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Systematic Review

Exploring the Potential of Open Innovation for Co-Creation in Entrepreneurship: A Systematic Literature Review

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Abstract: In recent years, the concept of open innovation has garnered interest among companies due to its potential for generating new models and practices. This study aimed to explore the potential of open innovation for co-creation in entrepreneurship. To achieve this, a systematic literature review (SLR) was conducted, analyzing 53 scientific articles from the Scopus and Web of Science (WOS) databases. The analysis focused on the characteristics related to co-creation and open innovation, the actors involved in these processes, the strategies employed, and the benefits and challenges encountered. The results revealed that: (a) co-creation and open innovation activities enable entrepreneurs to expand their knowledge base through collaboration with diverse stakeholders; (b) the strategies implemented by entrepreneurs have been beneficial in promoting innovation and the creation of shared value, particularly in the development of technologies and new markets; (c) despite recognizing the importance of this collaboration, there are still challenges to be addressed to maximize the advantages of co-creation and open innovation, such as resource scarcity and collaboration skills. Therefore, this study aimed to provide value to entrepreneurs, organizations supporting entrepreneurship, decision-makers, and the community at large in designing programs and mechanisms that foster co-creation and open innovation competencies.

Keywords: co-creation; entrepreneurship; open innovation; systematic literature review; business education; COVID-19

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1. Introduction

Open innovation has driven significant changes in business, society, and the economy in recent decades. It has emerged as a key driver of transformation for the entrepreneurship sector, which requires flexibility and rapid adaptation through innovation (Saura et al. 2023). This need for adaptation was further heightened by the recent COVID-19 crisis, when small and medium-sized enterprises (SMEs) were compelled to alter their business models and explore new opportunities through collaboration with other stakeholders (Portuguez Castro and Zermeño 2021a). As SMEs navigate the challenges imposed by the COVID-19 pandemic, they must embrace the concept of open innovation and seek strategic partnerships to enhance their potential for success.

The COVID-19 pandemic has had a profound impact on SMEs worldwide. The various effects have included significant disruptions to their operations and financial stability (Endris and Kassegn 2022), as well as detrimental impacts on their businesses. These impacts have resulted in reduced sales revenue, disrupted supply chains, diminished customer demand, financing difficulties, imperfect management systems, and insufficient market competitiveness. These factors collectively exacerbated their vulnerability during the crisis (Rahman et al. 2022). In response, SMEs have been compelled to adapt their business models not only to survive but also to thrive in these unprecedented times. Therefore, the opportunities offered by open innovation and co-creation with strategic partners

warrant analysis to identify strategies that can enhance the potential of entrepreneurial ventures.

The role of entrepreneurship in driving regional development is widely recognized. Entrepreneurship is defined as the identification and exploitation of opportunities (Shane and Venkataraman 2007). Also, entrepreneurship is the process of identifying, creating, and pursuing opportunities to bring novel ideas and innovations to the market. Schumpeter (2000) highlighted the significant contribution of entrepreneurs in generating innovative concepts that not only transform industries, but also drive substantial changes in the market. However, in today's interconnected and swiftly evolving environment, the realm of entrepreneurial success surpasses individual brilliance (Omisakin et al. 2016). Instead, it mandates the incorporation of open innovation and co-creation principles. By embracing these strategies, entrepreneurs collaborate with a diverse range of stakeholders, pooling their collective knowledge to foster advancements across various disciplines (Wada et al. 2020). Through leveraging external expertise, market insights, and collaborative networks, entrepreneurs augment their capacity to rapidly adapt to shifting dynamics.

1.1. Open Innovation and Cocreation

The concept of open innovation refers to a paradigm focused on developing new products and services through both the internal and external exchange of ideas. Collaborative innovation involves sharing resources, knowledge, and skills among various stakeholders, including companies, start-ups, strategic suppliers, expert customers, local authorities, public and private laboratories, schools, universities, and NGOs (Allal-Chérif et al. 2023). The concept of open innovation was coined as a new paradigm that came to replace the previous closed innovation approach. With this new focus, ideas can come from within or outside the company, considering that access to knowledge has been expanded thanks to the internet, with the possibility of establishing valuable relationships with universities, the government, and other organizations (Chesbrough 2002). This paradigm shift implies that research and development departments can acquire new knowledge, integrate external expertise, and use technology to strengthen intellectual property and drive their own business model, creatively combining internal and external knowledge to create new products and services.

According to Chesbrough (2020), open innovation can occur in two directions: outside-in and inside-out and can be either business-to-business (B2B) or business-to-consumer (B2C). Regarding these processes of open innovation, four dimensions are identified (Chesbrough 2014). The first is the nature of the external actor, referring to the type of collaborator, which can encompass suppliers, clients, competitors, non-profit organizations such as universities or research centers, governments, and individuals. The differences among these agents can lead to variations in the incentives and coordination of collaboration. The second dimension is the topology of the relationship with external parties, which can involve a single partner, a network of multiple contacts, or a community. As for the third dimension, it concerns the impetus for collaboration, which can stem from upper management (top-down) or through collaboration among employees or customers (bottom-up). Lastly, there is the locus of innovation, which can take two approaches: a bidirectional one wherein two agents separately undertake innovation efforts and subsequently share them, and an interactive one wherein the outcomes of innovation emerge from collaborative activities involving all parties.

On the other hand, the concept of open innovation 2.0 has emerged, aiming to harness the benefits of open innovation to maximize resources and social capital utilization. This approach places special emphasis on the idea that all actors within the innovation ecosystem should share experiences, information, and best practices (Curley and Salmelin 2018). This type of collaboration allows for the development of a set of skills, expertise, and knowledge that benefit the participants. Innovation is defined as the adoption and creation of something new that adds value to those who adopt it (Baldwin and Curley 2007). This innovation is sustainable if the growth of companies is decoupled from resource

consumption and socio-environmental impact, achievable through the appropriate use of technologies to address social challenges (Curley and Salmelin 2018). Despite the recognized importance of open innovation, there is still a need to understand how companies can effectively implement this type of innovation (Evald et al. 2021). This concept is like the idea of co-creation, where a process of developing a new product or service occurs, and participants contribute to a task initiated by the company (Roser et al. 2009). Thus, this study aimed to identify how entrepreneurial ventures can utilize open innovation and co-creation to foster their growth.

The term co-creation is related to collaboration between different agents. This concept was popularized by Ramaswamy and other collaborators, who define it as the practice of developing a company's products or services in collaboration with customers, executives, employees, and other stakeholders to create value (Ramaswamy and Gouillart 2010). According to Ramaswamy and Ozcan (2014), the co-creation process requires:

- Involving stakeholders in jointly creating value and expanding how the company relates to value creation and resources.
- Designing platforms where environments of interaction among individuals, processes, and artifacts can be developed to enhance co-creation efforts and generate mutually valuable outcomes.
- Recognizing that value is subjective and varies based on individual experiences and participants' interests.
- Harnessing the capabilities of individuals within social and business communities to generate new co-creative value generation capabilities.
- Building ecosystems of capabilities with other sectors, both private and public, to expand wealth and well-being in the economy and society at large.

Its significance lies in the fact that companies have realized they can expand their knowledge base by interacting with other market actors for product and service development (Pokojski 2020; Adamides et al. 2021). While co-creation and open innovation are sometimes used interchangeably, a review of these concepts reveals a distinction: co-creation refers to collaborative innovation involving individual external contributors who bring their expertise and knowledge, while open innovation refers to the integration of diverse agents, which can be individual collaborators or organizations, participating in business innovation projects (Tekic and Willoughby 2018). Understanding how these strategies can drive the growth and competitiveness of entrepreneurial ventures is particularly relevant for supporting business decision making and guiding future research.

The benefits of collaboration among different actors have been previously studied. A systematic literature review explored the relationship between companies, academia, and governments through a triple helix (Burbridge and Morrison 2021). These authors identified that, due to the globalization of the economy, environmental concerns, and the development of a knowledge society, innovation partnerships have evolved. However, they also identified the need to comprehend the barriers that arise in these processes. Some of these barriers include a lack of trust (Wyrwich et al. 2022), resource availability (Audretsch et al. 2023), and the protection of knowledge from competitors (Pokojski 2020). On the other hand, in the case of SMEs, it is necessary for them to be open to collaboration to innovate and capitalize on the value of their innovations (Heidemann Lassen et al. 2020). In this context, this research aimed to uncover the potential for success that co-creation and open innovation strategies offer to entrepreneurial ventures.

1.2. Embracing the Co-Creation and Open Innovation Paradigms

Open innovation and co-creation are crucial elements in driving success and fostering innovation in today's competitive business landscape. By embracing open innovation and co-creation, businesses can tap into a diverse range of perspectives, ideas, and expertise from both internal and external stakeholders (Vadana et al. 2021). In regard to open innovation and business networks, corporations have long recognized the importance of open innovation in driving growth and staying ahead of the competition. In recent

years, there has been a shift towards a more open innovation paradigm, where companies are actively engaging with external partners, such as customers, suppliers, and even competitors, to create and share knowledge (dos Santos et al. 2018). By collaborating with external stakeholders, companies can gain access to a wider pool of ideas, expertise, and resources. This collaborative approach not only increases the speed and efficiency of innovation processes but also enhances the quality of the final product or service.

The relationship between open innovation and disruptive technologies is interconnected and mutually reinforcing. This connection facilitates the rapid exchange of ideas and information, breaking down traditional barriers between organizations and enabling global-scale collaboration (Wei and Li 2021). Several instances of business innovation that have embraced co-creation and innovation can be found in international companies.

An example can be observed in the electric car industry, where Tesla, Inc. has embraced an open innovation policy. Within this policy, the company has made its patents accessible to anyone interested in designing and constructing electric vehicles (Tesla Inc. 2018). Tesla's move to open its patents exemplifies innovation and co-creation within international corporations (Fukawa et al. 2021). By granting other companies unrestricted access to their patented technology, Tesla cultivates a collaborative environment that fosters innovation and expedites the advancement of electric vehicles (Li et al. 2023). This open-source approach benefits not only Tesla by creating new opportunities for collaboration and partnership but also the entire industry by propelling the widespread adoption of carbon-free technology.

In a similar vein, Toyota also recognized the value of open innovation and followed suit by releasing its patent portfolio of hydrogen fuel cell technology. This strategic move by Toyota demonstrates their commitment to driving innovation and advancing the adoption of alternative fuel vehicles (Visser 2020). By making their patent portfolio freely available, Toyota is encouraging other companies to develop and improve upon their hydrogen fuel cell technology. The decision by both Tesla and Toyota to embrace open innovation and share their intellectual property signifies a shift in the traditional approach to intellectual property rights (Wellings et al. 2021). Rather than hoarding their patents and fiercely protecting their technology, these companies recognize the importance of collaboration and knowledge sharing in driving industry-wide progress.

In the consulted literature, there exists a knowledge gap. Although the significance of corporate collaboration through open innovation and the co-creation of knowledge to foster innovation is acknowledged, a deeper understanding of how to execute it effectively is still required, considering existing barriers such as a lack of trust and access to collaboration networks. This study sought to investigate the main characteristics of the ventures engaging in these practices, stakeholders involved, and primary strategies employed, as well as to identify the benefits and challenges they encounter.

The specific objectives of this study were to: describe the characteristics related to co-creation and open innovation and the actors participating in these processes, identify the main strategies used by ventures to foster co-creation and open innovation, and recognize the observed benefits and challenges in ventures implementing these practices. To achieve these objectives, empirical cases found in the scientific literature were analyzed, aiming to identify the most relevant aspects that can guide future applications and research related to the analyzed topics. The method of analysis is detailed in Section 2, Research Methodology.

This study is considered relevant as it seeks to identify gaps, determine trends, and report on the progress made in this field in recent years, especially in the context of the COVID-19 pandemic and the opportunities it presents for ventures in the so-called "new normal". It may be of interest to entrepreneurs, organizations supporting entrepreneurship, and decision-makers and serve as a basis for empirical studies on the implementation of these strategies.

2. Research Methodology

To carry out this study, a systematic literature review (SLR) was employed as the method to identify the potential of co-creation and open innovation in the field of entrepreneurship. This approach allows the identification and extraction of relevant information on subjects of interest from the existing literature and is used to recognize, analyze, and interpret the available information within a specific time frame in a research domain (Ramírez-Montoya and García-Peñalvo 2018). Such literature reviews have been widely used in the field of entrepreneurship, and in the case of the proposed analysis, which examined the relationship between open innovation and co-creation, few studies with this focus were found. To conduct the literature review, the methodology proposed by Kitchenham and Charters (2007) was chosen. This methodology involved analyzing topics related to entrepreneurship, open innovation, and co-creation and identifying the main gaps that would enable the formulation of research questions. The steps followed to achieve the objective of this research were: (1) planning, (2) implementation, and (3) reporting. Some examples of previous studies that have used this methodology are those conducted by Dvouletý et al. (2020), Ramírez-Montoya and García-Peñalvo (2018), and Portuguez Castro and Zermeño (2021a).

2.1. Planning

Initially, a thorough examination of the literature encompassing the domains of entrepreneurship, open innovation, and co-creation was undertaken. This comprehensive literature review aimed to pinpoint existing gaps within the body of knowledge. Through this initial review, a significant insight emerged: the imperative to delve into the mechanisms through which entrepreneurial ventures can optimally harness the advantages offered by open innovation and co-creation. This imperative arose from the recognition that despite the promising potential of these approaches, barriers to their widespread adoption persist (Evald et al. 2021; Wyrwich et al. 2022; Audretsch et al. 2023). The following research questions were defined:

1. Who can be a partner in an open innovation process?
2. What are the main strategies employed by entrepreneurial ventures to foster co-creation and open innovation in their pursuit of business success?
3. What benefits and challenges have been observed in ventures implementing co-creation and open innovation practices?

To conduct the information search, the Scopus and Web of Science (WOS) databases were reviewed in April 2023, which have been used in previous studies (Portuguez Castro and Zermeño 2021a; Guimarães et al. 2021). Relevant keywords were defined for the study, such as entrepreneurship, co-creation, and open innovation. Additionally, only articles published in English and Spanish from 2019 to 2023 were selected. These articles were selected considering that they were published within the period of the pandemic and thereafter, in order to learn more about the impact it may have had in recent years and whether the study of these concepts has continued to be conducted.

To identify the articles, the following search strings were used:

For Scopus—(TITLE-ABS-KEY (entrepreneur*) AND TITLE-ABS-KEY (“open innovation”) AND TITLE-ABS-KEY (cocreation)) AND (LIMIT-TO (DOCTYPE, “ar”)) AND (LIMIT-TO (LANGUAGE, “English”) OR LIMIT-TO (LANGUAGE, “Spanish”)) AND (LIMIT-TO (SRCTYPE, “j”)) AND (LIMIT-TO (PUBYEAR, 2019) OR LIMIT-TO (PUBYEAR, 2020) OR LIMIT-TO (PUBYEAR, 2021) OR LIMIT-TO (PUBYEAR, 2022) OR LIMIT-TO (PUBYEAR, 2023)).

For WOS—entrepren* and “open innovation” (All Fields) and Article (Document Types) and English or Spanish (Languages) and Social Sciences Citation Index (SSCI) (Web of Science Index) and 2023 or 2022 or 2021 or 2020 or 2019 (Publication Years) and (ALL = (entrepren* and “open innovation” and cocreation)) AND (DT==(“ARTICLE”) AND LA==(“ENGLISH” OR “SPANISH”) AND EDN==(“WOS.SSCI”) AND PY==(“2023” OR “2022” OR “2021” OR “2020” OR “2019”)).

The results showed that, in the case of Scopus, 385 articles have been published since 2005, including 383 on entrepreneurship and open innovation, and only three including the term co-creation. Of the publications, 59% corresponded to the years 2019 to 2023, with a total of 226 publications meeting the search criteria. In WOS, 789 articles have been published since 2005, including those on entrepreneurship and open innovation, and only four including the term co-creation. Of the publications, 72% corresponded to the years 2019 to 2023, with a total of 381 articles meeting the search criteria. Both databases were downloaded into an Excel file and are available in Portuguez Castro (2023).

When reviewing the references using VOSviewer software version 1.16.19, a co-citation network of authors was obtained (Figure 1), where it can be observed that the most influential authors were Chesbrough, Bogers, and Vanhaverbeke. The most cited author was Cooke, with 383 citations.

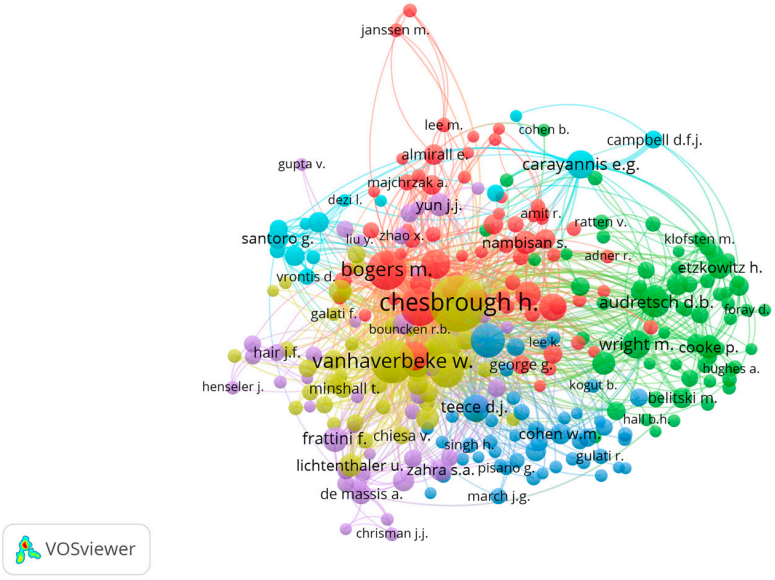

Figure 1. Author co-citation network (2005–2023). Source developed by author with VOSviewer.

The countries that published the most on the topic during the period from 2005 to 2023 were the United States, the United Kingdom, Denmark, and Italy. Figure 2 displays the relationships of the countries that published on the topics of analysis during this period.

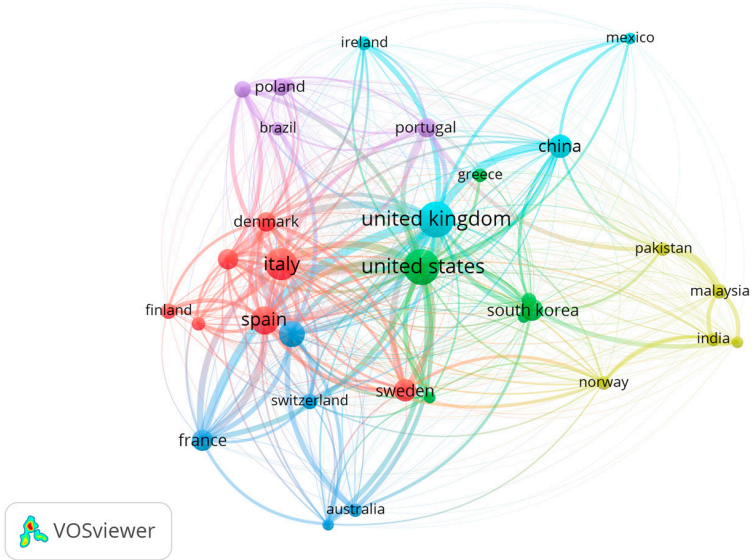

Figure 2. Publications by country (2005–2023). Source developed by author with VOSviewer.

2.2. Implementation

The review process followed the steps established in the PRISMA 2020 statement (Page et al. 2021). The review process is depicted in Figure 3.

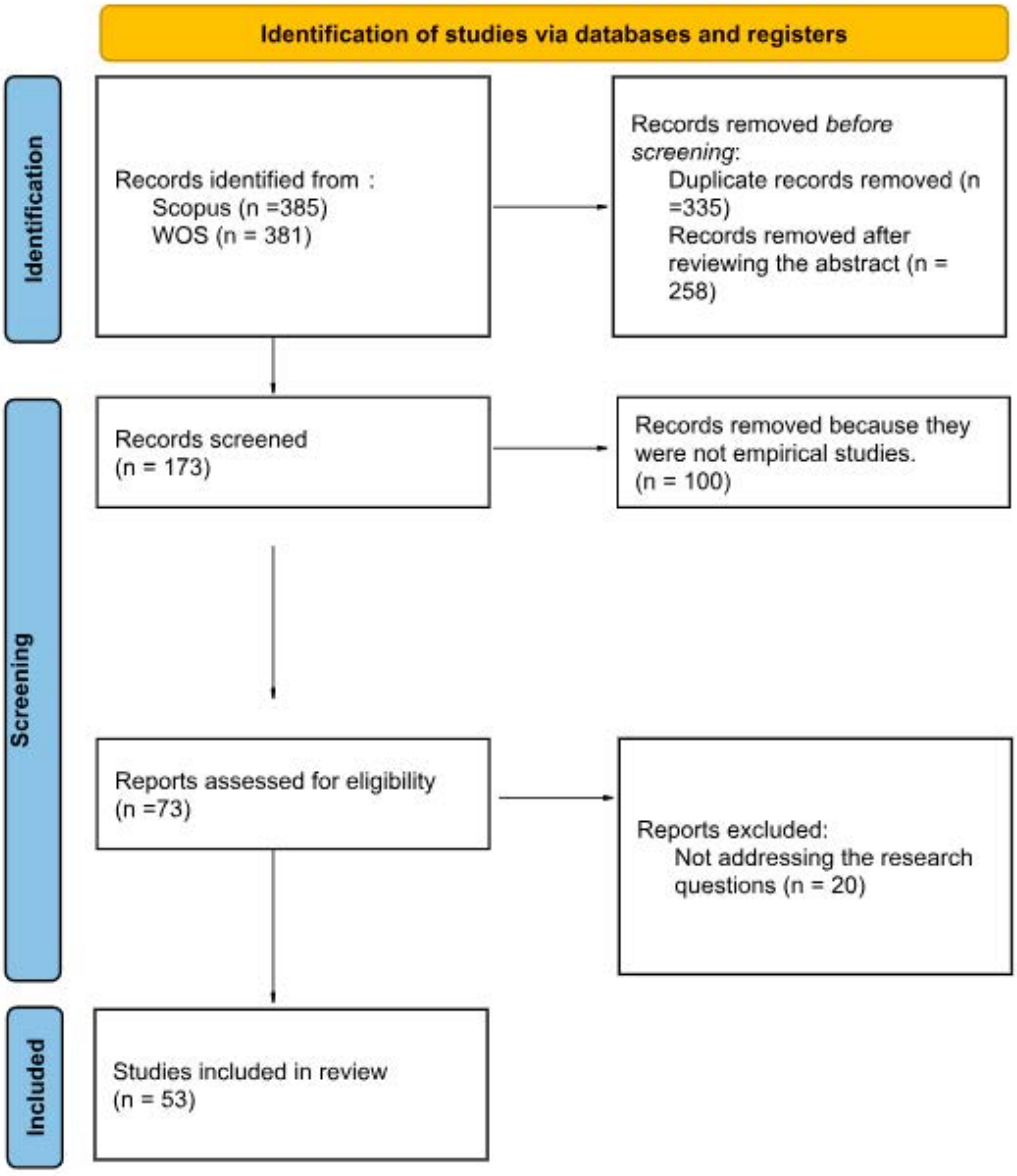

Figure 3. PRISMA 2020 flow diagram. Source developed by author based on Page et al. (2021).

2.2.1. Identification

An initial search following the chain led to the identification of 226 articles in Scopus and 381 in WOS.

2.2.2. Selection

The abstracts of the articles were reviewed to determine their eligibility and relevance in addressing the research questions of the study, resulting in 173 articles. Additionally, it was ensured that the selected articles were empirical studies, and that full-text access was available, leading to the exclusion of 73 articles that did not address the research questions or were bibliographic studies.

2.2.3. Inclusion

In total, 53 articles were included. After the documents were selected, a content analysis was conducted to address the research questions, categorizing the information to support the analysis.

2.3. Reporting

The results of the in-depth analysis of the articles are presented in tables and graphs to visualize the different axes of analysis. Regarding the co-occurrence of keywords, it was found that the most common ones were "open innovation", "performance", "entrepreneurship", "collaboration", "impact", "technology", and "management". Figure 4 shows the keywords. Please see the attachment.

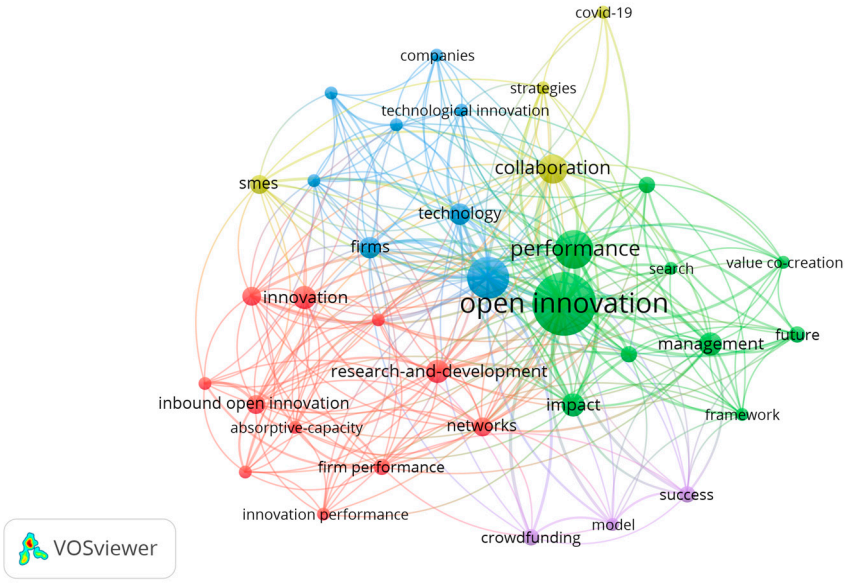

Figure 4. Co-occurrence of keywords (2019–2023). Source developed by author with VOSviewer.

3. Results

The answers to the research questions are presented below based on the analysis of the 53 selected empirical studies from the databases.

3.1. Partners in the Co-Creation and Open Innovation Processes

To answer the question of who can be a partner in open innovation and co-creation processes, initially, the concepts of co-creation and open innovation were reviewed as the theoretical framework underpinning the analyzed research. According to the consulted authors, co-creation is defined as the process through which entrepreneurs cooperate with other actors to create value for stakeholders (Pokojski 2020; Milici et al. 2023). They employ this mechanism to expand their knowledge base and facilitate innovation processes (Secundo et al. 2020). Therefore, innovation is the result of these knowledge-sharing processes and allows for the acceleration of innovation in the participating organizations (Corvello et al. 2023). In this sense, co-creation, combined with open innovation, can yield results of joint value.

According to the analyzed authors, open innovation is defined as the exploitation of external sources of knowledge through internal processes (Torres de Oliveira et al. 2022; Milici et al. 2023) for the development of new products, technologies, or services (D'Angelo and Baroncelli 2020; Adamides et al. 2021; Dantas et al. 2022). This collaboration can encompass knowledge, resources, and skills among different parties, including companies, suppliers, customers, local authorities, universities, and governments (Allal-Chérif et al. 2023). This enables entrepreneurial ventures to obtain resources that they may not possess

but are essential for their development (Leković et al. 2020). It becomes an instrument that facilitates the participation of ventures in the global market.

Among the partners identified, small and medium-sized enterprises utilize open innovation to collaborate and develop relevant innovations during times of crisis. The main actors are depicted in Table 1.

Table 1. Partners in open innovation and co-creation processes.

Partners	Authors
Business partners can be start-ups, entrepreneurs, families, and sustainable businesses	Corvello et al. (2023); Torres de Oliveira et al. (2022); Leković et al. (2020); Xu and Koivumäki (2019); Latifah et al. (2022); Pokojski (2020); Bertin and Mavoori (2022); Liao et al. (2019); Bettenmann (2023); Dameri and Demartini (2020); Rosenow-Gerhard (2021); Leckel et al. (2020); Yun et al. (2019)
Other business and customers	Milici et al. (2023); Dantas et al. (2022); Audretsch et al. (2023); Prijadi et al. (2022); Rauter et al. (2019)
Suppliers and competitors	Adamides et al. (2021); Torres de Oliveira et al. (2022); Allal-Chérif et al. (2023); Dantas et al. (2022); Pokojski (2020); Markovic et al. (2021); Del Sarto et al. (2022)
Universities	Audretsch et al. (2023); D'Angelo and Baroncelli (2020); Secundo et al. (2020); Çubukcu et al. (2020); Milana (2022); Del Sarto et al. (2022); Pokojski (2020); Galvão et al. (2020); Rauter et al. (2019)
Scientific parks and research centers	Torres de Oliveira et al. (2022); D'Angelo and Baroncelli (2020); Çubukcu et al. (2020); Pokojski (2020); Leckel et al. (2020)
Governments, local authorities, NGOs, and entrepreneurial ecosystems	Markovic et al. (2021); Bednář and Danko (2020); Espinoza-Sánchez et al. (2022); Rauter et al. (2019); Portuguez Castro and Zermeño (2021b); Prijadi et al. (2022); Aumuller-Wagner and Baka (2023); Sjödin (2019)
Community networks	Dantas et al. (2022); Audretsch et al. (2023); Prijadi et al. (2022); Dameri and Demartini (2020)

Source: author elaboration.

These elements can be utilized by companies, organizations supporting entrepreneurship, and decision-makers to identify different models of open innovation based on the actors participating in the processes. It is considered interesting to involve various actors from the entrepreneurial ecosystem who can support entrepreneurs with resources, as well as the broader community, customers, partners, and even other competitors.

3.2. Main Strategies

The second question was: what are the main strategies employed by entrepreneurial ventures to foster co-creation and open innovation in their pursuit of business success? Among the main strategies, companies seek to expand their knowledge base; thus, they are willing to seek diverse strategic partners that allow them to develop ideas through collaboration. In this regard, co-creating knowledge with external stakeholders is used to stimulate, facilitate, and develop innovation processes (Secundo et al. 2020).

One of the reasons why open innovation processes are promoted is to collaborate with other actors, especially during times of crisis (such as the COVID-19 pandemic) (Corvello et al. 2023; Markovic et al. 2021; Radziwon et al. 2022). In this context, one of the strategies mentioned most frequently was the transformation of the economic model towards a more sustainable one, which not only aims for the company's continuity but is also oriented towards the advancement of the Sustainable Development Goals (SDGs) and incorporates social and environmental elements (Allal-Chérif et al. 2023; Prijadi et al. 2022; Grama-Vigouroux et al. 2023; Espinoza-Sánchez et al. 2022; Del-Aguila-Arcentales et al. 2022; Naz et al. 2020; Rauter et al. 2019). On the other hand, strategies such as crowdsourcing, which involves seeking ideas or solutions from a large group of people, often facilitated online (Gaofeng 2019; Pohlisch 2020; Taylor and Joshi 2019; Chu et al. 2019); crowdfunding,

which involves raising funds for a project by collecting small contributions from many individuals (Vrontis et al. 2021; Troise et al. 2020); and the development of networking spaces to promote idea sharing (Bednář and Danko 2020; Prijadi et al. 2022), including the use of social networks (Sánchez-García et al. 2022; Latifah et al. 2022; Vrontis et al. 2021), have also been employed.

The analyzed companies have also sought to develop collaborative innovation through interaction with large companies to acquire missing competencies (Corvello et al. 2023; Secundo et al. 2020; Milici et al. 2023; Naz et al. 2020). Additionally, some companies and corporate accelerators associate with start-ups to conduct innovation contests (Bettenmann 2023), and other partners with governments or external competitors to access resources more quickly (Markovic et al. 2021). The primary objective of these interactions is to strengthen their existing knowledge base and exchange knowledge (Torres de Oliveira et al. 2022; Leković et al. 2020), as well as develop platforms that foster value creation and collaboration (Ahsan and Musteen 2021).

Lastly, open innovation is also related to the use of technologies and other collaborative strategies. In this context, companies utilize emerging technologies such as artificial intelligence and big data (Allal-Chérif et al. 2023; Secundo et al. 2020; Çubukcu et al. 2020), as well as circular entrepreneurship strategies (Dantas et al. 2022) and innovation laboratories like living labs and DIY labs (Arndt et al. 2021; Rosenow-Gerhard 2021). The social, organizational, and cognitive proximity of start-ups with other actors is also analyzed as an important factor for successful outcomes in the application of open innovation (Vrontis et al. 2021). These experiences have brought benefits to the companies implementing them, as well as challenges that still need to be addressed to make the most of open innovation and co-creation processes. Some examples of these findings are presented in Table 2.

Table 2. Main strategies in open innovation and co-creation.

Strategies	Authors
Transformation of the economic model	Allal-Chérif et al. (2023); Prijadi et al. (2022); Grama-Vigouroux et al. (2023); Espinoza-Sánchez et al. (2022); Del-Aguila-Arcentales et al. (2022); Naz et al. (2020); Rauter et al. (2019)
Crowdsourcing, crowdfunding, and networking	Gaofeng (2019); Pohlisch (2020); Taylor and Joshi (2019); Chu et al. (2019); Vrontis et al. (2021); Troise et al. (2020)
Use of emerging technologies	Markovic et al. (2021); Audretsch et al. (2023); Secundo et al. (2020); Gaofeng (2019); Prijadi et al. (2022); Pokojski (2020); Bettenmann (2023)
Interaction with other companies, governments, and competitors	Allal-Chérif et al. (2023); Secundo et al. (2020); Çubukcu et al. (2020)
Social capital	Vrontis et al. (2021)

Source: author elaboration.

These strategies can be considered by entrepreneurs and decision-makers to establish programs that facilitate interaction among different actors, contributing to the success of entrepreneurs in developing innovative ideas. The synergy that can be achieved through these strategies can bring significant benefits, fostering a more entrepreneurial ecosystem. Therefore, understanding the challenges faced can help mitigate risks and promote knowledge co-creation.

3.3. Benefits and Challenges of Co-Creation and Open Innovation Practices

Regarding the question of what benefits and challenges have been observed in entrepreneurial ventures implementing co-creation and open innovation practices, engaging in co-creation and open innovation activities allows entrepreneurial ventures to gain benefits that foster knowledge generation. Among the primary benefits is the improvement of communication and trust with other stakeholders (Torres de Oliveira et al. 2022; Allal-Chérif et al. 2023). This pertains to reinforcing connections with suppliers, clients,

and essential collaborators to achieve shared goals. Cooperative endeavors facilitate the exchange of information and assets, leading to cost reduction and heightened effectiveness for all participating entities. Another benefit is the creation of networking relationships that facilitate innovation development (Sánchez-García et al. 2022; Espinoza-Sánchez et al. 2022; Rosenow-Gerhard 2021; Chu et al. 2019) in formal and informal ways (Del Sarto et al. 2022; Arndt et al. 2021). Through open innovation, SMEs can also foster a culture of continuous learning and improvement. This entails actively seeking feedback and insights from external partners, as well as embracing a mindset of experimentation and adaptation.

Moreover, it enables them to access resources, ideas, knowledge, and information, as well as funding from other involved actors such as larger companies, research institutions, and governmental organizations (Markovic et al. 2021; Audretsch et al. 2023; Secundo et al. 2020; Gaofeng 2019; Prijadi et al. 2022; Pokojski 2020; Bettenmann 2023), and expand their network, validating their business ideas (Dameri and Demartini 2020; Leckel et al. 2020). Open innovation offers a solution by enabling SMEs to leverage the expertise, networks, and resources of their partners, empowering them to overcome the challenges they face.

Other benefits are related to the synergy among actors (Bednář and Danko 2020). This is presented when different individuals or entities work together, as the combined effort produces a greater result than the sum of their individual efforts. The development of social creativity through knowledge combination was also highlighted; Secundo et al. (2020) suggested that combining different perspectives and insights can foster social creativity, resulting in new and inventive ways of approaching challenges. Moreover, other researchers have identified positive effects concerning product sustainability and innovation (Leković et al. 2020; Markovic et al. 2020; Milana 2022; Del-Aguila-Arcentales et al. 2022). This could involve the integration of environmentally friendly practices, the optimization of resource utilization, and the generation of novel ideas for products that align with current market trends and consumer preferences. Open innovation also fosters new ways of understanding customer needs (Dantas et al. 2022; Prijadi et al. 2022); collaboration in research and development (D'Angelo and Baroncelli 2020); and mutual value creation for participants in these processes (Milici et al. 2023). Additionally, it stimulates creative ideation and idea proposals for new business models (Bednář and Danko 2020; Prijadi et al. 2022).

Further benefits are evident in the development of employee competencies (Taylor and Joshi 2019), where working in collaborative environments can contribute to enhancing employees' skills, knowledge, and capabilities by exposing collaborators to new learning opportunities. Obtaining funds through social networks involves leveraging their extended networks to obtain financial support through collaboration from various sources, including partners, investors, or collaborators (Vrontis et al. 2021; Troise et al. 2020). Collaboration can also contribute to fostering social capital, entrepreneurship education, and technological knowledge, among other things (Yoon et al. 2021; Vrontis et al. 2021; Troise et al. 2020). Collaborative efforts mutually benefit organizations and expose them to innovative business practices and technological knowledge. Regarding internationalization, these processes aid in rapid and early market commercialization on a global scale (Leković et al. 2020; Zahoor et al. 2022) and serve as instruments for the development of global policies (Leckel et al. 2020), given the promotion of social, technological, and organizational proximity. A synthesis of the main benefits of open innovation and co-creation for entrepreneurial ventures found in the 53 consulted articles is presented in Table 3.

Table 3. Main benefits of open innovation and co-creation.

Benefits	Authors
Improvement of communication and trust	Torres de Oliveira et al. (2022); Allal-Chérif et al. (2023)
Leveraging knowledge from actors within the ecosystem	Sjödin (2019); Galvão et al. (2020)
Access to ideas, knowledge, information, and funding	Markovic et al. (2021); Audretsch et al. (2023); Secundo et al. (2020); Gaofeng (2019); Prijadi et al. (2022); Pokojski (2020); Bettenmann (2023)
Impact on product sustainability and innovation	D'Angelo and Baroncelli (2020); Leković et al. (2020); Markovic et al. (2020); Milana (2022); Del-Aguila-Arcentales et al. (2022)
Market penetration in the global market	Leković et al. (2020); Zahoor et al. (2022)

Source: author elaboration.

Regarding challenges, the main barriers are related to obtaining resources in a timely manner (Markovic et al. 2021) and facing financial obstacles. This includes funding shortages or difficulties in securing necessary financial support (Milici et al. 2023; Del-Aguila-Arcentales et al. 2022). Additionally, there are limited resources for the global market (Dantas et al. 2022; Leković et al., 2020); the scarcity of resources available for the global market can constrain collaborative ventures. This could involve insufficient access to diverse resources needed for international expansion. Insufficient investment in research and development (Milici et al. 2023; Latifah et al. 2022) can hamper collaborative innovation. Inadequate funding for research and innovation can limit the development of novel ideas. Furthermore, time constraints restrict the thorough exploration and execution of collaborative projects (Xu and Koivumäki 2019; Milici et al. 2023); a lack of co-working skills such as communication and coordination can hinder successful partnerships (Latifah et al. 2022); and the absence of collaboration platforms (Grama-Vigouroux et al. 2023) is identified as a hurdle because effective tools and platforms are necessary for streamlined communication and cooperation among collaborators.

Other challenges are associated with the need for a change in mindset (Dameri and Demartini 2020). This refers to the challenge of shifting traditional ways of thinking and operating to embrace the concepts of collaboration and open innovation. In this sense, organizations need to adapt their mindset to accommodate new collaborative approaches. Fostering interdisciplinary research (Aumuller-Wagner and Baka 2023) implies promoting and facilitating research that crosses disciplinary boundaries. This requires breaking down silos and encouraging collaboration between different fields to drive innovation. Encouraging entrepreneurs to be less directive and more oriented towards innovation and change involves moving away from traditional top-down approaches and embracing openness to new ideas and change. Overcoming the necessity of generating intellectual property licenses (Milana 2022; Ratten 2019) presents the challenge of navigating intellectual property issues when collaborating with external partners. This could involve complexities around ownership, sharing, and protecting intellectual property in collaborative ventures. Additionally, the challenge of training employees to acquire knowledge from external partners (Markovic et al. 2020) is an additional obstacle that has been found. This requires developing the skills and mindset necessary for successful knowledge exchange in collaborative settings. A synthesis of the main challenges found in the 53 consulted articles is summarized in Table 4.

Understanding the benefits and challenges is crucial to motivate entrepreneurs to engage in collaborations with other actors and to mitigate the effects of challenges faced by other entrepreneurs in these processes. These benefits and challenges can be utilized by those designing incubation and acceleration programs to prepare entrepreneurs for a more open mindset in sharing knowledge, as well as for those providing training to large enterprises to encourage knowledge-sharing experiences.

Table 4. Primary challenges for open innovation and co-creation.

Challenges	Authors
Resource scarcity: financial barriers, limited resources for the global market.	Torres de Oliveira et al. (2022); Milici et al. (2023); Del-Aguila-Arcentales et al. (2022)
Low investment in R&D, intellectual property licenses, need to enhance research.	Dantas et al. (2022, p. 23); Latifah et al. (2022); Milana (2022); Ratten (2019); Aumuller-Wagner and Baka (2023)
Training for open innovation, lack of co-working skills, orientation towards innovation and change.	Markovic et al. (2020), Grama-Vigouroux et al. (2023), Latifah et al. (2022)
Absence of collaboration platforms, idea generation.	Grama-Vigouroux et al. (2023)
Time limitations.	Xu and Koivumäki (2019); Milici et al. (2023)

Source: author elaboration.

4. Discussion

Open innovation enables enterprises to utilize both internal and external resources to enhance their competitiveness through collaboration with diverse actors. Regarding the first question related to the partners involved in co-creation and open innovation processes, it was found that entrepreneurs utilize these processes to create value and expand their knowledge base. They can use these learnings to develop new products, services, and technologies, thereby generating advantages for the participating actors. As shown in Table 1, this collaboration can occur with various stakeholders, including other companies, customers, partners, suppliers, and even competitors. Moreover, there are benefits associated with engaging with diverse actors in the entrepreneurial ecosystem, such as universities, scientific parks, government entities, and the community at large. According to the research by Secundo et al. (2020), collaborating with other actors helps improve innovation and develops existing competencies. However, authors like Grama-Vigouroux et al. (2023) suggested that there is still a need to develop platforms that promote networking and further develop skills to optimize these interactions. Entrepreneurs and organizations supporting entrepreneurship can consider these factors to facilitate the creation and development of collaborative spaces and networking among different actors.

Open innovation strategies should focus on enabling enterprises to expand their knowledge base. Regarding the second question related to the main strategies employed by entrepreneurial ventures to foster co-creation and open innovation in their pursuit of business success, it was found that entrepreneurs seek external collaborators that enable them to develop ideas towards more transformative business models, placing special emphasis on the SDGs. On the other hand, the creation of networks and the acquisition of skills, resources, and technologies that are not currently available hold significance, aiming to strengthen an environment of collaboration and the creation of shared value. As depicted in Table 2, the key strategies utilized for co-creation and open innovation include transforming the economic model, crowdsourcing, crowdfunding, and networking, as well as interacting with other actors to develop competencies, technologies, and social capital. As per Leković et al. (2020), such interaction reinforces enterprises' knowledge base and facilitates information exchange to obtain resources that favor innovation. Furthermore, the actors interacting with entrepreneurs can also benefit from this interaction by sharing knowledge with new companies (Rosenow-Gerhard 2021). The strategies employed by entrepreneurs can be considered by program designers for entrepreneurship development, ecosystem members, and decision-makers to enhance the benefits of shared knowledge in innovation and development.

The processes of open innovation and co-creation have proven to be beneficial for entrepreneurs and participating actors. Regarding the third question related to the observed benefits and challenges of implementing open innovation and co-creation practices, it was found that greater knowledge, funding, and synergy among actors were obtained, fostering the development of new ideas that have an impact not only on the companies but also on other participants and society. As shown in Table 3, the benefits of co-creation and open

innovation include improved communication and trust, the better utilization of knowledge from ecosystem actors, obtaining ideas, impacting sustainability, and accelerating market entry on a global scale. As emphasized by Naz et al. (2020), the awareness of open innovation involves the combination of technologies and markets that are considered essential elements for developing a sustainable and innovative business model. These findings can motivate entrepreneurs to increase their confidence in sharing knowledge with other actors and encourage other stakeholders to take an interest in developing collaborations to make the most of co-creation opportunities.

Despite the benefits found in this study, there are challenges that hinder the widespread development of these processes. As indicated in Table 4, the main challenges still involve resource scarcity, a lack of instruments to protect intellectual property, insufficient coworking skills, and a shortage of collaboration platforms. Authors like Markovic et al. (2020) state that it is necessary to provide training to individuals to equip them with skills that facilitate obtaining knowledge from external partners. Encouraging interdisciplinary research can also aid in overcoming these challenges (Aumuller-Wagner and Baka 2023), as well as fostering collaboration spaces (Arndt et al. 2021). These challenges can be considered by actors in the entrepreneurial ecosystem, such as universities and research centers, to design programs that strengthen collaboration and develop coworking competencies and collaborative spaces like living labs or innovation laboratories.

5. Conclusions

The objective of this study was to identify how entrepreneurs can utilize open innovation and co-creation to foster their growth. It was found that through open innovation, entrepreneurs collaborate with other actors to obtain resources such as knowledge, information, and technologies that they lack, thus generating new products and services. Among the main strategies, entrepreneurs seek to expand their knowledge base through collaboration, using multiple mechanisms to exchange knowledge that fosters value creation for the participants.

Regarding the benefits, co-creation and open innovation processes have been advantageous for participants. Some of these benefits pertain to enhanced communication and trust among other stakeholders, including suppliers, customers, and collaborators. Additionally, a culture of ongoing learning and improvement is cultivated, embracing a mindset of experimentation and adaptation. It was also noted that processes like crowdfunding facilitate access to resources and information typically associated with larger companies, thereby expanding networks for idea validation, although there is still resistance to change and hesitancy in information sharing.

Other obstacles include the scarcity of funds, which can impose limitations on international expansion and investment in research and development (R&D). Time constraints for executing collaborative projects and a deficiency in skills such as communication and coordination are also challenges that must be confronted. Addressing these challenges requires continuing to foster co-creation spaces where diverse types of actors, including customers, employees, partners, competitors, governments, and the entrepreneurial ecosystem can be integrated. Reducing barriers to open innovation is considered beneficial to fully leverage the advantages of knowledge sharing and promote an innovative mindset.

As implications for practice and research, these results demonstrate that in recent years, co-creation and open innovation are processes that should continue to be carried out and researched for their effects on local and global economies. Empirically measuring the impact of these collaborations will be of great value in replicating best practices and addressing the challenges faced in collaboration. In this sense, measuring these collaborations and their effects will allow us to develop a roadmap to enhance practices and reduce the obstacles that arise in these joint aid processes. Furthermore, the ongoing application and study of co-creation and open innovation will enable us to understand how these collaborations unfold in the real world, thus uncovering valuable insights and practical knowledge that can drive progress and innovation.

However, some limitations exist, such as not all studies describing the steps followed in co-creation and open innovation processes and this study being limited to reviewing articles from the two analyzed databases; hence, this study was not intended to be exhaustive. Nevertheless, it is considered useful for identifying case studies in different contexts and serving as a basis for similar research. For future studies, it is suggested to investigate in more detail the successful strategies and practices employed by entrepreneurs and other actors involved in generating innovative ideas. Additionally, developing strategies to facilitate channels for co-creation and open innovation by decision-makers and policymakers in entrepreneurship is recommended.

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