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Interinstitutional Collaborations in Open Innovation and Sustainability: An Integrative Literature Review

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ABSTRACT

In the face of worsening environmental, social, and economic challenges faced globally, the demand for innovative solutions that promote a more sustainable development model is growing. In this scenario, open innovation has emerged as a compelling model for fostering collaborations among universities, companies, and governments, thereby generating shared value. Recent literature highlights the importance of collaborative and interinstitutional approaches to overcome the limitations of traditional innovation models. However, barriers related to asymmetry of interests, regulatory gaps, and complexity in knowledge management among heterogeneous institutions persist. In view of this, this study seeks to analyze interinstitutional collaborations in open innovation and their relationship with sustainability, through an integrative literature review. The methodology adopted involved the selection and analysis of eight articles indexed in the Web of Science database, based on the keywords “Open Innovation”, “Sustainability” and “Collaborative Networks”. The results indicate that open innovation can strengthen sustainable practices by promoting knowledge flows between different actors, but its effectiveness depends on overcoming regulatory, technological and organizational obstacles. It is concluded that, although inter-institutional collaborations are promising in promoting sustainability, advances in public policies, collaborative governance and management of technological diversity are still needed to expand their impact.

INTRODUCTION

In the face of intensifying environmental, social, and economic challenges faced globally, the demand for innovative solutions that promote a more sustainable development model is growing. In this context, open innovation has emerged as a relevant model to stimulate collaborations between different actors, such as universities, companies, and government, in order to generate shared value. According to Chesbrough and Bogers (2014), open innovation involves the use of internal and external knowledge flows to accelerate innovation and expand markets for external use of innovation. Its relevance in the field of sustainability lies precisely in its ability to foster articulations that enhance the adoption of sustainable technologies and practices.

In addition, the growth of literature focused on sustainability indicates the need for collaborative and interinstitutional approaches as a way to respond to the limitations of traditional innovation models. According to Carayannis and Campbell (2010), the construction of networks between universities, companies and governments can enable innovations that are more aligned with social and environmental needs. However,

despite evidence that collaboration favors the creation of sustainable solutions, barriers persist such as the asymmetry of interests, regulatory obstacles, and the risks associated with knowledge sharing between heterogeneous institutions.

For this reason, this study aims to analyze interinstitutional collaborations in open innovation and their relationship with sustainability. To this end, an integrative literature review was carried out, based on the analysis of publications indexed in the Web of Science database. The choice for this method allowed us to gather different empirical and theoretical perspectives, in order to understand the main advances, gaps and challenges related to the theme.

LITERATURE REVIEW

Innovation, as an engine of economic and social development, has been central to several theoretical models that seek to explain contemporary transformations. Schumpeter (1934) already pointed out that economic progress depends on the “creative destruction” generated by disruptive innovations. Since then, several authors have broadened the understanding

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of the innovative phenomenon, incorporating the idea of national innovation systems and emphasizing the importance of interaction between institutional agents to strengthen a country's innovative capacity (Freeman, 1995; Lundvall, 1992; Nelson & Winter, 1982).

These conceptions have evolved to incorporate sustainability as a cross-cutting axis of innovation policies. The integration between economic development, social responsibility and environmental preservation has guided the formulation of strategies aimed at sustainable innovation. The most recent models have been trying to incorporate these elements into collaborative ecosystems in which different institutions — companies, universities, and governments — share responsibilities and resources in search of sustainable solutions. In this scenario, innovation ecosystems emerge as dynamic arrangements that connect heterogeneous actors in co-creation networks, (Cai & Amaral, 2021; Luengo & Obeso, 2013). De Matos *et al.* (2024) reinforce this argument by arguing that the complementarity between the models expands the institutional response capacity to the challenges of sustainable development. The effectiveness of these partnerships also depends on the implementation of collaborative governance models, in which different actors share responsibilities and make decisions together. Collaborative governance can promote the transparency, legitimacy, and responsiveness of social innovation initiatives (Ansell & Gash, 2007).

In this aspect, as a complement, we have open innovation, which emerges as an evolution of these models, based on the intentional sharing of knowledge across organizational boundaries. According to Nascimento *et al.* (2023), open innovation is characterized by the expansion of knowledge flows between internal and external agents in organizations, promoting collaborative environments aimed at generating joint value. This logic breaks the limits of closed innovation and allows for greater agility and diversity in the solutions developed.

Santos *et al.* (2024), on the other hand, investigate the impact of social innovation initiatives on urban communities. Her work demonstrates how collaboration between third sector organizations and private companies can generate creative solutions to complex problems, such as digital inclusion and access to green technologies. This case reinforces the need to build social and cultural capital to ensure the long-term sustainability of these initiatives.

Similarly, Xiong *et al.* (2022) propose evolutionary models for the diffusion of innovations in digital ecosystems, demonstrating that their effectiveness depends on a fluid articulation between platforms, individuals, and complementers. In parallel, Noor and Pitt (2009) show that, in supply chain management, open innovation can reduce waste and increase environmental efficiency, as long as there are minimum technological capabilities.

On the other hand, the complexity of social and environmental problems requires approaches that recognize the non-linear and unpredictable nature of

these systems. Complexity theory offers a conceptual framework for understanding and managing these contexts, emphasizing the importance of experimentation, adaptation, and continuous learning to deal with ever-changing environments (Snowden & Boone, 2007). This perspective is particularly relevant when considering the role of open innovation in scenarios of uncertainty, in which multiple actors interact with different visions, capabilities, and interests.

Given this theoretical panorama, it is essential to investigate how inter-institutional collaborations operate in practice and how they contribute to the promotion of sustainability. The next section presents the main findings obtained from the analysis of the literature, highlighting the advances, challenges and opportunities involving open innovation in the context of partnerships between universities, companies and government.

MATERIALS AND METHODS

This To analyze how interinstitutional collaborations in open innovation contribute to sustainability, an integrative literature review was conducted, aiming to gather and synthesize empirical and theoretical studies on the subject. The integrative review was chosen due to its ability to combine results from different methodological approaches, promoting a comprehensive understanding of a complex and multidisciplinary topic.

The search was carried out in the Web of Science database, recognized for its breadth and quality of indexed publications. The search strategy was constructed using three key terms that reflect the core of the research problem: “Open Innovation”, “Sustainability”, and “Collaborative Networks”. These terms were combined using the Boolean operator AND, aiming to filter studies that simultaneously address the three dimensions of interest: the innovation model, the sustainable orientation, and the collaborative and interinstitutional aspect.

The search string used was:

(“Open Innovation”) AND (“Sustainability”) AND (“Collaborative Networks”)

The application of this filter, limited to peer-reviewed articles in English, published in the last 15 years, and available in open access, resulted in a total of 8 articles considered most aligned with the guiding question of this study. The inclusion criteria were:

- The article must address open innovation involving collaboration between at least two distinct institutional agents (e.g., companies, universities, or governments);
- The article must explicitly connect innovation practices to sustainable development or environmental/social sustainability;
- The article must present theoretical models or empirical evidence of collaborative dynamics.

Exclusion criteria included duplicated articles, conference proceedings, or works focused solely on technical innovation without a sustainability perspective.

The 8 selected articles (Xiong *et al.*, 2022; Noor & Pitt, 2009; Durmaz *et al.*, 2021; Li *et al.*, 2019; Obradovic *et*

al., 2021; Vendrell-Herrero & Opazo-Basaez, 2023; Shin *et al.*, 2017; Zhang *et al.*, 2022) compose the analytical corpus discussed in the Results and Discussion section. These studies were examined in-depth to identify common patterns, theoretical contributions, and practical challenges regarding interinstitutional collaboration in open innovation ecosystems oriented toward sustainability.

RESULTS AND DISCUSSION

Open innovation, as a crucial mechanism for promoting sustainability, has been widely discussed in the academic literature. Integration between different actors – companies, universities and governments – is central to addressing economic and environmental challenges, but studies also reveal gaps and challenges that need to be overcome. Next, we analyze the contributions of authors Xiong *et al.* (2022), Noor and Pitt (2009), Durmaz *et al.* (2021), Li *et al.* (2019), Obradovic *et al.* (2021), Vendrell-Herrero and Opazo-Basaez (2023), Shin *et al.* (2017), and Zhang *et al.* (2022), integrating their perspectives into the debate on interinstitutional collaborations for sustainable development.

Xiong *et al.* (2022) explore the diffusion of innovation within open innovation ecosystems, proposing an evolutionary model in five phases: knowledge, persuasion, decision, implementation, and confirmation. They highlight that the sustainability of these ecosystems depends not only on the generation of innovations, but also on their effective dissemination among digital platforms, complementers, and individuals. This approach is particularly relevant in the digital context, where goods and services are often developed in collaborative networks. The study also points out that the lack of research on diffusion processes limits the understanding of how open innovation can be sustained in the long term. Thus, although the proposed model is promising, it requires further empirical investigation to assess its impact on the promotion of sustainable practices.

Noor and Pitt (2009), in turn, focus on the application of open innovation to supply chain management, emphasizing how collaboration between companies and research institutions can optimize logistics processes and reduce waste. They argue that the integration of emerging technologies into production chains not only improves operational efficiency, but also contributes to environmental sustainability by minimizing negative impacts. However, the authors acknowledge that less digitized sectors face difficulties in adopting these collaborative practices. This point converges with the observations of Xiong *et al.* (2022), who also point out challenges related to technological implementation in open ecosystems.

Durmaz *et al.* (2021) introduce the concept of “negative entropy” in sustainable supply chains, suggesting that waste reduction directly depends on efficient integration between different actors throughout the innovation cycle. They argue that collaborative practices can minimize

systemic inefficiencies and promote greater resilience in business operations. However, the authors caution that this approach requires more robust regulatory harmonization to maximize its benefits. This perspective complements the contributions of Noor and Pitt (2009), reinforcing the importance of inter-institutional collaboration to achieve common sustainability goals.

Li *et al.* (2019) investigate the factors that influence technological standardization and sustainability, pointing out that the lack of harmonization between regulations hinders the adoption of shared solutions. This perspective aligns with that of Durmaz *et al.* (2021), who also highlight the need for clearer regulations to encourage knowledge exchange between institutions. Technological standardization is, therefore, a determining factor to enable the expansion of open innovation, but the lack of harmonization between regulations can prevent the adoption of shared solutions on a large scale.

Obradovic *et al.* (2021) point out that in the manufacturing sector, intellectual property protection and data security are barriers that hinder the adoption of open innovation models. This fear of sharing knowledge with other actors can limit the implementation of sustainable solutions on a large scale, preventing companies from maximizing the benefits of interagency collaboration. However, Li *et al.* (2019) argue that these challenges can be overcome by adopting more flexible risk management models, which allow for a balance between security and information sharing.

Vendrell-Herrero and Opazo-Basaez (2023) explore resilience, social capital, and technology in companies, arguing that resilient companies are those that integrate social and technological practices. This integration is crucial for open innovation, as it allows companies to adapt to changes in the external environment and take advantage of opportunities for collaboration. Their perspective suggests that companies that invest in social capital (social networks) and technology (digital tools) are better prepared to innovate openly and sustainably. This study underscores the importance of organizational culture and employee engagement for the success of open innovation.

Shin *et al.* (2017) study the factors that affect the survival of SMEs, with a focus on biotechnology companies. They highlight the importance of access to financial resources, the capacity for innovation, and strategic management to ensure the sustainability of these companies. While the study focuses on biotechnology, its results are relevant to other industries, as they show that open innovation can be an effective strategy for SMEs to overcome their resource limitations and compete in global markets. However, the authors also warn of the risks associated with open innovation, such as the loss of control over intellectual property and dependence on external partners.

Zhang *et al.* (2022) examine the relationship between the technological heterogeneity of partners and innovation in intercompany alliances. They argue that the diversity of knowledge and skills of partners can drive innovation,

but also generate conflicts and coordination difficulties. Therefore, effective management of technological heterogeneity is essential for the success of open innovation alliances. This perspective complements the contributions of Obradovic *et al.* (2021), in suggesting that overcoming barriers to open innovation requires not only more flexible risk management models, but also the ability to manage the diversity of knowledge and skills of partners. Effective coordination between partners with different technological backgrounds can lead to more innovative and sustainable solutions.

Furthermore, leadership plays a decisive role in how institutional actors engage in innovation processes. Studies highlight that transformational leadership styles tend to foster more open and adaptive environments, while authoritarian or passive approaches may hinder

institutional commitment to change and collaborative innovation (Alfozan, 2024).

There is a clear alignment between the studies with regard to the centrality of inter-institutional collaboration to promote sustainability through open innovation. All recognize the crucial role of digital technologies as enablers of these processes, but also highlight specific challenges, such as regulatory gaps (Durmaz *et al.*, 2021; Li *et al.*, 2019), difficulties in spreading innovation (Xiong *et al.*, 2022), and the need to manage technological heterogeneity (Zhang *et al.*, 2022). Additionally, Vendrell-Herrero and Opazo-Basaez (2023) emphasize the importance of social capital and organizational culture, while Shin *et al.* (2017) highlight the specific challenges faced by SMEs. Chart 1 summarizes the main findings according to the literature:

Table 1: Literature Synthesis

Author(s)	Parent Topic	Contributions	Gaps and Challenges
Xiong <i>et al.</i> (2022)	Spreading open innovation	Evolutionary model in five phases	Need for more empirical studies
Noor & Pitt (2009)	Open innovation and supply chain management	Waste reduction and logistics optimization	Difficulties in less digitized sectors
Durmaz <i>et al.</i> (2021)	Negative entropy in sustainable chains	Minimizing inefficiencies and resilience	Lack of regulatory harmonization
Li <i>et al.</i> (2019)	Technological standardization and open innovation	Facilitating the adoption of sustainable solutions	Regulatory barriers
Obradovic <i>et al.</i> (2021)	Open innovation in manufacturing	Impact of intellectual property and data security	Business resistance
Vendrell-Herrero & Opazo-Basaez (2023)	Resilience and open innovation	Importance of social capital and technology	Cultural management
Shin <i>et al.</i> (2017)	SME survival and open innovation	Impact on global competitiveness	Dependence on external partners
Zhang <i>et al.</i> (2022)	Technological heterogeneity and innovation	Diversity of knowledge management	Partnership coordination

The synthesis presented in the table reinforces the relevance of open innovation for the advancement of sustainability, highlighting the main challenges and opportunities identified by the authors analyzed. When comparing different approaches, the importance of aligning technological, regulatory, and organizational aspects to strengthen inter-institutional collaborations and enable sustainable practices on a large scale is observed.

CONCLUSIONS

This study aimed to analyze interinstitutional collaborations in open innovation and their relationship with sustainability. According to the reviewed literature, it is evident that open innovation plays a strategic role in promoting sustainable practices by enabling the sharing of knowledge and resources among various actors within the innovation ecosystem. However, regulatory, organizational, and technological challenges still need to be overcome to increase the effectiveness of these collaborations. The studies analyzed show

that the integration between companies, universities and governments allows significant advances in the implementation of sustainable models. The application of emerging technologies, the standardization of processes, and security in data management were aspects often highlighted as critical factors for the success of these initiatives. In addition, the need to strengthen public policies that encourage open innovation and promote a more harmonized regulatory environment proved to be a recurring point in the literature findings. While inter-institutional collaborations are a promising avenue to accelerate the transition to a more sustainable model, there are still gaps to be explored. Future research can deepen the analysis of the long-term impacts of these partnerships and develop more effective metrics to measure the benefits of open innovation in the context of sustainability. Progress in this area will depend on the alignment between institutional policies, technological advances, and cooperation strategies that favor an environment conducive to sustainable innovations.

REFERENCES

- Alfozan, A. A. (2024). Leadership Dynamics in Organizational Change: An In-Depth Exploration of Public and Private Sectors in Saudi Arabia. *American Journal of Multidisciplinary Research and Innovation*, 3(1), 11–19. <https://doi.org/10.54536/ajmri.v3i1.2393>
- Ansell, C., & Gash, A. (2007). Collaborative governance in theory and practice. *Journal of Public Administration Research and Theory*, 18(4), 543–571. <https://doi.org/10.1093/jopart/mum032>
- Cai, Y., & Amaral, M. (2021). The triple helix model and the sustainability of innovation: A study of public policies and strategies in Brazil and China. *Journal of Cleaner Production*, 287, 125272. <https://doi.org/10.1016/j.jclepro.2020.125272>
- Campana, C. A., Costa Neto, A., Carmo, A. P. F. do, Silva, A. T. P. da, Santos, E. M. dos, Oliveira, E. D. de, Ferreira, H. S., Lima, G. S., Silva, J. A., Fagundes, J. M., Beker, J. C., Sousa, M. Q. de, Rocha, N. L. de S. da, & Silva, E. N. da. (2025). A influência da contabilidade ambiental no desempenho sustentável das empresas: uma revisão sistemática da literatura. *Contribuciones A Las Ciencias Sociales*, 18(3), e16049. <https://doi.org/10.55905/revconv.18n.3-049>
- Carayannis, E. G., & Campbell, D. F. J. (2010). Triple helix, quadruple helix and quintuple helix and how do knowledge, innovation and the environment relate to each other? *International Journal of Social Ecology and Sustainable Development*, 1(1), 41–69. <https://doi.org/10.4018/jsesd.2010010105>
- Chesbrough, H., & Bogers, M. (2014). Explicating open innovation: Clarifying an emerging paradigm for understanding innovation. In H. Chesbrough, W. Vanhaverbeke, & J. West (Eds.), *New Frontiers in Open Innovation* (pp. 3–28). Oxford University Press.
- Durmaz, A., Demir, H., & Sezen, B. (2021). The role of negative entropy within supply chains: A sustainability perspective. *Sustainable Production and Consumption*, 26, 222–233. <https://doi.org/10.1016/j.spc.2021.04.014>
- Etzkowitz, H., & Leydesdorff, L. (2000). The dynamics of innovation: From national systems and “Mode 2” to a triple helix of university–industry–government relations. *Research Policy*, 29(2), 109–123. [https://doi.org/10.1016/S0048-7333\(99\)00055-4](https://doi.org/10.1016/S0048-7333(99)00055-4)
- Freeman, C. (1995). The ‘national system of innovation’ in historical perspective. *Cambridge Journal of Economics*, 19(1), 5–24.
- Li, Y., Guo, H., & Cooper, S. Y. (2019). The influencing factors of the technology standardization and sustainability. *Sustainability*, 11(24), 6930. <https://doi.org/10.3390/su11246930>
- Nayem, S. Z., Khatun, M., & Hossain, M. S. (2024). An Investigation of the Mechanisms of Technology Transfer and Automation in Universities: A Case Study on Promoting Entrepreneurship and Startup Ecosystems at Bangladesh Open University. *American Journal of Education and Technology*, 3(2), 52–69. <https://doi.org/10.54536/ajet.v3i2.2785>
- Noor, M., & Pitt, M. (2009). The application of supply chain management and innovation in facility management. *Journal of Facilities Management*, 7(2), 138–150. <https://doi.org/10.1108/14725960910990035>
- Obradovic, T., Vlacic, B., & Dabic, M. (2021). Open innovation in the manufacturing industry: The role of external knowledge and organizational factors. *Technovation*, 102, 102221. <https://doi.org/10.1016/j.technovation.2021.102221>
- Santos, D. B. dos, Reis, B. D. dos, Souza, C. A. de, Silva, E. N. da, Souza, E. J. A. de, Vilhena, F. A. de F., Ferreira, H. S., Nascimento, J. W. do, Fagundes, J. M., Beker, J. C., Miranda, N. V. de, Santana, R. B. de, Monteiro, S. M. C., Oliveira, T. L. de, & Oliveira, K. de. (2025). Inovação tecnológica na sustentabilidade: uma revisão sistemática sobre o papel das tecnologias verdes na transição para economia circular. *Contribuciones A Las Ciencias Sociales*, 18(1), e14482. <https://doi.org/10.55905/revconv.18n.1-107>
- Schumpeter, J. A. (1934). *The theory of economic development: An inquiry into profits, capital, credit, interest, and the business cycle*. Harvard University Press.
- Shin, K., Park, G., & Choi, J. Y. (2017). Factors affecting the survival of SMES: A study of biotechnology firms. *Sustainability*, 9(1), 108. <https://doi.org/10.3390/su9010108>
- Snowden, D. J., & Boone, M. E. (2007). A leader’s framework for decision making. *Harvard Business Review*, 85(11), 68–76.
- Silva, E. N., Silva, E. F., Silva, F. D. A., Branco, F. A. C., Matos, F. R. P., Beker, J. C., Silva Neto, M., Castro, M. A. A., Miranda, N. V., & Santiago, S. A. (2024). Theoretical models of innovation and socioeconomic development: A comparative analysis between the Triple Helix model and the Sábato Triangle. *IOSR Journal of Business and Management*, 26(7), 12–18. <https://doi.org/10.9790/487X-2607081218>
- Vendrell-Herrero, F., & Opazo-Basaez, M. (2023). Open and social: Portraying the resilient, social, and technological firm. *Journal of Enterprise Information Management*, 36(2), 334–359. <https://doi.org/10.1108/JEIM-06-2021-0279>
- Xiong, B., Lim, E. T. K., & Tan, C. W. (2022). Towards an evolutionary view of innovation diffusion in the digital economy. *Industrial Management & Data Systems*, 122(1), 45–64. <https://doi.org/10.1108/IMDS-11-2021-0686>
- Zhang, S., Li, J., & Li, N. (2022). Partner technological heterogeneity and innovation in interfirm alliances. *R&D Management*, 52(3), 397–415. <https://doi.org/10.1111/radm.12467>