

## ARTIGOS

### ENTREPRENEURIAL ECOSYSTEMS: A CONFIGURATIONAL RESEARCH APPROACH

### ECOSSISTEMAS EMPREENDEDORES: UMA ABORDAGEM DE PESQUISA CONFIGURACIONAL

#### ABSTRACT

The entrepreneurial ecosystem approach has emerged as a framework capable of providing a systemic understanding of entrepreneurship. Considering that entrepreneurial ecosystems admit different configurations, this article aims to stimulate a reflection on the application of the configurational approach in the analysis of entrepreneurial ecosystems. An analysis model based on six dimensions of entrepreneurial ecosystems is indicated: geographic breadth, sectorial diversity, mode of governance, degree of maturity, innovative effort, and environmental munificence. This proposal is justified by indicating a possibility for a more subtle and rigorous understanding of entrepreneurial ecosystems, allowing for more precise and reliable policy recommendations for the creation and strengthening of entrepreneurial ecosystems.

Keywords: entrepreneurship; entrepreneurial ecosystems; configurational approach; public policy.

#### RESUMO

A abordagem do ecossistema empreendedor surgiu como uma estrutura capaz de fornecer uma compreensão sistêmica do empreendedorismo. Considerando que os ecossistemas empreendedores admitem diferentes configurações, este artigo visa estimular uma reflexão sobre a aplicação da abordagem configuracional na análise de ecossistemas empreendedores. É indicado um modelo de análise baseado em seis dimensões de ecossistemas empreendedores: amplitude geográfica, diversidade setorial, modo de governança, grau de maturidade, esforço inovador e munificência ambiental. Esta proposta se justifica por indicar a possibilidade de uma compreensão mais sutil e rigorosa dos ecossistemas empreendedores, permitindo recomendações

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de políticas mais precisas e confiáveis para a criação e fortalecimento de ecossistemas empreendedores.

**Palavras-chave:** empreendedorismo; ecossistemas empreendedores; abordagem configuracional; política pública.

## 1 INTRODUCTION

ACS (2006, p. 97) presented a stimulating question: how is entrepreneurship good for economic growth? A simple answer to this question, according to the author, is that entrepreneurship drives economic growth through the creation of jobs, the intensification of competition, and technological changes promoted by new businesses created by entrepreneurs. This perspective fuelled the idea that entrepreneurship policies should emphasize the indiscriminate creation of new businesses, as this would ensure a greater level of economic progress. However, as the same author acknowledges, “reality is more complicated”.

There is a certain consensus among scholars in the field that the type of entrepreneurship matters. Baumol (1996), based on the notions of productive, unproductive, and destructive entrepreneurship, recognizes the existence of a variety of roles among which the entrepreneur’s efforts can be reallocated. ACS (2006), using the Global Entrepreneurship Monitor (GEM) concepts of entrepreneurship by necessity and entrepreneurship by opportunity, points out that only the latter type of entrepreneurship is positively related to economic growth. Audretsch (2012) and Mason and Brown (2014) claim that high-growth companies contribute to a large portion of the jobs created. Stam (2015) highlights the role of ambitious entrepreneurship in economic growth, arguing that ambitious entrepreneurs – individuals who explore opportunities for new goods and services aiming at maximum added value – are more likely to obtain growth,

innovation, and internationalization of their companies than the “average entrepreneur”.

More recently, studies on entrepreneurship have recognized the role played by the external environment to the entrepreneur and the firm (AUTIO *et al.*, 2014; JACKSON; DOBSON; RICHTER, 2018). Van de Ven (1993) focused on issues and events involved in building an infrastructure capable of facilitating or restricting entrepreneurship. Radosevic (2007) defended the need to integrate entrepreneurship literature with the innovation systems literature. In turn, Isenberg (2010) suggested that the creation and growth of enterprises depend on the ecosystem in which these processes are inserted. In short, these approaches recognize that the entrepreneur does not operate in a vacuum and that it is the “context” that regulates who decides to start a new company, what type of company they will start, and how aggressively the company will seek growth and with what results (ACS *et al.*, 2016).

When assuming that the entrepreneurial process is regulated by the context, studies about entrepreneurship – traditionally focused on the individual – started to incorporate the idea that institutions matter. As stated by Baumol (1996), the “rules of the game” lead to the return of entrepreneurial activity with another. This “individual-institution” integration is explicit in the approach of National Entrepreneurship Systems (ACS; AUTIO; SZERB, 2014; ACS *et al.*, 2016; ACS *et al.*, 2018). For ACS *et al.* (2018), entrepreneurship and institutions, combined as an ecosystem, represent a missing link in explaining the different rates of economic growth between countries.

In this scenario, the approach to entrepreneurial ecosystems has emerged as a structure capable of providing an understanding of entrepreneurial activities within a holistic perspective, in which the entrepreneur is at the center of the system, but his/her actions are regulated by the context (ACS; AUTIO; SZERB, 2014). In general terms, most definitions of entrepreneurial ecosystems highlight the combination and interaction of different elements (material, cultural and social), usually

through networks, producing shared values that support ambitious entrepreneurship (SPIGEL, 2017; STAM, 2015; MALECKI, 2018). In terms of policy, the approach to entrepreneurial ecosystems suggests that government action should emphasize the quality of business, prioritizing projects with high growth potential (ISENBERG, 2010).

Thus, considering that entrepreneurial ecosystems support different configurations, this article aims to stimulate a reflection on the application of the configurational approach in the analysis of entrepreneurial ecosystems. The configurational approach, as an analysis perspective, has been used more frequently for about three decades in organizational studies. This perspective of analysis focuses on sets of attributes that configure archetypes or organizational gestalts. Central to this approach is the concept of equifinality, which means the possibility of achieving organizational success with different combinations of the same attributes. In addition, the approach highlights the existence of a limited number of configurations that prove to be viable. Although adopted in the scope of analysis of organizations, its application can occur at broader levels, such as that of entrepreneurial ecosystems. This stems from the fact that the configurational approach adopts a holistic view defended by Demers (2008) and which, according to Miller and Friesen (1984), analyses a composite of strongly interdependent and mutually reinforcing elements in which the importance of each element can be better understood by referring to the configuration as a whole.

At the same time, the issue of public policies to encourage entrepreneurship has received increasing attention in the field literature (TERJESEN; BOSMA; STAM, 2016; LEYDEN, 2016; JACKSON; DOBSON; RICHTER, 2018). For example, Zahra and Wright (2011) drew attention to the fact that public policymakers need to consider the portfolio of new ventures that they would like to see appear and grow, pointing out their

diversity and stressing that they are vital parts of the entrepreneurial ecosystem that makes a society grow and prosper. However, the contribution of the configurational approach has rarely been addressed in these studies. The main relevance of this article lies in the idea that the configurational approach can contribute to the process of formulating public policies for entrepreneurship when considering that entrepreneurial ecosystems can manifest themselves in different ways, claiming, therefore, different types of government actions.

This paper has five additional sections. The second section presents a brief review of the concept of entrepreneurial ecosystems. Then, the third section describes the configurational approach. The following section presents some previous studies that used the configurational perspective to analyse entrepreneurial ecosystems. The fifth section presents the suggested dimensions of entrepreneurial ecosystems and outlines an analysis model based on the configurational approach. Finally, the paper concludes with the final considerations.

## **2 ENTREPRENEURIAL ECOSYSTEMS: A BRIEF REVIEW**

Initially, it is important to underline that the interpretation of entrepreneurship as an exclusively individualistic practice seems to be outdated (COOKE, 2016; STAM, 2015). Instead, entrepreneurship must be viewed as an embedded action, i. e., both the individual and the institutional context are important (ACS *et al.*, 2016). In this sense, the approach to entrepreneurial ecosystems has emerged as a theoretical-analytical framework capable of interpreting entrepreneurship as a systemic phenomenon.

The widespread use of the entrepreneurial ecosystem concept in the entrepreneurship literature is quite recent (COHEN, 2006; ISENBERG, 2010). However, the relevance of understanding the influence of

environmental factors on new venture creations and entrepreneurial activities was emphasized much earlier (COOPER, 1981; GARTNER, 1985; MALECKI, 1990). The last five years have witnessed astonishing growth in studies that have applied the ecosystem approach to entrepreneurship research (GIMENEZ; STEFENON; INÁCIO JÚNIOR, 2022). In the most recent papers, many efforts have been driven towards operationalizing the entrepreneurial ecosystem concept, identifying and describing its components, pointing to its relevance for guiding entrepreneurial public policy formulation and implementation, and debating about the appropriate geographic level for its application.

Spencer and Gómez (2004) adopted the notion of a country's institutional environment for researching the influence of normative, cognitive, and regulatory dimensions on entrepreneurship. This piece of research followed a previous direction presented in Busenitz, Gómez and Spencer (2000). For them, normative institutions are related to the level of admiration that entrepreneurs and entrepreneurial activity receive from a country's population. The cognitive dimension is a set of "knowledge and skills possessed by people in a country, as well as the frameworks they use to categorize and evaluate information" (BUSENITZ, GÓMEZ; SPENCER, 2000, p. 1100). Finally, the regulatory dimension is comprised of legislation, fostering policies, and other mechanisms that may stimulate or refrain from individual behaviours.

Cohen (2006) transformed the idea of an "entrepreneurial system" suggested by Neck *et al.* (2004) into an "entrepreneurial ecosystem" while arguing about "how a community could potentially evolve into a 'sustainable valley' where a cluster of innovative sustainable technologies is developed in a geographic region" (COHEN, 2006, p. 1). Further, he complements the concept, to explore "the potential applicability of entrepreneurial ecosystems to the introduction of a new modified form of an eco-industrial park,

referred to as a sustainable entrepreneurial ecosystem" (COHEN, 2006, p. 2).

ACS, Autio, and Szerb (2014) suggested the concept of National Systems of Entrepreneurship (NSE) to deal with the embedded action character of entrepreneurship. For the authors (ACS; AUTIO; SZER, 2014, p. 479), an NSE would be "the dynamic, institutionally embedded interaction between entrepreneurial attitudes, ability, and aspirations, by individuals, which drives the allocation of resources through the creation and operation of new ventures".

According to Stam (2015), the concept of an entrepreneurial ecosystem is closely linked to other recent approaches to "entrepreneurship systems" (NSE, for example) that aim to overcome the deficiencies of the innovation systems approaches, which highlight the role of the institutional context, and entrepreneurship studies that emphasize the individual. Mason and Brown present the following definition of an entrepreneurial ecosystem, based on a synthesis of definitions found in the literature:

[...] a set of interconnected entrepreneurial actors (both potential and existing), entrepreneurial organisations (e.g. firms, venture capitalists, business angels, banks), institutions (universities, public sector agencies, financial bodies), and entrepreneurial processes (e.g. the business birth rate, numbers of high growth firms, levels of 'blockbuster entrepreneurship', number of serial entrepreneurs, degree of sellout mentality within firms and levels of entrepreneurial ambition) which formally and informally coalesce to connect, mediate and govern the performance within the local entrepreneurial environment (MASON; BROWN, 2014, p. 5).

A novel research approach to entrepreneurial ecosystems was argued by Roundy (2016). Theorizing the types and purposes of narratives that can be applied, the author defends that this research approach may

produce novel results with implications for theory and practice, especially for would-be entrepreneurs and policymakers. The typology of the narrative includes success stories, historical accounts, and future-oriented narratives. On the other hand, the purposes of the narratives are multiple, serving for “transmitting culture, facilitating sensemaking, constructing identity, providing legitimacy, garnering attention and charting the future” (ROUNDY, 2016, p. 242) of an entrepreneurial ecosystem.

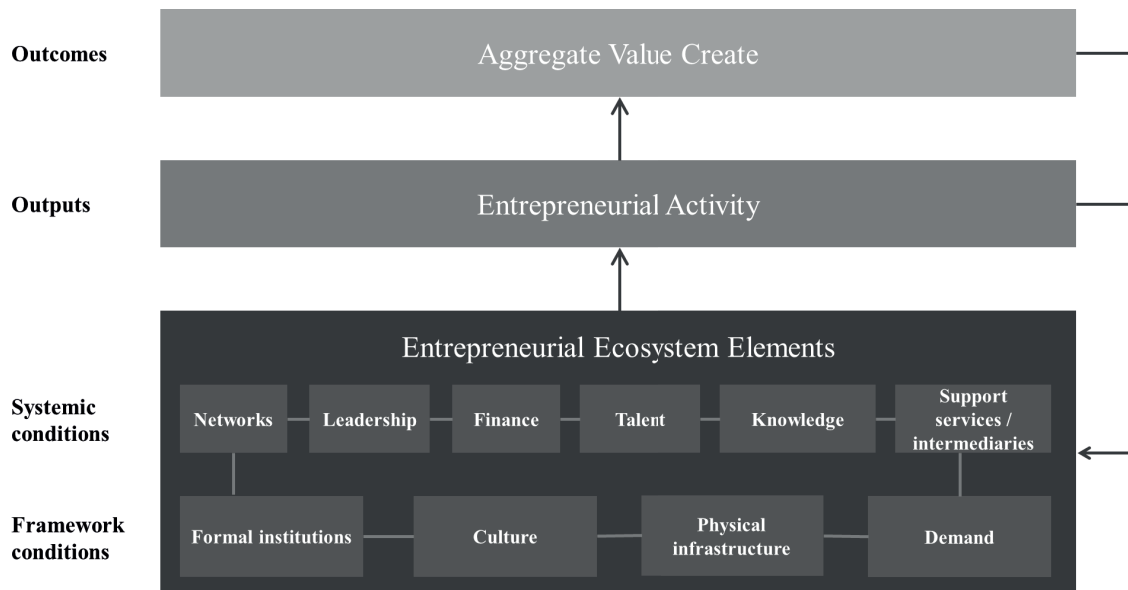
Alvedalen and Boschma (2017) argue that entrepreneurship is embedded in social relations and, therefore, suggest that the literature on entrepreneurial ecosystems more effectively incorporates network theory in its theoretical and analytical scope. Radosevic (2007) reinforces this aspect by recognizing the systemic character of entrepreneurship. For the author, successful entrepreneurship involves more actors than just the entrepreneur, and the implications of this fact indicate the relevance of social networks for entrepreneurship. Following this perspective, Stam (2015, p. 1764) points out that the approach to entrepreneurial ecosystems is part

of a “new economic view on people, networks, and institutions”.

In this perspective, Sternberg (2009) supports the idea that entrepreneurs and their companies are fundamental elements of endogenous regional development potential. At the same time, the author emphasizes that entrepreneurship cannot be explained exclusively by factors of an individual character and argues that a set of contextual factors is relevant to entrepreneurship. In other words, entrepreneurial activity is considered one of the determinants of regional development, in which, at the same time, it is recognized that local conditions are critical determinants of local entrepreneurship.

The “entrepreneurship-space” nexus is evident in the entrepreneurial ecosystem model proposed by Stam (2015). This model (Figure 1) provides a causal depth with four ontological layers: structural conditions and systemic conditions (they form the elements of the entrepreneurial ecosystem), entrepreneurial activity (represents the outputs from the entrepreneurial ecosystem), and the creation of added value as the outcome of the ecosystem.

Figure 1 - Key elements, outputs, and outcomes of the entrepreneurial ecosystem



Source: (STAM, 2015, p. 1765).

It should be noted that the Stam model (2015) includes an upward causation (reveals how the fundamental causes of value creation are mediated by intermediate causes) and a downward causation (shows how the outcomes and outputs of the system contribute to the conditions of the system), in addition to intra-layer relationships, which illustrate the interaction of different elements within the ecosystem. Briefly, the Stam model suggests that the creation of added value in a region (subnational space) is influenced and stimulates the characteristics and dynamics of the entrepreneurial ecosystem, and this interactive process is mediated by the type of entrepreneurial activity existing in this space.

In short, the entrepreneurial ecosystems literature differentiates the entrepreneurial environment (ecosystem) from the entrepreneurial outputs (entrepreneurial activity), focusing on ambitious and high-impact entrepreneurship. Studies on the topic also suggest that the performance of the ecosystem depends on the interaction between entrepreneurs, organizations, and institutions. Furthermore, it is recognized that the entrepreneurial ecosystem is geographically limited (effects of agglomeration economies, networks and knowledge spillovers for the emergence and growth of companies are more effective in smaller geographical units). Finally, due to the uniqueness of entrepreneurial ecosystems, their development requires specific, bottom-up, and tailored policies (SZERB *et al.*, 2019).

The perception that ecosystems are unique justifies the hypothesis that there is neither an “ideal model” nor a “perfect configuration” of an entrepreneurial ecosystem. This means that ambitious and high-growth entrepreneurship can manifest itself as the output of different entrepreneurial ecosystems in terms of the characteristics of their conditions and elements. The configurational approach is briefly described in the next section, to highlight its main characteristics and its suitability for the analysis of entrepreneurial ecosystems.

### 3 CONFIGURATIONAL APPROACH

The configurational approach emerged as a possibility to oppose the analysis domain in organizational studies, the perspective of synthesis (MILLER; MINTZBERG, 1985). The analytical perspective, with its search for causality, emphasizes the notion of continuous relationships between a few variables. On the other hand, the perspective of the synthesis involves the search for a larger set of relevant variables, in which it is not possible to find causalities, and which are harmonized in different configurations.

Miller (1987), in a seminal work, explained that the configurational approach proposes that a certain number of forces can restrict possible variations assumed by organizations. The author defended the existence of what he called imperatives present in organizational studies. From three criteria – (i) the imperative must represent a widely accepted paradigm of organizational analysis; (ii) must have been demonstrated empirically; and (iii) would have to generate organizational configurations that occurred repeatedly – the author analysed the management literature and recognized the existence of the imperatives of environment, structure, leadership, and strategy. In his analysis, he suggested that the theoretical propositions in the field of management presented partial explanations for successful organizations’ performance. For him, an organization’s success could be explained by combinations of distinct states of the four imperatives along their life cycle.

Although all configurations are products of multiple influences from various factors, the prevalence of an imperative over others, or at least of the main imperative positioned as the cause of others may be observed. However, some configurations, essentially in moments of transition, can be understood as the result of the influence of several imperatives simultaneously and with levels of similar significance, perceived as hybrid models (MILLER, 1987).

In this sense, the notion of configurations

has been presented as clusters of attributes, which include states and organizational processes, as well as characteristics of the context in which organizations are located. Both analysis and synthesis are relevant to the advancement of knowledge. While the analysis contributes to the definition and measurement of attributes and parts of a phenomenon, the synthesis allows the combination of these same attributes and parts in integrated images, concepts, or totalities that lead to the perception of stable and differentiated patterns, which are associated with permanence and or development of organizations in society.

While the configurational approach guides the search for multiple possibilities of variation of attributes and processes that occur simultaneously, in which it is not possible to determine the direction of causality, it is recognized that the set of totalities that may arise, theoretically, is very large. However, empirically, a small set of stable configurations is perceived. In addition, the change from one configurational state to another occurs in a quantum rather than a linear or gradual way (MILLER; FRIESEN, 1984).

This same conception appears in Meyer, Tsui, and Hinings (1993). For them, numerous dimensions of organizational life, such as environments, industries, technologies, strategies, structures, cultures, ideologies, groups, members, processes, practices, and beliefs can give rise to different configurations. In other words, the configurational approach seeks to reveal how order emerges from the interaction of components of organizations. This emergence reflects a holistic view that leads to the identification of states of organizational balance and imbalance.

Thus, as pointed out by Gimenez *et al.* (2016, p. 113), “the configuration approach considers that organizations cannot be understood in isolation, without considering the whole, since social realities for the configurational approach form amalgamations of interdependent variables, and these variables cannot be changed regardless of

the others.” This implies that the adoption of the configurational approach means the abandonment of deterministic and reductionist views and, at the same time, the recognition of the complexity of organizational phenomena that are best understood by probabilistic explanations.

Finally, as pointed out by Demers (2008), the configurational approach focuses on the classification of organizations according to conceptually conceived typologies or empirically derived taxonomies. It is this understanding that leads to the possibility of using the configurational approach in the study of entrepreneurial ecosystems. The next section explores the hypothesis, presented earlier, that high-impact, i.e., ambitious and high-growth entrepreneurship, may be the output of different entrepreneurial ecosystems. In other words, it seeks to argue that entrepreneurial ecosystems can occur in multiple configurations.

Thus, in the next section, we provide some empirical evidence from prior studies that allow the identification of multiple configurations of entrepreneurial ecosystems. Then, in the following section, we provide a model comprised of six dimensions that we judge may be useful in further clarifying how entrepreneurial ecosystems differ when one tries and grasp their configurations.

#### 4 MULTIPLE CONFIGURATIONS OF ENTREPRENEURIAL ECOSYSTEMS: PREVIOUS STUDIES

The application of the configurational approach to the entrepreneurial ecosystem is yet to be developed. Spigel (2017, p. 56), although not using the configurational approach literature, they suggested that entrepreneurial ecosystems may conform to different configurations. In a limited approach, Collombeli, Paolucci, and Ughetto (2019) have developed the notion of different configurations for the governance of entrepreneurial ecosystems. Finally, in their critical appraisal of research on entrepreneurial ecosystems, Alvendale and Boschma (2017, p.

888) identified a gap in the use of “a multi-scalar approach that looks at the spatial configuration of linkages that make up an entrepreneurial ecosystem.”

To Spigel (2017, p. 50), “entrepreneurial ecosystems are combinations of social, political, economic, and cultural elements within a region that support the development and growth of innovative startups [...]”. Illustrative case studies of the Canadian cities of Calgary and Waterloo were used by the author to explore the different possible configurations of entrepreneurial ecosystems and how it affects the types of resources entrepreneurs can obtain to start and expand their businesses. The survey results showed that Calgary’s entrepreneurial ecosystem is driven by its strong local oil and gas market, which creates numerous opportunities for new ventures and attracts highly skilled workers and financial capital to the region. The Waterloo ecosystem, in turn, is driven by an underlying entrepreneurial culture that fosters strong networks of public and private actors. Despite the different configurations, both ecosystems confer significant benefits to new ventures.

Muñoz *et al.* (2020) advanced Spigel’s (2017) work by examining how the attribute configurations of ecosystems in 71 regions of Chile support or hinder the emergence of new and innovative firms. The study used GEM data on the assessment of local experts on their ecosystems and was carried out using the Fuzzy-Set Qualitative Comparative Analysis (FsQCA). In short, the study developed an evaluative approach to entrepreneurial ecosystems as configurational narratives and revealed three distinct types of ecosystems that explain the different local levels of entrepreneurial activity: Active self-propelled, Indulged, and Passive self-absorbed. According to the authors:

As our research shows, there is no single recipe for strong entrepreneurial activity at the local level, conversely, there are several distinct configurations of the most necessary conditions

and partially sufficient combinations of conditions that can support the development of a successful local entrepreneurial ecosystem (MUÑOZ *et al.*, 2020, p. 12).

Similarly, although not applying the concept of configuration, Brown and Mason (2017, p. 23) proposed a typology of entrepreneurial ecosystem divided into two types: embryonic ecosystems and scale-up ecosystems. The two types differ in their dynamics which include differing states and processes related to dominant actors, nature of ecosystem interactions, levels of entrepreneurial orientation, nature of funding escalator and availability of funding, importance and role of dealmakers, fluidity and diversity of ecosystem actors, level of “Blockbuster” entrepreneurship, and nature of entrepreneurial recycling.

The study by Alves *et al.* (2019) should also be highlighted. The paper evaluated data from 299 municipalities in the state of São Paulo to identify different patterns behind knowledge-intensive entrepreneurship ecosystems. The authors suggest that ecosystems have regularities, but they can take on different configurations. Supported by an entrepreneurial ecosystem concept model with five dimensions (science and technology, human capital, market dynamics, business dynamics, and infrastructure) and using FsQCA techniques, the authors identify a relatively heterogeneous nature of entrepreneurial ecosystems, in which research universities, the intensity of knowledge-intensive jobs and the availability of credit are fundamental conditions, while the proximity to the main economic centre emerges as an important differential between ecosystems. Finally, the authors state that the main message of the study is that entrepreneurial ecosystems have diverse configurations and, therefore, comprehensive models may not be able to address local idiosyncrasies and, therefore, are unable to satisfactorily guide the policy-making process.



## 5 DIMENSIONS OF ENTREPRENEURIAL ECOSYSTEMS

In the previous sections, it became evident that entrepreneurial ecosystems involve a set of elements that interact in complex and specific ways and may have different configurations. Therefore, the analysis of ecosystems must consider multidimensional approaches. This section presents six dimensions of entrepreneurial ecosystems that can manifest themselves in different ways: geographic breadth, sectorial diversity, mode of governance, degree of maturity, innovative effort, and environmental munificence. These dimensions emerged from the analysis of recent literature that addressed different aspects and components of entrepreneurial ecosystems, either from a theoretical perspective or an empirical way.

The proper assessment of entrepreneurial ecosystems requires a delimitation of their geographic breadth (AUDRETSCH *et al.*, 2019). The NSE perspective assumes national spaces as the limits of an entrepreneurial ecosystem (ACS; AUTIO; SZERB, 2014). Other approaches – Sternberg (2009), Stam (2015), and Szerb *et al.* (2019) – admit that sub-national spaces (regions and cities) present themselves as the most appropriate scales of analysis. Miller and ACS (2017) suggest that the ecosystem may be even smaller than a region, such as a university campus or even an incubator. Thus, it is understood that geographic breadth, which can be defined as narrow or wide, is an important dimension for the assessment of entrepreneurial ecosystems.

Sectorial diversity is another dimension of entrepreneurial ecosystems to be considered. According to Sternberg (2009), the consideration of environmental factors in a broad sense, including spatial proximity and characteristics of the regional environment, is becoming increasingly prevalent and popular. In this sense, the author refers to two types of contextual structures within regions that

emphasize the benefits of spatial proximity: regional sectoral clusters and diversified urban areas. Within this debate, it makes sense to differentiate between location economies and urbanization economies. Location savings are associated with regional sectoral clusters, as they involve the benefits for companies that arise when they are located close to other companies in the same industry. The benefits from urbanization economies, in turn, are related to the intensity of intra-regional competition and the greater diversity in spatial proximity. This means, therefore, that entrepreneurial ecosystems can benefit from positive externalities from structures with high or low sectorial diversity.

According to Colombo *et al.* (2019), an entrepreneurial ecosystem is characterized by the participation of entrepreneurial companies, by a structure that promotes entrepreneurship, and by the mode of governance, which coordinates and motivates entrepreneurial activities by establishing rules and standards. For the authors, efficient governance structures in entrepreneurial ecosystems need to be concerned with the provision, allocation, and distribution of resources and critical incentives. In this sense, they point out the existence of two distinct governance modes for entrepreneurial ecosystems: the bottom-up approach and the top-down approach. From the point of view of the bottom-up approach, the governance of entrepreneurial ecosystems is coordinated and motivated in a self-regulatory manner by the interests of different stakeholders (banks, public officials, entrepreneurs, investors, and large corporations), thus assuming that critical elements for ecosystem development need not be intentional and formal. In the top-down approach to governance, on the other hand, the governance structure is formalized because it is assumed that ecosystems can be shaped by “top-down” policymaking and implementation. In other words, in this case, governments are explicitly recognized as the feeders of the entrepreneurial ecosystem. In this way, it is possible to highlight two modes of governance

that tend to predominate in entrepreneurial ecosystems: formal governance and informal governance. In a similar path, Colombelli, Paolucci, and Ughetto (2019) proposed that entrepreneurial ecosystems' governance may evolve during its life cycle from a hierarchical mode to a relational one.

Mack and Mayer (2016) present an evolutionary structure of the development of entrepreneurial ecosystems integrating contributions from previous works, such as those of Isenberg (2011), and describing how the elements of the ecosystem interact and evolve. The authors' perspective assumes that entrepreneurial ecosystems evolve in four stages: birth, growth, sustainability, and decline. In the first two stages (birth and growth) the formation of new companies is greater than the death of companies. The later stages (sustaining and declining) are characterized by a lower number of births and a greater number of company deaths. The evolutionary perspective proposed by the authors is valuable because it provides a sense of how history, culture, and the institutional environment impact the ecosystem, providing stakeholders with action points to help maintain or propel the ecosystem to the next stage. Thus, it is useful to consider that entrepreneurial ecosystems can have different degrees of maturity. Nascent or consolidated, for instance, if one aggregates the four stages into two phases: birth and growth; and sustainability and decline.

Another dimension of the analysis of entrepreneurial ecosystems refers to the innovative efforts of companies. Proprius (2002), based on the contributions of Freeman and Perez (1998), points out that radical innovations are discontinuous events resulting from deliberate research and development activity. Incremental innovations, in turn, take the form of minor improvements around major radical innovations. This suggests that the infrastructure needed to carry out radical innovations within ecosystems differs from the infrastructure required for incremental innovations. As a result, it is understood that

innovation efforts within entrepreneurial ecosystems can be predominantly directed towards radical or incremental innovations or mixed in different degrees.

Spigel and Harrison (2018) argue that both the resources available in an entrepreneurial ecosystem and the strength of the networks through which these resources flow are fundamental to understanding its functionality. Thus, they define munificence as the rich aggregate of financial resources, entrepreneurial knowledge, skilled workers, and experienced mentors that generate competitive advantages for entrepreneurs who can access them in their ecosystem. On the other hand, those who are outside their ecosystem and, therefore, without access to the same resources, face greater difficulties in developing their enterprises. In this way, you can find entrepreneurial ecosystems that are highly munificent, rich, and others where the availability of resources is low, or poor.

From this, it is possible to conclude that the combination of the different states of the dimensions leads to the theoretical possibility of identifying many different configurations. If for the sake of argument, only two variations of each of the dimensions described above are considered, the resulting possible configurations reach 64, i. e., a combination of two different states for each of the six dimensions ( $2^6$ ). On the other hand, if the continuous nature of the six dimensions is considered, one can observe diverse levels of variations in each one. This would imply a great range of possible configurations being formed. However, consistent with the configuration approach presented previously, it is assumed that only a small part of these configurations will be stable and durable. The selection of "viable configurations" for entrepreneurial ecosystems depends on further research developments in the field. Chart 1 shows some types of entrepreneurial ecosystems that, in principle, could be stable and generate adequate results.

Chart 1 - Examples of possible stable configurations of entrepreneurial ecosystems

Configuration	Geographic breadth	Sectoral diversity	Governance mode	Maturity degree	Innovative effort	Environmental munificence
Type 1	Narrow	Low	Informal	Nascent	Incremental innovation	Poor
Type 2	Broad	High	Formal	Consolidated	Radical Innovation	Rich
Type 3	Narrow	High	Informal	Consolidated	Incremental innovation	Poor
Type 4	Narrow	High	Formal	Nascent	Radical innovation	Rich

Source: elaborated by the authors.

The types of configurations presented in chart 1 theoretically demonstrate some possible configurations for entrepreneurial ecosystems based on the dimensions presented in this section. Taking the “type 1” configuration as an example, it is possible to sketch an entrepreneurial ecosystem with the following characteristics: narrow geographical range (ecosystem defined in a city), low sectoral diversity (entrepreneurial activities linked to a main economic activity), informal governance (absence of formal coordination and presence of few government policies), nascent maturity level (increasing number of new companies), innovative effort predominantly directed towards incremental innovations (small improvements in products and processes) and poor environmental munificence (unavailability or difficult access to critical resources). We suggest that, for such an entrepreneurial ecosystem configuration, policy emphasis should focus on strengthening industrial concentration and productivity gains through measures related to the expansion of markets, expansion of scale, inter-firm cooperation for the acquisition of inputs, and availability of working capital.

In the same way, it is possible to theoretically outline an entrepreneurial ecosystem based on the characteristics listed in the type 2 configuration: wide geographic breadth, high sectoral diversity, formal governance, consolidated maturity, innovative effort with a greater connection with radical innovations, and rich environmental munificence. Under these

conditions, the emphasis of the policy must include, for instance, strengthening dynamic competitive advantages through government support for R&D, intersectoral alliances for the development of disruptive innovations, partnership with universities, and the attraction of risk capital.

The type 3 entrepreneurial ecosystem shows an ecosystem with a narrow geographical range, but with wide sectoral diversity. The mode of governance is informal, and the degree of maturity shows a consolidated ecosystem. Innovation efforts are directed towards incremental innovations and munificence is poor. In this scenario, governmental policies might be conceived in partnership with the private sector, taking advantage of the informal character of the governance mode and the high diversity of the productive structure, stimulating, for example, the collaboration between the different sectors for the fortification of the local economy. However, the poor munificence and the consolidated degree of maturity of the ecosystem may demand a stronger policy role in offering resources to existing companies with high growth potential.

In a type 4 entrepreneurial ecosystem, a less interventionist policy stance would be acceptable (and even beneficial). As it is a highly munificent ecosystem, government actions could have a governance character and be based on relational policies, seeking to strengthen the relationships between the different actors and institutions of the ecosystem. In addition, as it is an ecosystem with a nascent degree of

maturity, special attention should be given to new firms' formation, stimulating the interaction of these potential entrepreneurs with actors providing venture capital and with mentoring and advisory services. The radical nature of the innovations demands a strategic role for universities in basic research efforts and the encouragement of university-business partnerships.

Chart 2 summarises the types of EE configurations and policy implications.

Chart 2 - Characteristics and policy implications according to types of entrepreneurial ecosystems

Configuration	Characteristics	Policy implications
Type 1	EE delimited in a city whose access to critical resources is poor. Productive structure little diversified and focused on incremental innovations. There is the occurrence of the formation of new firms, despite the absence of government incentives.	Focus on strengthening industrial concentration and productivity gains through measures related to expanding markets, increasing scale, inter-firm cooperation for the acquisition of inputs, and availability of working capital.
Type 2	EE delimited in a state or country, whose productive structure is highly diversified. The innovative efforts of existing companies and other organizations target the technological frontiers of different segments. Critical resources are plentiful and easily accessible, and formal leadership facilitates EE coordination.	Emphasis on strengthening dynamic competitive advantages through government support for R&D, cross-sectoral alliances for the development of disruptive innovations, partnership with universities, and attraction of venture capital.
Type 3	EE delimited in a city, but with wide sectoral diversity. Informal governance and low rate of formation of new firms. Innovation efforts directed towards incremental innovations. Access to critical resources is poor.	Formulation and implementation of policies in partnership with the private sector, taking advantage of the informal nature of the governance model and the high diversity of the productive structure. Low munificence implies a more active role in politics in providing resources to existing firms with high growth potential.
Type 4	EE delimited in a city, with high sectoral diversity and with innovative efforts aimed at radical innovations. The formation rate of new firms is high. EE provides easy access to critical resources. Involvement of public actors in the governance of the EE.	Less interventionist political conduct would be acceptable (and even beneficial), so that government actions could be based on relational policies, strengthening relationships between the different actors in the EE. Special attention to new firms, encouraging interaction between venture capitalists and mentors. The strategic role of universities (basic research and university-industry partnerships).

Source: elaborated by the authors.

## 6 FINAL CONSIDERATIONS

The entrepreneurial ecosystems literature aims to explain ambitious, high-impact entrepreneurship from a holistic perspective. As stated by Malecki (2018, p. 5), "discussion of entrepreneurial ecosystems has largely focused on the essential ingredients, while largely ignoring the processes or 'recipes' for their combination into a sustainable milieu with entrepreneurial vitality". Brown and Mason (2017) highlight that the entrepreneurial ecosystem approach offers

a new and distinctive way for academics and policymakers to be able to understand and promote growth-oriented entrepreneurship. The absence of a more specific analysis of ecosystems is pointed out by the authors as one of the reasons that hinder a more rigorous understanding of these “living organisms”.

In this sense, the major contribution of this paper is to emphasize that the configurational approach provides an expanded view of entrepreneurial ecosystems. This is due to the recognition that attributes of an ecosystem can manifest themselves in different ways without this implying inferior system performance. In other words, the configurational approach indicates the possibility of entrepreneurial ecosystems being successful from different combinations of the same attributes.

On the other hand, another contribution of the paper is that applying a configurational approach to the understanding of the entrepreneurial ecosystem may help to uncover other relevant dimensions that might enlighten entrepreneurship public policy formulation and implementation. We view these initial developments as complementary to recent proposals in the field, such as, for instance, Stam (2015). This complementary view manifests itself in the possibility of providing further details about the relevant factors that differentiate types of entrepreneurial ecosystems related to the systemic and framework conditions present in Stam’s model.

Thus, this paper represents a starting point for the study of entrepreneurial ecosystems in light of the configurational approach. It is important to note that, as its third contribution, the study suggested six dimensions of ecosystem analysis: geographic breadth, sectorial diversity, mode of governance, degree of maturity, innovative effort, and environmental munificence. As noted earlier, these dimensions are explored in recent field studies and contributions. However, no evidence of its articulation in the sense proposed in this article was

found. Yet, it is likely that future research developments may suggest the inclusion of other dimensions, such as, for example, the issue of leadership and hierarchy within the ecosystem, the presence of large companies as anchors, and the integration of the ecosystem with the global context.

From the perspective of future research, efforts must be channelled to the empirical field to clarify the issue of the multiple configurations of entrepreneurial ecosystems. Given the absence of ready indicators for most dimensions of ecosystem analysis, field research and case studies emerge as important alternatives for a methodological approach. These research developments tend to provide a more subtle and rigorous understanding of the different configurations of entrepreneurial ecosystems, allowing for more accurate and reliable policy recommendations for the creation and strengthening of entrepreneurial ecosystems.

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