralized decision-making architectures enable practitioners to become closer to new technologies, customers, and markets. This can apply to both procedural (e.g., identifying work packages) and substantive concerns (e.g., procedures for obtaining overall project direction agreements) (Konietzko et al., 2020).

Digitalization, or the socio-technical process of implementing digital advancements, is becoming more common. Big data, the internet of things (IoT), augmented reality, robots, sensors, 3D printing, system integration, ubiquitous connectivity, artificial intelligence, machine learning, digital twins, and blockchain are all examples of digitalization phenomena and technology. Agriculture, as well as connected food, fiber, and bioenergy supply chains and systems, is projected to be profoundly transformed by digitalization, with early indicators of transition already obvious (Klerkx et al., 2019). New technology is changing corporate strategy and innovation capabilities while expanding manufacturing and process innovation possibilities. This process of change is currently being accelerated by supply chain collaboration for sustainability (Chen et al., 2017).

Artificial Intelligence (AI) gained interest in the last fifty years. As a result, AI must be defined as a system's ability to function intelligently in ever-larger areas, accurately interpreting external inputs and applying these teachings to achieve specified aims and activities through a flexible configuration. In this respect, artificial intelligence (AI) is distinct from the Internet of Things (IoT) and Big Data. This tendency may assist businesses in establishing a link between innovation and sustainability. Because it fosters economic growth, the business sector is at the heart of strategies for reaching the United Nations Sustainable Development Goals for 2030. In reality, businesses of any size or production specialization can benefit (Di Vaio et al., 2020). Also, Sustainable Product eService Systems have a lot of potential for delivering social well-being and economic development while staying within our planet's constraints. They are difficult to design, test, implement, and mainstream. (Vezzoli et al., 2015). The literature on sustainable business models (SBMs) also classifies the various types of SBMs accessible (Ludeke-Freund et al., 2018).

In today's globally competitive economic world, corporations are increasingly integrating products and services. Both product and service suppliers are affected by this problem. Integrating product and service offers has the potential to increase efficiency, which can benefit industry and society economically and environmentally (Reim et al., 2015). To stimulate and foster the adoption of the circular economy on a micro level, comprehensive understanding of building circular business models is required. Existing knowledge contains a number of well-developed and validated

frameworks for business models, design patterns, and tools for developing a business model (Lewandowski, 2016). Sustainability is a management trend that has become increasingly significant in today's business strategy. Sustainability's ability to become more dynamic and integrated with strategies, making it into a corporate asset, has yet to be investigated. This adaptive process is evident in creative approaches. There is, however, a misalignment between these practices and the organization's strategies and capabilities (Amui et al., 2017).

Businesses are increasingly expected to develop innovations that balance economic, environmental, and social aims in order to comply to the concept of sustainable development (sustainable innovations). However, accomplishing this goal is not easy, and while various research have attempted to expand understanding of sustainable innovation, there is a lack of systematic organization of existing data. The most promising innovations in the new era are Internet and communication technologies, blockchain in the food supply chain, and other Industry 4.0 applications, as well as approaches that redefine how we consume food (for example, lab-grown meat, plant-based meat alternatives, and the valorization of a wide range of bioresources). There is also a pressing need to use social marketing to better identify attitudes, perceptions, and barriers that influence consumer and agrifood industry behavior change. As a result, this shift will aid in the adaptation to new norms produced by the COVID-19 epidemic, where there is a huge knowledge gap for decision-making (Galanakis et al., 2021).

RESULTS

Bibliometric analysis was made using the VOSViewer software, using data from the Web of Science database. This section aims to present a more detailed analysis of the results. The software used for this analysis was VOSviewer, a software tool for building and visualizing bibliometric networks. It allows the creation and visualisation of statistics in the form of analysis type by analysis unit, like: co-occurrence by author keywords, bibliographic coupling by sources, co-citation by cited authors etc. Using VOSviewer software, maps based on bibliographic data such as co-authorship, keyword co-occurrence, citations, bibliographic coupling and co-citation were created. For the data normalisation, LinLog/modularity method was used. As it is shown in the figure below, the main keywords in the scale of occurrences are innovation, sustainability knowledge and business which are also keywords of this paper, part of the equation used to determine the database used, but there are also terms like: management, knowledge management, performance, technology, impact, entrepreneurship, collaboration, strategy, firms, perspective, systems, capabilities, sustainable development and business model innovation that also assess the level of research. The items are organised into 4 clusters, each of them concentrated to a keyword with a large number of occurrences.

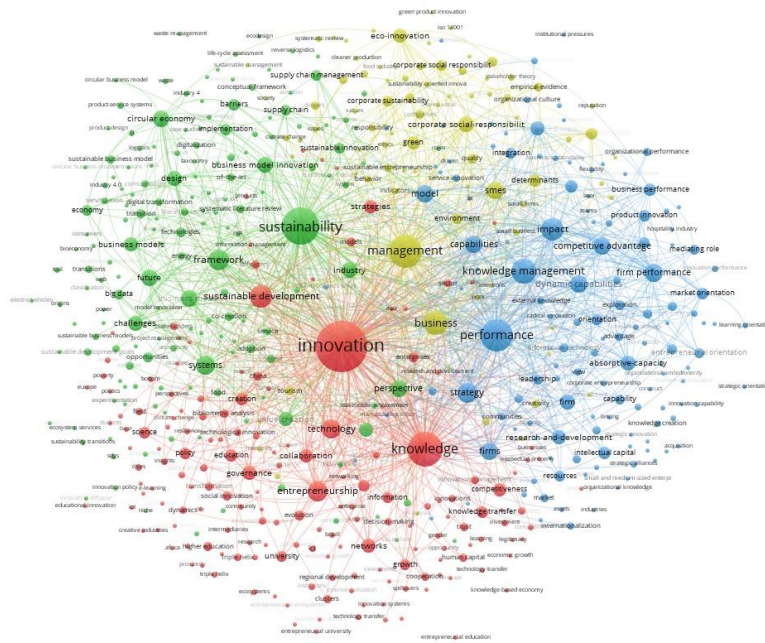


Figure no. 2. Co-occurrence of Keywords Plus
 Source: Web of Knowledge database, processed with VOSviewer

Analysing bibliographic coupling by countries using the full counting method, resulted in 65 countries that meet the minimum number of 5 documents per country. The scores regarding average citations by documents weights shows that Italy, England, Germany, Australia, Portugal and India have the most research on the paper subject.

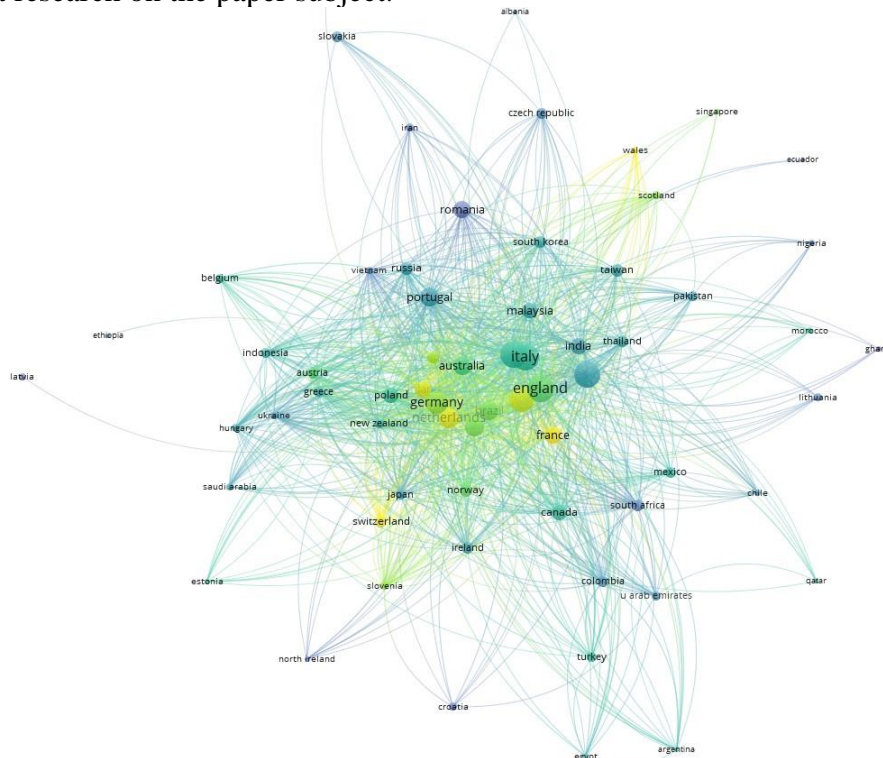


Figure no. 3. Bibliographic coupling by countries
 Source: Web of Knowledge database, processed with VOSviewer

To assess the interest of researchers on this particular subject was used the number of publications over the years as shown in the figure below.

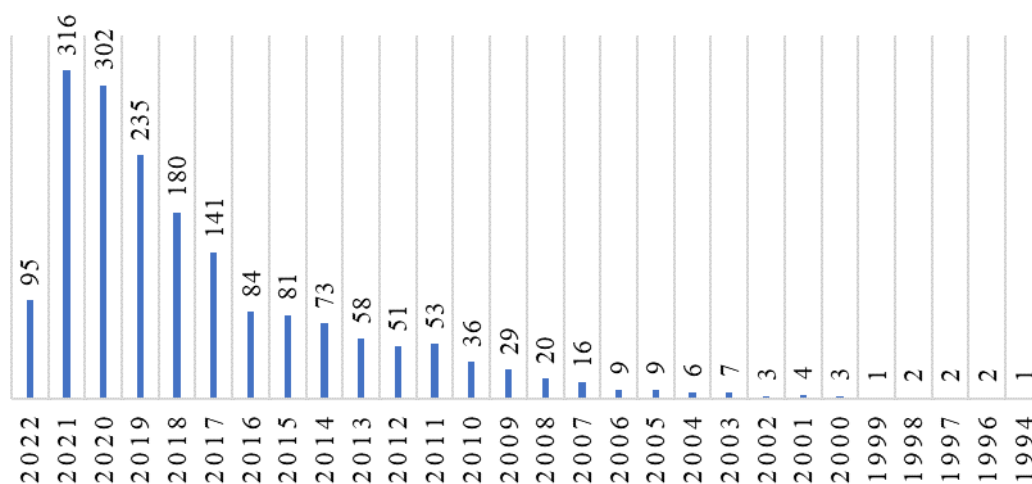


Figure no. 4. Number of publications between 1994-2022

Source: Web of Knowledge database

CONCLUSIONS

The purpose of this paper is to depict the evolution of the scientific literature that has developed on the concept of sustainability linked to business, and how they generate innovation and knowledge. The research used a dynamic methodology called systematic literature network analysis that combined a Systematic Literature Review of 30 highly cited papers on this matter with the analysis of bibliographic networks. The systematic literature review was very complex because of all the new terminology linked to sustainability and business and future research is needed to analyse the impact of each one in the business strategy for success. The bibliometric analysis underlined a growing interest for sustainability applied in business.

FUTURE RESEARCH DIRECTIONS

Future research directions may include different categories of businesses, by their dimensions: SMEs, MNCs, and entrepreneurial businesses to study the impact of different capabilities and access to knowledge and innovation in each category.

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