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PROGRAMA DE PÓS-GRADUAÇÃO EM ADMINISTRAÇÃO
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Value Creation and Capture in Innovation Ecosystems: an analysis in platform and territorial perspectives

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Thesis submitted for the Doctoral Degree in Business Management, at School of Management at Federal University of Rio Grande do Sul.
Advisor: Aurora Carneiro Zen, PhD.

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an analysis in platform and territorial perspectives

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ABSTRACT

The literature on innovation ecosystems has been widely recognized for its ability to assist companies in creating new business opportunities, and to facilitate the development and enhancement of the innovation projects in diverse geographical regions. For this reason, value creation and capture have been considered a central issue in the field of innovation ecosystem studies. However, creating and capturing value within an innovation ecosystem from the perspective of a company is substantially different from that within a territorial innovation ecosystem. Regardless of the type of innovation ecosystem, managing the value creation and capture process is a challenge. To contribute to this discussion, this thesis aims to analyze how value creation and capture occur in innovation ecosystem from the platform and territorial perspectives. Three primary theoretical gaps have been identified concerning the relationship between value creation, value capture, and innovation ecosystems: firstly, the need to comprehensively understand how these processes unfold within the context of innovation ecosystems; secondly, the distinction in value creation and capture between territorial and platform perspectives; and finally, the relatively unexplored context of value creation and capture within innovation ecosystems of emerging countries. To address these gaps, a qualitative approach was employed. This thesis comprises three distinct papers: a theoretical essay, a systematic literature review, and a comparative case study. The first paper, 'Value Creation and Capture in Innovation Ecosystems', aimed to propose an integrative framework for analyzing the creation and capture of value in innovation ecosystems. The second paper 'Creating and Capturing Value in Innovation Ecosystems: a systematic literature review between 2010 and 2021' aims to identify what are the contributions of the platform and territorial perspectives to the literature on value creation and capture in innovation ecosystems. The third paper, 'Developing Innovation Ecosystems Through Value Creation and Capture Mechanisms: a comparative case study of platform and territorial perspectives,' aimed to analyze value creation and capture mechanisms in both territorial and platform innovation ecosystems. This comparative case study was conducted in two innovation ecosystems within an emerging country context, situated in the Serra Gaúcha region of Southern Brazil. The findings suggest that the competitive pursuit of value capture undermines the process of value creation, consequently reducing the innovation ecosystem development. Therefore, innovation ecosystem managers need to comprehend the crucial aspect of an integrated view of value creation and capture mechanisms when establishing their ecosystem strategies. The results underscore that aligning objectives to establish a value proposition among actors within the quadruple helix is more complex in territorial innovation ecosystems than in platform innovation ecosystems. This underscores the inherent complexity of engaging actors in aligning their interests within territorial innovation ecosystems, given their different value perceptions, diverse value capture mechanisms, and distinct critical success factors, which differ from the platform perspective. Finally, the results describe an emerging economy region characterized by industries of low and medium technological intensity. Consequently, the findings contribute to delineating the challenges encountered by companies situated outside metropolitan areas, organizations undergoing a transformative shift in their innovation culture, and actors possessing cultural traits that initially impede innovation adoption. This is particularly pertinent for traditional or family-owned enterprises that have yet to embrace an innovation-driven culture, as observed in numerous emerging countries regions.

Keywords: regional innovation, ecosystem strategy, value appropriation, value co-creation.

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SUMMARY

1. INTRODUCTION

In the past two decades, the concept of innovation ecosystem has gained significant attention in both academic and managerial discussions (Klimas & Czakon, 2022). The literature on ecosystems has been recognized for its ability to help companies develop new markets and business opportunities for various types of innovations (Pellikka & Ali-Vehmas, 2016) and contribute to the improvement of quality of life and the development of cities (Santos et al., 2022), innovation districts (Pique et al., 2019), and regions (Liang & Li, 2023).

For an innovation ecosystem to thrive and generate benefits, it is argued in the literature that a multilateral alignment of partners is necessary (Adner, 2017). This involves the participation of heterogeneous actors from the quadruple helix (Santos et al., 2022) who need to manage both collaborative and competitive relationships (Bacon et al., 2020; Hannah & Eisenhardt, 2018) in a non-hierarchical manner (Jacobides et al., 2018). Therefore, innovation ecosystems are complex and dynamic, demanding strategic coordination among actors and resources throughout all stages of development (Autio, 2022) to create ecosystem-level value propositions (Adner, 2017). These propositions enable the creation/co-creation and capture of this value (Ketonen-Oksi & Valkokari, 2019).

Studies on innovation ecosystems have advanced from different analytical perspectives: platform and territorial (Zen et al., 2023). The territorial approach considers territory and geographic space as central elements in innovation ecosystems (Scaringella & Radziwon, 2018). In this perspective, the analysis of innovation ecosystems involves a set of actors that create value within a specific geographical context. The territorial perspective has examined how innovation ecosystems contribute to economic development and the improvement of quality of life in districts such as 22@, in Barcelona (Pique et al., 2019) and cities such Amsterdam (Oskam et al., 2021), Porto Alegre (Foguesatto et al., 2023; Mignoni et al., 2023), and Medellín (Gonçalves et al., 2022). The platform approach analyzes innovation ecosystems from the standpoint of a hub company (Adner, 2006; Adner & Kapoor, 2010). From this perspective, companies interact and collaborate to create and capture value (Pellikka & Ali-Vehmas, 2016) and have explored the role of innovation ecosystems in the success of startups (Zhang et al., 2023) and various sectors such as nano-electronics (Leten et al., 2013), electroelectronics (Benitez et al., 2020), telecom (Jones et al., 2021), genetic therapies, and autonomous vehicles (Kapoor & Klueter, 2021).

Furthermore, the literature on innovation ecosystems emphasizes that collaboration, alignment, and coordination of actors are crucial elements to manage for ecosystem

development (Ketonen-Oksi & Valkokari, 2019; Santos et al., 2022). This thesis argues that the creation and capture of value are processes that can contribute to facilitating ecosystem development. Therefore, managers of innovation ecosystems need to understand the processes of value creation and capture, analyze factors that influence these mechanisms, and effectively manage these processes to contribute to the ecosystem's development.

In this regard, it is important to comprehend the concept of "value" within an innovation ecosystem. It is necessary to consider three aspects. Firstly, every value proposition has a target user, such as a company's customer (platform perspective) or the population of a city or region (territorial perspective). Thus, the subjective perception of these end users determines the definition of value (Lepak et al., 2007; Vargo & Lusch, 2008). Secondly, value creation refers to activities that enable users (customers or population) to progressively perceive higher value compared to other available products/services. From an ecosystem perspective, value is not created in isolation but co-produced with all partners involved (Yaghmaie et al., 2020). Value can be co-created through joint activities among ecosystem actors (Ritala et al., 2013) to generate benefits at different levels: individual, organizational, or societal (Lepak et al., 2007). Therefore, defining the value proposition to be created by the ecosystem is a process that involves aligning and establishing a common vision among multiple actors. This process can be complex in both platform and territorial ecosystems. For example, the larger the number of ecosystem actors and the more heterogeneous the group, the more complex it can be to establish a common value proposition at the innovation ecosystem level.

The third aspect is that the value created by the ecosystem can be captured at different levels: individual, organizational, ecosystem, or society (Lepak et al., 2007). Value capture refers to the process of ensuring that the benefits of value creation are distributed and shared among the participating actors in the ecosystem. Each actor or the ecosystem can benefit in various ways from innovation projects, including intrinsic or social rewards, as well as non-pecuniary or pecuniary extrinsic rewards (Chesbrough et al., 2018). These benefits can encompass financial return, power, status, influence, fame, and/or social relationships (Cabral et al., 2019). In platform ecosystems, value can be shared among the actors within the network, while in territorial ecosystems, the value created is shared with the entire territory (Zen et al., 2023). In other words, the definition of the value proposition, value creation, and value capture are complex and relevant issues in the literature on innovation ecosystems because they involve strategic considerations related to the potential benefits generated by the ecosystem and the potential benefits for the actors participating in the ecosystem.

The analysis of value creation and capture has been examined in the context of interorganizational networks (Ritala & Tidström, 2014), clusters (Hsieh et al., 2012; Lee et al., 2020; Pitelis, 2012), open innovation (Chesbrough et al., 2018; Dell'Era et al., 2020; Majchrzak et al., 2023), and alliances (Adegbesan & Higgins, 2011; Lavie, 2007). The Business and Innovation Ecosystem approach has also been studied from the perspective of firms and/or hub firms (Letaifa, 2014; Ritala et al., 2013), particularly in innovation ecosystems within high-tech sectors, such as digital ecosystems and artificial intelligence (e.g., Chen et al., 2021; Prashantham, 2021), with a primary focus on companies and industries in developed countries (e.g., Arena et al., 2021; Kapoor & Klueter, 2021).

Some theoretical studies have made significant contributions to the understanding of value creation and capture in innovation ecosystems. Amit & Han (2017) proposed a framework for analyzing the configuration of resources for value creation in digital ecosystems. Prashantham (2021) examined how value can be co-created by new ventures orchestrated by hub firms in digital ecosystems. Talmar et al. (2020) put forward a model for mapping innovation ecosystems, considering the activities and resources required for value addition and capture. Arena et al. (2021) developed a comprehensive conceptual model of shared value creation based on actors, structure, governance, relationships, strategies, internal mechanisms, and outcomes. Siaw & Sarpong (2021) elaborated on a model for analyzing the structure of dynamic exchange capabilities to outline the processes through which firms co-create and co-capture value in ecosystems. Lampert et al. (2020) proposed a model that considers complementary assets and uncertainty in value creation and capture. Finally, Abdulkader et al. (2020) introduced a model to understand value co-creation through open innovation ecosystem principles and the alignment between value creation and capture.

Despite these studies, the complexity of ecosystem structures and the ambiguity in understanding the concepts of value creation and capture in ecosystems have resulted in fragmented contributions by researchers (Khademi, 2020). Furthermore, most research on value creation and capture in innovation ecosystems has focused on focal actors, paying less attention to how other actors (complementors, policymakers, investors, startups, and intermediaries) influence value creation and capture in the ecosystems (Khademi, 2020). Moreover, the literature has primarily focused on value creation (Santos & Zen, 2024) without considering that value capture is an inseparable process from value creation and should be examined in conjunction with it. Additionally, despite the growing attention on value creation and capture in innovation ecosystems, several fundamental aspects remain underexplored both theoretically and empirically. There are still limited contributions in the literature on innovation ecosystems

that identify the mechanisms of value creation and capture, as well as the critical success factors that influence how value can be created and captured within territorial innovation ecosystems. Only Bettanti et al. (2022), Oomens & Sadowski (2019), Oskam et al. (2021), and, Visnjic et al. (2016) have conducted studies on value creation and capture in innovation ecosystems from the perspective of a city or region.

This thesis aims to fill a gap in the literature and provide a better comprehension on the process of value create and capture value in innovation ecosystems, considering the interaction of multiple actors and interests. Second, to provide a comparative and integrated view of two theoretical approaches (territorial and platform) that until then were researched separately in the literature on creation and capture of value in innovation ecosystems. Third, the literature has shown limited attention to research on value creation and capture within the context of an emerging economy. Analyzing the two theoretical perspectives together allows for a better and more comprehensive understanding of complex environments such as innovation ecosystems. Therefore, the central question of this research is: **How does the creation and capture of value occur in the innovation ecosystem from the platform and territorial perspectives?**

1.1 OBJECTIVES

This thesis aims to analyze how value creation and capture occur in innovation ecosystem from the platform and territorial perspectives.

The specific objectives are:

a) Identify the key elements of value creation and capture in platform and territorial innovation ecosystems.

b) Analyze the influence of critical factors of success in value creation and capture in platform and territorial innovation ecosystems.

c) Understand the influence of value creation and capture mechanisms in innovation ecosystem development.

d) Propose an integrative framework for analyzing value creation and capture in innovation ecosystems in the context of emerging economies.

1.2 METHODOLOGICAL DECISIONS

This subchapter outlines the methodological decisions adopted in this research. In order to achieve the objectives of this thesis, an qualitative approach was used. This method was chosen due to the incipience of studies on the creation and capture of value in innovation ecosystems. To answer the objective 'how' the creation and capture of value occurs, an exploratory research was used. Research that employs qualitative exploratory methods proves valuable when investigating phenomena that are not well-understood, providing the opportunity for a comprehensive and in-depth exploration of the subject (Mansourian, 2008).

Exploratory research adopted different strategies. In this thesis, three papers were conducted: a theoretical essay, a systematic literature review, and a comparative case study in the Serra Gaúcha region. The theoretical essay was chosen with the purpose of identifying the creation and capture of value in organizational and interorganizational contexts. Based on the results obtained in this theoretical essay, a systematic literature review was conducted, which was selected to deepen specific knowledge about the creation and capture of value in innovation ecosystems. Finally, the comparative case study was chosen to empirically investigate the categories that emerged from the systematic literature review. Therefore, the studies were planned to gradually advance and deepen the elements of analysis.

Brazil was chosen as the field of study to carry out the case study because most research on value creation and capture in innovation ecosystems analyzes already developed countries (Santos & Zen, 2024). However, emerging countries have different institutional, economic, social and cultural realities. Furthermore, studies that analyze the mechanisms of value creation and capture in emerging countries are limited, for example; Chen et al. (2016) and Jiang et al. (2019) analyzed the context of China and Benitez et al. (2020) analyzed the co-creation of value in an innovation ecosystem in Brazil. To address this gap, the choice of Brazil as the research setting aims to contribute into the unique dynamics of value creation and capture within the innovation landscape of emerging economies.

Brazil occupies 49th place among 132 countries participating in the Global Innovation Index (GII), rising five positions compared to the 2022 ranking (World Intellectual Property Organization, 2023). These data show Brazil leading Latin America and the Caribbean and, after continuous growth in recent years, the country secures its position as the most innovative economy in the region. Among the five BRICS countries, Brazil is in third place in the GII, ahead of Russia (51st place) and South Africa (59th). China is ranked 12th and India is ranked 40th (World Intellectual Property Organization, 2023). On the one hand, Brazil presents

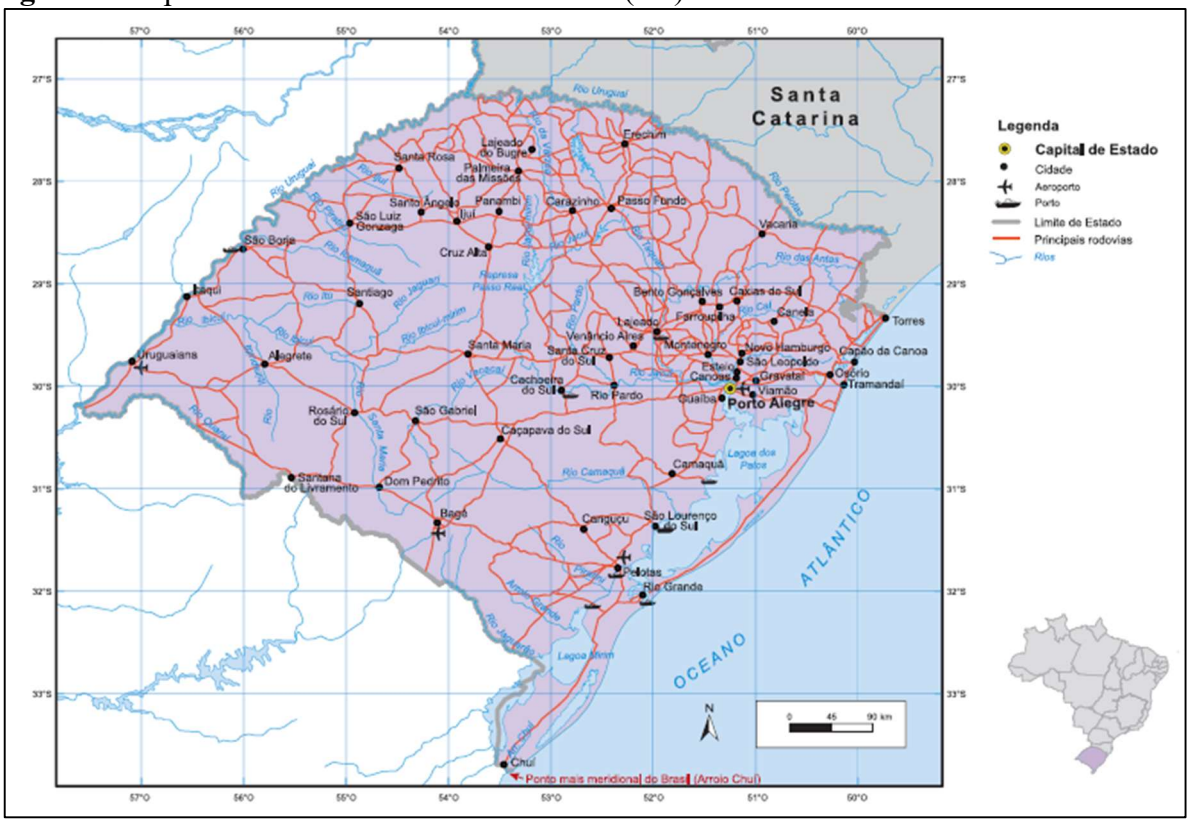
positive aspects related to innovation in e-participation, government's online service, unicorn valuation, citable documents H-index, and QS university ranking. On the other hand, it shows weakness in the indicators entrepreneurship policies and culture, policies for doing business, labor productivity growth, graduates in science and engineering, PISA scales in reading, mathematics and science (World Intellectual Property Organization, 2023).

The empirical research was conducted in the state of Rio Grande do Sul (Figure 1). This state is located in the southernmost part of Brazil and is composed of 497 municipalities, covering a total area of 281,707.15 square kilometers (Rio Grande do Sul, 2021). With a population of 10,822,965 inhabitants in 2022, accounting for approximately 5.4% of the Brazilian population, it ranks as the sixth most populous state in Brazil (Ibge, 2023). Rio Grande do Sul is recognized as one of the states with the highest quality of life in the country, with a Human Development Index of 0.771 (Instituto de Pesquisa Econômica Aplicada, 2022). In 2021, its economic production contributed to 6,5% of the national Gross Domestic Product, placing the state in the fourth position among the federal units (Ibge, 2023).

The state of Rio Grande do Sul was selected for its national relevance in relation to innovation. The state of Rio Grande do Sul (RS) is considered an innovative state according to the 2023 edition of the competitiveness ranking, which ranked RS in second place among the most innovative 27 states of Brazil (Centro de Liderança Pública, 2023). Second, Rio Grande do Sul is the second state in training doctors in different areas of knowledge, which corresponds to more than two thousand graduates per year, equivalent to the per capita proportion of the state of São Paulo (Secretaria de Inovação, Ciência e Tecnologia, 2022). Finally, in its portfolio of productive skills, RS has a consolidated technology-based industry that covers the agroindustry, health, petrochemical, leather-footwear, metallurgical, transport sectors, among many others (Secretaria de Inovação, Ciência e Tecnologia, 2022).

The Inova RS program was selected for being a public policy aimed at developing eight regional innovation ecosystems in the state of Rio Grande do Sul. Therefore, Inova RS aims to stimulate economic and technological advancement through the vocational activities of the territories (Secretaria de Inovação, Ciência e Tecnologia, 2022). In other words, there is alignment between the territorial perspective of the ecosystems and the objectives of the Inova RS program. The program is thus governed by a decentralized management model, considering the distinctive socioeconomic profiles presented by each eight region of the state. These are territories with autonomy to define their long-term strategic planning, encompassing goals, targets, policies, action plans, and a shared vision for the future (Secretaria de Inovação, Ciência e Tecnologia, 2022).

Figure 1. Map of the State of Rio Grande do Sul (RS)

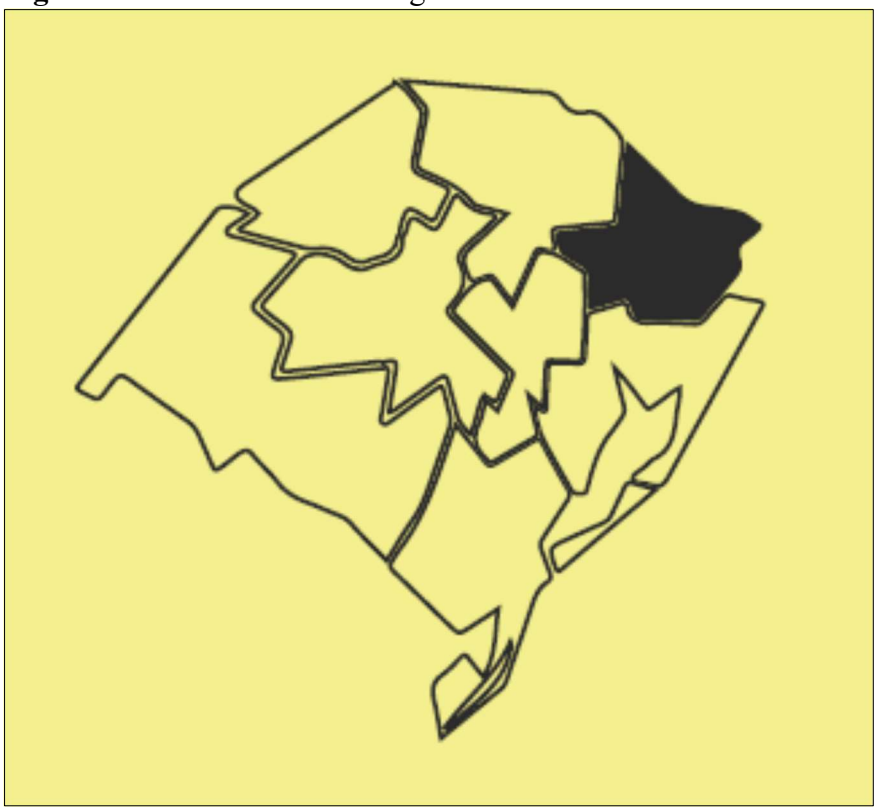


Source: Ibge (2023)

The institutional mission of Inova RS is to 'strengthen regional innovation ecosystems, articulating organized civil society and the collaborative and disruptive collaboration of the business, academic, and governmental sectors for the full development of RS' (Secretaria de Inovação, Ciência e Tecnologia, 2022, p. 13). Participation in the program is voluntary, occurring in strategic committees and technical committees that plan and develop innovation projects. These projects are then reviewed by a regional board that determines the strategic areas to be prioritized in each of the eight regional innovaton ecosystems like agribusiness, smart cities, defense and security, creative economy, blue economy, technological education, electromechanical, energy, industry 4.0, health, information and communication technology, and tourism (Secretaria de Inovação, Ciência e Tecnologia, 2022).

Within Inova RS, the regional innovation ecosystem of Serra Gaucha was chosen for empirical research (Figure 2). The ecosystem's goal is to broaden the current economic matrix and leverage new opportunities, with a focus on enhancing quality of life and fostering sustainable development in the region. Three strategic areas have been identified for development, namely Industry 4.0, tourism, and smart cities, with technological education serving as a cross-cutting element across projects (Secretaria de Inovação, Ciência e Tecnologia, 2022).

Figure 2. The Serra Gaúcha Region.



Source: Secretaria de Inovação, Ciência e Tecnologia (2022)

This area was selected due to the concentration of manufacturing activities, including the production of buses, trucks, agricultural machinery, wineries, furniture industry, tourism, and agriculture. In 2022, the population of the Serra region was estimated to be 1.2 million inhabitants, with 187 thousand companies (Sebrae, 2023). Higher education in the Serra Gaúcha plays a crucial role in the educational development of the region. In 2021, higher education institutions recorded a total of 53,958 students enrolled in undergraduate and postgraduate courses (Sebrae, 2023).

In this region, there was already a historically well-developed metal-mechanical and furniture industry stemming from Italian immigrants who founded the cities in this region during the 19th century. However, for the purposes of this study, our starting point is a movement of innovation policies and corporate innovation strategies that began in 2019, such as Inova RS and Helix Institute. We explore two types of innovation ecosystem in the same cultural and regional context.

The organizational structure of the Helix Institute is strategically designed to promote effective collaboration among diverse ecosystem actors. Comprising multidisciplinary teams, the Helix Network includes experienced professionals in innovation management, renowned researchers, and experts in regional development. This integrated approach allows the creation of specific programs such as workshops, hackathons, and research projects aligned with local

challenges and demands. Moreover, the institute serves as a facilitator for public-private partnerships, connecting businesses, academic institutions, and government bodies. This dynamic and collaborative structure reinforces the Helix Institute's capability to catalyze a conducive environment for innovation, strengthening ties among various actors in the Serra Gaúcha region (Instituto Helix, 2024). Table 1 conducts a comparative analysis between the two innovation ecosystems.

Table 1. Comparative Analysis of IEs.

	Inova RS Serra Gaúcha	**Helix Institute**
Leading Actor	State Government	Helix Institute
Mainly Innovation Ecosystem Goals	By 2030, the Serra and Hortênsias region will emerge as a global reference in innovation through a strategy of smart specialization in transforming the tourism experience, smart cities, technological education, and Industry 4.0, with a focus on enhancing the quality of life and fostering sustainable development in the region	To accelerate the maturaty of the IE in the Serra Gaúcha and: conduct structured open innovation processes, provide innovation experiences, and cultivate a fertile environment in the Serra Gaúcha for talents to innovate and thrive (quality of life, education, leisure, and security).
Innovation Ecosystem Launch	October 2019	September 2018
Innovation Ecosystem Approach	Territorial Innovation Ecosystem	Platform Innovation Ecosystem
Key Actors	Quadruple helix	Companies and startups
IE Characteristic	Public Program	Private Institute
Geographic Context	Serra Gaúcha Region	Mainly Caxias do Sul city (but, not limited)

Source: The authors

1.3 POTENTIAL CONTRIBUTIONS

This thesis aims to address three significant gaps in the existing literature on value creation and capture in innovation ecosystems. The first gap involves comprehending, in an integrated manner, how value creation and value capture processes occur within the context of innovation ecosystems. The literature on innovation ecosystems has predominantly focused on value creation, often in isolation from value capture (Santos & Zen, 2024). It is relevant to delve deeper into the mechanisms associated with both value creation and capture, considering perspectives related to innovation and competitive (Gomes et al., 2018). Furthermore, several scholars have recommended the examination of multilateral interdependencies among ecosystem members to understand the determinants of value creation and capture (Bogers et

al., 2019). It is crucial to explore the alignment between value creation and capture among different network partners and how this alignment evolves as relationships mature (Sjödin et al., 2020). Therefore, this research has the potential to contribute to this discussion by enhancing our understanding of how value creation and capture occur, identify their critical factors involved in both creation and capture, and explore how these processes can influence the development of the innovation ecosystem.

Secondly, there is a gap in understanding the differences between territorial and platform perspectives. This research contributes to bridging an existing gap, which is the absence of a comprehensive understanding of how various types of innovation ecosystems relate to and interact with one another (Autio & Thomas, 2022). A challenge for researchers is to identify how this dynamic of value creation and capture occurs in innovation ecosystems where different types of actors interact: companies, universities, civil society organizations, and the government. For example, the dynamics of relationships between companies and startups differ when public actors, universities, and civil society organizations are involved in innovation ecosystems (Zen et al., 2023). Also, few studies seek to understand the relationship between public organizations and ecosystem value (as in Ojasalo & Kauppinen, 2024) and how public and nonprofit organizations interact with private organizations to create and appropriate value (Cabral et al., 2019). Indeed, the value propositions of a platform ecosystem (emphasis on economic value) are generally quite distinct from the value proposition of a territorial ecosystem, which emphasizes the gains of the region and the quality of life of the population. As a result, there are distinct value perceptions, actor engagement dynamics, different innovation ecosystem strategies, and various factors that could influence each type of innovation ecosystem. The heterogeneity among these actors, including their objectives, goals, knowledge bases, cultures, and capabilities, leads to different mechanisms of value creation and capture at the organizational level (Corsaro, 2020). Despite numerous studies having been conducted from both the platform (Miremadi et al., 2023) and territorial perspectives (Scaringella & Radziwon, 2018), the potential contribution of this thesis is to introduce a theoretical model aimed at comprehending the distinctions that arise in platform and territorial ecosystems. By presenting empirical results, this thesis builds upon previous studies that conducted comparative research between territorial and platform innovation ecosystems (Piantoni et al., 2023; Zen et al., 2023) and provides additional insights.

Thirdly, this research addresses the underexplored context of value creation and capture in emerging countries. While most studies have focused on value creation and capture in innovation ecosystems in developed countries (Bettanti et al., 2022; Dattée et al., 2018; Kapoor

& Klueter, 2021; Leten et al., 2013; Oomens & Sadowski, 2019; Oskam et al., 2021; Visnjic et al., 2016), only a few studies have been conducted in emerging contexts, especially in China (Chen et al., 2016; Chen et al., 2021; Zhang et al., 2021), and a limited number of research endeavors have analyzed the context of Latin American emerging countries (Benitez et al., 2020; Guerrero et al., 2021). However, emerging economies require solutions that are often different from those known to work in highly developed regions (Thomas et al., 2021). There is a gap in the current literature relating to how innovation and regional development in emerging economies should best be promoted (Thomas et al., 2021). Thus, to advance the understanding of this gap and respond to the calls from the academic community to better comprehend how innovation occurs in emerging economies, this research investigates the Serra region of Rio Grande do Sul, Brazil. There are significant differences between developed and emerging countries, especially differences in demographics, economics, culture, legal, and social contexts. Also, Latin American context offers an excellent opportunity to expand and refine existing theories of hybrid public–private collaborations (Aguinis et al., 2020). The empirical findings, particularly related to critical success factors of value creation and capture, value creation and capture mechanisms, actor engagement, and the level of innovation maturity, can contribute to the analysis of value creation and capture in innovation ecosystems in other emerging countries.

Overall, this thesis aims to bridge the gap in the literature by providing a comparative and integrated view of the territorial and platform approaches to value creation and capture in innovation ecosystems. Through empirical research, it seeks to contribute to existing knowledge, offer insights into actors' value perceptions, explore the context of emerging countries, and provide recommendations for public policy development. The following section will present the three papers included in this thesis, along with their objectives and research methods.

1.4 STRUCTURE OF THESIS

This thesis presents three papers that contribute to the understanding of value creation and capture in innovation ecosystems. The first paper, titled 'Value Create and Capture in Innovation Ecosystems, explores the differences between platform and territorial perspectives in defining, boundaries, relationships, actors, value dimensions, and life cycle within innovation ecosystems. The research adopted a theoretical essay method developed from a narrative review of articles. The terms 'value creation', 'value capture', and 'value appropriation' were researched

in the Web of Science and SCOPUS databases concerning both organizational and inter-organizational levels (primarily networks, alliances, open innovation, and ecosystems). Through the analysis of the articles found, it was possible to identify common elements of analysis in these diverse organizational and interorganizational literatures. The article subsequently presents six theoretical propositions related to the analysis of value creation and capture, considering elements such as theoretical approach, process approach, strategies for value creation and capture, and multidimensional value. The final stage involved constructing the framework, which was developed based on the relationships among these theoretical propositions.

The second paper, titled 'Creating and Capturing Value in Innovation Ecosystems: a systematic literature review between 2010 and 2021,' addresses the gap in the literature regarding the strategies, mechanisms, and drivers of value creation and capture in innovation ecosystems from both platform and territorial perspectives. Through a systematic review, it identifies the contributions of each perspective and reveals similarities and differences in value creation mechanisms, value capture mechanisms, drivers, and value dimensions.

The third paper, titled 'Developing Innovation Ecosystems through Value Creation and Capture Mechanisms: a comparative case study of platform and territorial perspectives,' conducts comparative case studies in two innovation ecosystems in the Serra Gaúcha region, Brazil. It analyzes how value creation and capture occur in both territorial and platform-based ecosystems, and examines the impact of critical success factors on value creation, capture, and ecosystem development. The paper highlights the similarities and distinctions between territorial and platform innovation ecosystems in the processes of value creation and capture in an emerging economy context. Also, the results show the tension in competition for value capture, its impact on actor engagement, and the importance of value creation and capture mechanisms for ecosystem development.

Overall, these three papers contribute to the literature on value creation and capture in innovation ecosystems by providing theoretical propositions, an integrative framework, insights from a systematic literature review, and empirical evidence from comparative case studies.

1.5 RELATION BETWEEN PAPERS

This section shows the relations between three papers and, afterwards, how each paper contributed to the achievement of specific objectives. Initially, Table 2 provides a summary of

each article concerning its title, objectives, theoretical approach, methodology, key findings, and publication status.

Table 2: Synthesis of Papers

	Paper 1	**Paper 2**	**Paper 3**
Title	Value Creation and Capture in Innovation Ecosystems	Creating and Capturing Value in Innovation Ecosystems: a literature review between 2010 and 2021.	Developing Innovation Ecosystems through Value Creation and Capture Mechanisms: a comparative case study of platform and territorial perspectives
Purpose	To propose an integrative framework for analyzing value creation and capture in innovation ecosystems.	To identify what are the contributions of the platform and territorial perspectives to the literature on value creation and capture in innovation ecosystems	To analyze how the creation and capture of value occur in both territorial and platform-based innovation ecosystems
Theoretical Approach in Innovation Ecosystems	Territorial and Platform	Territorial and Platform	Territorial and Platform
Method	Theoretical Essay	Systematic Literature Review	Comparative Case Study
Connections With Other Papers	An initial study to approximate the literature on value creation and capture at the organizational and interorganizational levels (network, alliances, supply chains, open innovation) with the literature on innovation ecosystems.	After the initial understanding of the theoretical elements on value creation and capture in interorganizational contexts, the need arises to deepen the literature on value creation and capture in innovation ecosystems through a systematic literature review.	Based on theoretical elements of second paper, this study provides empirical evidence on similarities and differences on the value creation and capture mechanisms in territorial and platform ecosystems. Also, shows that the mechanisms for creating and capturing value are fundamental for the development of an ecosystem.
Status	Published in International Journal of Innovation. Santos, C. A. F., & Zen, A. C. (2022). Value creation and capture in innovation ecosystems. *International Journal of Innovation - IJI*, *10*(Special issue), 483-503.	Presented in XLVI Enanpad Santos, C. A. F., & Zen, A. C. (2022). Criação e Captura de Valor em Ecossistemas de Inovação: uma revisão sistemática da literatura entre 2010 e 2021. Anais do XLVI Enanpad. Published in Journal of Creation of Value. Dos Santos, C. A. F., & Zen, A. C. (2023). Creating and Capturing Value in Innovation Ecosystems: A Systematic Literature Review Between 2010 and 2021. Journal of Creating Value, *10*(1), 550-571.	Presented in VI International Conference on Cluster Research. Santos, C. A. F., & Zen, A. C. (2023). Mechanisms of Value Creation and Capture: an analysis of platform and territorial perspectives. *Proceedings of VI Rethinking Cluster*. Valencia. Presented in XXVI SemeAD as extend abstract. Santos, C. A. F., & Zen, A. C. (2023). Developing Innovation Ecosystems Through Value Creation and Capture Mechanisms: a comparative case study of platform and territorial perspectives. *Annals of XXVI SemeAD*. São Paulo. Submitted in Technological Forecasting and Social Change.

The thesis papers can be related in three aspects: the same theoretical concepts, the different methods adopted in the three papers, and the role of the results of each paper in the development of the subsequent paper. First, the relationship between the three papers can be analyzed from a theoretical standpoint. The thesis situates all three papers within the same theoretical framework concerning the creation and capture of value in innovation ecosystems in both theoretical perspectives' territorial and platform. It can be observed that there was a theoretical progression between the first and last papers. The first paper, in an exploratory manner, indicated that the analysis of value creation and capture in innovation ecosystems can be approached through five elements: process approach, value creation and capture strategies, value creation mechanisms, value capture mechanisms, and multidimensional value. The second paper presents theoretical advancements by discussing, in accordance with the literature on innovation ecosystems, the strategies, mechanisms, and critical success factors associated with each theoretical approach.

The third paper, based on empirical evidence, provides theoretical contributions, and proposes a distinct theoretical model from the first paper. This model explains how value creation and capture occur, considering elements such as actor engagement, innovation ecosystem strategies, actors' value perception, and critical success factors. These elements, when effectively managed, contribute to the development of the innovation ecosystem in emerging economy. Furthermore, the theoretical model allows for analysis from both the territorial and platform theoretical perspectives.

Second, the three papers use different methods to analyze the same theoretical concept. This strategy produces results that are more robust and compelling than single-method studies (Davis et al., 2010). The main intention of the first paper was to present the theoretical differences between the territorial and platform perspectives, identify which theoretical elements are central in the analysis of value creation and capture in interorganizational theoretical fields, and propose an integrative framework for value creation and capture in innovation ecosystems. Therefore, to establish the theoretical foundations of the thesis and identify the relevant theoretical elements to explain the phenomenon, the adopted method was the theoretical essay (Whetten, 1989), which allows for early-stage theoretical mapping of the elements and their potential relationships. In turn, the theoretical elements found in the first paper contributed to the second paper's ability to identify, in a specific and profound way, the strategies, mechanisms, and critical success factors for the creation and capture of value in the literature on innovation ecosystems.

The systematic literature review method was adopted because contributed to construct a solid knowledge base through greater methodological rigor by adopting a replicable, scientific, and transparent process (Tranfield et al., 2003). With the results of the systematic literature review, it was possible to deepen knowledge about the creation and capture of value and refine the construction of a data collection instrument for an empirical study. Therefore, the intention of the third paper was to discover empirical evidence of value creation and capture in two innovation ecosystems. To achieve this objective, a comparative case study was conducted in the Serra do Rio Grande do Sul Region, Southern Brazil. We selected one ecosystem for analysis using the territorial approach (Inova RS) and another using the platform approach (Helix Institute).

Another relevant point of relationship is the existence of a common thread in the construction of each of the studies, as the results of one paper contribute to the preparation of the next paper. The decision to investigate the creation and capture of value in innovation ecosystems was not intentional, nor was it a simple and easy process. The decision arose during the preparation of a bibliometric study on innovation ecosystems in the second half of 2020. In this study, Zen et al. (2023) identified and explored the theoretical foundations of territorial and platform innovation ecosystems. As a result, they initially found that the literature on value creation and capture had relevant studies focusing on the platform approach, such as Adner and Kapoor (2010) and Kapoor and Klueter (2021). However, they found a lack of studies emphasizing the perspective of creating and capturing value in the territorial approach.

Thus, the findings of Zen et al. (2023) allowed the first paper to explore the contributions of theories such as alliances, open innovation, and networks in identifying common theoretical elements for analyzing creation and capture in interorganizational contexts. However, innovation ecosystems have different analysis dynamics compared to alliances (Jacobides et al., 2018), networks, and open innovation. Furthermore, the bibliometrics study conducted by Zen et al. (2023) indicated that the platform and territorial approaches could also present differences in the dynamics of value creation and capture.

The results of the first paper were also significant in enabling the second paper to delve into the discovery of specific contributions in the context of innovation ecosystems regarding the creation and capture of value in both the territorial and platform approaches. Finally, the results of the second paper indicated theoretical contributions regarding strategies, value creation mechanisms, and critical success factors specific to the literature on innovation ecosystems. These findings not only advanced the findings of the first paper but also provided the theoretical foundation for the preparation of a third paper that investigated empirical

evidence of the creation and capture of value in innovation ecosystems. Consequently, the three papers are interconnected through their individual results and provide a guideline that explains the writing trajectory of the papers that form part of this thesis. Table 3 presents the relationships between the specific objectives of the thesis and each of the three papers.

Table 3: Relationship Between Specific Objectives and Papers

Specific Objectives	Paper 1	Paper 2	Paper 3
Identify the key elements of value creation and capture in platform and territorial innovation ecosystems.	X		
Analyze the influence of critical factors of success in value creation and capture in platform and territorial innovation ecosystems.		X	X
Understand the influence of value creation and capture mechanisms in innovation ecosystem development.			X
Propose an integrative framework for analyzing value creation and capture in innovation ecosystems in the context of emerging economies.			X

So, this thesis is primarily justified because value creation and capture are considered a central question for innovation ecosystem field (Khademi, 2020; Yaghmaie et al., 2020). Also, regardless of the type of innovation ecosystem, managing the value creation and capture process is a challenge (Piantoni et al., 2023). Thus, understanding aspects related to both collaboration for value creation and aspects related to competition for value capture can be a differentiating factor for managers and actors participating in territorial and platform innovation ecosystems. The results of this thesis can be utilized by both managers and actors in territorial and platform innovation ecosystems, as well as by researchers in the field.

2. PAPER I:
VALUE CREATION AND CAPTURE IN INNOVATION ECOSYSTEMS

Santos, C. A. F., & Zen, A. C. (2022, July). Value creation and capture in innovation ecosystems. *International Journal of Innovation - IJI*, *10*(Special issue), 483-503. https://doi.org/10.5585/iji.v10i3.21470.

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VALUE CREATION AND CAPTURE IN INNOVATION ECOSYSTEMS

CRIAÇÃO E CAPTURA DE VALOR EM ECOSSISTEMAS DE INOVAÇÃO

CREACIÓN Y CAPTACIÓN DE VALOR EN ECOSISTEMAS DE INNOVACIÓN

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Abstract

Objective of the study: The objective of this theoretical essay is to propose an integrative framework for analyzing value creation and capture in innovation ecosystems.
Methodology: This is a theoretical essay based on a narrative review of the concepts of innovation ecosystems, value creation, and value capture.
Originality/Relevance: The paper theoretically contributes to the analysis of value creation and capture by comparing and contrasting the platform and territorial approaches in innovation ecosystems.
Main results: In analyzing the creation and capture of value in innovation ecosystems, the theoretical similarities and differences between the territorial and platform approaches must be considered. Thus, strategies for creating and capturing value must be designed procedurally, according to each stage of the innovation ecosystem's life cycle. Furthermore, value creation and capture strategies must be aligned, and actors must develop individual and collective mechanisms to create and capture the value in the innovation ecosystem, which can be viewed as a multidimensional value (economic, social, cultural or environmental).
Theoretical/methodological contributions: The article provides a conceptual framework as well as six theoretical propositions for analyzing value creation and capture in innovation ecosystems.
Social/management contributions: The article assists companies, governments, universities, and non-governmental organization managers in considering both the creation and capture of value as drivers for action in innovation ecosystems.
Keywords: Regional innovation. Value appropriation. Innovation ecosystem coordination.

Resumo

Objetivo do estudo: O objetivo deste ensaio teórico é propor um framework integrativo para análise da criação e captura de valor em ecossistemas de inovação.
Metodologia: Este artigo trata-se de um ensaio teórico elaborado a partir de uma revisão narrativa dos conceitos de ecossistemas de inovação e criação e captura de valor.
Originalidade/Relevância: O artigo contribui teoricamente para a análise da criação e captura de valor considerando as diferenças e semelhanças entre as abordagens plataforma e territorial dos ecossistemas de inovação.
Principais resultados: As semelhanças e diferenças teóricas entre as abordagens territorial e plataforma devem ser consideradas na análise da criação e captura de valor dos ecossistemas de inovação. Assim,

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as estratégias de criação e a captura de valor devem ser elaboradas a partir de uma visão processual, de acordo com cada uma das etapas do ciclo de vida do ecossistema de inovação. Além disso, as estratégias de criação de valor devem ser alinhadas com as estratégias de captura de valor e os atores devem desenvolver mecanismos individuais e relacionais para criar e capturar o valor do ecossistema de inovação, que pode ser compreendido como um valor multidimensional (econômico, social, cultural ou ambiental).
Contribuições teóricas/metodológicas: O artigo apresenta uma estrutura conceitual e seis proposições teóricas para análise da criação e captura de valor em ecossistemas de inovação.
Contribuições sociais/para a gestão: O artigo contribui para que gestores empresariais, públicos, gestores universitários e de ONGs considerem tanto a criação quanto a captura de valor como drivers para atuarem em ecossistemas de inovação.

Palavras-chave: Inovação regional. Apropriação de valor. Coordenação do ecossistema de inovação.

Resumen
Objetivo del estudio: El objetivo de este ensayo teórico es proponer un marco integrador para analizar la creación y captación de valor en ecosistemas de innovación.
Metodología: El presente es un ensayo teórico que se basa en una revisión narrativa de los conceptos de ecosistemas de innovación, creación de valor y captación de valor.
Originalidad/relevancia: El artículo contribuye de forma teórica al análisis de la creación y captación de valor al comparar y contrastar los enfoques territoriales y de plataforma en los ecosistemas de innovación.
Resultados principales: Al analizar la creación y captación de valor en los ecosistemas de innovación, se deben considerar las similitudes y diferencias teóricas entre los enfoques territoriales y de plataforma. Así pues, las estrategias de creación y captación de valor deben diseñarse de manera procedimental, de acuerdo con cada etapa del ciclo de vida del ecosistema de innovación. Además, las estrategias para crear y captar valor deben estar alineadas, y los actores deben desarrollar mecanismos individuales y colectivos para crear y captar el valor en el ecosistema de la innovación, el cual puede entenderse como un valor multidimensional (económico, social, cultural o ambiental).
Aportaciones teóricas/metodológicas: El artículo ofrece un marco conceptual, así como seis proposiciones teóricas para analizar la creación y la captación de valor en los ecosistemas de innovación.
Aportaciones sociales/de gestión: El artículo ayuda a los gestores de empresas, gobiernos, universidades y organizaciones no gubernamentales a considerar tanto la creación como la captación de valor como motores de la acción en los ecosistemas de innovación.

Palabras clave: Innovación regional. Apropiación de valor. Coordinación de ecosistemas de innovación.

Introduction

Innovation ecosystems have gained great attention in the academic and management fields overthe last two decades (Dias Sant'Ana, 2020; Gomes *et al.*, 2018). During this period, research in this areahas advanced in two directions. The main approach (platform) examines innovation ecosystems (Adner, 2006; Adner & Kapoor, 2010) from the perspective of a hub company that interacts with other organizations to create and capture economic value (Pellikka & Ali-Vehmas, 2016). The second approach views the territory as a central element in innovation ecosystems (Scaringella & Radziwon, 2018; Piqué, Miralles & Berbegal-Miraben, 2019) and analyzes innovation ecosystems as a group of actors who create value in a geographical context, such as a city or region. In order to capture this value, both approaches study organizations' collaborative actions in value creation activities that they could not achieve operating alone (Ritala & Tidström, 2014).

Value creation in these ecosystems is a complex issue, as an innovation ecosystem is an arrangement formed by different types of actors. Thus, the value created in an ecosystem can be multidimensional, as well as economic, social, cultural (Ben Letaifa, 2014), or environmental (Oskam,Bossink & De Man, 2021), and thus subjective (Chesbrough, Lettl & Ritter, 2018), assuming multiple dimensions, such as status, influence, social relationships or intrinsic satisfaction (Cabral *et al.*, 2019).

Value creation and capture have been analyzed through the perspective of inter-organizational networks (Ritala & Tidström, 2014), open innovation (Chesbrough *et al.* 2018; Dell' Era *et al*., 2020), alliances (Lavie, 2007; Adegbesani & Higgins, 2010) and business and knowledge ecosystems (Clarysse *et al.*, 2014).

Moreover, value creation and capture have been studied in the innovation ecosystem literature primarily through the platform ecosystem approach (Schreieck, Wiesche & Krcmar, 2021) and from the perspective of companies and/or hub firms (Ritala *et al.*, 2013; Oh, Koh & Raghunathan, 2015), and to a lesser extent through how other actors influence the creation and capture of value in ecosystems (Khademi, 2020). Few studies in the territorial approach have assessed the creation and capture of value in cities or regions (Visnjic *et al.*, 2016; Radziwon, Bogers, & Bilberg, 2017).

Nonetheless, the literature on innovation ecosystems has primarily addressed the economic dimension while ignoring the social, environmental, and cultural dimensions of value. Despite this increased attention, the complexity of ecosystem structures and the ambiguity of understanding concepts such as value creation and capture in ecosystems have resulted in fragmented contributions from researchers (Khademi, 2020). In this regard, we found no studies in the literature on innovation ecosystems that highlights the similarities and differences of theoretical approaches to innovation ecosystems, as well as how these differences can interfere with the analysis of value creation and capture. Thus, a theoretical understanding of value creation and capture is required, taking into account the proximity and differences between the territorial and platform approaches.

The central argument of this theoretical essay is that differences in platform and territorial approaches result in different types of organizational objectives and different value perceptions among the actors in an innovation ecosystem (universities, companies, government and civil society). Thus, the goal of this theoretical essay is to propose an integrative framework for analyzing value creation and capture in innovation ecosystems that considers the differences between the territorial and platform approaches. To accomplish this objective, we developed a theoretical essay (e.g., Whetten, 1989; and Meneghetti, 2011) that was created from a narrative review of the concepts of innovation ecosystems and value creation and capture using searches in the Web of Science and SCOPUS databases on these two topics.

This article is justified by the urge for a theoretical understanding of the similarities and differences between territorial and platform approaches to innovation ecosystems in terms of value creation and capture. According to Bogers, Sims, and West (2019), future research should investigate how multilateral interdependencies among ecosystem members influence value creation and capture. When public actors and non-profit organizations are included in this network of organizations that create and capture value, this understanding becomes even more vital (Cabral *et al.*, 2019).

The contributions of this conceptual article can help future studies analyze the strategies and mechanisms by which actors create and capture value in innovation ecosystems, while taking into account the differences between the territorial and platform approaches. The advancement of this understanding can contribute to explain why actors such as universities, government agencies, and civil society participate in innovation ecosystems when they see value creation potential. However, these actors are frequently unable to identify mechanisms for capturing this value. As a result, future public policies can consider both value creation and value capture as drivers for motivating and engaging actors in innovation ecosystems.

This article is organized as follows: it begins with a discussion of the conceptual foundations of innovation ecosystems, as well as the creation and capture of value at the organizational and inter-organizational levels. Next, the essay proposes an integrative framework for analyzing value creation and capture in innovation ecosystems using the territorial and platform approaches, as well as six theoretical propositions. Finally, the study presents its final considerations.

2 Innovation ecosystems: platform and territorial approaches

Adner (2006) defined the concept of innovation ecosystem as "the collaborative arrangements through which firms combine their individual offerings into a coherent, customer-facing solution" (Adner, 2006, p. 2) following Moore's seminal publication on business ecosystems (Moore, 1993). Several authors then proposed definitions for this concept (Carayannis & Campbell, 2009; Adner & Kapoor, 2010; Gomes *et al.*, 2018; Granstrand & Holgersson, 2020). Regardless of the different theoretical perspectives, actors, relationships, cooperation, competition, co-evolution, and value creation elements pervade these definitions. Ecosystem management is another important aspect. Because there are no formal contracts, ecosystem leaders must persuade other actors to make contributions that are consistent with the ecosystem's value offering through orchestration (Autio, 2022).

The subsections that follow present two theoretical perspectives on innovation ecosystems: platform and territorial. The goal is to understand the similarities and differences between these approaches in terms of actors, relationship characteristics, value creation, ecosystem life cycle, and ecosystem management.

2.1 Innovation ecosystems: platform approach

An innovation ecosystem is defined in this approach as "a network of interconnected organizations, connected to a focal firm or a platform, that incorporates both production and use side participants, and creates and appropriates new value through innovation" (Autio & Thomas, 2014, p. 2). A platform is a mechanism for improving performance and generating new technologies for creating value in innovation ecosystems (Adner & Kapoor, 2010).

According to this viewpoint, a dominant company plans and proposes a platform, defined as a common service/product asset that actors can use to develop their offerings and achieve complementary innovations, in each innovation ecosystem. This market leader in the innovation ecosystem defines common goals, aligning participants' capabilities to drive innovation, value creation, and sharing among participants (Gawer, 2014; Gawer & Cusumano, 2014; Kwak *et al.*, 2017).

Value is defined as the economic gains resulting from company innovations in products/services offered to the market. On the one hand, there is value creation based on collaborative relationships between companies at each stage of the ecosystem's life cycle (Moore, 1993). On the other, the gains from the products/services must be captured by these actors through competition relations for market shares superior to competitors or through market penetration in new markets.

In terms of actors, this approach's research focuses primarily on the perspective of the hub company/ecosystem leader (Nambisan & Baron, 2013), with less emphasis being placed on the role of actors such as universities, government, and non-profit organizations (Borges *et al.*, 2019). According to Gomes *et al.* (2021), ecosystem research should conduct additional studies on the perspectives of non-focal or non-leading actors. Interdependent relationships (Jacobides, Cennamo & Gawer, 2018) between the hub firm and suppliers, customers, universities, and government are considered when constructing an innovation ecosystem with the goal of providing products/services to customers.

An innovation ecosystem is defined as an interdependent community of heterogeneous participants (Thomas & Autio, 2020; Gomes *et al.*, 2021), which requires some form of governance, whether decentralized or centralized (Bogers *et al.*, 2019). Orchestrating this network of partners is critical to achieving innovation goals (Yaghmaie & Vanhaverbeke, 2019), but it is a challenge due to the lack of formal contracts (Autio, 2022). Therefore, each stage of the ecosystem's lifecycle requires a different strategy and activity orchestration (Autio, 2022).

Concerning the limits, the platform approach has not included discussions about the ecosystem's territorial delimitation. Actors, on the other hand, are constrained by their complementarity (Gomes *et al.*, 2021), which can occur with local organizations or with organizations from other regions and countries.

2.2 Innovation ecosystems: territorial approach

Economic geography emphasizes the spatial dimension of ecosystems, which are defined as institutional, geographic, economic, or industrial contexts that can be analyzed at various levels, such as industries, universities, regions, and nations (Feldman, Siegel & Wright, 2019). Ecosystems are defined by their territorial boundaries and geographical proximity, rather than by a platform or technology (Jackson, 2011).

Territorial approach studies predate the concept of innovation ecosystems (see Lundvall, 1992; Nelson, 1993; Asheim & Gertler, 2005). Scaringella and Radzivon (2018) identify the presence of common elements in a given territory, such as a distinct atmosphere and shared values (trust, belonging to a community, mutual understanding built over time through shared culture and routine), in addition to a solid base economy with agglomeration economies and localized spillovers. In the social realm, the coexistence of collaboration and competition, of social and human capital, of knowledge and its transfer through intensive learning are factors that can result in outcomes such as innovation/entrepreneurship and economic growth and development (Scaringella & Radziwon, 2018).

This territory includes various ecosystem actors such as companies, research institutes, universities, civil society organizations, and legislators (Scaringella & Radziwon, 2018; Santos, Zen & Bittencourt, 2021). When these actors propose innovations in a geographic context, they create value for reasons other than those examined by the platform approach. Community, brand, social commitment, social responsibility, economic development, and innovation are organizational outcomes that some actors can leverage by being co-creators in regional ecosystems. Thu, value has economic, social, environmental, and cultural components (Ben Letaifa, 2014; Oskam *et al.*, 2021).

Therefore, each actor is motivated to create value (Cunningham, Menter & O'Kane, 2017). The main motivation for the university is reputation; for the government, public goods; for industry, profit; and for civil society, prices (Cunningham *et al.*, 2017). Regardless of these differences, a balance of interests of the actors involved is required to create collaborations that encourage the various parties to develop together (Valkokari *et al.*, 2017).

The territorial approach allows for the analysis of innovation ecosystems at different levels, such as an urban district (Piqué *et al.*, 2019), a city (Visnjic *et al.*, 2016), or a region (Markkula & Kune, 2015). The regional innovation ecosystem is one of the key concepts, and it consists of multiple technological innovation organizations and multiple technological innovation environments in a region (Huang, 2003), including universities, government, businesses, and civil society. Orchestrators facilitate activities and play critical roles in unlocking the full potential of innovation in the region's ecosystem. The regional ecosystem's active orchestration revolves around concepts such as knowledge co-creation and exploitation, opportunity exploration, and empowerment (Markkula & Kune, 2015).

Another critical component is the understanding of the life cycle concept, which is associated with the ecosystem. An urban district's innovation areas evolve in four stages: initiation, launch, growth, and maturity (Piqué *et al.*, 2019), and different strategies are more effective at engaging and mobilizing

actors for joint development actions at each stage of developing an innovation ecosystem (Santos, Zen & Bittencourt, 2021).

Thus, research on innovation ecosystems has advanced in platform and territorial approaches, revealing both similarities (interdependence between actors, collaboration and competition relationships, and the joint co-evolution of actors and the ecosystem at various stages of development) and differences: The platform approach emphasizes the development of products and services with a focus on value creation between companies; and territorial ecosystems, with the goal of developing innovations aimed at the economic, social, environmental, and cultural development of a geographically defined area.

Table 4: *Main differences and similarities between innovation ecosystems approaches*

Elements	Platform approach	Territorial approach
Definition	Collaborative arrangements through which companies combine their individual offerings into a coherent customer-facing solution (Adner, 2006).	Ecosystems can be analyzed at different levels of aggregation, such as companies, industries, universities, regions and nations. (Feldman *et al.*, 2019)
Limits	Actors are limited by their complementarity (Gomes *et al*., 2021) and not by their geographic limits.	It emphasizes the spatial dimension of ecosystems (Feldman *et al.*, 2019) with geographic proximity to their entities (Jackson, 2011; Scaringella & Radzivon, 2018), delimited by an urban district (Piqué *et al.*, 2019), a city or a region (Markkula & Kune, 2015).
Actors	Emphasis on companies and a hub firm (Adner, 2006; Adner & Kapoor, 2010; Nambisan & Baron, 2013)	Emphasis on the heterogeneity of actors such as universities, companies, government and civil society (Piqué, *et al.*, 2019; Zen *et al.*, 2021)
Characteristics of Relationships	Relationships of interdependence, collaboration and competition (Moore, 1993; Adner, 2006)	Relationships of interdependence, collaboration and competition (Scaringella & Radzivon, 2018)
Value Dimensions	Economic (Adner & Kapoor, 2010)	Economic, social, cultural. (Ben Letaifa, 2014; Scaringella & Radzivon, 2018)
Life cycle	Birth, expansion, leadership and author renewal or death (Moore, 1993).	Beginning, launch, growth and maturity (Piqué *et al.*, 2019; Santos *et al.*, 2021)

Source: From authors' authority.

In this way, the definition, limits, diversity, and heterogeneity of actors, as well as the final goal, differ between the platform and territorial approaches, making the perception of value and the relationships between the actors more complex and diffuse. Consequently, the value creation and capture analyses of these approaches cannot be understood in the same way.

Value creation and capture at organizational and inter-organizational levels

The creation and capture of value have been the subject of research at the organizational and inter-organizational levels (networks, alliances, open innovation and ecosystems). These contributions lay the groundwork for the identification of five theoretical dimensions of value creation and capture: procedural approach, value creation and capture strategies, value creation mechanisms, value capture mechanisms, and multidimensional value.

Procedural Approach. Value creation and appropriation objectives should be viewed as dynamic phenomena that change over time during the relationship (Ritala & Tidström, 2014). Chesbrough and Appleyard (2007) present the "open strategy," which aims to strike a balance between value capture and value creation rather than losing sight of value capture in the pursuit of innovation. The value varies according to the stage of the ecosystem (Khademi, 2020).

The stages of ecosystem development have been used to analyze value creation and capture (Ben Letaifa, 2014; Ritala *et al.*, 2013). In the early stages, there is a high value placed on co-creation and a low value placed on capture (Ben Letaifa, 2014). There is high value co-creation and capture during the development or expansion stage (Ben Letaifa, 2014). Then, there is low value creation and high value capture during the maturity stage (or its inability to create more value). When value capture goes beyond value creation, the ecosystem must focus on value co-creation or renew itself. Low value creation and capture occur during the renewal or death stage. At this point, there is little value capturing. To dismantle their network, members must work together. If this happens, they can either restart their innovation process or collaborate to regenerate their ecosystem (Ben Letaifa, 2014). Thus, at each stage, organizations must implement collaboration and competition strategies that adhere to the aforementioned value creation and capture characteristics. According to Seo *et al.* (2015), the informal strategy (secrecy and lead time) is effective during the invention stage. The combination of formal (patents) and informal strategies results in increased productivity during the commercialization phase.

Value Creation and Capture Strategies: Individual performance and the capture of the value of a company's innovation are becoming increasingly dependent on the ability to manage assets and resources outside of its direct control; thus, the strategic perspective of innovation ecosystems, such as co-creation, networking, and interaction with innovation ecosystem partners, play a critical role (Pellikka & Ali-Vehmas, 2016). This requires leaders to develop a strategy that considers: continuous orchestration, continuous encouragement from complementary agents and suppliers, continuous business model review, and continuous ecosystem performance (Khademi, 2020). This procedural characteristic of value creation and capture is an important factor to consider. Thus, value creation and capture must be strategically aligned, and once achieved, both value creation and capture must be maintained and monitored to ensure that such alignment is kept (Sjödin *et al.*, 2020).

Value Creation Mechanisms. When writing about competitive advantage, Porter (1985) states that new value is created when companies develop new ways of performing tasks, new methods or

technologies. Sjödin *et al.* (2020, p. 161) define value creation as "sets of activities that enable providers and customers to progressively realize this higher value." Thus, value creation is the result of various types of activities, such as input acquisition and product and service creation. Value creation was defined by Ritala *et al.* (2013, p. 5) as "the collaborative processes and activities that create value for customers and other stakeholders." This product is the result of R&D activities, company maintenance, and value realization activities such as marketing and customer relationships (Bowman & Ambrosini, 2007). Therefore, value is created when the willingness of a buyer to pay for a product or service exceeds the opportunity cost (Brandenburger & Stuart, 1996).

Companies in networks use the network to identify value creation synergies (Ritala & Tidström, 2014). Value creation requires relationship-specific assets, knowledge sharing routines, and the establishment of effective governance mechanisms (Dyer, Singh & Hesterly, 2018). Organizations must use the network's cooperative relationship to create individual value for the company by combining company and network resources to create value for themselves (Ritala & Tidström, 2014).

Value creation mechanisms in alliances increase the focal company's ability to generate value from its relationships with partners by pursuing shared goals and diversifying activities that contribute to the overall value of the alliance (Lavie, 2007) or multiple concurrent alliances (Wassmer & Dussauge, 2011).

The emphasis in open innovation processes is on the interactions of companies with various external actors (creative individuals, innovation communities, universities, customers, suppliers, competitors, and companies from other industries) to create value (Dell Era *et al.*, 2020). Value creation can occur in open innovation by providing resources to an external organizational partner who values or uses this resource in its processes (Chesbrough *et al*., 2018).

Value Capture Mechanisms. The process of capturing value can be defined as either the negotiation/bargaining between the company and the buyer, which determines the price of this value (Brandenburger & Stuart, 1996) or as the process of ensuring profits from value creation and distributing these profits among the participants, like suppliers and partners (Sjödin *et al.*, 2020). Value capture was defined by Ritala *et al.* (2013, p. 248) as "the individual firm level actualized profit-taking; that is, how firms eventually pursue to reach their own competitive advantages and to reap related profits." Value capture is influenced by competition, as an increase in supply can reduce the exchange value (Lepak *et al.*, 2007). To increase value capture, organizations can implement isolation mechanisms, which are physical or legal knowledge barriers that prevent a competitor from replicating a product or service (Lepak *et al.*, 2007). The value created by one level of analysis (individual and/or organizational) can be captured by another (social). This is referred to as process value slippage by Lepak *et al.* (2007).

Patents, secrecy, lead time advantages, and investments in complementary assets are the primary value capture mechanisms (James *et al.*, 2013). Companies maximize value capture in their relational strategy by leveraging joint capabilities for value appropriation in line with the network's common

benefits (Ritala & Tidström, 2014). Capabilities to capture value are linked to contract elaboration, governance, and negotiation during alliance formation. Capabilities to capture value are also linked to intra-firm routines for learning and knowledge transferring, absorption capacity, monitoring, and governance in the post-training stage (Wang & Rajagopalan, 2015).

Internal assets (physical, traditional reputational, organizational, financial, intellectual, and technological) and business models must be designed to capture value in open innovation processes (Dell Era *et al.*, 2020). The value capture process entails appropriating a portion of the value created and is defined as the process of negotiating access to and/or ownership of resources in exchange for providing value to a partner (Chesbrough *et al.* 2018).

Furthermore, value capture mechanisms differ depending on determinants such as actor role, stage of value creation and capture, type of interaction between actors, mutuality of intentions, and the actor's position in the ecosystem structure (Khademi, 2020). Value has multiple dimensions, including social, cultural, environmental, and economic. As a result, according to Ben Letaifa (2014, p. 282), it is "myopic to evaluate the value of such socioeconomic keystones exclusively by assessing their annual balance sheets." Thus, community, brand, social commitment, social responsibility, and economic development are organizational outcomes that some socioeconomic actors can leverage by being ecosystem co-creators (Ben Letaifa, 2014).

Multidimensional Value. Value, because it lacks a concrete definition, can be understood as a subjective concept with various representations depending on individual or organizational interests and perceptions (Schneider & Sachs, 2017). Thus, the definition of value varies depending on the type of organization and can be perceived as ecosystem or multi-actor (Ben Letaifa, 2014).

The literature on value creation and capture has focused on the economic value created by businesses and has used value concepts that are aligned with customer perceptions. This essay, on the other hand, sheds light on the perceived value by universities, government, civil society and companies. These ecosystem actors all have different objectives. Thus, value must be understood as multidimensional (Lepak, Smith, & Taylor, 2007), with economic, social, cultural, and environmental dimensions. (Ben Letaifa, 2014; Oskam *et al.*, 2021).

Therefore, the literature presents the following theoretical dimensions: procedural approach to value creation and capture, value creation and capture strategies, individual and collective value creation mechanisms, individual and collective value capture mechanisms, and multidimensional value. These dimensions are summarized in Table 5.

Table 5: *Contributions from the Value Creation and Capture Literature*

Dimensions	Concept	Conceptual Basis
Procedural Approach	• Planning strategies for creating and capturing value throughout the stages of an innovation ecosystem's life cycle.	Ben Letaifa (2014) Ritala and Tidström (2014)
Value creation and capture Strategies	• Aligning value creation strategies with value capture strategies. • Developing individual and collective value creation and capture strategies.	Chesbrough and Appleyard (2007), Sjödin *et al.* (2020) Pellikka and Ali-Vehmas (2016).
Individual and collective value creation mechanisms	• Each actor has a motivation to create value: reputation, public goods, profit, price. • Establishing collaborative value creation processes and activities that enable providers and customers to achieve a higher value. • Value creation mechanisms are tangible (they connect actors) and intangible (clear communication, trust and common vision among actors). • The value creation mechanisms can be the creation of products and services, the research and development activities and the company's maintenance activities.	Ritala *et al.* (2013), Sjödin *et al.* (2020), Bowman e Ambrosini (2007), Cunningham *et al.* (2017).
Individual and collective value capture mechanisms	• Patents, industrial secrecy, lead time, complementary assets and bargaining are value capture mechanisms. • Revenue distribution among ecosystem members is a value capture mechanism. • Reputational, organizational, intellectual, human and technological assets are value capture mechanisms. • The motivation of each actor, guaranteeing the understanding of the objectives and business needs of the different actors are value capture mechanisms.	James *et al.* (2013), Brandenburger and Stuart (1996), Lepak *et al.* (2007), Pellikka and Ali-Vehmas (2016), Ritala *et al.* (2013), Khademi (2020), Ben Letaifa (2014), Dell Era *et al.* (2021)
Multidimensional value	• The value created and captured is multidimensional: economic, social, environmental and cultural.	Ben Letaifa (2014), Lepak *et al.* (2007), Oskam *et al.* (2021)

Source: From authors' authority.

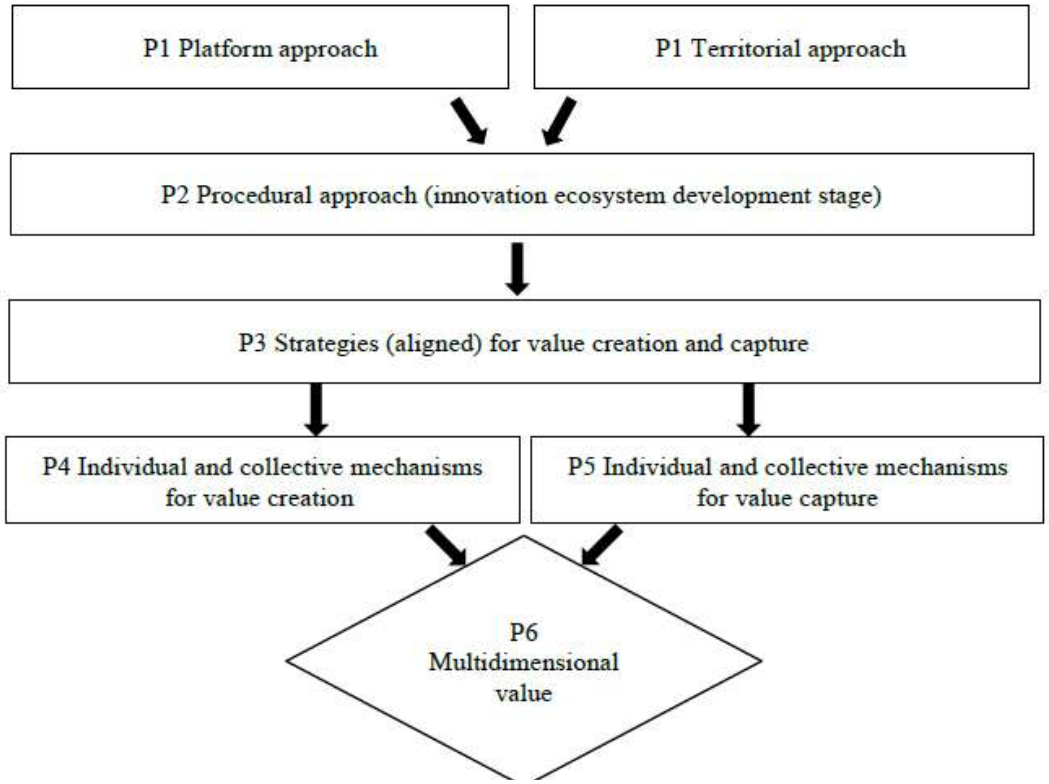
In summary, the publications emphasize the dimension of economic value and the importance of inter-actor relationships in value creation. Value capture, on the other hand, is primarily dependent on individual strategies and negotiation skills to capture a portion of the value created. As a result, the complexity of the relationship between value creation and capture grows as it becomes necessary to collaborate to create value and compete to capture a portion of this collectively created value. Based on the contributions of these authors, it is possible to advance in the theoretical understanding of the creation and capture of value in innovation ecosystems.

4 Integrative framework for the creation and capture of value in innovation ecosystems

We propose an integrative framework to analyze the creation and capture of value in innovation ecosystems based on the theoretical discussion presented (Figure 3). The integrative framework is described first, followed by the six theoretical propositions. The framework is divided into six dimensions: theoretical approach (platform or territorial), procedural approach of value creation and capture, value creation and capture strategies, value creation mechanisms, value capture mechanisms,

and multidimensional value. The arrows represent the interdependence between these dimensions. Initially, we argue that the first step in the analysis of value creation and capture in innovation ecosystems is a positioning/decision by researchers about which theoretical approach (platform or territorial) will be used.

Figure 3. *Integrative Framework for Value Creation and Capture in Innovation*



Source: From authors' authority.

Next, it is recommended to take a procedural approach to value creation and capture, as these are processes that must be analyzed throughout the various stages of the innovation ecosystem's development. The next step is to create and capture value through individual and collective mechanisms. These mechanisms must be established based on the type of value perceived by each actor, which can be multidimensional (economic, social, cultural, or environmental) and varies based on the organizational objectives of each actor in the innovation ecosystem. We developed six theoretical propositions for the analysis of value creation and capture in innovation ecosystems based on the literature presented in this article.

The study's central argument is that different types of organizational objectives result in different mechanisms and strategies for value creation and capture. As a result of these differences in objectives, different perceptions of value emerge among universities, companies, governments, and civil society. Thus, both the territorial approach and the platform can use the integrative framework as long as the

following differences between the approaches are observed. Initially, these are approaches with different theoretical foundations. The territorial approach emphasizes innovations in a geographically limited context (Scaringella & Radzivon, 2018; Feldman *et al.*, 2019), whereas the delimitation in the platform approach is determined by the complementarity of actors (Gomes *et al.*, 2021). The platform approach emphasizes companies and hub firms (Adner, 2006; Adner & Kapoor, 2010), whereas the territorial perspective addresses the heterogeneity of actors (Piqué *et al.*, 2019; Zen *et al.*, 2021). These distinctions result in different types of organizational objectives and value perceptions to be created and captured in innovation ecosystems. In this sense, we propose that researchers take a theoretical stance in relation to both approaches. Proposition 1 is derived from this literature review:

> P.1: *"The platform approach or the territorial approach can be used to analyze the creationand capture of value in innovation ecosystems."*

The stages of ecosystem development interfere in value creation and capture strategies in innovation ecosystems for both the platform and territorial approach. Just as the literature on innovation ecosystems has identified that different strategies are more effective in engaging and mobilizing actors in the development of the different stages of an innovation ecosystem through the platform (Autio, 2022) and territory (Piqué *et al.*, 2019; Santos *et al.*, 2021), value creation and capture strategies must also consider these stages of development. Therefore, as the ecosystem evolves, the creation and capture strategies must be developed/readapted so that the organization can participate in value creation at the appropriate time and devise appropriate value capture strategies for each stage of development of ecosystems (Ben Letaifa, 2014). With this, it is necessary to adopt a procedural approach to analyze value creation and capture strategies. As a result, proposition 2 is derived from the literature:

> P.2: "*The value creation and capture strategies are procedural in nature and are dependent onthe stage of development of the innovation ecosystem*."

Keeping these two strategies aligned and making efforts to maintain this alignment is just as important as adopting strategies for value creation and capture (Sjödin *et al.*, 2020). Contributing to value creation does not automatically imply capturing value, as they are distinct but interdependent processes (Oskam *et al.*, 2021). The creation and capture of value in the innovation ecosystem must be planned at both the creation and management stages (Ritala *et al.*, 2013). The success of the innovation ecosystem is determined by value capture, which is influenced by knowledge flows related to value creation (Radziwon *et al.*, 2017). Thus, a balance between value creation strategies is recommended, particularly when companies collaborate in the co-creation of value and are unable to adopt value capture strategies during the search for innovation, because sustaining a business model requires capturing a portion of the value created by innovation (Chesbrough & Appleyard, 2007). As a result of this analysis, proposition 3 is developed:

P.3: "*Each actor in the innovation ecosystem must coordinate their value creation and capture strategies.*"

Based on their value creation and capture strategies, each actor must establish collective value creation mechanisms: collaborative value creation activities for customers and other stakeholders that enable end users to perceive higher value in this product/service (Adner & Kapoor, 2010; Sjödin *et al.*, 2020). Companies, universities, governments, and civil society all have different reasons for creating value, such as reputation, profit, public goods, and price (Cunningham *et al.*, 2017).

Companies use the network to identify value creation synergies (Ritala & Tidström, 2014), and the specific assets of relationships, such as knowledge sharing routines, are critical for value creation (Dyer *et al.*, 2018). Thus, value creation should be a goal of the relational strategy, with the co-competitive relationship serving as a source of mutual value creation by combining network resources and capabilities to create common benefits for the entire network. Similarly, they should leverage the network's cooperative relationship to generate individual value for the company by combining company and network resources to generate value for themselves (Ritala & Tidström, 2014). These mechanisms can be both tangible and intangible, such as clear communication, attracting actors, and building trust and a shared vision among actors (Ritala *et al.*, 2013).

Individually, this value is created through investment in research and development activities, as well as activities related to product and service creation, in addition to company maintenance operations (Porter, 1985; Bowman & Ambrosini, 2007). As a result of this research, proposition 4 is developed:

P.4: "*Each actor in an innovation ecosystem must develop individual and collective value creation mechanisms based on value creation and capture strategies.*"

Each actor must establish individual and collective value capture mechanisms based on value creation and capture strategies. Patents, industrial secrets, lead time advantages, and investments in complementary assets are examples of individual value capture mechanisms commonly used by businesses (James *et al.*, 2020). Thus, while some value capture mechanisms are individual, capturing the value of a company's innovation is also dependent on collective aspects, such as the ability to manage assets and resources that are not directly under its control (Pellikka & Ali-Vehmas, 2016). Internal reputational, organizational, intellectual, human, and technological assets can also capture value (Dell Era *et al.*, 2021), as can revenue distribution among ecosystem members (Khademi, 2020). Therefore, from this literature, proposition 5 is elaborated:

P.5: "*Each actor in an innovation ecosystem must develop individual and collective value capture mechanisms based on value creation and capture strategies.*"

Value is also an important concept to grasp when attempting to comprehend the creation and

capture of value in innovation ecosystems. Contributions on the creation and capture of value frequently present the economic dimension of value (Brandenburger & Stuart, 1996; Sjödin *et al.*, 2020), primarily because they analyze value from the company's perspective. However, in a territorially analyzed innovation ecosystem, the heterogeneity of actors (Piqué *et al.*, 2019; Santos *et al.*, 2021) generates multiple interests and objectives (Cunningham *et al.*, 2017). Thus, value is understood to be multidimensional in this context (Lepak *et al.*, 2007), as it can be economic, social, environmental, and cultural for each of the various organizations that comprise an innovation ecosystem (Scaringella & Radzivon, 2018; Oskam *et al.*, 2021). As a result of this research, proposition 6 is created:

P.6: "*The value created and captured in the innovation ecosystem is multidimensional and canbe economic, social, environmental, or cultural in nature.*"

Therefore, it is understood that the actors in an innovation ecosystem must have value creation and capture strategies that are aligned with and in accordance with each stage of the innovation ecosystem's development. The concept of value creation and capture strategy differs from the concept of value creation and capture mechanism in this context. Strategies are each actor's intentions and plans for creating and capturing value. And the value creation and capture mechanisms are the value creation and capture practices/activities, or how each actor created and captured (benefited) by participating in innovation ecosystem projects.

In this sense, when participating in an innovation ecosystem, actors (primarily universities, government agencies, and civil society) must be clear about their individual goals. Furthermore, they must develop strategies and mechanisms to capture these values and benefits as they participate in each stage of development of the innovation ecosystem. Similarly, actors must understand how they can contribute to the establishment of common collective goals established by the innovation ecosystem, as well as develop mechanisms to aid in the creation and co-creation of these benefits for the innovation ecosystem.

5 Final considerations

The objective of this essay is to propose an integrative framework for analyzing value creation and capture in innovation ecosystems that considers the differences between territorial and platform approaches. Three theoretical contributions were presented in this article. Initially, the platform and territorial approaches were presented in relation to theoretical elements such as definition, actors, relationship nature, created value, limits, and ecosystem life cycle. Second, five theoretical dimension of value creation and capture were identified: multidimensional value, value creation mechanisms, value capture mechanisms, procedural approach, and value creation and capture strategies. The third and most important contribution was the six theoretical propositions and conceptual model for analyzing the

creation and capture of value in innovation ecosystems, as well as the possibility of applying the framework for analyzing innovation ecosystems using both the territorial and the platform approach.

We argue that the differences between platform and territorial approaches (the heterogeneity of actors, differences in organizational objectives, and different perceptions of value) are elements that require attention in studies on the creation and capture of value in innovation ecosystems. In this sense, we highlight the theoretical foundations of each approach so that future research can progress in relation to ecosystems as a platform as well as territorially delimited ecosystems.

This essay also presented empirical contributions. Although the creation and capture of value in businesses has been well documented in the literature, university, government, and civil society managers require management tools on this subject as well. Second, it contributes to the development of public policies that consider value creation and capture as drivers to motivate and engage actors in innovation ecosystems. Because by identifying the mechanisms for generating and capturing these diverse actors, public policies can be tailored to the needs of each actor and, as a result, to the innovation ecosystem itself.

However, there are some limitations to the article. Since this is a theoretical study, additional research based on the propositions presented here is required. Future empirical studies may shed new light on value creation and capture in innovation ecosystems. One suggestion is to conduct empirical research at different territorial levels (such as cities or regions) or on different business sector platforms to identify similarities and differences in these actors' mechanisms and strategies for value creation and capture in relation to each of these methods.

Because it is associated with the collaborative activity of the actors in the proposal of a new product/service, value creation has received more attention in innovation ecosystems. The end consumer looks for a product and/or service, and value is created for the consumer, according to the platform. The final goal of the territorial approach is society, as innovations seek to develop the geographically delimited territory. When analyzed within a city or region, many actors in an innovation ecosystem do not have deliberate competitive strategies (mainly to non-profit organizations, public universities, public agencies). However, in order to capture multidimensional value from their collaborations in innovation ecosystems, these actors must plan and execute strategies as well as establish mechanisms. As a result, actors in innovation ecosystems (as defined by the territorial approach) must consider whether a large number of ideas have a positive impact on the innovation of their organizations, as well as whether and how this value is captured.

The argument advanced in this essay emphasizes the importance of understanding the interdependent relationships between actors' strategies for value creation and capture and their mechanisms for creating and capturing value in an innovation ecosystem. As a result of better clarifying the dynamics of value creation and capture in innovation ecosystems, it is expected to contribute to regional economic, social, and cultural development, as innovation ecosystems have been identified as a relevant force to generate regional development.

Authors' contributions

Contribution	Santos, C. A. F. dos	Zen, A. C.
Contextualization	X	X
Methodology	X	X
Software	X	
Validation	X	X
Formal analysis	X	X
Investigation	X	
Resources	X	X
Data curation	X	X
Original	X	
Revision and editing	X	X
Viewing	X	X
Supervision		X
Project management	X	X
Obtaining funding		X

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3. PAPER II:
CREATING AND CAPTURING VALUE IN INNOVATION ECOSYSTEMS: A SYSTEMATIC LITERATURE REVIEW BETWEEN 2010 AND 2021

Santos, C. A. F., & Zen, A. C. (2022). Criação e Captura de Valor em Ecossistemas de Inovação: uma revisão sistemática da literatura entre 2010 e 2021. In. XLVI Encontro da Anpad, Online. http://www.anpad.org.br.

Santos, C. A. F., & Zen, A. C. (2023). Creating and Capturing in Innovation Ecosystems: a systematic literature review between 2010 and 2021. *Journal of Creating Value*, *Vol. 10*(1). https://doi.org/10.1177/23949643231185656

Creating and Capturing Value in Innovation Ecosystems: A Systematic Literature Review Between 2010 and 2021

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Abstract
Value creation and capture in innovation ecosystems has been researched from two different perspectives: territorial (analysing city/regions) and platforms (ana- lysing hub companies/firms). However, there is a gap in relation to the similaritiesand differences of value creation and capture for each of these perspectives of innovation ecosystems. Thus, our objective is to identify, through a systematicreview, what are the contributions of the platform and territorial perspectives to the literature on value creation and capture in innovation ecosystems. We used Web of Science database and analysed 42 articles in English issued between 2010 and 2021. Our results identified similarities in the dimensions strategies,mechanisms of value creation and procedural view, as well as differences in relation to mechanisms of value capture, critical factors of success and value dimensions for each of the perspectives. At the end, we suggested an investiga- tion agenda for future studies in these field.

Keywords

Innovation management, innovation strategy, value appropriation

Introduction

In 2010, Adner and Kapoor wrote one of the most relevant articles in the field of innovation ecosystems (1,178 citations in the Web of Science database by

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February 2023). In their publication, the authors examined the relationship between the sequence and structure of value creation and the results of competition for value capture in innovation ecosystems. Building upon this perspective, in our article, we also consider that value creation is dependent on the subjective perception of a designated user who serves as the central figure in the creation of value (Lepak et al., 2007). Thus, value is established by the beneficiary (Vargo & Lusch, 2008) and can be phenomenological, co-created, emergent and multidimensional (Vargo et al., 2017). Based on an innovation ecosystem perspective, value can be co-created in joint activities among universities, companies, the civil society and government entities (Ritala et al., 2013) to generate benefits to users in different levels (i.e., individual, organizational or society). In this sense, each innovation ecosystem actor searches to capture the value from the ecosystem according to their organizational objectives. Consequently, each actor can benefit in multiple ways from innovation projects: intrinsic or social rewards, and, non-pecuniary or pecuniary extrinsic rewards (Chesbrough et al., 2018). Therefore, an innovation ecosystem is formed by companies, universities, government and civil society which aim to create and capture value from collaborative innovation activities around a joint value proposition (Jacobides et al., 2018; Ritala et al., 2013). Value creation and capture has become a popular research topic in innovation ecosystems, as evidenced by studies conducted by Dattée et al. (2018) and Khademi (2020). Effective strategies for creating and capturing value are essential for companies that aim to enter and thrive within an ecosystem (Randhawa et al., 2021).

Value creation and capture in ecosystems was the subject of a systematic literature review carried out by Khademi (2020). The author identified the main research topics in the area: the mechanisms, critical factors of success, challenges and strategies of value creation and capture. However, an aspect that was not explored in depth in Khademi's (2020) review is the strategies, mechanisms and critical factors of success of value creation and capture specific to each of the analysis perspectives of innovation ecosystems. According to Thomas and Autio (2020), innovation ecosystems can be examined from both a territorial and non-territorial perspective.

The territorial perspective can be carried out mainly at the levels of a city, an urban district or a region. Non-territorial analysis refers to the hub firm and its complements, which do not necessarily inhabit the same local, as long as they belong to the same industry or platform (Thomas & Autio, 2020).

The literature on value creation and capture in innovation ecosystems also identifies two analytical perspectives, which we refer to as platform and territorial (Santos & Zen, 2022). The platform perspective has emphasized the study of hub firms from different sectors (Kapoor & Klueter, 2021) and the territorial approach analyses regional innovation ecosystems (Oskam et al., 2021) and innovation ecosystems in cities (Visnjic et al., 2016).

Thus, we argue that there is a gap in the literature in relation to the strategies, mechanisms and critical factors of success of value creation and capture according to each of these analysis perspectives in innovation ecosystems (platform and territorial). Each perspective may present differences regarding strategies,

mechanisms and critical factors of success of value creation and capture among the actors. Furthermore, orchestrating diverse actors, such as municipal governments, companies and citizens requires the proper alignment of various incentives within this type of stakeholder arrangement (Linde et al., 2021).

Therefore, this article aims to carry out a systematic literature review to identify what are the contributions of the platform and territorial perspectives to the literature on value creation and capture in innovation ecosystems. We describe the current panorama of publications in the area and the strategies, mechanisms and critical factors of success of value creation and capture in innovation ecosystems. As theoretical contributions, we compare six dimen- sions of analysis of value creation and capture in innovation ecosystems and propose a research agenda in the field.

This article is theoretically justified as it advances the understanding of the differences and similarities between the platform and territorial approaches in innovation ecosystems for the analysis of value creation and capture. Empirically, the article is justified as it presents strategies, mechanisms and critical factors of success of value creation and capture that may be relevant to business managers, university managers, public managers and non-profit organizations working in innovation ecosystems.

Method

We conducted a systematic literature review, a process that enables scientific and transparent replication (Tranfield et al., 2003). For operationalization purposes, we adopted the Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) protocol indicated by Moher et al. (2009) and Da Silva and Amaral (2019).

Following Da Silva and Amaral's (2019) approach, we started by defining the research questions, selecting the appropriate article-search database, and identifying relevant search terms to achieve our research objectives. We formulated three research questions to guide our literature review:

1. What are the strategies of value creation and capture regarding the platform and territorial perspectives of innovation ecosystems?
2. What are the mechanisms of value creation and capture in relation to the platform and territorial perspectives of innovation ecosystems?
3. What are the critical factors of success of value creation and capture con- cerning the platform and territorial perspectives of innovation ecosystems?

Next, we accessed the Web of Science database to search for articles available in online journals, published in English, in the 'Business' and 'Management' knowledge areas, from 2006, date of the seminal publication by Adner (2006) on innovation ecosystems, to 2021. The search was performed on March 7,2022.

We chose a group of search terms according to the objectives of the review. Below, we present the two search algorithms used in the Web of Science database:

- 'innovation ecosystem*' AND ('value creation' OR 'value cocreation' OR 'value co-creation');
- 'innovation ecosystem*' AND ('value capture' OR 'value appropriation).

We found 131 articles: 114 articles on value creation/co-creation and 17 articles on value capture/appropriation. We excluded 11 articles, as they appeared in both value creation and value capture searches. Then, we evaluated the contents of title, abstract and keywords, in order to identify whether the articles could contribute to answering the research questions. We selected the relevant data from the articles and registered them in electronic spreadsheets. Figure 4 provides the flow diagram of the systematic review.

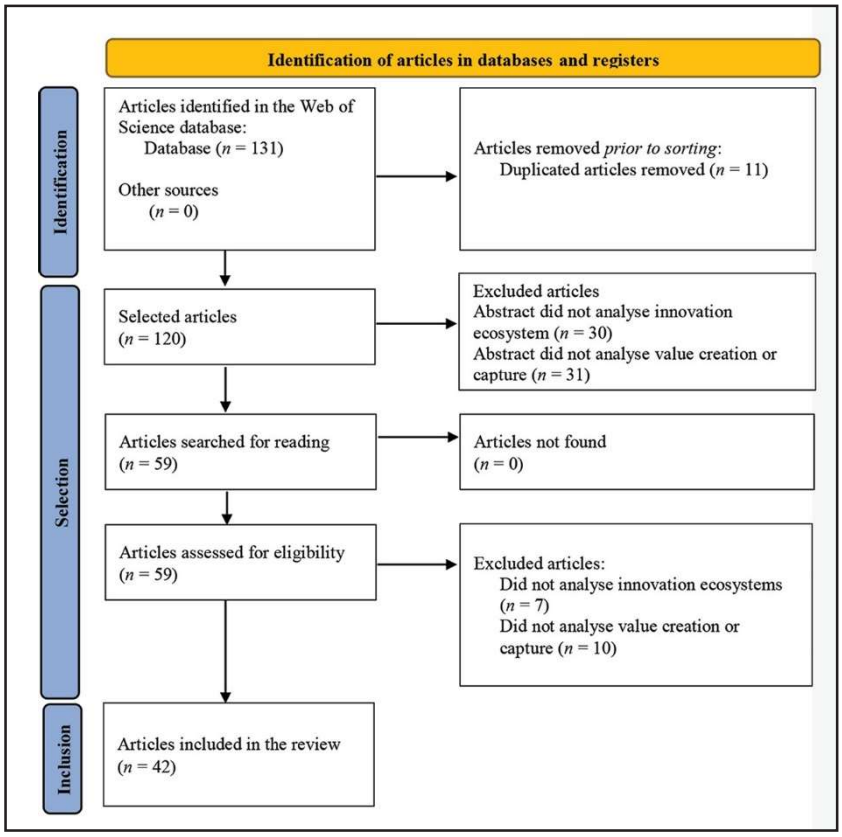

Figure 4. PRISMA Protocol for Systematic Literature Review

We excluded 61 articles after reading the titles, abstracts and keywords, as the abstract did not present relationships with innovation ecosystems or value creation/capture. Thus, in the following stage, 59 articles remained eligible for full reading and content assessment. The introduction section, theoretical framework, method, results/discussions and final considerations of these articles were analysed, and the questions were answered (inclusion and exclusion criteria). We separated these two questions: for group one, all answers must be affirmative. For group two, at least one of the answers must be positive. After the complete read- ing of the articles, we excluded 17 articles, with 42 articles remaining for final analysis.

Finally, we extracted data from the articles and analysed them qualitatively through content analysis. Table 6 provides the review protocol.

Table 6. Systematic Review Protocol

Stage of Review	Information	
Database searchand primary selection	Year Authors Title Abstract Keyword	If the answer to any of the questions below was affirmative, the article was selected: Does the article refer to value creation orco-creation in innovation ecosystem? Does the article refer to value capture or appropriation in innovation ecosystem?
Content evaluation	Objectives Theoretical framework Method Results Conclusions	Group 1: only positive answers Does the article present a theoretical approach related to innovation ecosystems? Do the results involve value creation/co-creationor value appropriation/capture in innovation ecosystems?
	Research questions	Group 2: at least one positive answer What are the strategies of value creation and capture in relation to the platform and territorialperspectives of innovation ecosystems? What are the mechanisms of value creation and capture in relation to the platform and territorialperspectives of innovation ecosystems? What are the critical factors of success of value creation and capture in relation to the platform and territorial perspectives of innovation ecosystems?
Data extraction	Year of publication Perspectives of analysis of innovation ecosystems (territorial orplatform) Industrial sectors or territorial levels Value creation or value capture Strategies of value creation and capture Mechanisms of value creation and capture Critical factors of success of value creation and capture	

Table 7. *Distribution of Articles—Year of Publication, Authors, Perspective of Analysis and Research Emphasis (Value Creation or Capture).*

Authors (year)	Perspectiveof Analysis	Value Creation	Value Capture	Strategy	Mechanism	Critical Factor of Success
Adner and Kapoor (2010)	Platform	•	•	•	•	•
Leten et al. (2013)	Platform		•	•	•	•
Ritala et al. (2013)	Platform	•	•	•	•	•
Visnjic et al. (2016)	Territorial	•		•	•	
Chen et al. (2016)	Platform	•		•	•	•
Amit and Han (2017)	Theoretical	•		•	•	•
Radziwon et al. (2017)	Territorial	•	•		•	•
Hannah and Eisenhardt (2018)	Platform	•	•	•	•	•
Ranganathan et al. (2018)	Platform	•	•	•		
Suseno et al. (2018)	Platform	•		•	•	
De Silva et al. (2018)	Platform	•			•	•
Dattée et al. (2018)	Platform	•	•	•		
Murgia (2018)	Platform	•	•		•	•
Talmar et al. (2018)	Theoretical	•	•	•	•	•
Oomens and Sadowski (2019)	Territorial	•	•	•	•	•
Ketonen-Oksi and Valkokari (2019)	Platform	•			•	•
Jiang et al. (2019)	Platform	•	•	•	•	•
Banda et al. (2019)	Platform	•	•	•	•	
Fukuda (2019)	Territorial	•		•		•
Benitez et al. (2020)	Platform	•		•	•	•
Abdulkader et al. (2020)	Theoretical	•	•	•	•	
Huang et al. (2020)	Platform	•	•		•	•
Hu et al. (2020)	Platform	•		•	•	
Helman (2020)	Territorial	•	•		•	•
Lampert et al. (2020)	Theoretical	•	•			•

(Table 7 continued)

(Table 7 continued)

Authors (year)	Perspective of Analysis	Value Creation	Value Capture	Strategy	Mechanism	Critical Factors of Success
Adner and Kapoor (2010)	Platform	•	•	•	•	•
Bagchi-Sen et al. (2020)	Territorial	•				•
Jones et al. (2021)	Platform	•	•		•	•
Siaw and Sarpong (2021)	Theoretical	•	•		•	•
Asplund et al. (2021)	Platform	•	•	•		•
Linde et al. (2021)	Platform	•		•	•	•
Guerrero et al. (2021)	Territorial	•	•	•	•	•
Prashantham (2021)	Theoretical	•		•		
Yan et al. (2021)	Platform	•	•	•	•	•
Zhang et al. (2021b)	Platform	•		•	•	
Chen et al. (2021)	Platform	•		•	•	•
Oskam et al. (2021)	Territorial	•	•	•	•	•
Randhawa et al. (2021)	Platform	•	•	•	•	•
Arena et al. (2021)	Theoretical	•			•	•
Kapoor and Klueter (2021)	Platform	•				•
Rehm et al. (2021)	Territorial	•		•	•	•
Zhang et al. (2021a)	Platform	•			•	•
Bettanti et al. (2021)	Territorial	•			•	•
Total		41	22	28	34	33

Results

Descriptive Analysis of Results

We identified 42 articles in our analysis (Table 6). A total of 41 articles (97.6% of the sample) researched value creation or co-creation. Of these, 22 publications jointly analysed value creation/co-creation and value capture. Only one article analysed value capture exclusively. These findings support Khademi's (2020) claim that there are more publications on value creation and few studies on value capture in ecosystems.

Afterwards, we classified the articles according to the perspective of analysis. Articles exploring ecosystems of companies from different sectors were classified as 'platform perspective'. Articles approaching cities, regions or nations were

classified as 'territorial perspective'. In addition to these two perspectives, a third perspective concerns theoretical-conceptual analyses which, unlike the two other perspectives, do not contribute empirically to the results.

We categorized the articles in relation to the research questions to identify which of them contribute to the strategies, mechanisms and critical factors of success of value creation and capture in innovation ecosystems. We also evaluated the articles according to the year of publication to check the evolution over time in Figure 2. Despite a drop in 2019, there has been an increase in the trend of article publishing since 2018. This growth starts in 2018, with 35 articles published until 2021 (representing 83.3% of the publications).

Then, we categorized the empirical articles according to the perspectives of analysis and their respective research contexts. Publications have advanced in two different perspectives. The first refers to the platform perspective of innovation ecosystems (25 publications), which aim at analysing how hub companies and firms (and their complements) create and capture value within their innovation ecosystems. The second concerns the territorial perspective and analyses value creation and capture within a geographically delimited context (10 publications), such as a city, a region or a country by heterogeneous actors (universities, government, civil society and also companies).

The *platform perspective* has mainly researched digital ecosystems, software and artificial intelligence industries. For instance, the healthcare sector presents research related to bone prosthesis implant companies, regenerative medicine and gene therapies. The articles also analyse the automotive, electronics, telecommunications industry and mechatronics, nanoelectronics and semiconductor companies. Other sectors analysed are defence/aerospace, universities and research institutions, start-ups, manufacturing industries, chemical industry as well as nuclear and solar energy.

Publications addressing the *territorial perspective* were carried out mainly in cities and metropolitan regions. The cities of Almere, Eindhoven and Amsterdam and Chicago, London Wroclaw and Vienna were the subject of research. Two studies were carried out in metropolitan regions: one in the Amsterdam region and another in the Munich metropolitan area.

Value creation and capture was also researched at the regional level: in a region of Denmark, and in Lombardy (Italy), in the United Kingdom regions (Bagchi-Sen et al., 2020) and Japan innovation ecosystem (Fukuda, 2019). Guerrero et al. (2021) described the creation and capture of social and economic value in three programs oriented towards the promotion of Social Purpose Organizations in Mexico.

Value Creation and Capture in Innovation Ecosystems: The Platform Perspective

The main *strategies of value creation and capture* from the platform perspective are related to the coordination structures of the innovation ecosystem and mainly depend on the characteristics of the actors, the sector and the phase of ecosystem development.

One strategy is to initiate value co-creation and sharing in a centralized manner by an actor (Benitez et al., 2020) or with a small group of key suppliers (Chen et al., 2016). In a second moment, the strategy evolves into a larger network of actors and complementors. Afterwards, the value can be shared across an extended network and, finally, the value can be shared within the innovation ecosystem (Chen et al., 2016).

Another approach is the vertical integration, which can be a strategy to manage interdependence (Adner & Kapoor, 2010). However, traditional governance models may face difficulties in new ecosystems in situations of high uncertainty (Kapoor & Klueter, 2021), as it is a challenge to demonstrate the creation and extraction of economic value in disruptive innovation environments (Banda et al., 2019). The platform framework is also a strategy to link actors with a common value proposition (Yan et al., 2021).

Collaboration between actors is the main *mechanism of value creation* in innovation ecosystems (Jones et al., 2021). Attracting actors to meetings, establishing a shared value foundation, common goals and vision are important activities for value creation (Ritala et al. 2013). Thus, the difficulty of combining heterogeneous parts of the network, such as public and private actors (Asplund et al., 2021) can affect value co-creation.

The literature describes examples of mechanisms of value creation and co-creation and collaboration between universities and companies (Yan et al., 2021) involving the sharing of research and development costs (Ritala et al., 2013). However, R&D collaborations are a dynamic phenomenon which evolve over time (Benitez et al., 2020).

Value creation can also be the result of collaborative activities between different types of actors such as end users contributing to a digital platform (Suseno et al., 2018), through the cooperation of manufacturing companies and users (Hu et al., 2020), between a group of private companies (Jiang et al., 2019) or between public and private initiatives (Asplund et al., 2021).

The main *mechanisms of value capture* are contracts (Adner & Kapoor, 2010), business models that clearly convey how value will be captured between partners (Huang et al., 2020; Ritala et al., 2013). The motivations of each actor to create value are also considered value capture mechanisms (Ritala et al., 2013). A public research institution appropriates the value by charging a fee from client companies, transferring technologies and creating spin-offs (Banda et al., 2019). Universities can be motivated by reputation (Asplund et al., 2021). Companies appropriate value by gaining prior knowledge of research results with academic partners (Leten et al., 2013) or by increasing the expected number of users of new technology (Huang et al., 2020).

The *critical factors of success of value creation and capture* described are related to the structure of interdependence and the location of the technological challenges of the hub-firm and its external partners (Adner & Kapoor, 2010), to the multiple needs of the various types of actors (Ritala et al., 2013) and the technological uncertainties related to the ways in which actors contribute to the value creation and capture proposition (Kapoor & Klueter, 2021).

The tensions and conflicts between competition and collaboration can also be understood as a critical factor of success value creation and capture (Hannah &

Eisenhardt, 2018; Jones et al., 2021). If, on the one hand, companies cooperate a lot, they may not actually capture value. On the other hand, if they compete too much, they may not create the value. Only when the appropriation of an individual actor's value is assured, an ecosystem can balance competitive and cooperative tensions (Jiang et al., 2019).

Trust (Asplund et al., 2021), conflict management (Jones et al., 2021), commitment, reciprocity and power (Benitez et al., 2020) are critical factors of success necessary to maintain knowledge sharing over time. Thus, cultural differences and geographic distances can cause difficulties and conflicts with the value appropriation (Jiang et al., 2019). Negotiations regarding value appropriation can also be more difficult due to the larger number of actors in the ecosystem (Murgia, 2018).

To establish a solid ecosystem, it is necessary to clearly establish responsibilities, rights and interests (Chen et al., 2021), as unclear rules regarding value distribution reduce the enthusiasm of actors to collaborate (Huang et al., 2020).

In summary, we identified that the platform perspective presents contributions in different contexts. Publications indicate the importance of analysing the coevolutionary and dynamic characteristic of strategies, mechanisms and critical factors of success in relation to the different stages of development of innovation ecosystems (procedural view). From this perspective, perceptions of value are mainly related to the economic dimension.

Value Creation and Capture in Innovation Ecosystems: Territorial Perspective

The territorial perspective emphasizes the relevance of coordination in innovation ecosystems as *a key strategy for value creation and capture*. At the city level, the city hall can act as a vertical integrator, which interacts directly with stakeholders, consolidating their respective contributions (Visnjic et al., 2016). Another strategy is for the municipal government to act as a hub platform (Visnjic et al., 2016).The actors interact with each other to create value rather than providing their products to the city hall.

The literature describes the *mechanisms of value creation*, such as collaborative relationships (Oomens & Sadowski, 2019) and the creation of measures for open value exchange (Oskam et al., 2021). First, the actors in the innova tion ecosystem need to have common goals (Radziwon et al., 2017) and a well-defined and shared vision of value propositions (Oomens & Sadowski, 2019). It is also necessary to attract proactively the involvement of stakeholders (Rehm et al., 2021). During the formation stage of an innovation project, it is crucial for the actors to align their expectations regarding value creation activities, as well as activities that lead to capturing individual value at the company level (Oomens & Sadowski, 2019). According to Helman (2020), each actor can create value in different ways: companies and start-ups create value by

growing and promoting themselves; incubators and coworking spaces by helping start-ups to develop with funding opportunities and physical space. Technology parks create value by organizing networking events that help start-ups and small businesses expand their connections without huge investments. Universities and research institutions create value by providing technical/scientific advice. The government by supporting innovative actions and attracting new investors, and the civil society by advising and supporting along with offering financial opportunities (Helman, 2020).

The literature describes the *mechanisms of value capture*. Companies and start-ups capture value through increased income/turnover. Incubators and coworking spaces through the profits and actions of supported start-ups. Technology parks, universities and research institutions capture value by developing innovations. The government by attracting new residents, increasing the city's relevance and enabling the promotion of broader sustainable regional development (Helman, 2020).

The literature also explains the main *critical factors of success* of value creation and capture. Informal agreements, flexibility of individual roles and adjustment of value targets over time are important critical factors of success (Oskam et al., 2021). However, the realignment of public and private goals of stakeholdersto continuously create and capture value may be a challenge (Oomens & Sadowski,2019).

Following the initial phase of formation, the strategic harmonization of ecosystem partners becomes pivotal. Oskam et al. (2021) suggested that it is necessary to understand the perception of the meaning of value for each actor, as the perception of value evolves according to the development of ecosystem. The semantic barriers between the academia and the market in the creation/execution of innovation leads to low innovative performance at an early stage, as well as a low level of commercialization (Helman, 2020).

The risks of adopting a new technology in a city and the risk-prone culture (Bettanti et al., 2021) are also reported as critical factors of success. Innovations that focus on local problems are more likely to be adopted by users (Rehm et al., 2020) if population participation occurs.

The literature also describes the learning capabilities of actors as critical factors of success. Oskam et al. (2021) depicted learning-based action, experimentation and openness to new opportunities as critical factors of success to create value in innovation ecosystems. Bagchi-Sen et al. (2020) stated that university spin-offs create additional value in their regions by launching products and services. However, university research results need to reach society not only throughpublications, but through technology transfer (Bettanti et al., 2021). Thus, decreases in public investments in science, technology and innovation can make a national innovation ecosystem more vulnerable (Fukuda, 2019). Public subsidies and funding (Oomens & Sadowski, 2019), bureaucracy and excessive regulation limit value creation (Bettanti et al., 2021) and are also critical factors of success in an innovation ecosystem. Guerrero et al. (2021) affirmed that openness

to change, economic profile, tax and labour market regulations are challenges for the creation and capture of economic and social value in emerging economies.

The territorial perspective mainly analyses success cases in developed countries and, to a lesser extent, ecosystems with difficulties and emerging countries. Furthermore, empirical studies seek to analyse the heterogeneity of quadruple helix actors. As a result, perceptions of value are not restricted only to the economic dimension, but also present contributions in the socioenvironmental dimensions.

Summary of Contributions and Research Agenda

Comparative Analysis of Platform and Territorial Perspectives

We compared the results between the platform and territorial perspectives and found similarities and differences in each of the six dimensions of analysis. On the one hand, there are common elements between the platform and territorial perspectives: both analyse value creation and capture with a procedural view over time, in accordance with ecosystem development. Each actor (or the ecosystem itself) adopts coordination strategies that can be more or less centralized (or decentralized). There is a need to align objectives and interests among the actors, and the value creation mechanisms are mainly based on collaborative relationships between actors.

On the other hand, there are different elements between the two approaches. The mechanisms of value capture are distinct between the two perspectives because there are different types of actors and organizational objectives. This singularity creates differences in the perception of value among heterogeneous actors. The territorial perspective has a different challenge from the platform approach, which is to align the different types of interests between actors, such as government, universities, civil society and companies. This multiplicity of objectives is not restricted to the economic dimension, as described by the platform perspective.

There is greater complexity in the territorial perspective in establishing common goals and, mainly, in keeping these different interests aligned over the development of the innovation ecosystem, as different values motivate these actors in value creation and capture. Consequently, the critical factors of success of the territorial perspective include social, cultural, institutional, normative, legal and governmental aspects, and not only the technological, organizational/economic critical factors of success described by the platform perspective.

This comparison reinforces our comprehension about value creation and capture presenting different results between the platform and territorial perspectives of innovation ecosystems. This finding indicates that there is a need to research each of these perspectives with distinction in all dimensions, but mainly in relation to the value dimension, the mechanisms of value capture and critical factors of success. However, both perspectives are similar in relation to the procedural view, the mechanisms of value creation and the strategies of value creation and capture. Table 8 compares each dimension of analysis between the platform and territorial perspectives.

Table 8. *Comparison Among Each Dimension of Analysis Between the Platform and Territorial Perspectives*

Dimensions	Platform Perspective	Territorial Perspective
Strategies of value creation and capture	• Vertical integration • Platform to connect actors • Orchestration of actors • Organic ecosystem development	• Vertical integration • Hub platform to connect actors • Orchestration of actors
Mechanisms of value creation	• Establishing common goals and bringing actors together • Collaboration between leading companies, start-ups, • universities, end users, suppliers • Collaborative research	• Attracting and bringing interested public and private actors together • Alignment of interests, objectives, expectations and shared vision of value between public and private actors • Collaborations between universities, start-ups, technology parks, civil society and government
Mechanisms of value capture	• Contracts • Intellectual property • Technology transfer • Fees • Business models • Participation in spin-offs	• Company revenue • Participation in start-up share • New inhabitants and increased relevance of the city • Promotion of sustainable regional development
Critical factors of success	• Interdependency between actors • Number of actors • Technological uncertainties • Tensions and conflicts in the collaboration and competition relationship • Trust, reciprocity and power • Cultural and geographic distances • Business model with rules, commitments and penalties for value creation and distribution • Learning capacity	• Informal agreements, flexibility of individual roles, adjustment of targets • Risks of adopting innovations • Innovative culture • Learning capacity • Presence of universities • Trust • Public investments, subsidies, funding in science, technology and innovation • Excessive bureaucracy and regulation
Dimensions of value	• Value is analysed mainly by the economic dimension	• The value is analysed by the economic, social, cultural and environmental dimensions
Procedural view	• Strategies are formulated based on the phases of the innovation ecosystem • Collaborative and competitive relationships are dynamic over the different phases of the ecosystem	• The perception of value of each actor is dynamic and changes during the development of the innovation ecosystem • Goals and objectives must be adjusted during the ecosystem development

Suggestions for Future Research on Value Creation and Capture in Innovation Ecosystems

From the analysis of the current scenario of publications, we have prepared a research agenda on value creation and capture for the platform and territorial perspectives of innovation ecosystems. Table 9 provides five specific suggestions for each of these perspectives.

Our suggestions aim at developing this field in topics that have not yet been studied or have little contribution from current research.

Table 9. *Research Agenda for Future Studies on Value Creation and Capture in Innovation Ecosystems*.

Perspective	Research Suggestion
Platform	1. How does the alignment of individual interests (competition/capture) occur in relation to the collective interests of the innovation ecosystem (creation/collaboration)?
	2. What are the strategies, mechanisms and critical factors of success of value creation and capture in medium/low technological intensity sectors?
	3. What are the strategies, mechanisms and critical factors of success of value creation and capture of non-focal actors or non-leaders of innovation ecosystems?
	4. How do end users contribute so that companies can create and capture value in innovation ecosystems? What are the critical factors of success and mechanisms involved in these collaborative relationships?
	5. What are the contributions of the open innovation literature to value creation and capture in innovation ecosystems?
Territorial	1. What are the different perceptions of value among actors (universities, government, civil society and companies)?
	2. How do the geographic context and social, cultural and institutional variables interfere with value creation and capture in innovation ecosystems?
	3. How to measure the performance of value creation and capture in innovation ecosystems with multidimensional value propositions (economic, social, cultural and environmental)?
	4. What are the strategies and mechanisms of value creation and capture from public actors, universities and non-profit organizations?
	5. What are the critical factors of success of value creation and capture in ecosystems in cities and regions located in emerging countries?

Final Considerations

This study aimed at carrying out a systematic review of the literature on value creation and capture in innovation ecosystems. We presented three theoretical contributions. First, we differentiated which publications are related to each of the perspectives of analysis of value creation and capture in innovation ecosystems. Mainly we showed that the perspectives of analysis have six similar dimensions, but different elements of analysis that consider the empirical peculiarities of each of these perspectives. Our second contribution was the comparative synthesis of dimensions for the analysis of value creation and capture in innovation ecosystems between the platform and territorial perspectives. Thirdly, we developed a research agenda with ten suggestions for further studies on these two perspectives.

Our article also presents managerial contributions, as we described to business managers, university managers, public managers and civil society entities a synthesis of what are the strategies, mechanisms and critical factors of success of value creation and capture in innovation ecosystems. These results can be useful in actions both at ecosystem and organizational levels.

Our research also has limitations. First, we consulted only one database and only articles published in journals. This study can be extended to other bases and include other types of publications. With this, other dimensions of analysis can emerge from this literature and complement the theoretical comprehension of this subject. Moreover, value creation and capture differs from one sector to another, and from one territory to another. Therefore, our results cannot be considered normative for all territorial or business contexts, but only as basic principles for studies on innovation ecosystems.

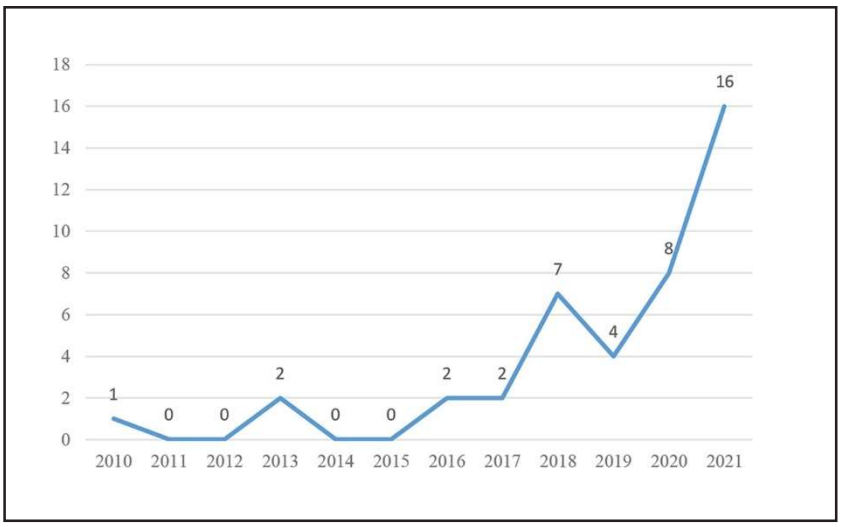

Figure 5 Article Distribution by Year of Publication.

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Conceptualization: Carlos Alberto Frantz dos Santos and Aurora Carneiro Zen; Methodology: Carlos Alberto Frantz dos Santos and Aurora Carneiro Zen; Formal analysis and investigation: Carlos Alberto Frantz dos Santos; Writing – original draft preparation: Carlos Alberto Frantz dos Santos and Aurora Carneiro Zen; Writing – review and editing: Carlos Alberto Frantz dos Santos and Aurora Carneiro Zen; Supervision: Aurora Carneiro Zen.

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4. PAPER III:
DEVELOPING INNOVATION ECOSYSTEMS THROUGH VALUE CREATION AND CAPTURE MECHANISMS: A COMPARATIVE CASE STUDY OF PLATFORM AND TERRITORIAL PERSPECTIVES

Santos, C. A. F., & Zen, A. C. (2023). Mechanisms of Value Creation and Capture in Innovation Ecosystems: an analysis of Platform and Territorial Perspectives. Proceedings of VI° International Conference on Cluster Research – 2023, Valencia.

Santos, C. A. F., & Zen, A. C. (2023). Developing Innovation Ecosystems Through Value Creation and Capture Mechanisms: a comparative case study of platform and territorial perspectives. Annals of XXVI Seminários em Administração, São Paulo.

Santos, C. A. F., & Zen, A. C. Developing Innovation Ecosystems Through Value Creation and Capture Mechanisms: a comparative case study of platform and territorial perspectives. Submitted in Technological Forecasting and Social Change.

ABSTRACT: Research on innovation ecosystems has emphasized the critical role of value creation and capture in developing innovation ecosystems from both platform and territorial perspectives. However, the literature has traditionally analyzed the creation and capture of value separately, focusing on either territorial or platform aspects. Thus, this study aims to analyze how the creation and capture of value occur in both territorial and platform-based innovation ecosystems. This research involved multiple case studies in two innovation ecosystems located in the Serra do Rio Grande do Sul Region in southern Brazil. We selected one ecosystem for analysis using the territorial approach (Inova RS innovation ecosystem) and another using the platform approach (Helix Institute innovation ecosystem). This paper contributes to the literature by showing how ecosystem strategies, actors' engagement and actors' perception of values shape the mechanisms for creating and capturing value in each ecosystem and can contribute to the development of an innovation ecosystem. The main contribution of this research is that it elucidates the similarities and distinctions between territorial and platform innovation ecosystems in the processes of value creation and capture. The territorial innovation ecosystem exhibited a more intricate and gradual development process, largely attributed to the heterogeneity of its stakeholders. Conversely, the platform innovation ecosystem displayed greater dynamism, thus yielding short-term financial returns. Consequently, the analysis of mechanisms for value creation and capture emerges as a critical determinant for engaging stakeholders and fostering the successful evolution of the innovation ecosystem.

1. INTRODUCTION

The literature on value creation and capture in innovation ecosystems has received significant attention from scholars and practitioners over the past decade (Adner, 2017; Khademi, 2020). Both processes are needed in ecosystems, and an integrated understanding of value creation and capture mechanisms is important in the innovation ecosystem context (Ritala et al., 2013), as such mechanisms are relevant components of innovation ecosystems (Klimas & Czakon, 2022).

Value creation depends on the subjective perception of a target user, who is the focus of value creation and can be determined by the beneficiary (Lepak et al., 2007; Vargo & Lusch, 2008). Based on the innovation ecosystem approach, value can be cocreated through joint activities among companies, universities, governments, and civil society entities (Ritala et al., 2013) to generate benefits for users at the individual, organizational, or societal level (Zen et al., 2023). Each actor (or ecosystem) tries to capture the value of innovation projects according to their organizational objectives: intrinsic rewards, social rewards, nonpecuniary extrinsic rewards, and pecuniary-extrinsic awards (Chesbrough et al., 2018).

Recent research hast begun to explore the different theoretical perspectives of the analysis of value creation and capture in innovation ecosystems (Piantoni et al., 2023; Santos & Zen, 2024). Territorial innovation ecosystems consider the roles of different types of public and private actors,

cultural aspects, and local and regional governments in generating societal benefits, improving quality of life and boosting regional development (Scaringella & Radziwon, 2018). In addition, the platform innovation ecosystem examines an innovation ecosystem from the perspective of a hub firm (Adner, 2006; Cennamo & Santaló, 2019) and its suppliers, complementors that help generate economic benefits for companies and a range of industries (Miremadi et al., 2023; Pushpananthan & Elmquist, 2022).

Previous studies on value creation and capture have investigated different industries (Ritala et al., 2013; Yaghmaie et al., 2020), the differences between knowledge ecosystems and business ecosystems (Clarysse et al., 2014), the open innovation perspective (Chesbrough et al., 2018; Majchrzak et al., 2023), regional innovation ecosystems (Bailey et al., 2018; Oskam et al., 2021; Radziwon et al., 2017) and urban innovation ecosystems (Oomens & Sadowski, 2019; Visnjic et al., 2016). Additionally, theoretical research has been conducted, as described in Talmar et al. (2020), Khademi (2020), and Santos and Zen (2023).

Furthermore, innovation ecosystems exhibit heterogeneity, prompting the academic community to emphasize the imperative of gaining a deeper understanding of the similarities and differences among various archetypes of innovation ecosystems (Klimas & Czakon, 2022; Piantoni et al., 2023). Until now, each theoretical approach has focused on researching the creation and capture of value in innovation ecosystems within its own domain. However, in an empirical context, relationships and interactions appear among numerous actors within these ecosystems. Limited attention has been given to an integrated perspective on different types of innovation ecosystems, particularly in exploring how various ecosystem types interrelate, where different types intersect, and what dynamics underlie these interactions (Autio & Thomas, 2022). Consequently, it is crucial to adopt an integrative viewpoint to compare the processes of value creation and capture in territorial and platform ecosystems and to comprehend the shared characteristics, distinctions, and potential elements of interaction between these two ecosystems.

In light of the above information, this article analyzes how value is created and captured in territorial and platform innovation ecosystems. To achieve this aim, we researched two innovation ecosystems (one from a platform perspective and another from a territorial perspective) in southern Brazil using the case of Serra do Rio Grande do Sul. In this region, there was already a historically well-developed metal-mechanical and furniture industry stemming from Italian immigrants who founded the cities in this region during the 19th century. However, for the purposes of this study, our starting point is a movement of innovation policies and corporate innovation strategies that began in 2019. We conducted multiple comparative case studies (Yin, 2017) based on 28

semistructured interviews with quadruple helix actors, face-to-face observations and 258 pages of secondary data conduct in 2021 and 2022.

As a key contribution, our article presents an integrative view for analyzing the two main theoretical perspectives on innovation ecosystems to understand the creation and capture of value Second, our research identifies the similarities and differences between territorial (Scaringella & Radziwon, 2018) and platform (Kapoor & Klueter, 2021) perspectives. The third contribution pertains to empirical evidence of value creation and capture in an innovation ecosystem within an emerging country context.

We also provide relevant managerial contributions with specific suggestions for company and university managers and public and civil society managers who act in innovation ecosystems, highlighting the analysis of value creation and capture mechanisms as critical factors for actors' engagement and the success of the innovation ecosystem.

2. THEORETICAL CONCEPTS AND RESEARCH MODEL

In this section, we highlight the elements of territorial and platform innovation ecosystem approaches. Next, we explore value creation and capture concepts in innovation ecosystems. Finally, we propose a conceptual framework to analyze value creation and capture mechanisms in innovation ecosystems.

2.1 INNOVATION ECOSYSTEM: TERRITORIAL AND PLATFORM PERSPECTIVES

Innovation ecosystems (Adner, 2006) have garnered great attention in management and academic fields in recent decades (Dias Sant´Ana et al., 2020; Gomes et al., 2021). Despite the diversity of concepts given to the innovation ecosystem (Granstrand & Holgersson, 2020), several elements permeate these definitions, such as multilateral joint alignment, collaboration and competition relationships, actors, value propositions, and complementarity. We adopt the definition of Klimas and Czakon (2022, p. 254): an “innovation ecosystem [is] a cooperation environment surrounding the innovation activities of its co-evolving actors, organized across co-innovation processes, and resulting in co-creation of new value delivered through innovation”.

There are different research approaches for analyzing the different typologies of innovation ecosystems. Klimas and Czakon (2022), for example, identified 34 specific types of innovation ecosystems. Although the academic community has made significant advances in the field of

innovation ecosystems (Granstrand & Holgersson, 2020), each research avenue has advanced the understanding a specific type of innovation ecosystem through its own analytical lens. Few studies (Clarysse et al., 2014; Piantoni et al., 2023) analyze different types of innovation ecosystems to understand the existing relationships between these different typologies of innovation ecosystems. Although the territorial and platform perspectives are studied separately by the academic community, in the empirical context, these ecosystems intersect, with actors participating in both types of ecosystems and relationships existing between these ecosystems such that one ecosystem can influence the development of another, for example. However, both ecosystems have a common point. Both seek to create value for their target audiences: platform innovation ecosystems create value for their target consumers (Ritala et al., 2013), while territorial innovation ecosystems create value for the population and citizens seeking to improve the quality of life in a city or region (Zen et al., 2023). Actors in both ecosystems also seek to obtain individual benefits and capture a part of the value created by the ecosystem (Khademi, 2020). In this way, the engagement of actors is important for value creation, value capture and the development of ecosystems (Blasco-Arcas et al., 2020).

The territorial perspective of innovation ecosystems (Scaringella & Radziwon, 2018) is characterized by the geographical delimitation of its scope of analysis (Feldman et al., 2019) and may include an innovation district, an urban innovation ecosystem (Autio & Thomas, 2022; Pique et al., 2019), a regional innovation ecosystem (Rong et al., 2020; Thomas et al., 2021) or even a national, international, or global innovation ecosystem (Klimas & Czakon, 2022). Research conducted with this approach emphasizes heterogeneity and nonhierarchically related participants. This perspective does not restrict hub firms' point of view and also includes the perspectives of universities, civil society, nonprofit organizations, city and local governments, service providers, and consumer citizens (Autio & Thomas, 2022). Therefore, this approach requires a holistic perspective because the system outcome for an urban or regional ecosystem is the delivery of societal activities, quality infrastructure and the physical environment as well as the sustainable production of goods and services (Autio & Thomas, 2022). Therefore, not only economic aspects but also social and cultural dimensions are relevant for territorial analysis (Scaringella & Radziwon, 2018).

This level of analysis involves the generation of innovation for a unique audience (society and population). Actors such as companies from different industries, municipal and regional public agencies, and universities have different organizational goals and, consequently, different types of value to be captured. This feature makes the establishment of ecosystem value proposals more

complex and represents a challenge in orchestrating and establishing strategies and maintaining effective relationships among actors.

Territorial innovation ecosystems are dynamic, coevolving and present different life cycle stages. According to Pique et al. (2019) the definition, launch, growth, and maturity stages have been analyzed in innovation districts. Santos et al. (2022) proposed different actor coordination strategies, ranging from centralized governance in the inception stage through orchestration and multiorchestration in the launching and growth stages and ending with the choreography strategy (highly decentralized) in the maturity stage of ecosystem innovation at the city level.

Based on the nonspatial perspective, we call the second type of ecosystem platform innovation ecosystems (Gawer & Cusumano, 2014). In this approach, an innovation ecosystem is defined as "a network of interconnected organizations, connected to a focal firm or a platform, that incorporates both production and use side participants, and creates and appropriates new value through innovation" (Autio & Thomas, 2014, p. 2). A platform ecosystem can be interpreted as a network of business actors that generate innovation and value within a shared marketplace (Lähteenmäki & Töyli, 2023). In other words, it represents a collaborative production platform involving partners and customers who form an ecosystem where various actors coexist in a symbiotic network relationship (Rietveld & Schilling, 2021). This approach analyses the innovation ecosystem mainly from the perspective of a hub firm and its complements (Adner & Kapoor, 2010). These actors are included in ecosystems due to their complementarity (Gomes et al., 2021) and do not need to be in the same territory (Thomas & Autio, 2020). Thus, a company's collaboration and value-creation relationships can occur with local organizations or with organizations from other regions and countries. Because there are no formal contracts, ecosystem leaders need to persuade other actors through orchestration to make voluntary contributions that are consistent with the ecosystem's overarching value offering (Autio, 2022).

2.2 VALUE CREATION AND CAPTURE IN INNOVATION ECOSYSTEMS

Value creation refers to collaborative relationships (Oomens & Sadowski, 2019) and processes and activities at the ecosystem level that create value for customers, stakeholders (Ritala et al., 2013) or target users (Lepak et al., 2007). Initially, to create value, it is necessary to have a well-defined and shared vision of value propositions (Oomens & Sadowski, 2019). Value creation can occur through forums and meetings through which a common vision and goals are communicated (Santos & Zen, 2024). Nevertheless, knowledge sharing and collaboration can be maintained through established structures such as consortiums or projects (Ritala et al., 2013). The dynamics

of value creation are a precursor to the analysis of value capture (Adner & Kapoor, 2010). However, both processes need to be understood in a joint and balanced way by the actors of the ecosystem: the value creation mechanisms must be aligned with the value capture mechanisms (Sjödin et al., 2020).

Value capture represents a fundamental motivation for joining an ecosystem based on what type and how much value created by the ecosystem is captured by a given actor (Talmar et al., 2020). Capture is a predominantly individual activity, but it can occur jointly (Ritala et al., 2013). Moreover, ecosystem development is centrally dependent on the value capture process, which also takes place at the interorganizational level (Radziwon et al., 2017). Value can be captured in several ways: through contracts, intellectual property, technology transfer, fees, business models, participation in spin-offs, company revenue, participation in startup shares, new inhabitants and increased relevance of the city, improvement in the quality of life of the population, and the promotion of sustainable regional development (Santos & Zen, 2024; Yaghmaie et al., 2020). However, one challenge is how to promote the sustainable capture of cocreated value in the regional ecosystem (Bailey et al., 2018) for different types of public and private actors, industries, universities, and municipalities.

Therefore, the **perception of value** is important. Oskam et al. (2021) suggest that it is necessary to understand the perception of the meaning of value for each of the actors. Each actor tries to capture the value of innovation projects according to their organizational objectives (Chesbrough et al., 2018). Arena et al. (2021) divide value in ecosystems into four spheres: economic (profit or market share), environmental (energy security, emission reduction, waste treatment, improved habitat, and enhancement of urban mobility), social (social benefits for external communities, the improvement of the wellbeing and quality of life of entire territories) and innovation (increased IP investments, spillovers of inventions, and new start-ups). Oskam et al. (2021) highlight that the perception of an actor's value evolves according to the development of the innovation ecosystem.

The **innovation ecosystem strategies** for creating and capturing value described by the territorial literature reference the city hall acting as a vertical integrator, interacting, and consolidating the contributions of an actor (Visnjic et al., 2016). At the regional level, Harmaakorpi & Rinkinen (2020) highlight regional development platforms for operationalizing smart specialization strategies. However, there are difficulties in coordinating different municipalities and industries: "Top-down governance and siloed structures may hinder ecosystem development, and strong leadership is needed to follow the strategy" (Harmaakorpi & Rinkinen, 2020, p. 643).

From a platform perspective, one strategy involves beginning value creation in a centralized form with one actor or a small group of actors and, after opening for other complementors, gradually expanding the network and, ultimately, the innovation ecosystem (Benitez et al., 2020; Chen et al., 2016). Thus, few actors participate in the definition phase of the value proposition defined by the hub firm, and actors who complement each other to create value are gradually added.

One of the main functions of an ecosystem strategy is **actor engagement** (Blasco-Arcas et al., 2020). Actor engagement is a precondition that precedes the creation and capture of value in innovation ecosystems. The selection of an attractor and the establishment and maintenance of relationships between actors are among the focuses of studies on actor orchestration and represent challenges for helping ecosystem leaders persuade others to make voluntary inputs into the ecosystem (Autio, 2022). To foster engagement within complex business environments, it is essential to orchestrate actors, create a conducive environment for interactions, and deliberately plan stimulation between them (Blasco-Arcas et al., 2020).

There are **critical factors for success** in value creation and capture in a **territorial innovation ecosystem**. The first factor is the alignment of the private and public goals of actors to continuously generate, capture and protect value (Oomens & Sadowski, 2019). Therefore, actors need flexibility, informal agreements, and the ability to adjust of value targets over time (Oskam et al., 2021). Another factor is related to the level of public investment, subsidies, and funding for science, technology, and innovation (Oomens & Sadowski, 2019) and to excessive bureaucracy and regulation (Bettanti et al., 2022).

Nevertheless, there are communication barriers between academics and the market, and university researchers need to interact with the public through not only publications but also technology transfer (Bettanti et al., 2022). To create and capture value, a regional innovation ecosystem needs to combine strategy, human resources, innovation, increasing returns to scale, and infrastructure (Bailey et al., 2018).

There are **critical factors for success** in value creation and capture in a **platform innovation ecosystem**, , including tensions and conflicts between competition and collaboration (Hannah & Eisenhardt, 2018; Jones et al., 2021; Yaghmaie et al., 2020); the structure of interdependence (Adner & Kapoor, 2010); technological uncertainties (Kapoor & Klueter, 2021); interfirm and interpersonal trust; constant, open communication and the maintenance of a common vision over time (Ritala et al., 2013); geographic distance; and cultural differences. Yaghmaie et al. (2020) provide a list of challenges in value creation and capture. At the interorganizational level, there are different objectives and mindsets; different views on the time frames of research

projects; IP protection issues; funding issues; public image concerns; risk sharing concerns; the development of relationships; government contributions and interference; government requirements; and reporting and monitoring obligations. Additionally, intraorganizational challenges, such as financial problems and interdepartmental issues, exist (Yaghmaie et al., 2020).

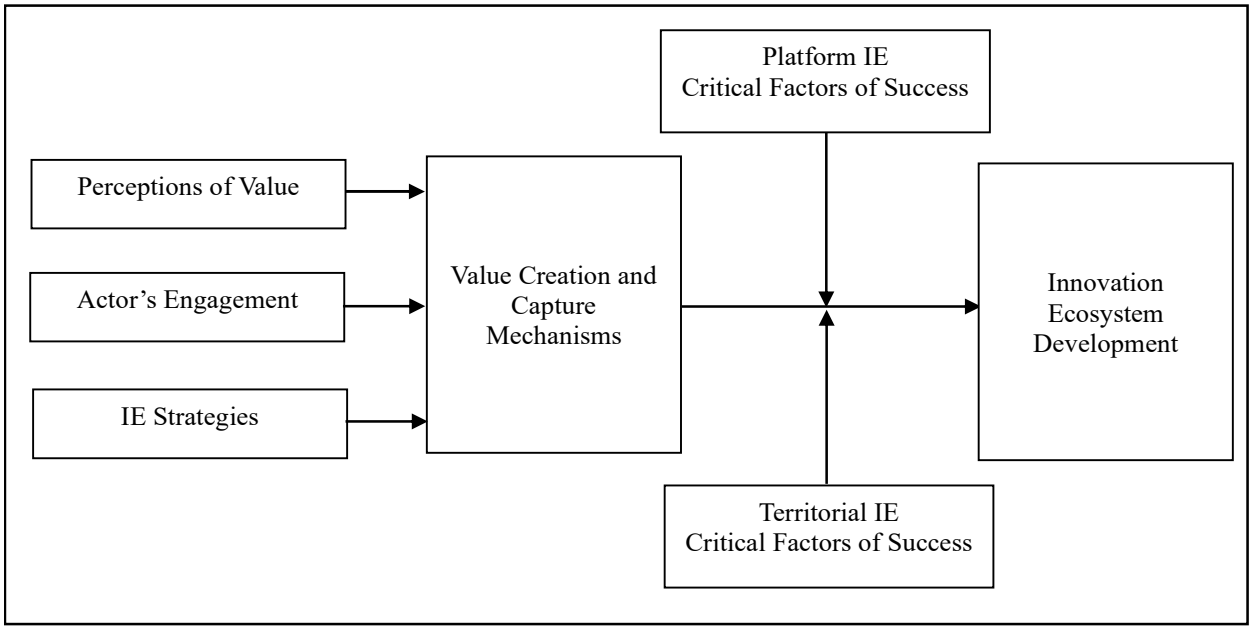
Conflict management (Jones et al., 2021; Yaghmaie et al., 2020) and the ability to define how each actor will ensure the capture of a part of the created ecosystem are important for balancing competitive and cooperative tensions, mainly in terms of value distribution ratios, cost sharing, coordination costs, and penalties (Chen et al., 2021). Thus, a business model that establishes responsibilities and rights (Chen et al., 2021) is important for maintaining the enthusiasm and engagement of actors in the innovation ecosystem.

The creation and capture of value contribute to the **development of the different stages of evolution in an innovation ecosystem**. In phase one, high-value cocreation and low-value capture occur. In this stage, ecosystem actors need to cooperate and collaborate to gather the resources required to propose and initiate the development of the value proposition (Letaifa, 2014). In phase two, high-value cocreation and high-value capture occur when actors expand their cocreation efforts and begin to capture the value being created (Letaifa, 2014). In phase three, low-value creation and high-value capture occur. At this stage, actors focus their efforts on competition to capture the value created by the ecosystem while reducing their value cocreation activities. In phase four, low-value creation and low-value capture occur when it is difficult to achieve value creation and capture; this requires ecosystem renewal (the reintegration of resources and collaborative actions between actors) or its disappearance (Letaifa, 2014).

2.3 FRAMEWORK FOR ANALYZING VALUE CREATION AND CAPTURE IN INNOVATION ECOSYSTEMS

Based on the literature on value creation and capture in innovation ecosystems, we identified seven key elements of these processes: **perceptions of value**, **actors' engagement**, **innovation ecosystem strategies**, and **territorial** and **platform critical factors of success**. These factors interfere with **value creation and capture mechanisms** and can contribute to or hinder the **development of innovation ecosystems**. Figure 6 presents our research model to explain these key elements.

Figure 6. Key Elements to Create and Capture Value in Innovation Ecosystems



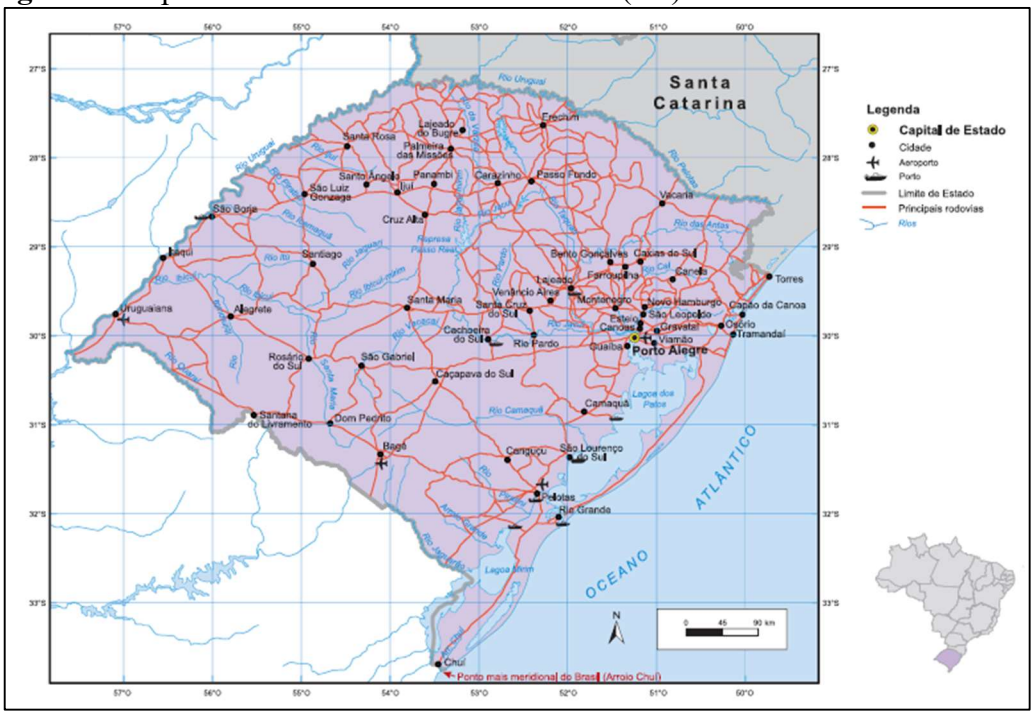
Initially, perceptions of value, actor engagement, and innovation ecosystem strategies are preconditions for defining the mechanisms for creating and capturing value. These mechanisms indicate how actors create and capture value and therefore are crucial for the development of innovation ecosystems (both territorial and platform): the more value that is created and captured by innovation ecosystem actors, the greater the success and development of the innovation ecosystem. However, the critical factor of success of territorial and platform approaches moderates the relation between value created and captured and the development of innovation ecosystems.

3. METHOD

We conducted a multiple comparative case study (Yin, 2017) in the Serra Gaúcha region (southern Brazil). In the innovation ecosystem field, multiple comparative case studies have been widely used (Oskam et al., 2021; Ritala et al., 2013; Visnjic et al., 2016) to improve the external validity of the study and increase the robustness of the outcomes. We selected two innovation ecosystems, the innovation ecosystem Inova RS located in the Serra Gaúcha and the Helix Institute innovation ecosystem, for three reasons. First, these cases allow us to research innovation ecosystems through territorial and platform approaches. The Inova RS innovation ecosystem located in the Serra Gaúcha, coordinated by the state government to develop the region, was analyzed via a territorial approach. Through the Inova RS public policy, the Serra Gaúcha prepared strategic plans to be a global reference for innovation through an intelligent specialization strategy to transform the experience in tourism, smart cities, technological education, and industry 4.0, focusing on the

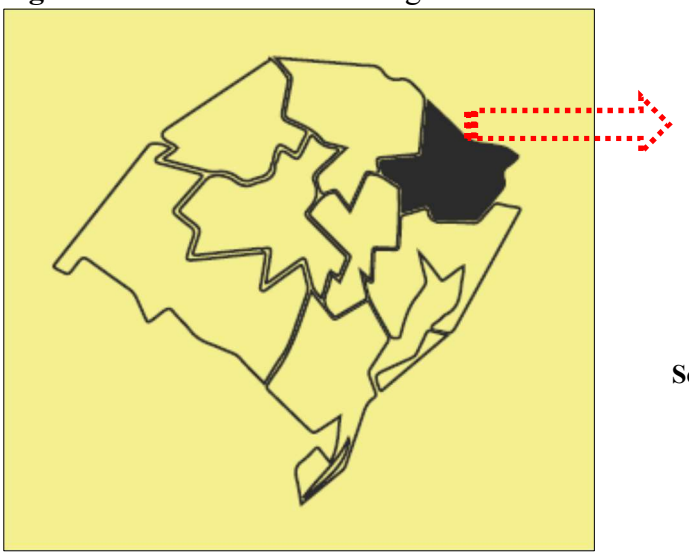
quality of life and sustainable development in the region (Inova RS, 2022). The Helix Institute innovation ecosystem includes structured processes to support the growth of high-potential companies through its network, connecting the challenges of companies with startup solutions and strengthening the innovation ecosystem of these companies (platform approach).

Figure 7. Map of the State of Rio Grande do Sul (RS)



Source: Ibge (2023)

Figure 8. The Serra Gaúcha Region



Source : Secretaria de Inovação, Ciência e Tecnologia (2022)

Table 10. Comparative Analysis of IE

Inova RS Serra Gaúcha	Helix Institute
Started in 2019	Started in 2018
Territorial IE approach	Platform IE approach
Quadruple helix actors	Companies and startups
Public Program	Private Institute
Serra Gaúcha Region	City of Caxias do Sul

Source: The authors

Second, the Serra Gaúcha region has a concentration of manufacturing activities, including the manufacturing of buses, trucks, agricultural machinery, and agriculture. In 2022, the population of the Serra Gaúcha region was estimated to be 1.2 million inhabitants, with 187 thousand companies (Sebrae, 2023). Third, the state of Rio Grande do Sul (RS) is considered an innovative state according to the 2022 edition of the competitiveness ranking of the Center for Public Leadership (CLP, 2022), which ranked RS in first place for the second consecutive year among the most innovative states of Brazil.

We identified the key actors from official documents of the Inova RS Serra Gaúcha region and Helix Institute and complemented the list using the snowball technique (Handcock & Gile, 2011), where every interviewed person was asked to provide the names of other people who could add a new perspective to the research. We conducted 28 semistructured interviews with managing directors and CEOs, professors, civil society representatives, and public managers of both innovation ecosystems (1,358 minutes of interviews and 396 pages of transcriptions). We also collected relevant secondary data (213 pages from documents and reports) and from observations (45 pages from newspapers) related to the Inova RS Serra Gaúcha region and Helix Institute Innovation Ecosystem.

We conducted the interviews across one year between the second half of 2022 and the first half of 2023. The interviews involved four blocks of questions. The first analyzed the company's organizational objectives and its history in the innovation ecosystem. The second section analyzed how the organization created and captured value in the ecosystem, including creation and capture mechanisms, strategies, and critical factors of success for the company in creating and capturing value. The third section analyzed the forms and mechanisms of management and coordination of the ecosystem, its characteristics, and the historical development of the innovation ecosystem. Finally, the fourth section allowed the interviewee to comment spontaneously on aspects the interviewer had not asked about the innovation ecosystem.

The data were analyzed through a detailed reading of the interview transcripts and secondary data. We used Atlas.ti software to analyze the data (Hwang, 2008; Kalpokas & Radivojevic, 2022). We marked relevant excerpts with the citation tool and then categorized these excerpts according to each of the previously established theoretical categories: perceptions of value, innovation ecosystem strategies, actor engagement, value creation and capture mechanisms, critical success factors and innovation ecosystem development. Afterward, we used the code networks to visualize the relationships between the citations and the categories as well as between the categories of analysis.

Table 11. List of Interviewees

Innovation Ecosystem	Interviewee	Interviewee Position	Actor	Organization	Duration
A (Territorial Innovation Ecosystem) Inova RS Serra Gaúcha Region Innovation Ecosystem	1	Secretary	Local government	Secretariat for Development of Bento Gonçalves and Strategic Committee Inova RS Serra Gaúcha region	0:55
	2	Innovation director	State government	Secretariat of Innovation, Science and Technology	0:54
	3	Secretary	Local government	Secretariat for Economic Development and Innovation of Caxias do Sul	0:55
	4	Project manager	State government	Inova RS Serra Gaúcha region	1:00
	5	Project manager	State government	Inova RS Serra Gaúcha region	0:54
	6	Director	University	TecnoUCS and Strategic Committee Inova RS Serra Gaúcha region	0:25
	7	Professor	University	IFRS and Strategic Committee Inova RS Serra Gaúcha region	0:38
	8	Professor	University	UERGS and Technical Committee Inova RS Serra Gaúcha region	0:49
	9	Director 1	Company	Union of Metallurgical of Caxias do Sul and Strategic Committee Inova RS	0:38
	10	Director	Company	Evolut and Technical Committee Inova RS	0:37
	11	Director	Civil society	Mobi Caxias and Strategic Committee Inova RS	0:29
	12	Secretary	Local government	Secretariat for Economic Development and Innovation of Gramado	0:49
	13	Director	Civil society	Trinopolo and Strategic Committee Inova RS Serra Gaúcha Region	0:59
	14	Director	Local government	Secretariat for Economic Development and Innovation of Flores da Cunha	0:59
B (Platform Innovation Ecosystem) Helix Institute Innovation Ecosystem	15	Director	University	TecnoUCS	0:52
	16	Head	Company	Conexo	1:01
	17	Director	Civil society	Helix	1:11
	18	Director	Company	Semente	0:50
	19	Director	Company	Meber	1:10
	20	Head of innovation	Company	Rede Sim	0:48
	21	Director	Company	Hyvia	0:37
	22	Innovation analyst	Company	Marcopolo	0:40
	23	Director	Company	Acelera Serra	0:40
	24	Director	Company	CDL	0:58
	25	CEO	Company	Moderniza	0:43
	26	CEO	Company	Urupê Gestão de Resíduos	0:54
	27	Director 2	Company	Union of Metallurgical of Caxias do Sul	0:31
	28	Director	Company	Scoreplan	0:42

Source: The authors

Next, for each case, the data from the interviews, secondary data and newspaper articles were triangulated. Then, we sought to understand how each actor's perceptions of value, innovation ecosystem strategies, and actor engagement influence value creation and capture mechanisms. Afterward, we analyzed how the critical factors of success contributed to or limited the development of each innovation ecosystem.

4. RESULTS

4.1 TERRITORIAL INNOVATION ECOSYSTEMS

The Inova RS program is a state-level public policy that aims to stimulate and develop eight regional innovation ecosystems in the State of Rio Grande do Sul. The **inception** stage began in the first half of 2019 when the Core Inova RS department planned the program. In the Serra Gaúcha ecosystem, the **launching** stage started in October 2019, with an invitation to quadruple helix actors from the Serra Gaúcha region to participate in Inova RS. Initially, the actors were hesitant, as they were not accustomed to holding meetings to discuss innovation-related issues. Since then, relationships between the actors have developed.

The **strategy** of the Inova RS innovation ecosystem was to establish centralized coordination within a governance structure. The objective was to mobilize the largest possible number of regional actors from the quadruple helix to participate in its innovation ecosystem. An organizational coordination structure was established comprising a strategic committee, a technical committee, a regional table (a deliberative body on innovation projects) and three innovation and technology managers.

Our results also demonstrate the emergence and development of **actor engagement**. The interviews revealed a general consensus that Inova RS represented, for actors, the possibility of *"being in Inova RS to create connections" (Interviewee 8)*. Therefore, with the Inova RS program, actors found the initial conditions to approach and create new relationships. Thus, at this initial stage, relationships of trust, information and resource sharing, and proposals for innovation-related projects and learning about "how" to collaborate in an innovation ecosystem were established. However, the tensions between capturing value in the launch phase resulted in reduced actor engagement at precisely the time when the actors needed to maintain and stabilize the collaboration network to create value. These disputes about creating projects with proposals that adhered more to the interests of the organizations themselves hindered collaborative work on proposals that could benefit the creation of value at the innovation ecosystem level.

The **perception of value of the actors** indicated benefits in institutional image, organizational learning and relational gains. In the launch stage, actors had certain expectations about economic gains. As their collaborative relationships developed, actors exchanged experiences, knowledge, and good practices. Universities, civil society actors and public actors reported benefits related to the image of being involved in innovation actions. Municipal managers perceived benefits when making connections with cities from the region (and other regions) for sharing information and public good practices related to innovation. At the ecosystem level,

relational gains occurred between the actors who approached each other and began to build relationships of collaboration, complementarity, and trust.

> *Inova RS created an ecosystem where there is dynamic interaction all the time from private and public institutions (...). We had distant institutions, and they started interacting with unique objectives, aiming at the development of the region (Interviewee 7).*

Economic gains, in turn, did not occur satisfactorily, as projects in the areas of tourism, industry 4.0, and technological education were not awarded resources in public funding calls.

The main **mechanisms for value creation** were collaboration relationships among actors, meetings to create innovation projects, and innovation-related events. The launch event of the Inova RS program, technical and strategic committee meetings, and working group meetings were spaces for establishing a common vision for the region. Another relevant way was through actors' articulations at innovation-related events in the Serra do RS region (Hackathons Wood & Steel, Mind7 Startup; Caxias do Sul City Hall Innovation Marathon; Innovation Section in Grape Festival and, Gramado Summit).

The main **mechanisms for capturing value** from the territorial innovation ecosystem were the projects submitted in the Inova RS public calls for innovation proposals. These projects established the duties and rights of each actor to materialize the value proposition presented in the project. However, actors in the Inova RS faced difficulties in approving projects in all four priority groups. Thus, the competition for value capture in the ecosystem launch stage hindered the value creation process. Therefore, little value was created (either at the organizational level or within the ecosystem itself) that could be captured in the next phases of the innovation ecosystem.

> *In the tourism working group (...) we didn't have a project or an executor for the project (...). When last year's call for proposals was launched, again, we had no constituted project for any area. The Serra region did not approve any project! We wasted the opportunity to generate USD 190,000 in the region (Interviewee 8).*

These difficulties in establishing value capture mechanisms are directly related to the critical success factors of the innovation ecosystem. However, actors report that value is captured through indirect mechanisms, such as organizational learning, institutional image, and the strengthening of relationships among ecosystem actors. Our results revealed four **critical factors** that directly interfered with the processes of creation and value capture within the innovation

ecosystem of the Serra Gaúcha: regional culture, interactions between industry and universities, competition to capture value at the launch stage and resources.

Regional culture has been identified as a critical factor of success in the development of innovation ecosystems. The main cultural characteristics in the Serra Gaúcha region innovation ecosystem that emerged in the results were tradition, an entrepreneurial bias, competition, and a focus on individual achievements. These characteristics can serve as a favorable factor and an incentive for entrepreneurial profiles and the development of regional enterprises. However, characteristics that emphasize competition and individual achievements over collective ones inhibit collaborative work and the exchange of knowledge, which are crucial mainly in the early stages of innovation ecosystems. An environment with an individualistic characteristic is conducive to reducing trust among actors and results in a lack of motivation to share resources within the innovation ecosystem. Therefore, this characteristic can also negatively influence ecosystem development.

> *The great driving force behind development and entrepreneurship in our region is envy (...). If my neighbor did it, then I do it better than my neighbor* (*Interviewee 1*).

> *In the Serra region (...), we have a peculiar characteristic, which is individualism, which is very strong in the region, and this ends up compromising actions aimed at innovation* (*Interviewee 10*).

The resources (such as lack of knowledge and expertise in project execution methodologies and scarcity of human and financial resources for innovation) were also mentioned by the interviewees. These factors may inhibit the actors' absorptive capacity and lead to delays, inefficiencies, or even the failure of innovation initiatives. The lack of talents exclusively dedicated to Inova RS, as well as the absence of innovation skills and methodologies, can limit the development of innovative solutions within the ecosystem.

> *This is the biggest barrier: we did not have a methodology to execute the project (...). People had the ability to create good projects, but they did not demonstrate the capacity to execute these projects (Interviewee 4).*

> *Nobody is paid for that in Inova RS (...). We are volunteers, and consequently (...), we end up having many changes over time, and this generates breaks throughout the process*" (*Interviewee 7*).

The interaction between industry and universities was also a critical factor for the development of ecosystems. When this interaction is scarce, there is a limitation in the exchange of knowledge generated by the industry-university collaboration. This reduces innovation capacity and constrains the opportunities for commercializing innovative products and services. Additionally, the results highlight competition between industries and universities for financial resources.

> *In the area of Industry 4.0, we had a lot of difficulty. Companies wanted resources, while academics wanted to provide training for entrepreneurs. These two visions did not converge (Interviewee 5).*

> *It will still be difficult (...) to have interactions between private and/or public initiative and the universities (Interviewee 7).*

The above description shows that the governance strategy adopted in the conception and launch stage of the Inova RS ecosystem was helpful for bringing actors together and creating connections: there were relational gains at the ecosystem level, with the approximation of actors and institutional and organizational learning gains. However, several critical factors limited the development of the innovation ecosystem. The lack of approval of these projects in calls for proposals generated frustration with the efforts made to develop projects aimed at creating value.

> *We worked hard to meet the calls for proposals, but our projects did not meet the requirements. So, all the knowledge and voluntary involvement of people in technical and strategic committees ended up not yielding results (Interviewee 1).*

The strategy to increase the participation of regional actors in order to enhance their sense of belonging within the regional ecosystem also amplified the heterogeneity of the actors, the complexity of orchestrating engagement, and the diversity of actors' perceptions of value within the ecosystem. Efforts to create value were insufficient to overcome the cultural characteristics of competition and the emphasis on individual achievements. These traits exacerbated disputes over the early capture of value that had not yet been created within the innovation ecosystem. In this context of limited knowledge exchange, there still existed a lack of expertise in managing innovation projects and barriers in industry-university interaction. With little value created, the capture of value (mainly the expectation of capturing economic value) did not meet the actors' expectations. This resulted in slow growth in the early stage of innovation ecosystem development.

4.2 PLATFORM INNOVATION ECOSYSTEMS

The Helix Institute is a nonprofit association with only private members whose objective is to collaboratively transform the innovation ecosystem of the serra region. The **inception** stage began in 2018 when four large regional companies planned to collaborate to solve common problems related to innovation. Previously, these companies had not carried out collaborative actions. The **launch** stage started in 2019 with the formalization of the Helix Institute. Starting in 2021, the ecosystem began to show elements of the **growth stage:** 18 new companies and universities joined the Helix Institute, which meant a total of 22 companies involved in 2022.

The **strategy** of the Helix Institute was to first attract the four largest companies in the region to participate in its ecosystem. One of the main strategies was to start a process of cultural change with the senior and middle management of the associated companies. With new values such as open innovation practices and collaboration, companies began to share their practices and search for solutions to joint problems. Initially, newcomers carried out a diagnosis of innovation maturity. The institute also held monthly meetings to establish common objectives, implements benchmarking between companies, developed supplier relationship networks, and conducted training at high and medium levels of companies. One of the main actions was forging a connection between the innovation challenges of companies associated with qualified startups (from outside the region) and participation in innovation events.

The **actor engagement** increased throughout the development of the Helix Institute innovation ecosystem. There was a cultural shift among member companies, resulting in them realizing that collaboration and open innovation are viable and sustainable alternative strategies for reducing costs, boosting learning, and obtaining relational gains. The Helix Institute now acts as a hub firm, training human resources and generating content on innovation to improve actor engagement. Therefore, the engagement of the actors is a result of the increase in the perception of value of the associates in relation to the Helix Institute:

> *"The Helix Institute is our support, all the information and connection (...). Everything we need in relation to where we need to go was provided by the Helix Institute" (Interviewee 21).*

> *Helix (...) is the gateway. At Helix, I have a single channel to access all these associated companies" (Interviewee 15).*

The **perception of value of the actors** in the platform innovation ecosystem indicated benefits in economic dimensions, organizational learning and relational gains. The economic

benefits were obtained through innovation projects in the companies' hiring processes for suppliers and labor, with the aim of digitizing and reducing costs in these processes so that companies could perceive immediate benefits (quick wins). Afterward, companies realized the advantages of investing in medium- and long-term innovation projects for their products and services, such as web applications, nanotechnology and the initiation of digital transformation processes in their operations. Additionally, the organizations realized the benefits of organizational learning and relational gains provided by the institute's connections with suppliers, startups, and participation in events related to innovation.

> *"We usually say our main asset is the network" (Interviewee 17).*

The main **mechanisms for value creation** were collaboration and open innovation practices with other organizations. The Helix Institute acts as an articulator between the challenges of companies associated with startups, entrepreneurs, universities, and research institutes.

> *I have some challenges to solve via startups (...) or teaching institutions (...) to see if they can solve it (Interviewee 16)*

> *In 2018, we joined the Helix Institute and [began to truly] understand what open innovation is; we share our pains, our doubts, and our desires with other companies (Interviewee 20).*

Another important mechanism was through the articulation of actors in innovation-related events in the Serra Gaúcha region. Until 2018, companies, entrepreneurs and startups in the region did not have suitable spaces to meet and connect. One of the main value creation actions is connecting companies at events, innovation weeks, innovation challenges, and pitch days.

> *We have been working to connect, strengthen the network, bring companies closer together, and encourage participation in events (Interviewee 17)*

The main **mechanisms for capturing value** from the platform innovation ecosystem were related to the economic benefits of associated companies in innovation projects focused on cost reduction, in the absorption of knowledge to develop new products and services, and in investment in startups to develop solutions.

> *Initially, the objective is to generate quick money with innovation, with process improvement and digitization to generate agility and cost reduction. Afterwards, it is to generate new solutions, new products" (Interviewee 18)*

> *"Our business is a low margin business. The more I reduce my expenses through innovation, the greater the impact on my bottom line" (Interviewee 20).*

> *"This startup already had the solution, and they were growing. So, we helped the startup to grow (...) and absorbed this solution to offer our customers" (Interviewee 22).*

At the ecosystem level, the Helix Institute's main value capture mechanism is the increase in the number of member companies and the satisfaction of companies in remaining associated with Helix.

> *"The Helix Institute opened the door for us and strengthened our relationship with companies in the region and in other states" (Interviewee 20).*

In the Helix innovation ecosystem, we identified three **critical factors of success**: regional culture, intraorganizational changes, and resources. The characteristics of the regional culture (entrepreneurial spirit, individualism, and competition) were reported by the interviewees. However, the results indicate that the strategic planning of the Helix Institute took these elements into account when starting the institute with only four large companies in the region.

> *"The serra region has this movement; if four big companies, with well-known names, are in the Helix, then other companies start to show interest in participating too" (Interviewee 23).*

Another critical factor of success is intraorganizational change. With the support of the Helix Institute, companies begin experiencing intraorganizational cultural changes, from a culture of organizational competition to a culture that considers collaboration, innovation and new competences in human resources that lead these changes in each of the associated companies to work from an ecosystem perspective.

> *"A transformation is taking place in the mentality of entrepreneurs in the Serra region" (Interviewee 23).*

> *"We were very afraid to invest in some changes (...), so when we started to have exchanges with companies, we had an excellent result" (Interviewee 20).*

> *"With Helix, it is easier for us to connect our innovation team with companies in the region" (Interviewee 21).*

Companies have the strategic support of their top management to promote the transformation of their interorganizational resources. However, they face obstacles at the managerial level.

> *"Senior management has to 'open the minds' of many other people internally" (Interviewee 17).*

> *"Our main challenge is in middle management (...), in how innovation flows when it reaches the level of coordination and management" (Interviewee 22).*

The results indicate how strategies are articulated at the ecosystem level and the level of engagement of the actors. In addition, value creation mechanisms help enable actors and the ecosystem itself to capture value in a way that is coherent with these actors' perceptions of value. Despite the critical success factors impacting value creation and capture mechanisms, the adoption of cultural change strategies in organizations has generated important results, and the ecosystem has been able to develop.

5. DISCUSSIONS

The adoption of the theoretical model allowed us to adopt an integrated view (Figure 6), highlighting the similarities and differences that occur in the creation and capture of value in territorial and platform innovation ecosystems. On the one hand, territorial and platform innovation ecosystems exhibit similarities in terms of their mechanisms of value creation. On the other hand, differences were observed in actor engagement, innovation ecosystem strategies, actor value perception, critical success factors and value capture mechanisms. Furthermore, the article contributes to the literature by indicating that, when used effectively, the mechanisms of value creation and capture can positively contribute to the development of the innovation ecosystem.

Our results also indicate that critical success factors, such as regional culture and regional resources, impact territorial and platform innovation ecosystems in a similar manner. Despite the previous reporting of critical success factors such as interactions between industry and universities (Bettanti et al., 2022), resources (Bailey et al., 2018), and conflicts (Hannah & Eisenhardt, 2018;

Jones et al., 2021), the contribution of our study is the highlighting that factors such as competition to capture value at the launch stage can disengage ecosystem actors and slow the development of the territorial ecosystem. Thus, our results suggest that there is a higher level of complexity in territorial innovation ecosystems, which arises from the heterogeneity of actors, the multiplicity of value perceptions, and the diversity of value capture mechanisms.

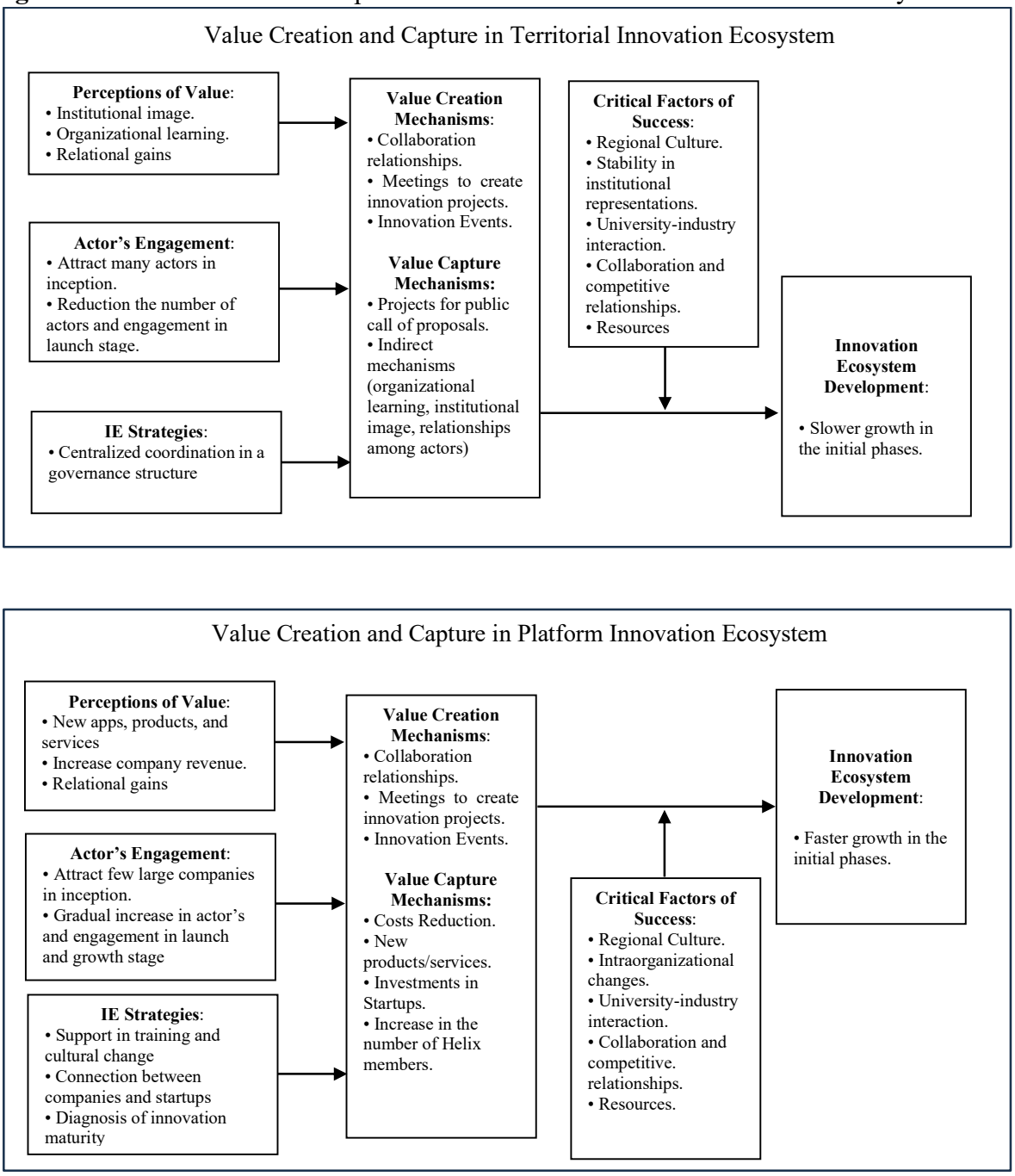
The platform innovation ecosystem embraced the local culture of isomorphism among small and medium-sized enterprises and translated this into a strategy previously mentioned by Benitez et al. (2020) and Chen et al. (2016) that involves starting with a small group of relevant companies in the initial stages to engage more actors in later stages. In other words, we can assert that it was not the regional culture that led to the disengagement of actors in the territorial innovation ecosystem; rather, it was the lack of understanding of the local culture and, primarily, the absence of strategies that leveraged the local culture to support the development of the territorial innovation ecosystem.

Our results also highlight the differences in the levels of actor engagement. The high level of engagement among actors in the platform innovation ecosystem is a result of the planned expansion of the number of actors, the strengthening of trust and collaboration relationships, and the neutralization of opportunistic behaviors (Steinbruch et al., 2021). Additionally, our article reinforces the findings of previous studies about the importance of initiatives that promote a culture of innovation among ecosystem participants and help find common interests aimed at a win–win situation (Blasco-Arcas et al., 2020; Santos et al., 2022). Our results suggest that actor heterogeneity (Autio & Thomas, 2021), difficulty in establishing common objectives, the creation of value propositions, and the lack of prospects for value capture influence the disengagement of actors in the territorial ecosystem. These findings have important managerial implications. By presenting an integrated view of two types of innovation ecosystems, we recommend that innovation ecosystem managers consider it essential to constantly monitor the level of actor engagement, paying attention to the slightest signs of disinterest, as well as difficulties or excessive delays in establishing value propositions (Oomens & Sadowski, 2019).

The results also highlight that there are different value perceptions among actors (Oskam et al., 2021) and different value capture mechanisms in territorial innovation ecosystems and platform innovation ecosystems. In the platform innovation ecosystem, value capture mechanisms benefit the company through the launch of new products and services and enhance its innovation performance. These value capture mechanisms primarily yield results in the short term in the economic dimension (Arena et al., 2022), for example, in terms of cost reduction, and in the medium term in terms of, e.g., investments in startups. Therefore, value capture occurs for each of

the companies at the organizational and ecosystem levels (Ritala et al., 2013; Talmar et al., 2020) in the form of, for example, an increase in the number of ecosystem platform members.

Figure 9. Value Creation and Capture in Territorial and Platform Innovation Ecosystem



In the territorial innovation ecosystem, value capture mechanisms did not result in direct improvements in the innovation performance of companies or the ecosystem itself. On the other hand, these value capture mechanisms generated indirect benefits such as institutional gains, improved organizational learning, and relational gains among actors. Thus, actors did not achieve economic outcomes in the short term, and the gains may be perceived only in the medium and long term. These findings help clarify that value capture in territorial ecosystems occurs differently

from that in platform innovation ecosystems. In practical terms, managers of territorial innovation ecosystems can conduct sessions to align the value capture expectations of participants, preventing future frustrations among actors who anticipate economic benefits from participating in territorial innovation ecosystems. Furthermore, as it is an early-stage ecosystem, the results of innovation projects have not yet led to a spillover of organizational gains to the region, such as new inhabitants and improvements in the quality of life of the population (Santos & Zen, 2024). Thus, our findings suggest that the benefits were more noticeable at the organizational level than the benefits generated in the social and environmental dimensions for the region (Arena et al., 2022).

Our findings open new perspectives by pointing to the possibility of learning from different innovation ecosystems. This discovery helps broaden the understanding of the recent debate in the ecosystem literature, which seeks to analyze the heterogeneity of innovation ecosystems, their possible similarities, their modes of interaction, and their potential points of intersection (Autio & Thomas, 2022; Piantoni et al., 2023). Thus, best practices gleaned from the platform ecosystem (internal cultural changes, strategies for understanding local culture, training at middle levels, diagnosis of innovation maturity levels, and stability in institutional representations) could be shared with managers of the territorial innovation ecosystem. In this way, both ecosystems could evolve in parallel at similar rates. Consequently, gains at the organizational and ecosystem levels, as well as for the territory, could become more visible and benefit all involved ecosystems. This contribution is important for regional innovation policy makers, as it suggests that best practices from the platform ecosystem can be shared and adapted for the territorial ecosystem and vice versa.

The proposed theoretical model confirmed that territorial and platform innovation ecosystems exhibit distinct dynamics in the processes of value creation and capture. Specifically, it illustrates how value perceptions, ecosystem strategies, and actor engagement help establish value creation and capture mechanisms. Furthermore, it emphasizes the critical success factors and their impact on both value creation and capture, as well as the development of the innovation ecosystem.

6. CONCLUSION

The creation and capture of value have previously been analyzed heterogeneously in the innovation ecosystems field (Santos & Zen, 2024). As a result, there is a need for empirical studies integrating platforms and territorial perspectives to understand how they relate to each other (Autio & Thomas, 2022; Piantoni et al., 2023). Based on this notion, our study analyzed how creation and capture value occur in territorial and platform innovation ecosystems in a emerging economy context. To achieve this aim, we researched two innovation ecosystems (one from a platform perspective and another from a territorial perspective) in southern Brazil using the case of Serra Gaúcha region.

This article makes three main theoretical contributions. First, our main contribution is to present an integrative view for analyzing the two main theoretical perspectives on innovation ecosystems to understand the creation and capture of value. Our results corroborate with Khademi (2020) in asserting that the mechanisms of ecosystem value creation and capture differ from one type of ecosystem to another. Another contribution to the field is that we offer an analysis model that adheres to the platform and territorial perspectives, as the elements of value perceptions, actor's engagement, ecosystem strategies, creation, and capture mechanisms of value in the innovation ecosystem and critical success factors have helped explain the development of innovation from both theoretical perspectives.

Second, our research identifies the similarities and differences between territorial (Scaringella & Radziwon, 2018) and platform (Kapoor & Klueter, 2021) perspectives. The results have shown that aligning objectives among actors in the quadruple helix is more complex in territorial innovation ecosystems than in platform innovation ecosystems. We also present additional results that advance current knowledge on public value (as in Ojasalo & Kauppinen, 2024) and how public and nonprofit organizations interact with private organizations to create and appropriate value (Cabral et al., 2019). Our research highlights that public organizations, universities, and civil society perceive value through indirect mechanisms such as gains in institutional image, organizational learning, and relational gains. Comparing these different types of ecosystems, the results offer a new perspective to studies analyzing the dynamics of value definition by Oskam et al. (2021) and the different dimensions of value (economic, social, and environmental) by Arena et al. (2021). We provide specific theoretical contributions to the literature on the creation and capture of value in territorial innovation ecosystems by emphasizing the complexity of engaging actors in aligning the interests of these heterogeneous actors, who have different value perceptions, distinct value capture mechanisms, and critical success factors that differ from the platform perspective. The results demonstrated how these differences can lead to diverse outcomes and impacts on the development of the innovation ecosystem.

The third contribution pertains to empirical evidence within an emerging country context. While research on value creation and capture from both platform and territorial perspectives has predominantly concentrated on developed countries, such as territorial contexts in the Netherlands (Oomens & Sadowski, 2019; Oskam et al., 2021), Denmark (Radziwon et al., 2017), and Italy (Bettanti et al., 2022), as well as urban centers like Chicago, London, and Vienna (Visnjic et al., 2016), the platform perspective has primarily analyzed digital ecosystems, software, and artificial intelligence industries (Chen et al., 2021; Linde et al., 2021; Prashantham, 2021). These studies have focused on sectors characterized by high technological intensity and research activities,

primarily those within companies or sectors situated in developed countries such as the United States, Japan, and European nations. Thus, our findings contribute by elucidate aspects of the legal, social, cultural, and economic context of the Serra Gaúcha region (Brazil). This context of emerging countries differs considerably from that of developed countries. By investigating a region with a strong cultural heritage that includes sectors of low and medium technological intensity (metal-mechanic, wine, and furniture sectors), and companies and institutions undergoing a transformation process in their innovation culture. Therefore, the results contribute by presenting the dilemmas faced by companies that are not located in metropolitan regions and have cultural characteristics that initially resist the adoption of innovation, especially as traditional/family-owned businesses that do not yet have an innovation culture, as is the case in many emerging countries and rural regions. This context differs significantly from that of metropolitan regions of developed countries, for example, as reported by Bettanti et al. (2022), Radziwon et al. (2017) and, Visnjic et al. (2016).

Our results make several empirical contributions that are useful for managers of public or private ecosystems, university managers and civil society bodies. Initially, policies providing financial support for territorial innovation ecosystems are fundamental for stimulating actors and promoting the development of regions through innovation. We suggest that territorial ecosystem managers identify the level of innovation maturity of quadruple helix actors. This information can contribute to ecosystem governance (and mainly to the actors themselves) to help perceive the gap between the actors and to be able to coordinate among the actors according to their respective capacities and innovation maturity. Value capture depends on the value created. With this, the effective creation of value can be a parameter for analysis by ecosystem managers (in both types of ecosystems) to continue, expand or reduce their efforts to engage actors. Therefore, ecosystem orchestrators need to make every possible effort to keep the actors engaged (through meetings, training, intraorganizational culture changes) until enough value is created to be later captured by the actors or the ecosystem. Furthermore, our results indicate the need for stability in institutional representations of innovation ecosystems. Therefore, we suggest territorial ecosystem policy-makers that each institution have at least two representatives (one fixed and one alternate) to maintain stability in the representation within the management structures of the territorial ecosystem. Specifically for contexts with traditional regional cultures, given the potential resistance to changes and investments in innovation, an alternative supported by our results is that companies can start with innovation projects with short-term gains (such as cost reduction, optimization of process and digitalization process). In this way, managers and employees will

perceive the benefits of innovation practices and feel less resistant to making new investments in medium- and long-term projects focused on the development of products and services.

Nonetheless, our research has some limitations, as it is a case study, and its results cannot be generalized. Additionally, the research was carried out in two ecosystems, one in the initial growth stage and one in the growth stage. Therefore, some results of innovation projects have not yet matured enough to be captured by the actors. Finally, the research context was a region within an emerging country. However, our contributions to the literature on value creation and capture in innovation ecosystems can enable additional research from different theoretical and empirical perspectives. Therefore, new studies can analyze innovation ecosystems in more advanced stages of maturity and complement our work on how the creation and capture of value occurs throughout the ecosystem development process and, mainly, how these difficulties are overcome along the way.

The alignment between value creation and capture mechanisms has already been reported by Sjödin et al. (2020). Our results suggest that these two mechanisms must be aligned with the perception of value (Oskam et al., 2021b) among actors in innovation ecosystems. Thus, new studies can analyze how the process of alignment between actors' perception of value and the establishment of mechanisms for creating and capturing ecosystem value occur.

Future research can contribute to our understanding of how ecosystems in emerging and/or developed countries include regional culture in their actor orchestration strategies and how this interferes with ecosystem development, especially in cultural contexts that have values such as tradition, family businesses and resistance to the adoption of innovation practices. New studies can use different methods, such as action research and ethnographic studies on regional cultural elements, or the adoption of quantitative methods to measure the impact of value creation and capture on the results and performance of the innovation ecosystem.

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5. CONCLUSIONS

Therefore, this thesis aimed to analyze how value creation and capture take place in the innovation ecosystem, considering both the platform and territorial perspectives. To address the 'how' of value creation and capture, an exploratory research design was adopted, involving three papers: a theoretical essay, a systematic literature review, and a comparative case study conducted in the Serra Gaúcha region, southern of Brazil. The theoretical essay aimed to identify value creation and capture in organizational and interorganizational contexts, subsequently informing a systematic literature review to deepen specific knowledge about value creation in innovation ecosystems. The comparative case study was then undertaken to empirically investigate categories emerging from the literature review, forming a progressive and comprehensive analytical framework.

Choosing Brazil as the research setting, specifically the state of Rio Grande do Sul, aimed to fill the gap in studies focusing on value creation and capture in emerging economies. Brazil, ranking 49th in the Global Innovation Index (World Intellectual Property Organization, 2023), represents a context with distinct institutional, economic, social, and cultural realities. The empirical research concentrated on the state of Rio Grande do Sul, recognized for its innovation and economic contributions to the national landscape. Notably, the research focused one of regional innovation ecosystems in the Inova RS program, which targets the development of regional innovation ecosystems in the state, aligning with the decentralization of management to accommodate diverse regional characteristics.

The selected regional innovation ecosystem within Inova RS was Serra Gaúcha, chosen for its concentration of manufacturing activities and strategic development areas such as Industry 4.0, tourism, and smart cities. The study also explored the Helix Institute, a platform innovation ecosystem organized by major companies to catalyze open innovation and collaborative ecosystems. This institute, strategically structured to promote effective collaboration, serves as a hub for integrating diverse actors in the innovation process, aiming to transform the Serra Gaúcha into a benchmark for innovation at both regional and national levels.

This thesis explored three main theoretical gaps concern value creation and capture in innovation ecosystems. The first gap involves comprehending, in an integrated manner, how value creation and value capture processes occur within the context of innovation ecosystems. Secondly, there is a gap in understanding the differences of value creation and capture between territorial and platform perspectives. Thirdly, this research addresses the underexplored context of value creation and capture in innovation ecosystems in emerging countries. Therefore, the three papers contribute to addressing these identified gaps.

The first gap involves comprehending, in an integrated manner, how value creation and value capture processes occur within the context of innovation ecosystems. Regarding this gap, the three articles jointly analyze the processes of value creation and capture in innovation ecosystems. The initial paper presents two specific propositions regarding this gap. One theoretical proposition argues that each actor within the innovation ecosystem should have coordinated strategies for both value creation and capture. Consequently, these processes cannot be carried out in isolation or randomly. The other proposition posits that each actor in an innovation ecosystem should devise both individual and collective mechanisms for value creation and capture presented distinct and complementary contributions to an integrated analysis of value creation and

The second paper provides a synthesis of the literature on innovation ecosystems at two elements of analysis: initially identifying strategies for value creation and capture at the innovation ecosystem level. These strategies are related to the levels of openness and centralization/decentralization surrounding the definition of the value proposition (Benitez et al., 2020; J. Chen et al., 2016; Visnjic et al., 2016). The paper then describes the different mechanisms of value creation and capture in innovation ecosystems. Value creation mechanisms are linked to collaborative activities, alignment of interests, and objectives among actors. Value capture mechanisms may vary for each actor participating in the innovation ecosystem, as they are related to the organizational goals of the actors. Value is determined by the beneficiary (Vargo & Lusch, 2008) and, each actor in the innovation ecosystem seeks to capture value according to their organizational objectives and can benefit from innovation projects in multiple ways, including intrinsic or social rewards, as well as non-pecuniary or pecuniary extrinsic rewards (Chesbrough et al., 2018). The literature reports that actors are integrated into the ecosystem based on the complementarity of resources that enable the creation of value as the value proposition is executed/implemented. In turn, it is pertinent that there be a negotiation among ecosystem actors regarding the value to be captured by each actor during the planning of the value proposition and the definitions of how each actor will contribute to value creation.

Finally, the third paper presents empirical results, providing an integrated understanding of how value creation and value capture processes occur within the context of innovation ecosystems. The comparative case study provides two relevant contributions to this gap: initially, the theoretical framework jointly incorporates the mechanisms of value creation and capture. Additionally, the results demonstrated that the Helix Institute platform ecosystem aligns with this approach: there are efforts to create value and coordinated actions to capture that value. Conversely, actors in the territorial innovation ecosystem encountered challenges in aligning value creation actions and engaged in competition to capture value that had not yet been created.

These results have significant implications for an integrated understanding of the processes of value creation and capture. They align with prior literature that had reported on the distinct nature of value creation and capture processes, emphasizing the need for a joint analysis. Furthermore, these findings suggest that value creation and capture are indeed distinct processes requiring a comprehensive analysis. Competition for early-stage value capture in the ecosystem may result in actor disengagement, reduced value creation, and a slowdown in the pace of innovation ecosystem development. Conversely, integrated planning of value creation and capture leads to complementary actors making contributions to value creation, engaging in collaborative activities, and sharing resources. Consequently, both the innovation ecosystem as a whole and each actor individually capture a share of the created value, fostering the development of the innovation ecosystem. Thus, the integrated planning of value creation and capture is a fundamental requirement for the development of any innovation ecosystem, whether from a platform or territorial perspective.

Secondly, there exists a gap in comprehending the disparities in value creation and capture between territorial and platform perspectives. Addressing this void, the thesis employed three different methods across the three papers to discern the differences and similarities between territorial and platform perspectives. Initially, the paper one provides a synthesis outlining the main differences and similarities between innovation ecosystem approaches, with the purpose of clarifying that these theoretical perspectives are distinct concerning the definition, limits, diversity, and heterogeneity of actors, actors' perception of value, as well as the final goal. Consequently, the analyses of value creation and capture in these approaches cannot be understood in the same manner.

Subsequently, the second paper undertakes a systematic literature review and compares the two theoretical perspectives across six dimensions: value creation and capture strategies, value creation mechanisms, value capture mechanisms, critical success factors, value dimensions, and the process view. The paper concludes that territorial and platform perspectives share these six dimensions, yet diverge in their analytical elements, taking into account the empirical peculiarities inherent to each perspective.

The examination of platform and territorial perspectives reveals commonalities and distinctions in their approaches to analyzing value creation and capture within innovation ecosystems. Both perspectives have aligned with ecosystem development, wherein actors, whether individual or the ecosystem itself, employ coordination strategies that may vary in centralization or decentralization. Alignment of objectives and interests is crucial, and value creation predominantly relies on collaborative relationships among actors.

However, divergence emerges in the mechanisms of value capture between the two perspectives due to distinct actor types and organizational objectives. This uniqueness leads to varied perceptions of value among heterogeneous actors. While the platform perspective primarily focuses on economic dimensions, the territorial perspective faces the challenge of aligning diverse interests from entities such as government, universities, civil society, and companies. It emphasizes value propositions that prioritize not only the economic but also social, cultural, and environmental dimensions. The multiplicity of objectives in the territorial perspective extends beyond the economic dimension addressed by the platform perspective.

The territorial perspective encounters greater complexity in establishing and maintaining common goals, with diverse interests influencing value creation and capture. Success factors for the territorial perspective encompass social, cultural, institutional, normative, legal, and governmental aspects, in contrast to the technological and organizational/economic factors emphasized by the platform perspective. This comparative analysis underscores the need for distinct research approaches for each perspective, particularly in understanding the value dimension, mechanisms of value capture, and critical success factors. Despite these disparities, both perspectives share similarities in their views on processes, mechanisms of value creation, and strategies for value creation and capture within innovation ecosystems.

The third paper further contributes to elucidating this gap through empirical findings from a comparative case study between two innovation ecosystems: one operating under the territorial perspective and the other under the platform perspective. This paper proposes a theoretical model that enables the comparative analysis of territorial and platform perspectives. The theoretical model affirms that territorial and platform ecosystems demonstrate distinct dynamics in the processes of value creation and capture. Territorial and platform innovation ecosystems share similarities in terms of their mechanisms for value creation. Distinctions were observed in actor engagement, innovation ecosystem strategies, actor value perception, critical success factors, and value capture mechanisms. Therefore, our findings suggest a higher level of complexity in territorial innovation ecosystems, stemming from the heterogeneity of actors, the multitude of value perceptions, and the diversity of value capture mechanisms.

These findings presented significant implications for understanding the differences in value creation and capture between territorial and platform perspectives. Initially, the three studies reinforce the argument that there are substantial disparities in the processes of value creation and capture between the two perspectives. Secondly, there is greater clarity regarding the distinctions (value perceptions and value capture mechanisms, ecosystem strategies, actor engagement) and similarities (value creation mechanisms, critical success factors) between the approaches. Thirdly,

the thesis results assist future researchers in distinguishing the key theoretical elements of each approach, thereby reducing the risk of investigating an innovation ecosystem from a theoretical perspective that adopts concepts, elements, and empirical findings from an innovation ecosystem with a different theoretical outlook. Hence, future research endeavors may consider these results as a starting point for new studies involving value creation and capture in both platform and territorial approaches.

The third gap is associated with the underexplored context of value creation and capture in the innovation ecosystems of emerging countries. The first and second papers provide theoretical evidence that emerging economies have been under-researched. The papers analyzed in the systematic literature review allow us to assert that the territorial perspective predominantly examines success cases in developed countries and, to a lesser extent, ecosystems facing challenges in emerging countries. In contrast, the Platform perspective primarily analyzes ecosystems in developed countries operating in digital ecosystems, software, and artificial intelligence industries, as well as the automotive, electronics, telecommunications, and mechatronics sectors, including nanoelectronics and semiconductor companies.

To advance the understanding of this gap, the comparative case study investigates the Serra Gaúcha region, Brazil. The third paper presented elements of the social, economic, and cultural context of an emerging economy positioned at the 49th place in the Global Innovation Index. The results revealed regional culture (entrepreneurial spirit, individualism, and competition), a lack of knowledge and expertise in project execution methodologies, and a scarcity of human and financial resources. These challenges were compounded by difficulties in the interaction between companies and industries. The absence of strategies to neutralize these critical factors limited the development of the territorial innovation ecosystem. The non-approval of these projects in calls for proposals generated frustration despite the efforts made to develop projects aimed at creating value. The results also showcased a dynamic innovation ecosystem. With the support of the Helix Institute, four major regional companies planned and led collaborations to address common problems related to innovation. This group of companies, willing to make intraorganizational changes regarding innovation, embraced new values such as open innovation practices and collaboration. Consequently, companies began to share their practices and seek joint solutions to common problems. Therefore, the empirical paper brought diverse elements from a typical context of an emerging economy, presenting both positive aspects and challenges to be overcome in relation to innovation and regional development.

These findings carry important implications for studies on innovation ecosystems in emerging economies. Initially, many emerging economies grapple with a fragile institutional

environment, poverty, limited capacities to devise and implement complex policies, deficits in economic productivity, and competitiveness (Thomas et al., 2021). Furthermore, in emerging economies, infrastructure often encounters structural challenges, such as limitations in investments, technological maturity, and access to resources. Thus, in the context of scarcity in emerging economies, these results contribute to understanding the nuances and peculiarities that surround the creation and capture of value in the innovation ecosystems of these economies. Table 10 provides a summary of the findings from the three papers of this thesis.

Table 10: Summary of findings from the three papers

Paper	Objective	Contributions	Key Results
Value Creation and Capture in Innovation Ecosystems.	Propose an integrative framework for analyzing value creation and capture in innovation ecosystems that considers the differences between the territorial and platform approaches.	Integrative framework for the creation and capture of value in innovation ecosystems.	Understanding of the concepts of value creation and capture through different theoretical lenses at the organizational and interorganizational levels.
		Six theoretical propositions: Theoretical approach, process view, strategies, mechanisms of value creation mechanisms of value, multidimensional value.	
Creating and Capturing Value in Innovation Ecosystems: a literature review between 2010 and 2021.	Identify, through a systematic review, what are the contributions of the platform and territorial perspectives to the literature on value creation and capture in innovation ecosystems.	Current panorama of publications in the area.	Summarizes the main theoretical similarities and differences in value creation and capture in innovation ecosystems concerning platform and territorial perspectives.
		Strategies, mechanisms and drivers of value creation and capture in innovation ecosystems.	
		Six dimensions of analysis of value creation and capture in innovation ecosystems.	
		Propose a research agenda in the field.	
Developing Innovation Ecosystems Through Value Creation and Capture Mechanisms: a comparative case study of platform and territorial perspectives.	Analyze how the creation and capture of value occur in both territorial and platform-based innovation ecosystems.	Comparison and identification the similarities and differences that occur in the value capture creation processes in territorial and platform innovation ecosystem.	Describing the strategies of the ecosystem and the mechanisms employed by its actors to create and capture value. Analyze actor engagement, actors' perceptions of value, and delineating the influence of critical success factors on the development of the innovation ecosystem within an emerging economy context.
		Theoretical model presenting the elements that influence and shape the mechanisms for creating and capturing value in innovation ecosystems	
		Explore the value creation and capture in an emerging country context.	

This synthesis of the paper results indicates that the three gaps identified in the literature on value creation and capture in innovation ecosystems have been addressed, achieving the objective of the thesis, which aims to analyze how value creation and capture occur in innovation ecosystems from the platform and territorial perspectives.

5.1 THEORICAL AND MANAGERIAL CONTRIBUTIONS

This thesis has three main theoretical contributions to the creation and capture of value in innovation ecosystems. The first main theoretical contributions is to present an integrative view for analyzing the two main theoretical perspectives on innovation ecosystems to understand the creation and capture of value. Khademi (2020) argues that the creation and capture of value in ecosystems have been researched in a fragmented manner by the academic community. The creation and capture of value had already been analyzed from both the territorial perspective (Oomens & Sadowski, 2019; Oskam et al., 2021; Visnjic et al., 2016) and the platform perspective (Adner & Kapoor, 2010; Kapoor & Klueter, 2021; Zhang et al., 2023). However, an analysis of both approaches was conducted: initially, theoretical analyses were carried out using different methods, such as theoretical essays and systematic literature reviews, and subsequently, empirical analysis was conducted through a comparative case study. Initially, the thesis corroborates with Khademi (2020) in asserting that the mechanisms of ecosystem value creation and capture differ from one type of ecosystem to another. But the results introduce new analytical elements for recent discussions that examine how value is created in different types of innovation ecosystems, as presented by Piantoni et al. (2023). In other words, we align with Piantoni et al. (2023) in arguing that physical proximity alone is not sufficient for actors to have greater alignment in the processes of value creation and capture. However, the thesis contributes by presenting theoretical elements and their relationships of two innovation ecosystems: territorial and platform. These include innovation ecosystem strategies, actors' value perception and engagement, creation, and capture mechanisms of value in the innovation ecosystem, and critical success factors that can contribute to or hinder the development of innovation ecosystems.

The second contribution of the thesis is to deepen the understanding of the similarities and differences between territorial (Scaringella & Radziwon, 2018) and platform (Kapoor & Klueter, 2021) perspectives. The results have shown that aligning objectives among actors in the quadruple helix is more complex in territorial innovation ecosystems than in platform innovation ecosystems. The thesis also presents additional results that advance current knowledge on public value (as in Ojasalo & Kauppinen, 2024) and how public and nonprofit organizations interact with private organizations to create and appropriate value (Cabral et al., 2019). The thesis highlights that public organizations, universities, and civil society perceive value through indirect mechanisms such as gains in institutional image, organizational learning, and relational gains. Comparing these different types of ecosystems, the results offer a new perspective to studies analyzing the dynamics

of value definition by Oskam et al. (2021) and the different dimensions of value (economic, social, and environmental) by Arena et al. (2021). We provide specific theoretical contributions to the literature on the creation and capture of value in territorial innovation ecosystems by emphasizing the complexity of engaging actors in aligning the interests of these heterogeneous actors, who have different value perceptions, distinct value capture mechanisms, and critical success factors that differ from the platform perspective. The results of third paper demonstrated how these differences can lead to diverse outcomes and impacts on the development of the innovation ecosystem.

The third contribution is related to empirical evidence in an emerging country context. Research on value creation and capture from both the platform and territorial perspectives has mainly been focused on developed countries, such as territorial contexts in the Netherlands (Oomens & Sadowski, 2019; Oskam et al., 2021), Denmark (Radziwon et al., 2017), and Italy (Bettanti et al., 2022) and cities like Chicago, London, and Vienna (Visnjic et al., 2016). The platform perspective has primarily analyzed digital ecosystems, software, and artificial intelligence industries (Chen et al., 2021; Linde et al., 2021; Prashantham, 2021), and sectors that require high technological intensity and research activities, mainly from companies/sectors in developed countries (United States, Japan, and European countries). Thus, the thesis contributes by presenting aspects of the legal, social, cultural, and economic context of the Serra Gaúcha region (Brazil). This context of emerging countries differs considerably from that of developed countries. By investigating a region with a strong cultural heritage that includes sectors of low and medium technological intensity (metal-mechanic, wine, and furniture sectors), and companies and institutions undergoing a transformation process in their innovation culture. Therefore, the thesis contributes by presenting the dilemmas faced by companies that are not located in metropolitan regions and have cultural characteristics that initially resist the adoption of innovation, especially as traditional/family-owned businesses that do not yet have an innovation culture, as is the case in many emerging countries and rural regions. This context differs significantly from that of metropolitan regions of developed countries, for example, as reported by Bettanti et al. (2022), Radziwon et al. (2017) and, Visnjic et al. (2016).

In addition to contributing to the three identified gaps, the thesis also provides insights for public policies and innovation ecosystem managers. To make regions dynamic, one of the key innovation strategies is the adoption of public policies that stimulate regional innovation ecosystems. Thus, the active orchestration of the regional ecosystem, knowledge co-creation and exploitation, opportunity exploration, and capacity building (Markkula & Kune, 2015) are some of the elements described in the literature to drive innovation in regions. Although Bailey et al. (2018) emphasizes the importance of a region adopting strategies that allow the regional ecosystem

to capture a portion of the value it helped create and co-create with companies and other organizations, it has been a challenge to develop and implement public policies related to regional innovation ecosystems. These challenges mainly stem from cultural, social, and economic differences between regions within the same country, and even differences within the same region.

The results of this thesis provided insights for formulating specific recommendations for public policy managers aiming to stimulate regional innovation ecosystems. Initially, it is crucial for managers of regional innovation ecosystems to be aware of the technological maturity level of participants within the innovation ecosystem. The territorial strategy encourages the involvement of various types of actors, including public and private entities, higher education institutions, and civil society. However, empirical findings did not identify practices for measuring the technological maturity level of actors in the territorial ecosystem. This practice could assist ecosystem management in aligning responsibilities and tasks based on the technological maturity of each participant, assigning more complex tasks to actors with higher levels of maturity and less complex tasks to those in less developed stages. Moreover, the actors themselves can establish comparisons among each other and identify which ecosystem participants are at the same level, above, or below, enabling exchanges of knowledge, resources, and know-how.

Secondly, it is recommended that public managers of territorial ecosystems establish direct and clear communication regarding both collective gains, at the regional ecosystem level, and potential individual gains for the actors. This dialogue should take place during the definition of the value proposition. In this way, each actor is made aware from the planning stage of their actual possibilities for value capture. Consequently, the gap between expectations and the reality of individual value capture for the actors is reduced. This practice can contribute to minimizing frustration and the level of disengagement among actors during crucial moments of value creation. In other words, our theoretical model in third paper indicates that the presence of engaged actors is one of the fundamental elements for the occurrence of value creation and co-creation in innovation ecosystems.

Thirdly, the strategy to encourage broad and open voluntary participation of stakeholders is crucial for fostering a sense of belonging among regional actors. Conversely, as the diversity and heterogeneity of actors increase, the complexity of formulating value propositions also rises, particularly in regional contexts involving diverse economic sectors, different universities, and various municipalities participating. Therefore, the ecosystem's open strategy is a delicate aspect to be managed: a greater number of participants does not always translate into enhanced development of the territorial innovation ecosystem. Consequently, public managers need to carefully consider the balance between the quantity of actors and their contributions, engagement,

and the resources (knowledge, infrastructure, human) each actor makes available to the ecosystem for value creation.

The second audience is innovation ecosystem managers. From a managerial perspective, coordinators and orchestrators of innovation ecosystems can incorporate questions into their routines, such as: How does each actor contribute to the value being created? How can each actor benefit from the value proposition of the innovation ecosystem? Who will be the target audience that will benefit from the value proposition (customers, businesses, population)? How is each actor (and the ecosystem itself) capturing value by participating in the innovation ecosystem? What are the critical success factors involved in the creation and capture of value in the innovation ecosystem? These questions are crucial because while participating in an innovation ecosystem might be beneficial for some actors, others may not gain as much as they expected, and therefore, they may reduce their commitment to the ecosystem and withdraw. It is thus essential that all actors are properly compensated for their efforts and contributions to the innovation ecosystem (Yaghmaie et al., 2020).

The results from papers 2 and 3 provide examples of value creation mechanisms (collaboration, alignment of interests, resource sharing, events, etc.) and value capture mechanisms (cost reduction, sales increase, institutional image, organizational learning). Additionally, the thesis presents examples of critical success factors such as the number of actors, tensions and conflicts in the collaboration and competition relationship, trust, regional culture, cultural and geographic distances, learning capability, innovative culture, public investments, excessive bureaucracy, and regulation. Therefore, ecosystem managers can analyze their internal and external contexts to identify factors that can act as moderators in the relationship between value creation and capture and the development of the innovation ecosystem.

5.2 LIMITATIONS AND FUTURE RESEARCHES

Despite its contribution, this thesis has some limitations in each of the three papers. Regarding the first paper, being a theoretical essay, the results were limited to theoretical propositions without empirical validation. In the second paper, the systematic literature review consulted only papers published in journals, and only in the Web of Science database. And the third paper was carried out in two ecosystems that are in the initial phases. Therefore, some results of innovation projects have not yet reached the maturity to be captured by the actors and included in the analysis of the paper. Another limitation identified in the thesis was the adoption of the term 'procedural view' in articles 1 and 2. Upon concluding the thesis, we recognize that the term

'process view' is more aligned with studies that perceive the process as a continuous and regulated action expressing continuity in the development of a specific activity (Faccin & Martins, 2022). The final limitation concerns the launch dates of each innovation ecosystem. While the Helix Institute was launched in September 2018, the Inova RS program was launched only in October 2019 in the Serra Gaúcha region. This temporal difference (one year and one month) was not considered in the analysis of paper 3 and, therefore, partially limits the comparison between the two ecosystems. The final aspect does not exactly pertain to a limitation but warrants a paragraph of explanation: the different definitions of value across the three articles. In paper 1, value was understood as multidimensional (Ben Letaifa, 2014; Oskam et al., 2021). However, in paper 2, despite the introduction arguing that value is established by the beneficiary (Vargo & Lusch, 2008), the results emphasize the multidimensional perspective of value. And, in paper 3, value was presented from the perspective of 'perceived value'. In this new understanding, value is created to generate benefits for users at the individual, organizational, or societal level. In general, these shifts in the conception of value represent further maturation in the understanding (rather than a limitation of the thesis) of this complex, subjective, and multifaceted term within the literature on innovation ecosystems.

Future research can be carried out to continue the contributions of this thesis. In general, this thesis analyzed the creation and capture of value at the organizational and interorganizational levels. However, Lepak et al. (2007) argue that the creation and capture of value can occur at individual, organizational and societal levels. Majchrzak et al. (2023) investigate the creation and capture of value at the individual level using the theoretical lens of open innovation. Therefore, new studies can investigate at the individual level of analysis the creation and capture of value in innovation ecosystems to capture the perceptions of individuals. These findings could contribute to a deeper understanding of value creation and capture and complement what is already known at the organizational and interorganizational levels of analysis.

Regarding the systematic literature review, new searches can be carried out using other databases, such as SCOPUS and including papers from congresses. Still, paper two analyzed only the economic, cultural, social and environmental dimensions. Therefore, future research could deepen the analysis of what are the actors' perceptions of value. Foguesatto et al. (2023) study citizens' perception of quality of life in an urban innovation ecosystem. That is, quality of life can be a form of value perceived by the citizens of a territorial innovation ecosystem. New studies can analyze the citizens' perception of value on the quality of life in the region, using the theoretical lens of creation and capture of value and understanding the quality of life as the value to be created by the ecosystem.

Empirically, future research can carry out quantitative studies, with the proposition of a scale to measure the relationships between the creation and capture of value and the performance of the innovation ecosystem, as well as the impact of critical factors of success with moderating variables of the relationship between creation and capture of value and performance of the innovation ecosystem. The third paper also opens possibilities for new research to adopt ethnographic methods to understand the relationships between local/regional culture and the development of innovation ecosystems, as few studies have analyzed how the influence of different cultural dimensions on stakeholder engagement impact policies and decision-making (Osobajo et al., 2023). We also suggest longitudinal studies that enable the analysis of ecosystem development over time. This could provide new insights regarding the effectiveness of innovation ecosystem strategies in creating and capturing value. Another possibility is to employ the theoretical lenses of coopetition to analyze the creation and capture of value in contexts of emerging economies.

Even, new case studies can analyze the creation and capture of value in other territorial contexts, such as urban districts, cities, or metropolitan regions, both in emerging and developed countries. Under the platform perspective, new research can be carried out in other sectors, such as digital platforms, automotive, pharmaceuticals or with startups, for example. New case studies can also be carried out to analyze the creation and capture of value in specific and in-depth contexts of public actors, or universities, for example. Finally, this thesis used both platform and territorial theoretical perspectives. Hence, new studies can compare the findings of this thesis with those of other types of ecosystems, such as knowledge ecosystems, business ecosystems, service ecosystems, and technological platform ecosystems.

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APPENDIX A - SEMI-STRUCTURED SCRIPTS FOR INTERVIEWS (PAPER 3)

Número do Questionário: _____ Data da entrevista: _____
Hora Início da entrevista: _____ Hora término da entrevista: _____
Ecossistema de Inovação: Hélice ( ) Inova RS ( ).

Bloco A: Perfil do entrevistado e da organização

1. Tipo de organização: universidade ( ); governo ( ); empresa ( ); sociedade civil ( ).
2. Conte um pouco sobre o histórico da empresa.
3. Quando a empresa ingressou no ecossistema/projeto de inovação?
4. Qual é o papel da organização no ecossistema de inovação? Quais ações a empresa desempenha no ecossistema?
5. Qual é o nome e o cargo/posição do entrevistado?

Bloco B: Percepção de Valor

6. Quais são os principais objetivos da organização em que você atua? (o que espera de geração de valor ao participar do ecossistema de inovação?)
7. Quais são os benefícios percebidos pela organização em que você atua ao participar do ecossistema de inovação?
Quais eram as expectativas de benefícios ao ingressar no ecossistema de inovação?
8. De que forma a sua organização contribui para o ecossistema de inovação?

Bloco C: Estratégias do Ecossistema de Inovação

9. A organização que você atua participou do estabelecimento dos objetivos iniciais do ecossistema de inovação?
10. Como foram definidos os objetivos iniciais do ecossistema de inovação? Quantos/quais atores participaram?
11. As responsabilidades e os direitos de cada ator foram definidos claramente no início das atividades do ecossistema de inovação?
12. Como o ecossistema de inovação é coordenado?

Bloco D: Engajamento dos Atores

13. Quais ferramentas são utilizadas para a coordenação do ecossistema para a participação dos atores?
14. Quais são as características da liderança do ecossistema de inovação?
15. Existem alguma organização líder do ecossistema de inovação? Qual?
16. Como é a tomada de decisão no ecossistema de inovação?
17. Quais são as estratégias da sua organização em relação à participação no ecossistema de inovação? Como a estrutura de inovação da empresa é organizada/coordenada/gerida?
18. Como foi a participação/nível de engajamento da sua organização ao longo da participação do ecossistema de inovação?
19. Como você percebe o nível de engajamento dos atores no início do ecossistema de inovação e neste momento?

Bloco E: Mecanismos de Criação de Valor

20. A sua organização colaborou com quais outros atores do ecossistema de inovação?

21. Como ocorreu esta colaboração ocorreu?
22. Esta colaboração mudou ao longo do desenvolvimento do ecossistema de inovação? Como? Cite exemplos.
23. Quais recursos a sua organização compartilhou com os demais atores nestas diferentes etapas?

Bloco F: Mecanismos de Captura de Valor

24. Como a organização em que você atua se beneficia do ecossistema de inovação?
25. Quais eram as expectativas de benefícios da sua organização antes de ingressar no ecossistema de inovação?
26. Estes benefícios foram intencionalmente planejados antes da participação no ecossistema de inovação?
27. Foram percebidos outros tipos de benefícios ao longo da participação no ecossistema de inovação? Quais?
28. Na sua opinião, como as demais organizações que atuam no ecossistema se beneficiam do ecossistema de inovação? Quais são os benefícios?
29. Na sua opinião como a região de Caxias do Sul se beneficia do ecossistema de inovação?
30. Quais são os benefícios do ecossistema para a região?
31. sua percepção existe competição entre os atores pelos benefícios gerados pelo ecossistema de inovação?

Bloco G: Fatores Críticos de Sucesso

32. Quais barreiras internas à sua organização impedem o desenvolvimento dos projetos de inovação executados no ecossistema de inovação?
33. Quais barreiras externas à sua organização impedem o desenvolvimento dos projetos de inovação executados no ecossistema de inovação?
34. Quais forças (internas e externas) impulsionam o desenvolvimento dos projetos de inovação executados no ecossistema de inovação?
35. Houveram tensões e conflitos durante o desenvolvimento do ecossistema de inovação? Como eles foram superados?
36. Na sua percepção existe confiança entre os atores do ecossistema de inovação?
37. Como o contexto geográfico, as variáveis sociais, culturais e institucionais interferem no desenvolvimento do ecossistema de inovação?
38. Ao final da entrevista: solicitar que o entrevistado realize perguntas ou fale espontaneamente sobre algum ponto que não foi questionado no roteiro.

APPENDIX B –SYNTHESIS OF SECONDARY DATA (PAPER 3)

Table 12. Synthesis of Secondary Data (Paper 3)

Number	Title Document	Pages	Source
1	Edital SICT nº 001/2020	16	www.sict.rs.gov.br
2	Resultado Final Edital SICT nº 001/2020	1	www.sict.rs.gov.br
3	Resultado Prelimitar Edital SICT nº 001/2020	2	www.sict.rs.gov.br
4	2020: O Ano da Colaboração	3	https://helice.network/blog/
5	Hélice apresenta Soluções de Startups na Mercopar	3	https://helice.network/blog/
6	Dentro do Hélice: o que faz nossa líder de operações	4	https://helice.network/blog/
7	Bem-vinda, Hyva!	4	https://helice.network/blog/
8	Bem-vindo, Sicredi	4	https://helice.network/blog/
9	Instituto Hélice, Instituto Caldeira e Aliança Empresarial assinam termo de cooperação	4	https://helice.network/blog/
10	Hélice apresenta resultados e lança objetivos do ciclo de gestão 2021 – 2023	4	https://helice.network/blog/
11	Conexão com Startups em 2020	3	https://helice.network/blog/
12	Por Dentro do Hélice: como é o dia a dia no instituto e no relacionamento com a comunidade?	4	https://helice.network/blog/
13	Unidos para Pensar Inovação e Provocar Mudanças: Instituto Hélice e Semente formalizam parceria	4	https://helice.network/blog/
14	Saiba tudo sobre o nosso Framework de Inovação	4	https://helice.network/blog/
15	Saiba como funciona o grupo de investimentos Hélice	3	https://helice.network/blog/
16	Por Dentro do Hélice: conheça a Incubadora de Talentos, o programa de imersão do instituto	4	https://helice.network/blog/
17	Mentoria e Empreendedorismo: Acelerando Startups	3	https://helice.network/blog/
18	Mentoria Hélice chega na sua 3ª turma	3	https://helice.network/blog/
19	Plataforma de transformação e retomada de empresas, Mercopar 2021 terá apoio do Hélice	3	https://helice.network/blog/
20	Hélice Network: Instituto Hercílio Randon apresenta nova fase no desenvolvimento de pesquisas disruptivas	4	https://helice.network/blog/
21	Crescimento Exponencial e Transparência: o que dizem as startups que se conectam como Hélice	4	https://helice.network/blog/
22	Caxias tem Pacto pela Inovação	5	https://www.baguete.com./
23	Por Dentro do Hélice: o que vem por ai em 2021?	4	https://helice.network/blog/
24	Instituto Hélice lança relatório de suas atividades de inovação em 2020	4	https://helice.network/blog/
25	Instituto Hélice e Sindimóveis/Movergs firmam parceria para estimular inovação na cadeia produtiva de madeira e móveis.	4	https://helice.network/blog/
26	Resultado Prelimitar Edital SICT 001/2021	3	www.sict.rs.gov.br
27	Resultado Final Edital SICT nº 001/2021	3	www.sict.rs.gov.br
28	Portaria SICT nº 08/2021 Membros Inova RS	3	www.sict.rs.gov.br
29	Edital SICT nº 002/2022	12	www.sict.rs.gov.br
30	O que é o Gramado Summit 2022?	9	https://divia.com.br/blog
31	Instituto Hélice e Conexo firma Parceria para expandir serviços ao ecossistema de inovação	3	https://helice.network/blog/
32	Instituto Hélice e Trino Polo oficializam parceria para desenvolver ecossistema de inovação da Serra Gaúcha	4	https://helice.network/blog/
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34	Mercopar é oportunidade para novas conexões	5	https://helice.network/blog/
35	Pacto pela Inovação será lançado	11	https://gauchazh.clicrbs.com.br/pioneiro/
36	Instituto Hélice realiza primeiro programa de aceleração de startups da Serra Gaúcha	4	https://helice.network/blog/
37	Boletim Informativo Inova RS Região Serra e Hortênsias	48	www.sict.rs.gov.br
38	Resultado Final Edital SICT nº 002/2022	2	www.sict.rs.gov.br
39	Resultado Preliminar Edital SICT nº 002/2022	2	www.sict.rs.gov.br

40	Maratona de Inovação gera ideias para qualificação do Alô Caxias	3	https://caxias.rs.gov.br/noticias/
41	O Hélice	5	https://helice.network/sobre
42	Inova RS Estrutura Organizacional	3	https://sict.rs.gov.br/programa-inovars
43	Mind7 Startup 2023 marca sua realização no ecossistema de inovação da região	5	https://gauchazh.clicrbs.com.br/pioneiro/
44	Entidade marca presença em Mesa do Inova RS Região Serra e Hortênsias	4	https://ciccaxias.org.br/noticias/
45	Realidade Virtual, batalha de startups e compartilhamento de ideias	9	https://gauchazh.clicrbs.com.br/pioneiro/
46	Mobi Caxias Apresenta Perfil Socioeconômico de Caxias	3	https://simecs.com.br/blog/
47	City Living Lab: Sistema de coleta de dados por dispositivos IoT (sensoriamento) para cidades inteligentes	1	https://www.citylivinglab.com/
48	Infográfico Instituto Hélice	1	https://helice.network/corps
49	Boletim Inova RS Região Serra e Hortênsias	5	https://sict.rs.gov.br/