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# Dynamic Governance in Innovation Ecosystems: Proposing a Framework Based on Dynamic Capabilities

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**Abstract:** Governance is a critical coordination system for integrating actors and creating value within innovation ecosystems. Given the conceptual fragmentation of the field and the lack of models that support effective management of such networks, this study aims to propose a governance framework grounded in Dynamic Capabilities Theory. A hybrid review (SLR and Bibliometrics) was conducted following the PRISMA protocol, analyzing 488 high-impact articles published between 2011 and 2025. The results indicate a transition from static models toward management focused on digital transformation and sustainability. A model organized into three pillars: Actors, Methods, and Results, is proposed, featuring Continuous Reconfiguration as its core differentiator. This mechanism allows for proactive adjustments in rules and partnerships according to the ecosystem's maturity and external shifts. The study concludes that governance must act as a mediation tool, ensuring the resilience and socio-environmental impact of innovation ecosystems.

**Keywords:** Innovation Ecosystems; Dynamic Governance; Network Management; Continuous Reconfiguration; Dynamic Capabilities; Systematic Review; Bibliometrics; PRISMA; Collaboration; Strategy.

## 1 Introduction

A nation's socioeconomic progress is closely linked to its capacity to innovate and adapt to societal changes. In a scenario of rapid shifts, competitiveness depends on reorganizing available technologies and competencies to meet market needs, making innovation ecosystems (IE) relevant pathways for boosting regional competitiveness.

IEs are composed of actors, activities, and artifacts, as well as institutions and relationships critical to innovative performance (Granstrand & Holgersson, 2020). These environments are characterized by the strategic interconnection of universities, companies, government, and civil society, where each actor contributes complementary competencies to aggregate collective value.

Rather than a rigid structure, governance functions as a dynamic adjustment process to respond to new challenges (Teece, 2007; Foss et al., 2023). This gives rise to the need for dynamic governance, capable of balancing formal mechanisms (rules and contracts) and relational ones (trust and reputation) to ensure the joint generation of results (Cobben & Roijakkers, 2019). The literature highlights the role of the ecosystem orchestrator (or manager), who is responsible for mobilizing actors and ensuring that individual interests do not override collective goals (Gomes et al., 2022).

Despite its importance, ecosystem governance remains a fragmented field, with a dissonance between theory and practice (Foguesatto et al., 2021). A gap is identified in the integration between the operational and strategic levels. Although studies exist on the composition of these environments, there is a lack of models that unify the role of actors, coordination mechanisms, and strategic objectives. A static view of governance prevails, failing to capture the need for adaptation in high-uncertainty environments (Dhanaraj & Parkhe, 2006). Overcoming this scenario is vital for the ecosystem to develop dynamic capabilities for continuous reconfiguration (Teece, 2014).

Based on this scenario, this article seeks to answer the following research question: How is the scientific production on governance in innovation ecosystems characterized, and how does this knowledge inform the determining factors for effective governance? To further detail this analysis, the study was guided by the following sub-questions (SQs):

(SQ1) How has the scholarly production on this topic evolved over time, and which are the primary journals and authors underpinning the field?

(SQ2) Which countries exhibit the highest research output on the topic, and how are their collaboration networks configured?

(SQ3) What are the core terms and the main thematic clusters that define the field of innovation ecosystem governance in the literature?

(SQ4) How are the research topics classified regarding their maturity, and what trends point toward the determining factors for effective governance?

The general objective is to map the scientific production on the topic to establish the foundation for an effective governance framework. The methodology employs a hybrid approach of Systematic Literature Review (SLR) and Bibliometrics. Bibliometrics introduces quantitative rigor in mapping the field's intellectual structure (Župič & Čater, 2015), while the SLR, conducted under the PRISMA protocol, allows for a deeper qualitative analysis.

Data were extracted from the Web of Science and Scopus databases, applying the ABS (Association of Business Schools) list quality filter to ensure scientific rigor and the international relevance of the sample. The primary contribution of this study is to offer a structure grounded in three pillars: Actors (network composition), Methods (rules and processes), and Results (purpose of cooperation). In practice, the study assists managers in coordinating these environments strategically, thereby enhancing their competitiveness.

## 2 Theoretical Framework

*Innovation Ecosystem and Governance*

National development is linked to the capacity to innovate and the organization of collaboration between the public and private sectors (Freeman, 1995; Lundvall, 1992). The concept of the Innovation Ecosystem (IE) emphasizes interdependence within complex networks, where the value proposition is a collective result of collaboration among heterogeneous actors, such as universities, government, firms, and civil society (Etzkowitz & Leydesdorff, 2000; Carayannis & Campbell, 2009). An IE comprises actors, activities, and artifacts governed by institutions and relationships that determine regional innovative performance (Granstrand & Holgersson, 2020).

However, the literature converges on the understanding that the mere agglomeration of these actors does not ensure the ecosystem's success. Structural flexibility requires a governance configuration that aligns divergent interests (Nascimento et al., 2022). Unlike traditional corporate structures, governance in innovation ecosystems (IE) does not operate through hierarchical control but through interest management and the definition of rules for complementary roles (Autio & Thomas, 2020; Yokomizo et al., 2024).

In this context, governance acts as the management system responsible for transforming informal interactions into a strategic collaboration network (Cobben & Roijakkers, 2019; Foss et al., 2023). Ecosystem efficiency depends on governance that ensures technological infrastructure and trust facilitate value co-creation (Marion & Fixson, 2021; Gomes et al., 2022). This integration allows digital tools to serve as support for process transparency, while relational mechanisms sustain long-term engagement among partners.

As the ecosystem matures, governance evolves from relational mechanisms toward formal monitoring models, ensuring resilience for the IE (Yokomizo et al., 2024). This maturity trajectory requires the manager to possess the capability to reconfigure the ecosystem according to its stage of maturity. While the birth of the ecosystem demands a focus on building bonds of trust, expansion and maturity require more robust processes for managing intellectual property and knowledge flows (Dhanaraj & Parkhe, 2006; Teece, 2014).

Despite this relevance, the topic is still treated in a fragmented manner, showing a dissonance between theoretical models and practical applicability (Foguesatto et al., 2021). The lack of clarity regarding governance capabilities results in disarticulation among the helix members (Van Gestel & Grotenbreg, 2021), leading to overlapping efforts and wasted resources. Thus, the systematization of knowledge becomes essential to map the thematic clusters that define the field and to establish guidelines that connect theory to real management needs (Blasi et al., 2022; Duarte et al., 2021).

In this sense, overcoming a static view of governance requires an approach that accounts for structural adaptability in high-uncertainty environments. Dynamic Capabilities Theory (Teece, 2007) emerges as the ideal theoretical foundation for this integration, as it defines the capacity of an ecosystem to sense opportunities, seize value, and, crucially, reconfigure resources and competencies (transforming). By applying this lens to governance, dynamic capabilities allow the ecosystem to go beyond merely coordinating actors, they enable the sustainment of competitive advantage through the Continuous Reconfiguration of rules and partnerships, ensuring network resilience and evolution in the face of technological and market shifts.

## 3 Methodology

This study employs the bibliometric analysis method supported by a Systematic Literature Review (SLR). This choice is justified as bibliometrics allows for mapping the evolution of the topic and scientific trends through statistical indicators (López & Martínez, 2021). According to Župič and Čater (2015), bibliometric methods complement qualitative reviews by identifying macro patterns in large volumes of data. To ensure rigor and transparency, the process followed the PRISMA protocol (Figure 1), guaranteeing an organized and systematic selection of the corpus (Donthu et al., 2021).

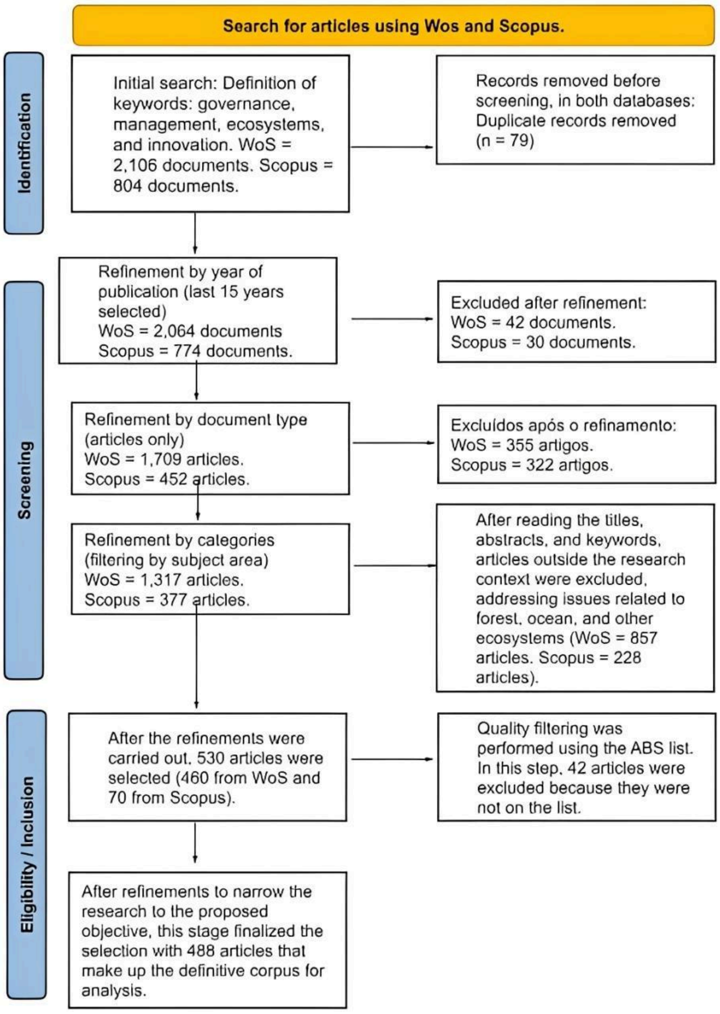


**Figure 1** Article Selection and Inclusion Process (PRISMA)

The SLR was integrated into the data collection as a bridge between quantitative analysis and the foundation of the final model. While bibliometrics organized the field and identified influential studies, the SLR enabled a detailed content analysis to understand theoretical arguments and practical evidence, serving as the basis for the proposed framework's construction. In this stage, the focus was not merely on word counts, but on a close reading to comprehend the theoretical arguments and practical evidence presented by the authors. This systematic review process served as the foundation for developing the model proposed in this article.

Data collection took place in October 2025 across the Web of Science and Scopus databases, selected for their high indexing rigor in the field of Administration (Yokomizo et al., 2024). The search string was structured to capture the intersection between norms and practical execution:

(TITLE-ABS-KEY (governance) AND (management) AND (ecosystems) AND (innovation)). The fifteen-year timeframe (2011–2025) covers the consolidation of global innovation ecosystems.

The sample was limited to peer-reviewed scientific articles. Filters were applied by subject category, followed by a manual analysis of titles and abstracts to exclude contexts outside of organizational management, such as biological ecosystems. A key quality criterion was the exclusive selection of journals listed in the Association of Business Schools (ABS). The use of the ABS list ensures high editorial quality and scientific rigor, eliminating low-impact publications and ensuring that the framework was built upon robust evidence from leading outlets in the field of management and innovation.

## 4 Results and Discussion

*Performance and Impact: Evolution, Journals, and Seminal Articles*

This section presents the results of the bibliometric analysis, organized to answer the main research question and the sub-questions (SQs) of this study, covering production performance (SQ1), social structure (SQ2), and field trends (SQ3 and SQ4). The analysis of the trajectory of Innovation Ecosystem Governance (IEG) demonstrates that the topic has moved from being a secondary variable to becoming a determining factor in the viability of collaborative ecosystems (SQ1). The evolution of publications (Figure 2) reveals three distinct phases. Between 2011 and 2015, production remained latent.

The first inflection point occurred in 2016, intensifying in 2020, signaling that governance has come to be recognized as the central element for the success of ecosystems, requiring practical coordination models (Gomes et al., 2022). The projected peak for 2025 confirms that the field has reached critical mass. The need for efficient mechanisms has surpassed conceptual discussions, focusing now on practical application to ensure strategic resilience (Holgersson et al., 2018; Blasi et al., 2022).

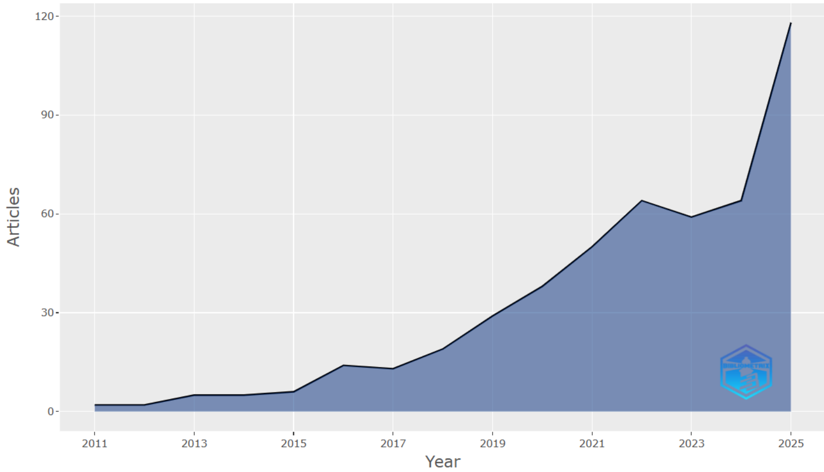

**Figure 2** Distribution of scientific publications by year

Journal productivity (Figure 3) shows a concentration in titles such as Technological Forecasting and Social Change and Technology Innovation Management Review. The data reinforce that IEG is what defines the rules in the ecosystem, transforming isolated contacts into real results (Camboim et al., 2019). A key determining factor identified is the active leadership of the manager, where a focal organization with the authority to mediate conflicts and align distinct cultures between universities and firms is essential (Gupta et al., 2020). Without this clear coordination, the ecosystem degrades into opportunism, where individual interests render co-creation unfeasible (Jin et al., 2025).

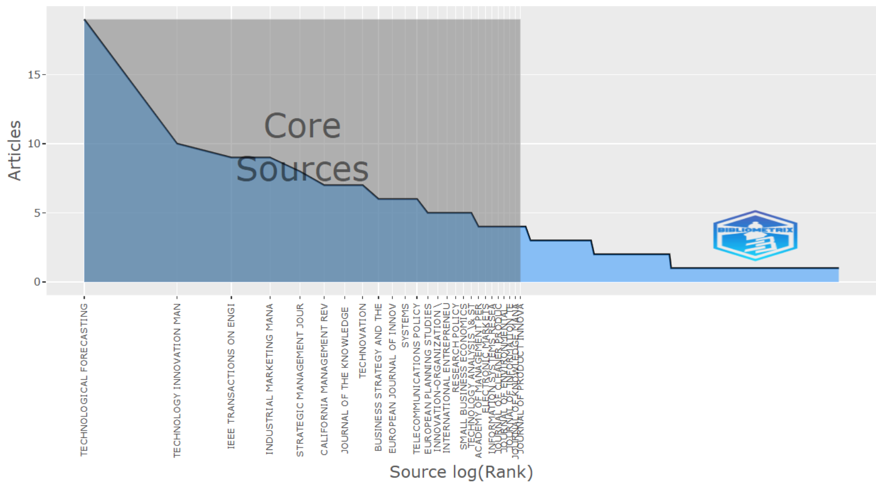

**Figure 3** Productivity of periodicals

Local citation data (Figure 4) reveal that the knowledge base of IEG is sustained by three main pillars. The strategic pillar (Strategic Management

Journal), where success depends on the strategic leadership of the focal entity to design competitive partnerships. The technological pillar (MIS Quarterly, ISJ) defines the technical infrastructure and digital platforms as tools that operationalize and organize interactions. And the sustainability pillar (Research Policy, Sustainability), which determines that governance must align operational efficiency with socioeconomic and environmental impact (Blasi et al., 2022).

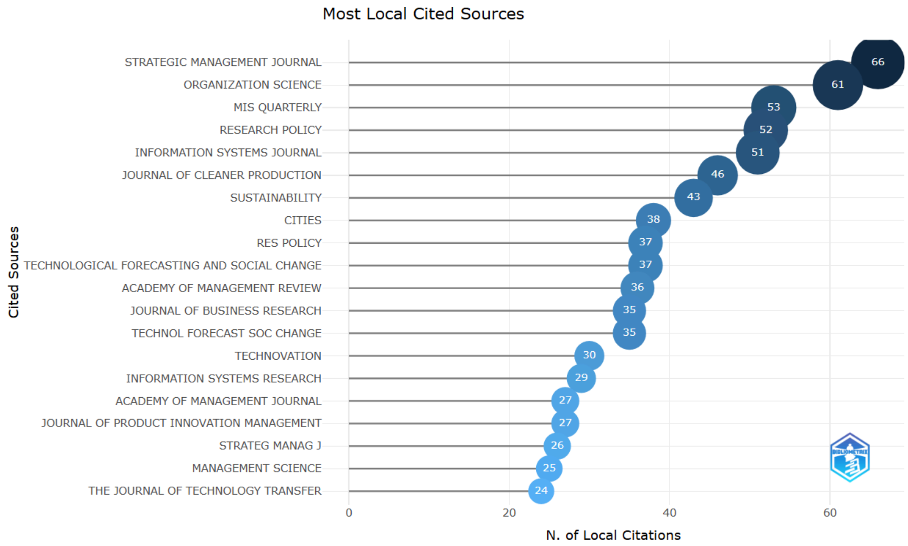


**Figure 4** Most cited local sources

The analysis of the most cited documents, illustrated in Figure 5, consolidates the determining factors for effective governance in innovation ecosystems. According to Marion & Fixson (2021), technological platforms go beyond the role of support tools, positioning themselves as the management mechanism that standardizes and enables collaboration among diverse actors. However, this technical infrastructure must be aligned with strategic guidelines, as Blasi et al. (2022) warn that technology, when implemented in isolation, fails to promote sustainable innovation if it is not accompanied by well-defined coordination mechanisms.

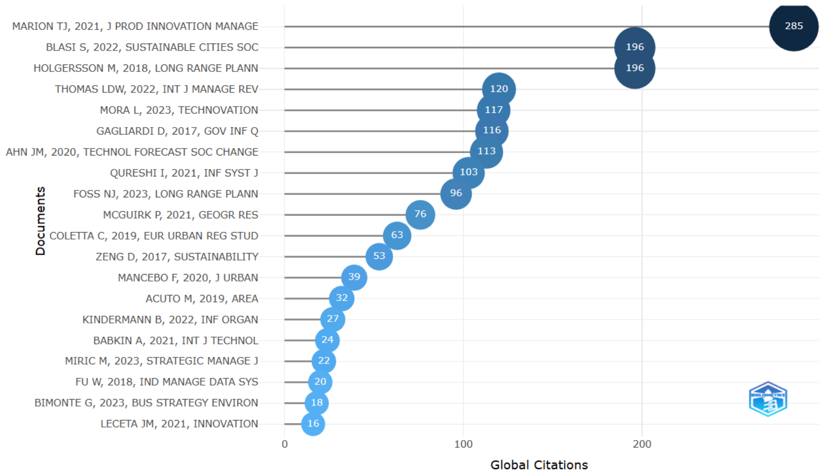


**Figure 5** Distribution of the most cited documents

The literature establishes that successful governance functions as a flexible management model, combining formal tools, such as platform control, with relational elements, such as trust and reputation (Cobben & Roijakkers, 2019). In the practical field, IEG is operationalized through feedback cycles and governmental support, where instruments such as subsidies incentivize collaboration (Ahn et al., 2020). In short, good governance is not a static set of rules, but a dynamic process of managing tensions that transforms the ecosystem into a resilient and results-oriented environment (Miric et al., 2023).

*Social Structure: International Collaboration and Productivity*

Ecosystem governance transcends formal rules, depending on partnerships and the relational dynamics between actors and institutions. This section addresses SQ2 by mapping the knowledge-generating hubs and the connectivity of the global network. The mapping by country (Figure 6) reveals the concentration of research within strategic axes. China leads the global volume (116 articles), followed by the United Kingdom (57), Germany (43), Italy (42), and the United States (40). This configuration confirms Innovation Ecosystem Governance (IEG) as a priority in the innovation agendas of Asia, Europe, and North America.

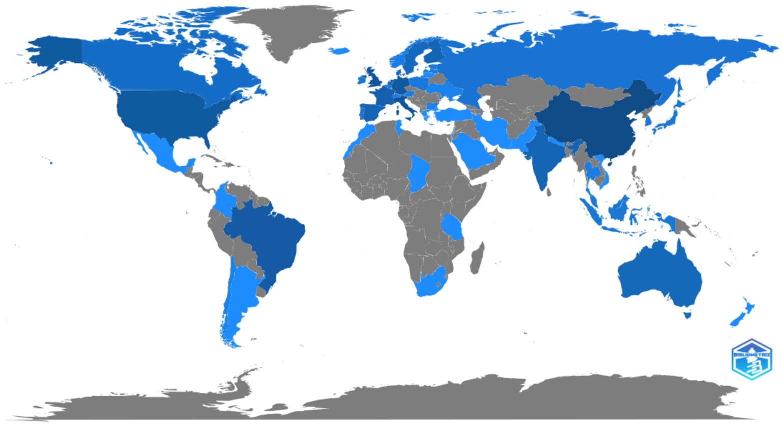

**Figure 6** Scientific production by countries

Brazil holds a prominent position, ranking 6th globally with 35 articles, and leading the research output in South America. This data is a determining factor, indicating a robust scientific community dedicated to adapting management models for emerging economies. The success of an ecosystem depends on its capacity to adapt to local contexts, and international collaboration acts as an engine for sharing practices that attract investment and generate innovation.

Productivity analysis (Figure 7) reveals two distinct models: global networks and agendas focused on the domestic market. While the United Kingdom, Germany, and the USA show high rates of international partnership, China balances strong internal production with high global participation. This differentiation suggests the existence of two strategic orientations: while some hubs prioritize strengthening their internal research to consolidate local innovation capacity, others seek the validation of their models through external collaboration networks and international partnerships.

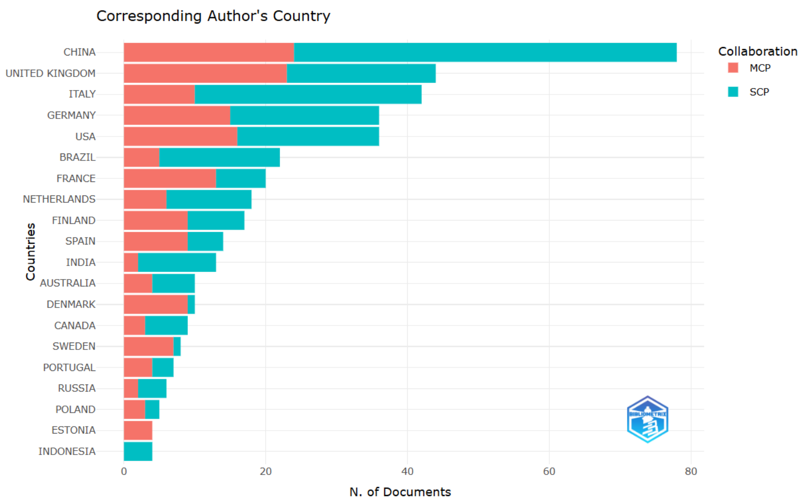

**Figure 7** Most productive countries

Brazil, despite its productivity, maintains a focus on national issues, revealing a strategic opportunity to lead foreign partnerships and validate governance models in other contexts. Smaller countries, such as Estonia, Denmark, and Sweden, depend almost entirely on international collaborations, driven by leading authors who attract networks and disseminate best practices (Marion & Fixson, 2021; Holgersson et al., 2018). Individual analysis verifies whether knowledge is concentrated or distributed (Paul & Dutta, 2023). Figure 8 and Table 1 present the application of Lotka's Law, revealing a highly dispersed production.

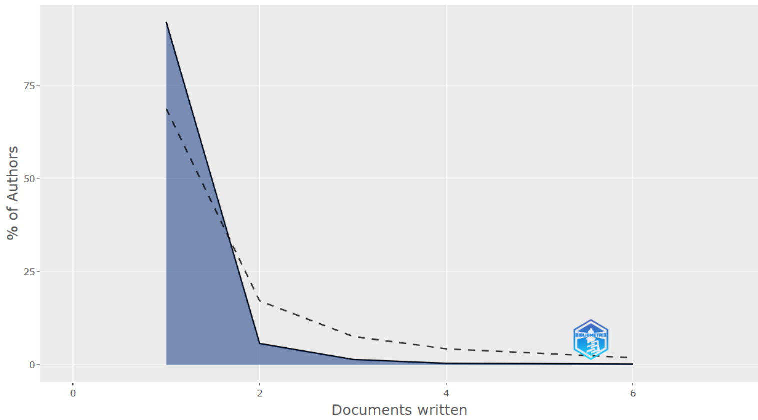


**Figure 8** Frequency distribution of scientific productivity according to Lotka's law

The vast majority of authors (92.2%) have only one publication, indicating that IEG does not yet possess a fixed core of specialists. The field is composed of isolated contributions from areas such as strategy (Foss et al., 2023) and urban sustainability (Blasi et al., 2022), which rarely interconnect. This fragmentation explains the difficulty in establishing a governance model that adapts to different realities; without a continuous reference group, definitions of good governance vary significantly (Barros & Langhi, 2023).

**Table 1** Production according to Lotka's law

| *Written documents* | *Number of Authors* | *Proportion of Authors* |
|---|---|---|
| 1 | 1399 | 0.922 |
| 2 | 87 | 0.057 |
| 3 | 22 | 0.015 |
| 4 | 6 | 0.004 |

| | | |
|---|---|---|
| 6 | 3 | 0.002 |

Source: (Bibliometrix, 2025)

The analysis of the most productive authors (Figure 9) confirms the absence of a dominant leadership; even the most relevant researchers possess a moderate volume of documents (a maximum of six articles). Asian authors (Chen Y, Li J, Zhang Y) lead in the volume of practical studies, consolidating China as an execution hub. In contrast, Western authors (Carayannis, Cennamo) sustain the conceptual foundation, introducing the multi-actor perspective that includes government and civil society (Carayannis & Campbell, 2009; Jacobides et al., 2018).

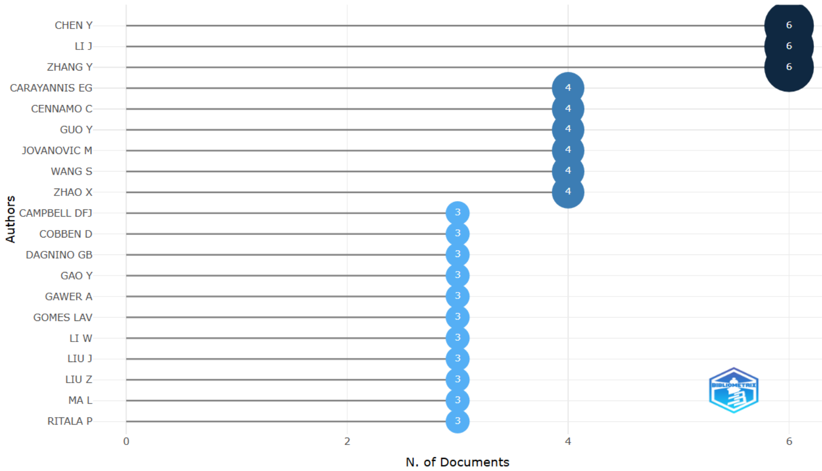


**Figure 9** Most relevant authors

The Scientific Collaboration Network (Figure 10) provides visual evidence of this division; author groups appear isolated, with low information exchange. In practice, this fragmentation requires the ecosystem manager (or orchestrator) to act as a bridge, uniting the best of each cluster. The red cluster (Asia) focuses on practical studies and execution. The blue cluster (Europe/Americas) focuses on theoretical foundations regarding the involvement of triple/quadruple helices.


**Figure 10** Scientific Collaboration Network

Regional clusters (Orange, Green, and Purple) demonstrate a scientific production composed of independent research. This fragmentation indicates that knowledge about governance is still constructed in isolation, hindering the consolidation of guidelines and their replication across different geographical contexts. For the manager, this scenario poses a challenge: the need to integrate business strategies with technological tools in an environment of dispersed information (Barros & Langhi, 2023). The absence of an integrated global network reinforces that governance effectiveness depends on the ability to articulate these findings into a coordination structure that is both technologically robust and adaptable to local realities.

*Intellectual Structure: Core Themes and Clusters*

To identify the field's intellectual foundation, Zipf's Law (Donthu et al., 2021) was applied to keyword frequency (Figure 11). The analysis reveals that IEG focuses on practical management, with terms such as innovation (135), governance (120), management (85), and performance (72) indicating that the central objective is to understand how administrative systems generate results for partners.


**Figure 11** Zipf's law

Governance operates through active leadership (Foss et al., 2023) and coordination models that structure collective value creation (Thomas & Tee, 2022). Strategy and business models reinforce that governance is the ecosystem's competitiveness tool, where success depends on the rigor of intellectual property and data management (Holgersson et al., 2018).

The cluster analysis (Figure 12) groups concepts into five domains that guide management. The red cluster (Smart Cities) establishes smart cities as governance laboratories, connecting urban planning to sustainable goals (Blasi et al., 2022; Mora et al., 2023). Efficiency is measured by concrete results, such as the emergence of startups and patents (McGuirk et al., 2021).


**Figure 12** Keyword cluster analysis

The blue cluster (Technology and Open Innovation) highlights that digital infrastructure and technologies such as blockchain act as the engine that organizes collaborative work (Marion & Fixson, 2021). The orange and green clusters (Sustainability) align local firms with global environmental preservation goals, transcending an exclusive focus on profit (Bimonte et al., 2023). The purple cluster (University-Industry Helix) focuses on knowledge transfer and governmental incentive policies (Ahn et al., 2020).

*Research Frontiers: Strategic Analysis and Trends*

The thematic map (Figure 13) classifies the maturity of subjects, revealing where the field is heading (Aria & Cuccurullo, 2017). Motor themes are led by the convergence of digital transformation, Artificial Intelligence (AI), and sustainability. The critical skill required of leaders is the ability to convert technological tools into solutions for smart ecosystems (Wang et al., 2025).

Niche themes highlight that technologies such as blockchain appear as specialized but still lack integration with core strategy (Kucukaltan et al., 2024). In basic themes, governance and open innovation form the established theoretical foundation (Jacobides et al., 2018), yet they demand greater detail regarding practical applicability. Emerging themes signal that digital platforms and entrepreneurship are being absorbed by complex topics such as AI (Nambisan & Baron, 2021).

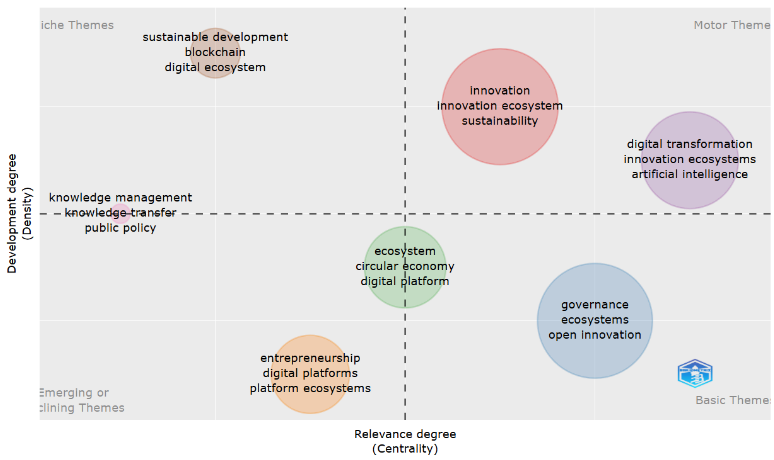


**Figure 13** Thematic Map

The temporal trajectory (Figure 14) confirms a paradigm shift. If 2021 consolidated the foundations of smart cities, the 2023 - 2025 period marks a shift toward the coordination of advanced technologies aimed at global environmental challenges. From 2023 onward, the agenda focuses on two axes: the technological axis (AI and blockchain as mechanisms for security and efficiency) and the impact axis (circular economy and sustainable development) (Schreieck et al., 2025; Nan et al., 2025).

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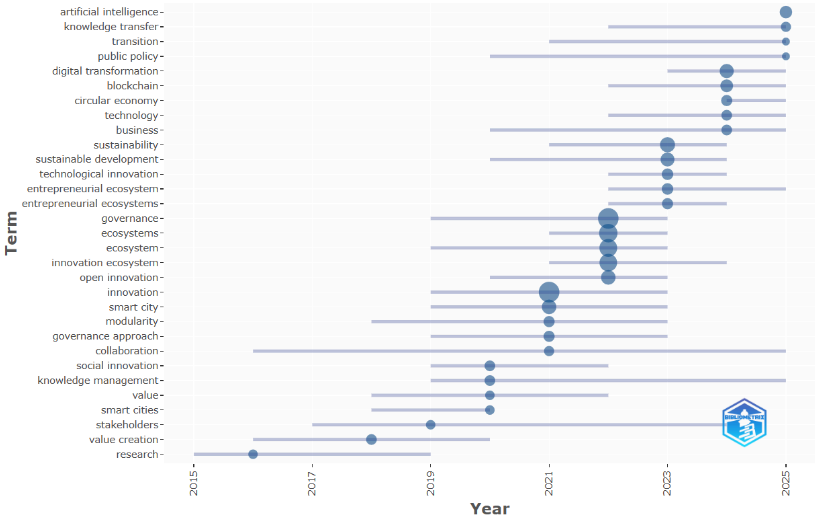


**Figure 14** Trending Topics

This transition highlights that contemporary governance is no longer an isolated process but depends on the integration of advanced digital tools and regenerative business models (Budde et al., 2024). The data demonstrate that the future of the field lies at the intersection of the digital and environmental agendas, which demands a new leadership profile. It becomes necessary to have managers capable of operating within this scope, utilizing technology as the backbone for ecosystem sustainability. This convergence scenario points to the need for more agile and adaptable coordination structures, providing the foundation for the proposal of a model that connects these variables operationally.

*Dynamic Governance Framework: Proposal and Operationalization*

The conceptual fragmentation identified in the literature (Foguesatto et al., 2021) reveals a lack of models that connect actors, coordination mechanisms, and strategic objectives in environments of uncertainty. Given this, this study proposes the Dynamic Governance Framework, grounded in Dynamic Capabilities Theory (Teece, 2014), to bridge the gap between theory and management practice in innovation ecosystems (IE). The model is structured around three interdependent pillars: Actors (Who), Methods (How), and Results (For What), with continuous reconfiguration as the central adjustment mechanism (Table 2).

The construction of the framework integrated bibliometrics with the qualitative analysis of the SLR. While Lotka's and Zipf's laws identified trends, the SLR identified the operational mechanisms of each pillar. In Pillar I (Actors), Lotka’s fragmentation revealed the need for a rigorous selection of partners (Daymond et al., 2023). In Pillar II (Methods), the frequency of the term technology identified by Zipf's law provided the foundation for using platforms and contracts for legal certainty (Holgersson et al., 2018; Marion & Fixson, 2021).

In Pillar III (Results), the trend of the term sustainability demanded the harmonization of competitiveness with socio-environmental impact (Thomas & Tee, 2022; Blasi et al., 2022; Tumelero et al., 2019). This process resulted in continuous reconfiguration, linking the motor themes with Dynamic Capabilities Theory (Teece, 2014), thereby enabling the reconfiguration of management variables.

**Table 2** Pillars of Governance in Innovation Ecosystems

| *Pillars* | *Dimension* | *Factors and Mechanisms (What to do)* | *Governance Objectives* | *Origin of the pillars* |
|---|---|---|---|---|
| Pillar I: Actors and Composition (Who) | Partner Selection | Careful selection of companies, government agencies, and universities with complementary capabilities (Daymond et al., 2023). | Building a cooperative network with complementary skills and aligned interests. | Identified by Lotka's Law and collaboration networks (Figs. 8 and 10), which revealed the fragmentation and isolation of research groups. |
| Pillar II: Coordination and Rules (How) | Management Mechanisms | The use of digital platforms and formal rules (contracts) to protect ideas and ensure trust (Holgersson et al., 2018; Marion & Fixson, 2021). | Legal certainty, transparency, and organization of activities. | Identified by the frequency of terms (Zipf's Law) and thematic clusters (Figs. 11 and 12), with emphasis on the terms governance, management, and technology. |
| Pillar III: Results (For what purpose?) | Value Generation | Defining and monitoring sustainable and social goals, using impact and performance indicators (Thomas & Tee, 2022; Blasi et al., 2022). | Innovation, market return, and socio-environmental impact. | Derived from trend analysis (Fig. 14), which indicated a shift in focus towards performance, sustainability, and the circular economy. |
| Dynamic: Continuous reconfiguration | Change Management | Continuous adjustment of strategy in response to advances in artificial | Resilience and adaptation of the ecosystem to uncertainties | Extracted from the Motor Themes quadrant (Fig. 13), based on the theory of Dynamic Capacities. |

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intelligence and environmental laws (Teece, 2007).

Source: author's own elaboration, 2025.

The choice of Cobben and Roijakkers (2019) model as the structural basis for this framework is justified by its capacity to integrate the duality of ecosystem governance, considering the balance between formal control mechanisms and trust-based coordination. While traditional corporate governance literature focuses on rigid and hierarchical structures, Cobben and Roijakkers' model offers a management logic that aligns with the three pillars identified in this research (Actors, Methods, and Results).

The integration of this theoretical foundation allowed this study to advance by converting management concepts into management variables (Who, How, and For What), filling the practical applicability gap identified in the literature. By adding Teece's (2014) dynamic capabilities theory to this base, the proposed framework overcomes the static view of the original model, providing the necessary agility for the continuous reconfiguration of the ecosystem in the face of technological disruptions.

The core differentiator of this framework (Figure 15) compared to static models, such as that of Cobben and Roijakkers (2019), is the inclusion of continuous reconfiguration. The ecosystem is treated as a living organism, where the manager must exercise the skills of monitoring (sensing), seizing opportunities (seizing), and transforming rules (transforming) (Teece, 2007). This agility prevents governance obsolescence in the face of disruptive technologies, such as Artificial Intelligence.

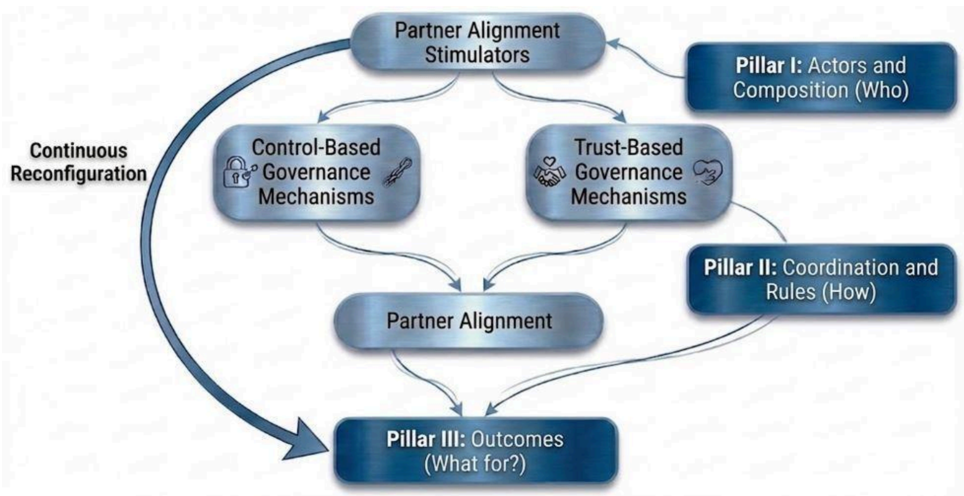


**Figure 15** Dynamic Governance Framework in Ecosystems

To operationalize this model and implement continuous reconfiguration, the manager can utilize practical indicators that serve as benchmarks for measuring collaboration. In Pillar I, the actor diversity metric allows for verifying whether the group possesses the necessary competencies to innovate. In Pillar II, the manager monitors the partnership formalization time, ensuring that contract rules do not become overly bureaucratic. In Pillar III, success is measured by the achievement of socio-environmental goals and the volume of new technologies generated.

Continuous reconfiguration is monitored by the response time to changes, which indicates the speed at which the ecosystem adjusts its goals (Pillar III) and processes (Pillar II) whenever a new market need is identified (Pillar I). The model's operationalization occurs through practical indicators that allow for diagnosing the need for adjustments at different stages of the ecosystem's maturity.

Thus, in the birth stage, governance focuses on actors and trust. In the expansion phase, it prioritizes methods and platforms, and upon reaching maturity, it triggers reconfiguration to avoid stagnation and obsolescence. All this demonstrates that governance is not a static set of rules, but an adjustment process that ensures the system's resilience and longevity (Dhanaraj & Parkhe, 2006). To ensure applicability, three indicators per pillar are proposed (Table 3), offering a multidimensional diagnosis without overwhelming the process with bureaucracy.

**Table 3** Management and Monitoring Indicators of the Framework

| *Governance Pillar* | *What to measure? (Indicators)* | *What does this mean in practice?* | *Change Trigger (When should the manager act?)* |
|---|---|---|---|
| I. Actors (Who) | Network Diversity | Balance between businesses, universities, and government. | |
| | Onboarding of New Partners | Arrival of new members with new technologies. | When the ecosystem stagnates and stops attracting new skills. |
| | Level of Participation | Genuine engagement of team members in projects. | |
| II. Methods (How) | Agility in Contracts | Average time to formalize a partnership. | |
| | Ease of Use of Technology | If the partners use the group's digital tools. | When bureaucracy stifles innovation or there is a lack of transparency in the rules. |

| | | | |
|---|---|---|---|
| | Trust Index | Security level for exchanging ideas and data. | |
| III. Results (For what purpose) | Delivering Green Innovations | Creating solutions with environmental impact. | |
| | Achieving Common Goals | Whether the strategic plan is being followed. | When the group loses focus on socio-environmental impact and collective value. |
| | New Products or Patents | Generating technological results and profit. | |
| Reconfig. Continued | Adaptation Speed | Quick response to crises or new technologies. | |
| | Learning from Mistakes | Rule changes after flaws were detected. | Whenever a manager realizes that the old rules no longer apply to the current situation. |
| | Readiness for Change | Ability to change focus if the market demands it. | |

Source: own elaboration, 2026.

By monitoring these indicators, the manager moves from a reactive stance to leading the ecosystem's evolution based on evidence. The transition to a continuous reconfiguration approach allows the system to develop strategic resilience (Teece, 2007), providing the agility to adjust partners, norms, and objectives whenever technological or market changes arise. Thus, governance ceases to be a set of static rules and becomes the central mechanism that ensures the ecosystem's competitiveness, sustainability, and long-term organization (Yokomizo et al., 2024).

## 5 Conclusions and Final Considerations

It is believed that the present investigation has fulfilled its general objective by mapping the scientific production on innovation ecosystem governance and, based on this analysis, proposing a Dynamic Governance Framework grounded in Dynamic Capabilities Theory. Through a hybrid approach of systematic literature review (SLR) and bibliometrics, it was possible to overcome the field's theoretical fragmentation, offering a structure that organizes the complexity of management in these environments into three interdependent pillars: Actors, Methods, and Results.

In this study, governance is understood as the process of organizing collaboration among different actors so that, together, they can generate and share results they could not achieve alone. More than a static set of rules, governance is understood here as a dynamic capability that allows the ecosystem to adjust its decision-making and collaboration structures in response to technological and market changes. In this perspective, governing means clearly defining who participates in the network (Actors), how exchanges are operationalized through formal and relational mechanisms (Methods), and toward what end the efforts are directed, aligning technological innovation with socio-environmental impact (Results).

Regarding Actors, the study demonstrated that governance is not limited to the simple agglomeration of members, but to the strategic governance of the helix, where the selection of partners with complementary capabilities is the determining factor for ecosystem survival. As for Methods, the research consolidated the need for hybrid mechanisms, where the legal certainty of formal contracts coexists with the fluidity of trust bonds and the support of digital platforms. The Results of governance were redefined beyond individual profit, focusing on collective value creation, innovation, and sustainable socio-environmental impact.

The main theoretical contribution of this work lies in the introduction of the concept of continuous reconfiguration as the engine of governance. By applying Teece's (2007) logic of Sensing, Seizing, and Transforming, the proposed framework moves from being a static structure to becoming a living and dynamic process. This theoretical perspective allows for the understanding that governance must change as the ecosystem matures: in early stages, relational governance based on trust predominates, while in mature ecosystems, the density of formal and digital mechanisms becomes essential to manage complexity.

The field of study presented here opens up for new investigations to test the direct influence of this governance model on ecosystem outcomes. As a suggestion for future studies, it is recommended to perform an empirical validation of the proposed framework through surveys with managers and key informants, aiming to diagnose the configuration of governance pillars in the context of emerging ecosystems. Comparative case studies are also suggested to analyze ecosystems with different degrees of consolidation and management maturity.

Such an approach would allow for an understanding of how structured governance contributes to the longevity and success rate of collective projects, identifying why certain ecosystems reach advanced stages of development while others face maturity barriers. Future research can further investigate how the maturity of each ecosystem requires different levels of reconfiguration of rules and partnerships over time, as well as the role of Artificial Intelligence as a new governance method capable of accelerating strategic decision-making.

From a managerial standpoint, this study offers ecosystem managers, such as directors of science parks and innovation hubs, an operational diagnostic tool. Through the indicator matrix proposed in Table 3, the manager can identify whether poor ecosystem performance stems from flaws in the network composition (Actors), excessive bureaucracy in processes (Methods), or misalignment with market demands (Results). Readiness for change becomes the primary success point of management.

For policymakers, the findings suggest that fostering innovation ecosystems should not focus solely on physical infrastructure, but rather on the training of governance managers. This framework can serve to design public funding calls that require clear metrics for socio-environmental impact and actor diversity, ensuring that public resources are allocated to resilient environments capable of reacting to external changes.

Although the use of the PRISMA protocol and the ABS list filter ensure the rigor and editorial quality of the analyzed sample, it is recognized as a limitation that the study focuses on only two specific databases, potentially omitting perspectives from other outlets. As an immediate next step in this research line, the intention is to perform the empirical validation of this framework through multiple case studies in Brazilian ecosystems of varying maturity levels. This analysis will allow for an understanding of how regional particularities and resource availability shape governance, with the aim of making innovation ecosystems increasingly effective for economic and social progress.

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