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The Role of Cultural Change in Cultivating Entrepreneurial Ecosystems in EU's Low-Growth Lagging Regions

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Abstract

This dissertation explores the dynamics that underlie the development of entrepreneurial ecosystems (EEs) in low-growth lagging regions of Europe. Entrepreneurial ecosystems have been conceptualized over the last few years to respond to the need to explain the dynamics that foster productive entrepreneurship at the regional and national levels.

Nevertheless, while regions with higher rates of development in entrepreneurship and innovation experience either the natural emergence or a faster and easier path of development of EEs, lagging regions in Europe (and, especially, extremely-low-growth ones) are characterized by different and hindering starting conditions under the economic, social, and spatial points of view, which raise the need of thinking differently at the stages of development of an EE.

Thus, after exploring the entrepreneurial ecosystem construct and unpacking the issues that affect low-growth lagging regions of the EU, this conceptual work investigates the role of culture in the processes of entrepreneurial ecosystem building in these geographies and proposes a conceptual framework to solve the issues related to cultural resistance in those regions.

The work, thus, is structured as follows: 1) the first chapter deconstructs the EE concept by analyzing both its roots in literature and its structure (in terms of its elements and the factors influencing its progress) and clears the need for an ecosystem manager; 2) the second chapter analyzes the structure and dynamics of EEs (in terms of the influence of actors on the factors) that guide the evolution of EEs over time, and propose a strategic process path for ecosystem managers; 3) the third chapter, instead, considers the necessary starting conditions for a region to have its thriving entrepreneurial ecosystem, and comprehends an in-depth analysis on the role of culture in the process of EE building. In doing so, he proposes an adaptation of the model of the "Diffusion of Innovations" to the entrepreneurial ecosystem construct.

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Contents

Introduction

The aim of this dissertation is to try to explain how it is possible to restart economic growth in low-growth or extremely-low-growth lagging regions of the European Union through the lens of the entrepreneurial ecosystems framework. Tracing back to concepts rooted in economic theory – with names like Marshall (1920), Schumpeter (1934), Lucas (1988), Baumol (1990), Romer (1990), Lundvall (1992), Porter (1998), Etzkowitz and Leyerdesoff (2000) - which emphasize the crucial role of entrepreneurship in driving economic growth (measured with GDP growth) through mechanisms like innovation, competition, job creation, capital accumulation, and knowledge spillovers, the concept of entrepreneurial ecosystems (EEs) advances these by posing the entrepreneur at the center of economic growth, but at the same time explaining that the coordination between the conditions and the elements that are outside the firm can influence the performance of the overall level of entrepreneurship and innovation, at the regional level.

Indeed, entrepreneurial ecosystems have become increasingly significant in understanding regional economic growth, particularly in relation to the creation of high-growth firms (Alvedalen & Boschma, 2017; Cavallo et al., 2019; Cao et al., 2021; Thai et al., 2023), especially given the growing challenges posed by economic and social development.

The disparity in development among European regions, indeed, has lately been exacerbated by rapid technological progress and necessitates a deeper examination of EEs as a potential solution for enhancing regional competitiveness (World Economic Forum, 2024; Johannessen & Sætersdal, 2020).

To do that, the work focuses first on the governance of entrepreneurial ecosystems and, after that, on their strategic management. Eventually, and based on the considerations of the previous chapters, it proceeds to explain why in these regions (and, indeed, in general) the initiation of these processes starts from cultural discourses—concluding with a description of how it is possible to approach the creation of entrepreneurial culture through processes of social change.

However, some basic considerations led to the choice of this approach for the resolution of structural problems.

First of all, two hypotheses have to do with the organization of entrepreneurial ecosystems and their evolutionary dynamics: that entrepreneurial ecosystems have their own organizational structure and that, as for organizations, they can be organized and managed to perform managerial processes to achieve a final goal; and that as an organization it can be managed.
Then, the second consideration is that these regions of the European Union have certain framework conditions that impede their growth - both economic and social - and that have contributed to making the economy stagnant. The assumption that is made, above all, is that these framework conditions have their own hierarchy in territorial development processes. A hierarchy, however, that does not find its foundation in the hierarchy of personal needs, but rather originates in the literature of management and organizational dynamics.
This hypothesis is directly related to the one related to evolutionary dynamics and allows us to prove that there is an order in terms of life cycle, and thus that there can be a starting point for strategic planning. Therefore, similarly to the phases of the life cycle of a company, based both on the size of the organization and on the level of complexity, the evolutionary dynamics depend first of all on the level of economic and social development present in the territory under study and then on the level of complexity of the relationships.
Finally, the third idea is that the first phase of development of any entrepreneurial ecosystem is directly related to the cultural aspects of the region in question. This consideration has its roots in the fact that behind every economic or social change there are in fact social dynamics, and that at the base of every managerial and economic system there is a cultural environment that determines its future development.
That being said, the dissertation contributes to advancing theory and practice in the literatures of entrepreneurial ecosystems and innovation, regional development, and social processes linked to culture.

First of all, it presents a reconstruction of the definition of entrepreneurial ecosystem, based on a systematic literature review, and thanks to that demonstrates the necessity for governance in entrepreneurial ecosystems. Secondly, it demonstrates how entrepreneurial ecosystems must follow logics related to management, linking then all the literature on management and strategic management to that of entrepreneurial ecosystems. Finally, it explains how to address the issue of lack of entrepreneurial culture through processes of social change and the adaptation of a model of *diffusion of innovation* and concludes with a summary of the findings and directions for future research.

Chapter 1. Searching for the Governance of Entrepreneurial Ecosystems

Introduction

In the last twenty years, the framework of entrepreneurial ecosystems (EEs) has emerged as a theory and tool to explain the mechanisms that lie behind economic growth and that concern entrepreneurship and innovation development processes at the regional level (Alvedalen & Boschma, 2017; Cavallo et al., 2019; Cao et al., 2021; Thai et al., 2023).

Inspired by the success of geographical areas (first among all, the so-called "Silicon Valley") where high-growth firms have been increasingly leading economic growth (Isenberg, 2010; Mason & Brown, 2014; Nicotra et al., 2018), indeed, the framework has been designed to describe how different actors, factors, artifacts, and the relations between them can foster the development of high-growth entrepreneurship in a defined region (Stam, 2015).

Because of these peculiarities, in the last decade, the development of EEs has become a policy priority for governments worldwide, given the emerging challenges posed by economic and social development, which have been growing in complexity. Globally, economic and social disparities between different geographical areas have become growing and widespread issues (World Economic Forum, 2024). Moreover, at the same time, the competitiveness of territories has growingly become dependent on the collective ability to keep up with the increasing pace of technological progress (Johannessen & Sætersdal, 2020).

In light of this, thus far, academics have tried to address these issues by advancing the literature concerning an EE's definition and theoretical constructs (Isenberg, 2010; Mason and Brown, 2014; Acs et al., 2017; Brown & Mason, 2017; O'Connor et al., 2018), constitutive elements and structure (Stam, 2015; Adner, 2017; Carayannis et al., 2017; Stam & Van De Ven, 2021), processes (Dubina et al., 2016; Spigel, 2017; Spigel & Harrison, 2018; Wurth et al., 2023), and evolutionary dynamics (Kantis & Federico, 2020; Cantner et al., 2021; Cho et al., 2022).

However, despite such progress, the development of EEs remains a tricky challenge for both researchers and practitioners, as many debates and unanswered questions still inhabit the literature (Cavallo et al., 2019; Wurth et al., 2021; Cho et al., 2022). Among those, there are still relevant questions regarding an ecosystem's governance (Colombo et al., 2017), and much work needs to be done in order to fully understand

how to create an EE, and what are the dynamics that underlie the development of a successful one.

In particular, there are still doubts about who should play this management role. According to Scott et al. (2022), there is relational governance within the ecosystem, based on relationships between organizations to achieve common goals. Similarly, Cunningham et al. (2019) speaks of an ecosystem as having the same characteristics as an organization but on a non-formal level, and in doing so he makes it explicit that rather than having formal governance, it is characterized by informal relationships. Colombelli et al. (2017), on the other hand, speak of governance in ecosystem as a mixture of hierarchical and relational governance, that this changes over time as the leadership role changes during the evolutionary stages. This approach is reminiscent of James' (1973) corporate life cycle, in which the relevance of certain functions changes as the life cycle changes. Finally, Colombo et al. (2017) present an ecosystem perspective that presents possibilities in adopting a top-down, or bottom-up, or a mixture of the two.

These differences of opinion make it clear that what needs to be done is a conceptual clarification about the manageability of the ecosystem, as well as the effective definition and delegation of responsibility for governance.

In order to be able to answer these doubts, what seems useful is a critical, conceptual work that analyzes the entrepreneurial ecosystem concept to be able to search, in the existing definitions of an EE, for a clear identification that leaves no room for doubt and creates the basis for being able to adopt a strategic approach to the development of entrepreneurial ecosystems.

Some works, especially reviews (primarily critical) or conceptual studies, have already analyzed the literature to identify the main themes and existing gaps (Stam, 2015; Brown and Mason, 2017; Alvedalen and Boschma, 2017; Malecki, 2018; Cavallo et al., 2019; Cao and Shi, 2021; Wurth et al., 2022). However, none of them provide a critical reconstruction of the concept, which instead can help avoid misconceptions and provide more clarity to the literature as a whole.

Therefore, considering this gap in the literature and that the final need of this work is to answer the question "*How to create an entrepreneurial ecosystem in a region that is lagging behind in the development of the European Union*?", a first step is precisely to critically analyze the definition of entrepreneurial ecosystem, to look for answers about the possibility in terms of creation, governance, and strategic management of an ecosystem.

The chapter, thus, is structured as follows: 1) first, in the literature background the author introduces the entrepreneurial ecosystem approach; 2) in the second paragraph, the author proceeds by identifying the relevant papers to be included in the analysis; 3) then, following a Systematic Literature Review and a process of Text Analysis, the author proceeds by carefully reporting the data, describing it and commenting on it, 4) finally, the author proceeds with the discussion, trying to infer from the results about the possibility or necessity for governance, 5) in the

conclusions the author summarizes the results and gives recommendations for future research.

1.1 On Entrepreneurial Ecosystems

Entrepreneurial ecosystems have played a pivotal role in the path to understand the factors influencing firm innovation and growth. This concept, deeply embedded in historical intellectual traditions, suggests that a firm's success is not imprisoned in the company's system, but rather finds home outside the firm, in a context with institutional and spatial factors.

Tracing its roots back to Marshall's work in 1920 on productivity in industrial districts, this idea has evolved through various frameworks, enriched by the contributions of scholars like Freeman (1995) and Lundvall (1992) in their exploration of national systems of innovation, and the Triple Helix model (Etzkowitz and Leyerdesoff, 2000).

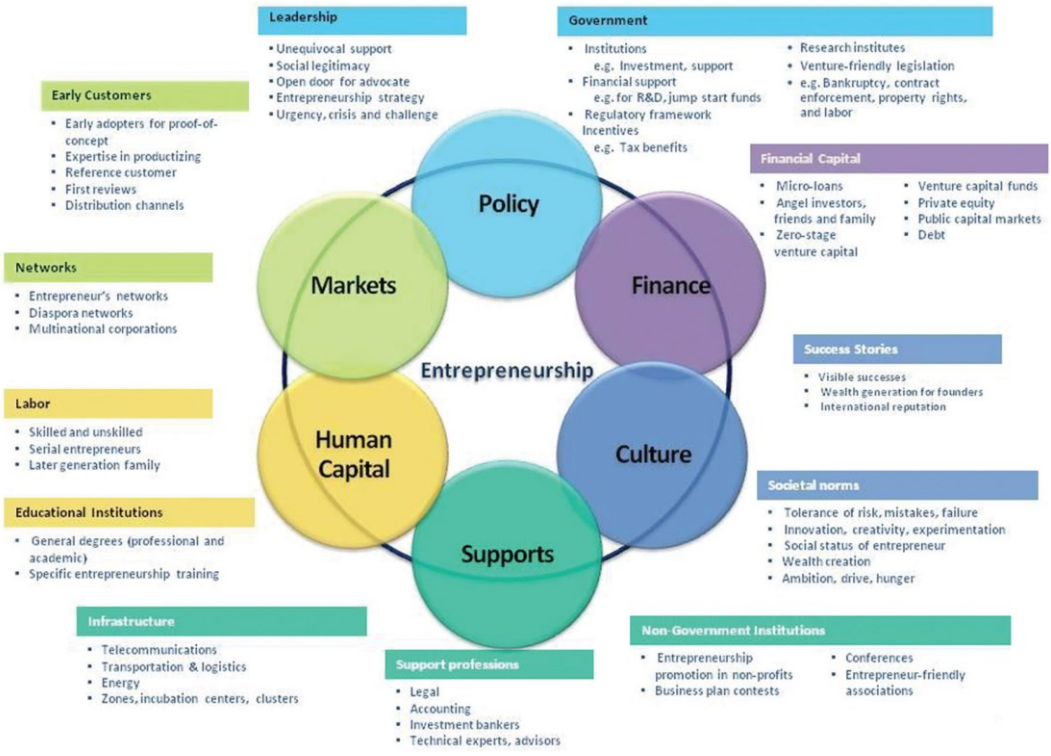

Fig. 1. Domains of the entrepreneurship ecosystem. Source: Isenberg (2011).

A central aspect of the framework is the focus on high-growth firms as indicators of productive entrepreneurship (Baumol, 1990), a departure from traditional models centered on large manufacturing or multinational companies. This shift highlights the role of entrepreneurs in driving organizational and economic innovation. Research has shown that high-growth firms, though small in number, are critical for job creation and economic growth (Mason and Brown, 2014). The growth of these firms is linked

to specific attributes, including the founder's education and risk tolerance, and the firm's resources and flexibility (Barringer et al., 2005).

However, these ecosystems were only made famous as a result of the work of Isenberg (2010) (see Fig. 1), who depicted an ecosystem as composed of a multiplicity of actors and six domains, namely policy, finance, culture, supports, human capital, and markets.
Nevertheless, it was only with the works of Spigel (2017) and Stam (2015) and Stam and Van de Ven (2017) that we started to have a slightly clearer view of the topic. In particular, Stam and Van de Ven (2021) developed a model that includes the elements and outputs of an ecosystem (see Fig. 2), and most importantly, it divides them between formal institutions of informal resource groups and outputs. This division is very useful precisely because it makes it possible to divide the social aspect from the economic aspect of the ecosystem, and to better understand the subsequent arguments.

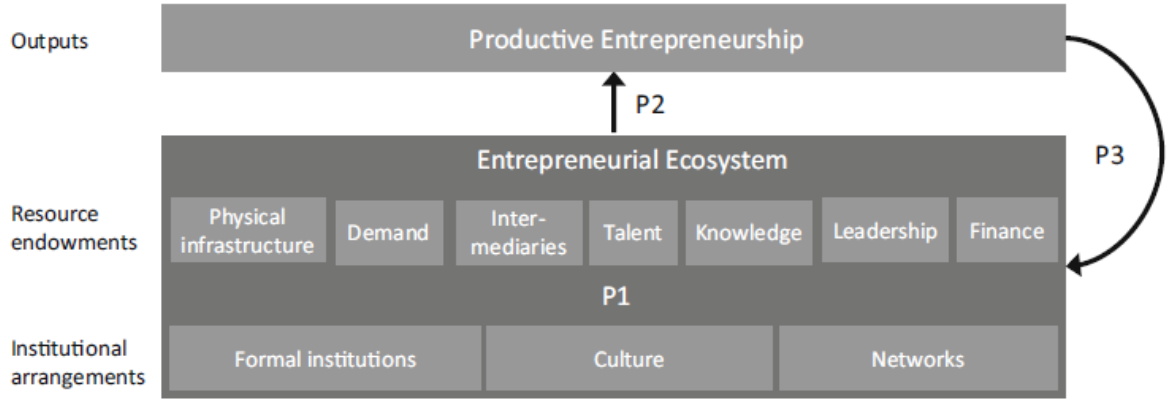

Fig. 2. Elements of an Ecosystem. Source: Stam and Van de Ven (2021)

1.2 Identification of relevant papers

Given the work that has already been done in defining the spheres and domains of entrepreneurial ecosystems over the years and considering the debates that still inhabit the literature, being able to proceed in the development of clear and operationalizable process theories requires conceptual clarity.

In order to proceed with the research, the author developed a systematic review of the literature, following the process suggested by Tranfield et al. (2003), which involves three main phases of: 1) planning of the review (for which the need had already been previously identified and a proposal made) through the definition of a clear research protocol; 2) conducting the review, through the application of the research protocol, leads to the identification of publications and the selection of studies to be included in the review based on the inclusion and exclusion criteria

specified in the research protocol; 3) reporting and dissemination, through a detailed analysis of the publications included in the sample.

Considering the adequacy, the author applied a multistage process following Wurth et al. (2022), although with some differences. Indeed, given the objective of this analysis to disentangle the definition of entrepreneurial ecosystems and problematize it, so to provide more clarity and delineate the boundaries
First of all, unlike these authors, the selected database was Scopus. In this regard, although both Web of Science and Scopus represent the most widely used databases for bibliographic analysis, the latter is a better option for some reasons. Scopus offers a more extensive and inclusive database than Web of Science, with a more user-friendly interface. In addition, it offers broader and easier access to metrics that are more reliable and less susceptible to manipulation than Web of Science (Pranckutė, 2021).
Secondly, unlike the other authors, the research focused exclusively on the concept of entrepreneurial ecosystem, excluding other related and similar concepts.
In this sense, the author refers to concepts such as the "startup ecosystem," the "entrepreneurial system," the "entrepreneurship system," or the "system of entrepreneurship." Therefore, the search by topic (title, abstract, keywords) was developed using a single keyword: "entrepreneur* ecosystem*." The keyword was defined in this way to include the terms "entrepreneurship ecosystem" and "entrepreneurial ecosystem." The result was an initial sample of 2245 items between 2006 and 2024. Of these, 1444 are journal articles, 56 books, 389 book chapters, 248 conference papers, 17 conference reviews, 54 reviews, 16 editorials, and 21 data papers, erratum, letters, notes, and retracted articles. As in Wurth et al. (2022), the author excluded books, book chapters, conference reviews, and 21 other items. Also, all releases not written in English (49 records) were excluded. This process left a total of 1713 articles, including journal articles, conference papers, reviews, and editorials.

In addition to journal articles, the author also included the remaining publications. Indeed, although the interest was to select high-quality publications, the author was also interested in selecting publications that were as accepted and approved as possible by academics, considering that the subsequent steps would allow for further refinement.

A first look at the dataset showed that journal papers, reviews, and editorials were all journal publications, while conference papers were published both in journals and within the proceedings of a conference. Therefore, considering this aspect, the author paid greater attention to refining the selection of the latter group.

The second phase, on the other hand, precisely follows Wurth et al. (2022) and concerns the application of exclusion criteria based on the journal of publication. Therefore, the author used the Scimago Journal Rankings (SJR) in the latest 2022 edition. To select the most relevant journals for the study, the author selected the top

25% of the journals in the following areas: Business and International Management; Business, Management, and Accounting Miscellaneous; Management of Technology and Innovation; Strategy and Management; Economics, Econometrics, and Finance Miscellaneous; Economics and Econometrics; Geography, Planning and Development; Social Sciences Miscellaneous; and Urban Studies.

This step is essential to include a more significant number of articles related to the areas linked with the concept of entrepreneurial ecosystem and, on the other hand, to ensure a higher scientific quality of the items in the database. This step, thus, brought to a sample of 741 journals, of which 113 were represented within our initial sample.

In particular, it should be noted that to select these 113 journals, cross-checking was also made between the journals included within the selection made on the SJR and the ones resulting in the sample of articles found on Scopus.

Since this systematic review aims to identify the most influential and important articles in the literature on entrepreneurial ecosystems, cross-checking also allowed the application of further inclusion criteria. Indeed, a tiny number of journals classified as Q2 within the Scimago database were included: on the one hand, they fall in the top 25% of the selected journals with the highest ranking (in the selected areas); on the other hand, these journals host some of the most relevant publications on EEs. Finally, another inclusion was that of a journal that does not fall within the previously selected categories but within the marketing area (i.e., Journal of Business Research). Although the marketing research area does not fall among the ones mainly linked with EE research, the specific journal (which has an appropriate ranking) hosts some relevant publications in this field. This process eventually led to the selection of an intermediate sample of 652 articles.

Finally, before proceeding to the last phase of this literature review, considering the need to investigate how the definition of entrepreneurial ecosystem was adopted, especially in conceptual studies, further exclusion criteria were applied.

First, the author excluded all publications that do not explicitly refer to the entrepreneurial ecosystem concept but use it only as the context in which the object of their research takes place. Second, publications that refer to other connected constructs – such as those of the innovation ecosystem, digital entrepreneurial ecosystem, and sustainable entrepreneurial ecosystem – were excluded as well. Third, non-conceptual publications and publications that did not show any definition of an entrepreneurial ecosystem were excluded. This process led to a final sample of 65 publications, ranging between 2006 and 2024 (see Table 1)

In the review's final phase, a critical analysis of the literature was carried out. Such a process allowed the author to extrapolate a precise definition, provide a holistic and integrated view of the logics underlying the dynamics of entrepreneurial ecosystems, and, based on this, answer the research questions related to the organizational character of entrepreneurial ecosystems and their structure as an organization.

1.3 Decomposing and Recomposing Entrepreneurial Ecosystems' definition.

As previously anticipated, the first objective of this review is to synthesize the multiple facets of the entrepreneurial ecosystem concept by critically analyzing the different definitions used by researchers to date, to justify the use of one definition in spite of another, and thus allow better conceptualization and operationalization.

Based on the final sample of publications, the author proceeded with a text analysis. The text was analyzed by grouping the recurrent definitions, following some of the scrutiny methodologies presented by Ryan et al. (2003), and then conducting a critical analysis of the results. For what concerns the scrutiny process, first, the author looked for repetitions between different definitions – and therefore, "[...] *'topics that occur and reoccur'* [...] *or are 'recurring regularities'* [...]" (Ryan et al., 2003) – and then, net of repetitions, he proceeded by looking for similarities and differences between the definitions. This analysis made it possible to identify the recurring and the less recurring themes to create an integrated definition.

Clearly, in carrying out this analysis, the author did not ignore the previous analyses made in other studies, nor did he ignore the fact that the differences between the definitions may have been caused by the simple fact that, on that particular issue, there is still a debate in the literature.

In order to reconstruct a definition that is as inclusive and reasoned as possible, and after selecting the recurring and less recurring themes, the author compared these results with other studies.
Therefore, when describing the results, first of all, the author reported recurrences in using some definitions by different authors. Also, the author highlighted the similarities between definitions, first by describing those that are similar in terms of use of terms and concepts, then by describing those that show only conceptual similarities. In this way, it was possible to identify groups of definitions and divide them based on their approach and underlying concepts.

Table 1. Selected Studies in Entrepreneurial Ecosystem Research

Author (Year)	Publication Title	Source (Journal)
Cohen (2006)	Sustainable valley entrepreneurial ecosystems	*Business Strategy and the Environment*
Autio et al. (2014)	Entrepreneurial innovation: The importance of context	*Research Policy*
Stam (2015)	Entrepreneurial Ecosystems and Regional Policy: A Sympathetic Critique	*European Planning Studies*
Mack and Mayer (2016)	The evolutionary dynamics of entrepreneurial ecosystems	*Urban Studies*
Roundy (2016)	Start-up Community Narratives: The Discursive Construction of Entrepreneurial Ecosystems	*Journal of Entrepreneurship*
Spigel (2017)	The Relational Organization of Entrepreneurial Ecosystems	*Entrepreneurship: Theory and Practice*
Acs et al. (2017)	The lineages of the entrepreneurial ecosystem approach	*Small Business Economics*
Audretsch and Belitski (2017)	Entrepreneurial ecosystems in cities: establishing the framework conditions	*Journal of Technology Transfer*
Brown and Mason (2017)	Looking inside the spiky bits: a critical review and conceptualisation of entrepreneurial ecosystems	*Small Business Economics*
Alvedalen and Boschma (2017)	A critical review of entrepreneurial ecosystems research: towards a future research agenda	*European Planning Studies*
Roundy et al. (2017)	The resilience of entrepreneurial ecosystems	*Journal of Business Venturing Insights*
Kuratko et al. (2017)	The paradox of new venture legitimation within an entrepreneurial ecosystem	*Small Business Economics*
Auerswald and Dani (2017)	The adaptive life cycle of entrepreneurial ecosystems: the biotechnology cluster	*Small Business Economics*
Roundy (2017)	"Small town" entrepreneurial ecosystems: Implications for developed and emerging economies	*Journal of Entrepreneurship in Emerging Economies*
Bruns et al. (2017)	Searching for the existence of entrepreneurial ecosystems: a regional cross-section growth regression approach	*Small Business Economics*
Roundy (2017)	Hybrid organizations and the logics of entrepreneurial ecosystems	*International Entrepreneurship and Management Journal*
Autio et al. (2018)	Digital affordances, spatial affordances, and the genesis of entrepreneurial ecosystems	*Strategic Entrepreneurship Journal*

Table 1. (continued)

Author (Year)	Publication Title	Source (Journal)
Spigel and Harrison (2018)	Toward a process theory of entrepreneurial ecosystems	*Strategic Entrepreneurship Journal*
Malecki (2018)	Entrepreneurship and entrepreneurial ecosystems	*Geography Compass*
Roundy et al. (2018)	The emergence of entrepreneurial ecosystems: A complex adaptive systems approach	*Journal of Business Research*
Carayannis et al. (2018)	The ecosystem as helix: an exploratory theory-building study of regional co-opetitive entrepreneurial ecosystems as Quadruple/Quintuple Helix Innovation Models	*R and D Management*
Thompson et al. (2018)	How entrepreneurial ecosystems take form: Evidence from social impact initiatives in Seattle	*Strategic Entrepreneurship Journal*
Nicotra et al. (2018)	The causal relation between entrepreneurial ecosystem and productive entrepreneurship: a measurement framework	*Journal of Technology Transfer*
Schäfer and Henn (2018)	The evolution of entrepreneurial ecosystems and the critical role of migrants. A Phase-Model based on a Study of IT startups in the Greater Tel Aviv Area	*Cambridge Journal of Regions, Economy and Society*
Cavallo et al. (2019)	Entrepreneurial ecosystem research: present debates and future directions	*International Entrepreneurship and Management Journal*
Audretsch et al. (2019)	Entrepreneurial ecosystems: economic, technological, and societal impacts	*Journal of Technology Transfer*
Brush et al. (2019)	A gendered look at entrepreneurship ecosystems	*Small Business Economics*
Colombo et al. (2019)	The governance of entrepreneurial ecosystems	*Small Business Economics*
Colombelli et al. (2019)	Hierarchical and relational governance and the life cycle of entrepreneurial ecosystems	*Small Business Economics*
Kuckertz (2019)	Let's take the entrepreneurial ecosystem metaphor seriously!	*Journal of Business Venturing Insights*
Liguori et al. (2019)	Development of a multi-dimensional measure for assessing entrepreneurial ecosystems	*Entrepreneurship and Regional Development*
Cunningham et al. (2019)	Entrepreneurial ecosystem governance: a principal investigator-centered governance framework	*Small Business Economics*
Roundy and Fayard (2019)	Dynamic Capabilities and Entrepreneurial Ecosystems: The Micro-Foundations of Regional Entrepreneurship	*Journal of Entrepreneurship*
Feldman et al. (2019)	New developments in innovation and entrepreneurial ecosystems	*Industrial and Corporate Change*

Table 1. (continued)

Author (Year)	Publication Title	Source (Journal)
Brown and Mawson (2019)	Entrepreneurial ecosystems and public policy in action: A critique of the latest industrial policy blockbuster	*Cambridge Journal of Regions, Economy and Society*
Roundy and Bayer (2019)	To bridge or buffer? A resource dependence theory of nascent entrepreneurial ecosystems	*Journal of Entrepreneurship in Emerging Economies*
Ghio et al. (2019)	The creation of high-tech ventures in entrepreneurial ecosystems: exploring the interactions among university knowledge, cooperative banks, and individual attitudes	*Small Business Economics*
Roundy and Bayer (2019)	Entrepreneurial ecosystem narratives and the micro-foundations of regional entrepreneurship	*International Journal of Entrepreneurship and Innovation*
Roundy (2019)	Back from the brink: The revitalization of inactive entrepreneurial ecosystems	*Journal of Business Venturing Insights*
Robertson et al. (2020)	Entrepreneurial ecosystems and the public sector: A bibliographic analysis	*Socio-Economic Planning Sciences*
Stam and van de Ven (2021)	Entrepreneurial ecosystem elements	*Small Business Economics*
Cao and Shi (2021)	A systematic literature review of entrepreneurial ecosystems in advanced and emerging economies	*Small Business Economics*
Cantner et al. (2021)	Entrepreneurial ecosystems: a dynamic lifecycle model	*Small Business Economics*
Audretsch and Belitski (2021)	Towards an entrepreneurial ecosystem typology for regional economic development: the role of creative class and entrepreneurship	*Regional Studies*
Iacobucci and Perugini (2021)	Entrepreneurial ecosystems and economic resilience at local level	*Entrepreneurship and Regional Development*
Donaldson (2021)	Culture in the entrepreneurial ecosystem: a conceptual framing	*International Entrepreneurship and Management Journal*
Audretsch et al. (2021)	Time and the dynamics of entrepreneurial ecosystems	*Entrepreneurship and Regional Development*
Schäfer (2021)	Spatialities of entrepreneurial ecosystems	*Geography Compass*
Wurth et al. (2022)	Toward an Entrepreneurial Ecosystem Research Program	*Entrepreneurship: Theory and Practice*
Bouncken and Kraus (2022)	Entrepreneurial ecosystems in an interconnected world: emergence, governance and digitalization	*Review of Managerial Science*
Leendertse et al. (2022)	Measure Twice, Cut Once: Entrepreneurial Ecosystem Metrics	*Research Policy*
Fernandes and Ferreira (2022)	Entrepreneurial ecosystems and networks: a literature review and research agenda	*Review of Managerial Science*

Table 1. (continued)

Author (Year)	Publication Title	Source (Journal)
Cho et al. (2022)	Evolutionary entrepreneurial ecosystems: a research pathway	*Small Business Economics*
Cobben et al. (2022)	Ecosystem types: A systematic review on boundaries and goals	*Journal of Business Research*
Fischer et al. (2022)	Spatial features of entrepreneurial ecosystems	*Journal of Business Research*
Johnson et al. (2022)	A Framework and Databases for Measuring Entrepreneurial Ecosystems	*Research Policy*
Daymond et al. (2023)	Managing ecosystem emergence and evolution: Strategies for ecosystem architects	*Strategic Management Journal*
Roundy and Lyons (2023)	Where are the entrepreneurs? A call to theorize the micro-foundations and strategic organization of entrepreneurial ecosystems	*Strategic Organization*
Buratti et al. (2023)	The dynamics of entrepreneurial ecosystems: an empirical investigation	*R and D Management*
Frimanslund et al. (2023)	The role of finance in the literature of entrepreneurial ecosystems	*European Planning Studies*
O'Connor and Audretsch (2023)	Regional entrepreneurial ecosystems: learning from forest ecosystems	*Small Business Economics*
Bonomi Santos et al. (2023)	Increasing entrepreneurial ecosystem-level outcomes through orchestration: A proposed framework	*Technovation*
Wurth et al. (2023)	Entrepreneurial Ecosystem Mechanisms	*Foundations and Trends in Entrepreneurship*
Roundy and Randy Evans (2024)	Entrepreneurial ecosystems as multiteam systems: Navigating independence and interdependence in the leadership of startup communities	*Journal of Business Venturing Insights*
Chaudhary et al. (2024)	Connecting entrepreneurial ecosystem and innovation. Grasping at straws or hitting a home run?	*Technovation*

Secondly, to strengthen these results, a second step was that of analyzing the definitions more deeply to identify their "skeleton" and some patterns.
Such a process allowed to perform a critical analysis of these patterns, comparing the results with those of the first grouping carried out in the previous step and with those of the analyses carried out in other systematic literature review studies by other authors. Such cross-comparison, in fact, eventually allowed to delineate a comprehensive definition of an entrepreneurial ecosystem.

However, before delving into this process, it is necessary to bear in mind that any definition can come in various forms, which express the different characteristics of a concept. Especially, the two main ways through which a concept can be defined are those of extension and intension. Extension, in particular, represents "*the set of objects to which the concept corresponds*." Intension, on the other hand, represents "*the set of characteristics that make up the concept*." (Kockaert & Steurs, 2015)
Considering that, at this stage, it is necessary to understand the essential qualities and characteristics of the concept of an entrepreneurial ecosystem in order to answer the research questions (which are conceptual in nature), the author proceeded through an approach based on intension. More specifically, the process of definition by intension can be traced back to Aristotle, according to whom defining something had to do with "*capturing its true essence*" (Lee, 2023).
Following the Aristotelian logic, a definition is the expression of what is necessary for something to exist (Smith, 2022). In particular, according to the Aristotelian thought, being able to define a concept means, above all, understanding both the '*genus proximum'* – and therefore, the '*superordinate*' and generic concept that allows the described concept to be inserted within a conceptual system or domain – and the *'specific differentia'* – which represents the set of characteristics that allows it to be distinguished from other concepts (Kockaert & Steurs, 2015).
Therefore, an optimal definition should undoubtedly refer to the superordinate concept and clarify the characteristics that allow readers to differentiate the concept from others, especially if they are similar.
In particular, as far as differentiation is concerned we go back to Aristotle, who used a method based on the division between conflicting arguments and who asserted that the only way to define something was: 1) to find its '*ultimate differentia*' (i.e. '*teleutaia diaphora*'), which expresses the activity (i.e., '*energeia*') of the defined thing and 2) ultimately to understand what the end (i.e., '*telos*') is – the reason for the existence of the thing analyzed (Lee, 2023).
Therefore, to better analyze the definitions of EEs, one must first know that the definitions certainly have characteristics that arise directly from the superordinate concept, which in this case is that of "ecosystem".

In this regard, Cavallo et al. (2019) – who, in their study, analyze the definition of an entrepreneurial ecosystem, its antecedents, and the debates present - retrace the etymological origin of the term, emphasizing its general characteristics of complexity

and hospitality, stating that an ecosystem represents a complex system that hosts entities. Therefore, to define the *genus proximum*, it is also necessary to analyze the concept of 'system'. According to Bertalanffy (1950) a system can be defined as "[...] *a complex of elements that interact with each other* [...]" (in a different way than the one they interact in other systems). In this regard, according to Marchal (1975):

"*In general, kinds of systems will be specified by conditions placed on their element sets, relation sets, or both, and it is the satisfaction of these additional conditions that will determine if a system is of a certain kind.*"

Therefore, in light of these considerations regarding the structure of a definition and the more general concept of ecosystem, the analysis of the different definitions must consider the predominant systemic character of an ecosystem, which means searching for a group of elements, specific conditions, and relationships between them.
Considering that these relationships must be different from those that occur in other systems and considering the differentiation approach mentioned above as well, to catch an ecosystem's essence it is therefore necessary to contemplate its ultimate goal and the activities required to achieve it.
Finally, in view of the welcoming character of an ecosystem, it is also necessary to consider the place (virtual or physical) where these relationships occur.
Therefore, with these argumentations in mind, the questions in this regard should be related to: 1) *What are the protagonists (i.e., the elements) of an ecosystem?* 2) *What features do they have?* 3) *Where do they operate?* 4) *What activities do they carry out?* and 5) *For what purpose?*

Although these questions allow to identify the components of the definition of an EE, before proceeding with the analysis it is also essential to assess the appropriateness of the term used.
On the one hand, following Brown and Mason (2017), Cavallo et al. (2019), and Kuckertz (2019), who carried out in-depth and detailed analyses of the origins of the use of the term 'entrepreneurial ecosystem', the word ecosystem was adopted to refer to virtuous processes of self-regulation. Therefore, it is clear that, in order to be able to speak of an EE, one must necessarily consider those elements, conditions, relationships, places (virtual or physical), activities, and objectives which lead the ecosystem to survive through virtuous cycles of self-regulation.

Table 2. Definitions of Entrepreneurial Ecosystem

Author (Year)	Definition
Cohen (2006)	A diverse set of inter-dependent actors within a geographic region that influence the formation and eventual trajectory of the entire group of actors and potentially the economy as a whole.
Autio et al. (2014)	The set of multi-level processes and stakeholders, multiple actors and multiple contexts that regulate the direction and quality of entrepreneurial innovation by shaping the direction and potential rewards of alternative courses of technological development and even the types of organizational forms that will be accepted as legitimate
[1] Stam (2015), Acs et al. (2017), Stam and van de Ven (2021); [2] Kuratko et al. (2017), Cavallo et al. (2019), Ghio et al. (2019), Audretsch and Belitski (2021), Donaldson (2021), Iacobucci and Perugini (2021), Leendertse et al. (2022), Wurth et al. (2023)	[1] A set of interdependent actors and factors coordinated in such a way that they enable productive entrepreneurship [2] within a particular territory.
Mack and Mayer (2016)	The interacting components of entrepreneurial systems, which foster new firm creation in a specific regional context
Audretsch and Belitski (2017)	A dynamic community of inter-dependent actors (entrepreneurs, supplies, buyer, government, etc.) and system-level institutional, informational and socioeconomic contexts
Bruns et al. (2017)	A multidimensional set of interacting factors that moderate the effect of entrepreneurial activity on economic growth
Roundy (2016), Roundy et al. (2017)	The sets of actors/Communities of agents, institutions, social structures and cultural values that produce entrepreneurial activity.
Spigel (2017)	Combinations of social, political, economic, and cultural elements within a region that support the development and growth of innovative startups and encourage nascent entrepreneurs and other actors to take the risks of starting, funding, and otherwise assissting high-risk ventures.
Auerswald and Dani (2017)	The higher-order complex of social, cultural, political, and economic feedback mechanisms within which the adaptive life cycle of any particular industrial cluster is embedded
Brown and Mason (2017)	A spatial concept to explain why certain places have high levels of entrepreneurial activity

Table 2. (continued)

Author (Year)	Definition
Alvedalen and Boschma (2017)	A system or network that consists of many interacting elements with highly complex relationships
Autio et al. (2018)	A digital economy phenomenon that harnesses technological affordances to facilitate entrepreneurial opportunity pursuit by new ventures through radical business model innovation
Roundy (2017)	The set of individuals, institutions, social structures, and cultural values – and the interactions among them – that generate entrepreneurial activity
Roundy (2017)	The geographically-bounded systems of individuals, organizations, physical resources, social structures, and cultural values that generate new venture activity
Spigel and Harrison (2018)	Benefits and resources produced by a cohesive, typically regional, community of entrepreneurs and their supporters that help new high-growth ventures form, survive, and expand
Malecki (2018)	Dynamic local social, institutional, and cultural processes and actors that encourage and enhance new firm formation and growth.
Roundy et al. (2018)	The sets of actors, institutions, social networks, and cultural values that produce and sustain entrepreneurial activity
Carayannis et al. (2018)	Fractal, multi-level, multi-modal, multi-nodal, and multi-lateral configurations of dynamic tangible and intangible assets within the resource-based view and the new theory of the growth of the firm
Thompson et al. (2018)	Systems of co-located elements where a variety of actors, functions, and institutions interact to support the creation and growth of new ventures
Nicotra et al. (2018)	A set of interdependent factors (or, as we call them, eco-factors) coordinated in a way that enables entrepreneurship.
Schäfer and Henn (2018), Brown and Mawson (2019), Buratti et al. (2023)	Sets of interconnected entrepreneurial actors, organisations, institutions, and entrepreneurial processes which formally and informally coalesce to connect, mediate and govern the performance within the local entrepreneurial environment
Audretsch et al. (2019)	Organized attempts to establish environments that are conducive to increasing the success for newly established ventures
Brush et al. (2019)	A number of interconnected elements that are mutually reinforcing, facilitating innovation and the growth of entrepreneurship. […] include a conducive culture, the availability of financing, the acquisition and development of human capital, new markets for products and services, and a range of institutional and infrastructural supports.

Table 2. (continued)

Author (Year)	Definition
Colombo et al. (2019)	A vehicle to describe, explain, advertise, and transport thoughts, frameworks, and opinions on how entrepreneurs interact with their environment as economic agents
Colombelli et al. (2019)	The union of localized cultural outlooks, social networks, investment capital, universities, and active economic policies that create environments that are supportive of innovation-based ventures
Kuckertz (2019)	Regional communities of interconnected actors related to entrepreneurship.
Cunningham et al. (2019)	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
Roundy and Fayard (2019)	The interconnected system of forces that generate and sustain regional entrepreneurship
Feldman et al. (2019)	An evolving complex, diverse, and potentially quite fragile set of agents, institutions, activities or processes, and surrounding culture, conceived in terms of institutional, geographic, economic, or industrial contexts that can be analyzed at different levels of aggregation (e.g. firms, industries, universities, regions, and nations).
Roundy and Bayer (2019)	The systems of inter-related forces that promote and sustain regional entrepreneurship
Roundy and Bayer (2019)	The sets of actors, institutions, social networks, and cultural values that produce and sustain regional entrepreneurial activity
Roundy (2019)	Systems of interrelated forces that promote and sustain entrepreneurship in a geographic area
Robertson et al. (2020)	The geographically-bound social networks of institutions and cultural values that give rise to and sustain entrepreneurial activity
Stam and van de Ven (2021)	Key entrepreneurs and firms that govern, integrate and perform all of the functions required for entrepreneurship to flourish in a territory
Cao and Shi (2021)	A community of multiple coevolving stakeholders that provides a supportive environment for new venture creations within a region

Table 2. (continued)

Author (Year)	Definition
Cantner et al. (2021), Audretsch et al. (2021)	A combination of social, political and cultural elements within a region that support the development and growth of innovative startups and encourage nascent entrepreneurs and other actors to take the risks of starting, funding, and otherwise assisting high-risk ventures
Cantner et al. (2021)	A complex system of interactions between agents within various socioeconomic, institutional and informational contexts which generate more new businesses and growth.
Schäfer (2021)	Conceptual umbrella for the benefits and resources produced by a cohesive, typically regional, community of entrepreneurs and their supporters that help new high growth ventures form, survive, and expand'
Bouncken and Kraus (2022)	The social and economic environment affecting local or regional entrepreneurship
Fernandes and Ferreira (2022)	The union of localized cultural outlooks, social networks, investment capital, universities, and active economic policies that create environments supportive of innovation-based ventures
Cho et al. (2022)	A holistic and finer-grained approach to studying the evolution of a local economy and its underlying mechanisms
Cobben et al. (2022)	Entrepreneurs [who] create new value, organized by a wide variety of governance modes, enabled and confined within a specific institutional context
Fischer et al. (2022)	Structures that encompass complex sets of interactions that shape aggregate competitive capabilities in economic agents
Johnson et al. (2022)	Systems where "innovation and commercial outputs are rarely created as the result of individual actions by producers or consumers. Rather, they arise from interactive co-creation that results from collaboration and partnership at multiple overlapping levels."
Daymond et al. (2023)	systems of co-located elements where a variety of actors, functions, and institutions interact to support the creation and growth of new ventures
Roundy and Lyons (2023)	The interconnected factors that support entrepreneurship within geographic areas
Frimanslund et al. (2023)	Factors or actors that enhance entrepreneurship

Table 2. (continued)

Author (Year)	Definition
O'Connor and Audretsch (2023)	Self-organized, adaptive, and geographically bounded community of complex agents operating at multiple aggregated levels, whose non-linear interactions result in the patterns of activities through which new ventures form and dissolve
Bonomi Santos et al. (2023)	The interaction of venture capitalists, corporations, universities, research entities, government, R&D centres, and specialised service providers within a region, collectively fostering high-potential entrepreneurial firms
Roundy and Randy Evans (2024)	Communities of actors and factors that influence entrepreneurship in geographic territories
Chaudhary et al. (2024)	A network of actors interacting formally and informally within the external environment
Chaudhary et al. (2024)	System that facilitates the invention of new products and services, resulting in successful start-ups being scaled up globally, which in turn creates an impact in the form of regional innovation and productive entrepreneurship

1.3.1 Analysis of definitions: recurrence, similarities, and differences.

From the sample of 65 articles, 52 definitions were extracted (see Table 2). The most recurrent definition had been initially proposed by Stam (2015). In some cases, it is presented with a reference to the territorial level of an EE. In particular, according to this definition, an entrepreneurial ecosystem is: "*A set of interdependent actors and factors coordinated in such a way that they enable productive entrepreneurship* (Stam, 2015; Acs et al., 2017; Stam and van de Ven, 2021) *within a particular territory* (Kuratko et al., 2017, Cavallo et al., 2019; Ghio et al., 2019; Audretsch and Belitski, 2021; Donaldson, 2021; Iacobucci and Perugini, 2021; Leendertse et al., 2022; Wurth et al., 2023)."

The second most widely used definition is the one introduced by Schäfer and Henn (2018), according to which an entrepreneurial ecosystem is: "[*A set] of interconnected entrepreneurial actors, organisations, institutions, and entrepreneurial processes which formally and informally coalesce to connect, mediate and govern the performance within the local entrepreneurial environment* (Schäfer and Henn, 2018; Brown and Mawson, 2019; Buratti et al., 2023)."

These two definitions are the most used ones in our sample and did not receive any substantial modification. However, a closer look at Table 2 reveals a set of similar definitions.

In particular, following the definition proposed by Roundy (2016), which sees entrepreneurial ecosystems as "*[...] sets of actors, institutions, social structures and cultural values that produce entrepreneurial activity[...]*", other scholars adopted similar definitions, albeit with some differences (i.e., Auerswald and Dani, 2017; Roundy, 2017; Roundy et al., 2017; Spigel, 2017; Malecki, 2018; Roundy et al., 2018; Brush et al., 2019; Roundy and Bayer, 2019; Robertson et al., 2020; Fernandes and Ferreira, 2022; Cantner et al., 2021; Audretsch et al., 2021; Frimanslund et al., 2023). Despite the differences in the used terms and sometimes in the goals and the elements, they all refer to ecosystems as having actors and being characterized by formal (i.e., political and economic contexts and elements) and informal (i.e., social structures and cultural values) institutions, whose relationships generate entrepreneurial activity. It is also crucial to notice that most of those definitions refer to ecosystems as having their 'home' in regions or 'territories', and that their final goal is not only that of fostering and generating entrepreneurial activity but, most notably, fostering the birth and growth of innovative ventures.

In a certain way, the definition used by Stam (2015) displays attributes similar to that introduced by Cohen (2006), which talks about a "*set of interdependent actors*" its location in a "*geographical region*" and whose relations impact "*the economy as a whole*." Others who used similar definitions are Mack and Mayer (2016), Audretsch and Belitski (2017), Bruns et al. (2017), Nicotra et al. (2018), Thompson et al. (2018), Roundy and Fayard (2019), Roundy and Bayer (2019), Roundy (2019), Cao and Shi (2021), Daymond et al. (2023), Roundy and Lyons (2023).
This latter group of definitions, in particular, mostly share the features of interdependence and interconnection of the underlying elements, the geographical contextualization, and the impact on entrepreneurship. However, they mainly differ for what concerns an EE's goals. Indeed, most definitions focus on sustaining and fostering entrepreneurship (sometimes referring to it as new venture creation), differing widely in this sense from the definition of Stam (2015), which instead refers specifically to productive entrepreneurship.
Finally, while the definitions presented so far have been grouped based on the similar structure, the remaining definitions display quite different structures, often with different sets of elements and objectives as well.
What is certain, however, is that by looking at the groups of definitions mentioned above, one can see a recurrence of themes consistent with what has been reported in other studies.
First of all, the definition introduced by Stam (2015) and then updated by Kuratko (2017), the one introduced by Roundy (2016), and the one introduced by Schäfer and Henn (2018), all refer to '*a set of actors and factors*'. The main differences between them reside in the final objective and the characteristics of these actors and factors. If the first shows productive entrepreneurship as an EE's goal, the other two see the stimulation of entrepreneurial activity as its objective. Moreover, regarding the relational aspect, the first introduces the concept of '*interdependence*', the second

one mentions only the interconnection between the elements, and the third does not mention it. Finally, an important aspect is common to the first two: the ecosystem's organizational character. On the one hand, in fact, the definition of Stam (2015) and Kuratko (2017) speaks of '*coordinated*' actors and factors – in order to enable productive entrepreneurship. On the other hand, the definition of Schäfer and Henn (2018) speaks of actors who '*formally and informally coalesce*' to '*mediate and govern*' the performance of the local business environment.
Therefore, considering the questions regarding the protagonists (or elements) of the ecosystem, their characteristics, the extent of the activities they carry out, the place (virtual or physical) in which they carry them out, the objective for which they carry them out, a first scenario emerges from this preliminary analysis, showing: 1) among the elements the actors and the institutional factors, that must be identified among those that can have an impact entrepreneurial and innovation processes; 2) among the characteristics of these elements, those of interdependence, interconnection, dynamism, and coordination; 3) among the places, the one identified in a well-defined geographical area, which is often identified as a region; 4) among the activities those that positively influence the local business and innovation environment, including the strategic coalition with other actors, and mediation and governance; 5) among the objectives those to stimulate entrepreneurship and/or productive entrepreneurship.

1.3.2 Text analysis of definitions: cutting and sorting.

Completed this first part of the analysis, to generate more sound results the review proceeds through a *cutting and sorting* process, as proposed by (Ryan et al., 2003). This means further dividing the definitions identified in the sample by separating the terms used, according to the five parameters (i.e., the five questions) identified above: 1) Who/What are the elements of the ecosystem? 2) What features do they have? 3) Where do they operate? 4) What activities do they carry out, and 5) For what purpose?

Thus, the study proceeds first with a simple description of the data. Then, a critical analysis is carried out by commenting on the results and linking and comparing them with previous studies.

1) Entrepreneurial Ecosystem's Elements

As far as the analysis of the elements of an ecosystem is concerned, in Table 3, it is possible to notice the presence of four macro groups of definitions, based on groups of recurring categories of elements.
The first group only generically speak of actors without specifying them. Many definitions in this group combine a mix of factors that are sometimes made explicit and sometimes not. In particular, there is a specific recurrence in the inclusion of *processes*, *institutions*, *activities*, *social structures*, and *cultural values*.

Table 3. Decomposition of EE's Definitions: Entrepreneurial Ecosystem's "Elements"

Categories	Elements	Author (Year)
Generic Actors + Mix of Factors	actors	Cohen (2006), Chaudhary et al. (2024)
	actors related to entrepreneurship	Kuckertz (2019)
	actors and contexts	Audretsch and Belitski (2017)
	actors and factors	Stam (2015), Acs et al. (2017), Audretsch and Belitski (2017), Kuratko et al. (2017), Nicotra et al. (2018), Cavallo et al. (2019), Ghio et al. (2019), Audretsch and Belitski (2021), Donaldson (2021), Iacobucci and Perugini (2021), Stam and van de Ven (2021), Leendertse et al. (2022), Frimanslund et al. (2023), Wurth et al. (2023), Roundy and Randy Evans (2024)
	actors, functions and institutions	Thompson et al. (2018), Daymond et al. (2023)
	actors, institutions, social structures and cultural values	Roundy (2016), Roundy et al. (2018), Roundy and Bayer (2019)
	actors, processes and contexts	Autio et al. (2014)
	actors within socioeconomic, institutional and informational contexts	Cantner et al. (2021)
	actors, institutions, activities or processes, and surrounding culture	Feldman et al. (2019)
	actors, physical resources, social structures, cultural values	Roundy (2017)
	actors, social structures, institutions, cultural values	Roundy et al. (2017)
	actors, social structures, institutions, cultural values and interactions among them	Roundy (2017)
	local social, institutional and cultural processes and actors	Malecki (2018)

A second group of definitions makes a more specific reference to the types of actors and factors. In particular, while some include among the actors '*entrepreneurs*' or '*entrepreneurial actors*', others include only '*universities*'. On the other hand, as far as factors and contexts are concerned, '*processes*' recur as before, although this time are '*entrepreneurial*'. Also, '*cultural*, *social*, and *institutional*' factors appear, together with '*policies* and *investment capital*'.

Two other groups, on the other hand, refer either only to specific actors - which, as can be seen, sometimes refer only to actors pertaining to the *industry* (*entrepreneurs, their supporters, consumers*) and other times only to organizations pertaining to *academia, government, and entrepreneurial support* - or they refer very generally to *conditions, forces, factors, and elements*.

Lastly, a final group refers exclusively to factors, specifying their function (to *promote innovation or entrepreneurship*) or their type. In the latter case, themes already noted above recur, which are those of *social, cultural, institutional, and political* factors, except for a reference to *human capital, finance, and new markets*.

Table 3. (continued)

Categories	Elements	Author (Year)
Specific Actors + Mix of Factors	cultural outlooks, social networks, investment capital, universities, and active economic policies	Colombelli et al. (2019)
	cultural outlooks, social networks, investment capital, universities, and active economic policies	Fernandes and Ferreira (2022)
	entrepreneurial actors, institutions, entrepreneurial organisations and entrepreneurial processes	Brown and Mawson (2019)
	entrepreneurial actors, organisations, institutions and entrepreneurial processes	Schäfer and Henn (2018)
	entrepreneurial actors, organisations, institutions and processes	Buratti et al. (2023)
	entrepreneurs and their environment	Colombo et al. (2019)

Table 3. (continued)

Categories	Elements	Author (Year)
Specific Actors	entrepreneurs and their supporters	Schäfer (2021)
	entrepreneurs and their supporters	Spigel and Harrison (2018)
	entrepreneurs who create new value	Cobben et al. (2022)
	Key entrepreneurs and firms	Stam and van de Ven (2021)
	universities, research entities, government, R&D centres, and specialised service providers	Bonomi Santos et al. (2023)
	producers or consumers	Johnson et al. (2022)
Generic Factors, Forces, Mechanisms	conditions	Liguori et al. (2019)
	elements	Alvedalen and Boschma (2017)
	factors	Bruns et al. (2017)
	factors	Roundy and Lyons (2023)
	forces	Roundy and Fayard (2019)

Table 3. (continued)

Categories	Elements	Author (Year)
Specific Factors, Forces, Mechanisms	elements facilitating innovation and mutually reinforcing	Brush et al. (2019)
	conducive culture, availability of financing, acquisition and development of human capital, new markets, institutional and infrastructural supports	Brush et al. (2019)
	entrepreneurial attitudes, ability, and aspirations, by individuals	Cunningham et al. (2019)
	forces that promote and sustain regional entrepreneurship	Roundy (2019)
	forces that promote and sustain regional entrepreneurship	Roundy and Bayer (2019)
	institutions and cultural values	Robertson et al. (2020)
	environments	Audretsch et al. (2019)
	social and economic environment	Bouncken and Kraus (2022)
	social, political, and cultural elements	Audretsch et al. (2021)
	social, political, and cultural elements	Cantner et al. (2021)
	social, political, economic and cultural elements	Spigel (2017)
	social, political, economic and cultural mechanisms	Auerswald and Dani (2017)

2) Entrepreneurial Ecosystem's Elements' Characteristics

Regarding the characteristics of the elements found above, in Table 4, four main groups of features emerge. It should be noted that the terms were not reported strictly as in the definitions but, instead, slightly altered to improve readability and describability for this analysis.

In the first group, most definitions privilege the '*systemic*' and '*relational*' character, talking about a set of elements that can be '*interconnected*', '*interactive*', or '*collaborative*'. This detail seems obvious, considering that the discussion concerns a system comprising – by nature – relations between its elements.

Nevertheless, among them, two characteristics tell something more about the specificity of the entrepreneurial ecosystem construct. The first is the *community-based* character of an ecosystem. The second is the '*interdependent*' character of the relationships between its elements.

On the other hand, the second most populated group is composed of definitions that privilege '*complex*' and '*dynamic*' character of the elements that operate in an ecosystem – especially their '*complexity*', '*diversity*,' and '*evolutionary character*.'

Table 4. Decomposition of EE's Definitions: Entrepreneurial Ecosystem's Elements' Characteristics

Categories	**Categories**	**Author (Year)**
Interaction, Interdependence, Community- and Network-based	community-based	Schäfer (2021), Roundy and Randy Evans (2024)
	community-based, co-evolutionary	Cao and Shi (2021)
	community-based, cohesive, regional	Spigel and Harrison (2018)
	interactive	Mack and Mayer (2016), Roundy (2017), Daymond et al. (2023), Thompson et al. (2018)
	interactive, collaborative	Johnson et al. (2022)
	interactive, collective	Bonomi Santos et al. (2023)
	interactive, network-based	Alvedalen and Boschma (2017)
	interconnected	Schäfer and Henn (2018), Brush et al. (2019), Brown and Mawson (2019), Roundy and Lyons (2023), Buratti et al. (2023)
	interconnected, community-based, regional	Kuckertz (2019)
	interconnected, mutually reinforcing	Brush et al. (2019)
	interconnected, systemic	Roundy and Fayard (2019), Roundy and Bayer (2019), Roundy (2019)
	interdependent	Cohen (2006)
	interdependent, coordinated	Stam (2015), Acs et al. (2017), Kuratko et al. (2017), Nicotra et al. (2018), Cavallo et al. (2019), Ghio et al. (2019), Audretsch and Belitski (2021), Donaldson (2021),Stam and van de Ven (2021), Leendertse et al. (2022), Wurth et al. (2023)

Finally, the last two groups see the main elements of an ecosystem as located in a '*specific geographical area'* (about which the author talks in the next paragraph) and as being susceptible to '*organization'* or '*coordination'*.
The latter character is also present in the first group of characteristics, alongside the concept of interdependence, and presents some notes of conceptual curiosity that will be elaborated later in the text.

Table 4. (continued)

Categories	Characteristics	Author (Year)
Complexity & Dynamism	complex, high-order	Auerswald and Dani (2017)
	complexity, interactive	Fischer et al. (2022)
	complexity, systemic, interactive	Cantner et al. (2021)
	evolving, complex, diverse, fragile	Feldman et al. (2019)
	fractal, multi-level, multi-modal, multi-lateral, dynamic	Carayannis et al. (2018)
	holistic, evolutionary	Cho et al. (2022)
	multidimensional	Bruns et al. (2017)
	multilevel and multiplicity	Autio et al. (2014)
	dynamic	Audretsch and Belitski (2017)
	dynamic, institutionally embedded	Cunningham et al. (2019)
	dynamic, local	Malecki (2018)
Place-based	geographically bounded	Roundy (2017), Robertson et al. (2020)
	localized	Colombelli et al. (2019), Fernandes and Ferreira (2022)
Organization	coordinated	Iacobucci and Perugini (2021)
	organized	Audretsch et al. (2019), Cobben et al. (2022)
	self-organized, adaptive, geographically bounded, community-based, complexity, non linear	O'Connor and Audretsch (2023)

3) Entrepreneurial Ecosystem's Locus

For what concerns the context or *locus* in which the relationships between the elements take place, Table 5 shows that the geographical location is the preferred one, compared to the non-geographical one, which has been used only a few times. However, a closer look at the identification of the type of geographical area shows that only two views alternate: the one that locates an ecosystem as being in a '*specific region'* and the one that locates it in a '*specific territory'*.

4) Entrepreneurial Ecosystems' Activities/Functions and (5) Goals

Finally, coming to the topic of an EE's activities and goals, considering the abundance of written material resulting from the cutting and sorting process, while no table is presented, the text proceeds directly with the description of the results.
In particular, from the textual analysis the author could distinguish a small number of activities/functions included in the definitions. These, in particular, involve '*creating the context*,' '*monitoring global performance'*, '*collaborating with other actors'*, and '*managing* and *taking care of the ecosystem's governance'*. Above all,

much emphasis is placed on creating the context, which – according to authors - should enable reaching the ultimate goal.

Also, the analysis allowed to identify three primary goals of an EE. The most recurrent goal is that of '*stimulating/supporting/promoting*' or '*generating*' '*entrepreneurial activity*' in general, which in turn takes the form of both the growth of current companies and the creation of new ones.

Another perspective, instead, is the one that sees the output of the entrepreneurial ecosystem as '*productive* (or *high growth*) *entrepreneurship*'. Indeed, a whole set of definitions and studies conceptualizes the ecosystem as enabling productive entrepreneurship, which means enabling both entrepreneurship and innovation, but above all, innovative entrepreneurship (Baumol, 1990).

Finally, there is a whole set of definitions that instead see the ecosystem as responsible for a higher goal: '*economic growth*.'

Table 5. Decomposition of EE's Definitions: Entrepreneurial Ecosystem's Locus

Categories	Context/Setting	Author (Year)
Non geographic	digital economy	Autio et al. (2018)
	entrepreneurial environment	Colombo et al. (2019)
	institutional context	Cobben et al. (2022)
	institutional, informational and socioeconomic contexts	Audretsch and Belitski (2017)
	multiple contexts	Autio et al. (2014)
	socioeconomic, institutional, informational contexts	Cantner et al. (2021)
Geographic	specific region	Cohen (2006), Mack and Mayer (2016), Spigel (2017), Spigel and Harrison (2018), Kuckertz (2019), Roundy and Fayard (2019), Roundy and Bayer (2019), Cao and Shi (2021), Cantner et al. (2021), Iacobucci and Perugini (2021), Audretsch et al. (2021), Schäfer (2021), Bouncken and Kraus (2022), Bonomi Santos et al. (2023), Chaudhary et al. (2024)
	specific territory	Brown and Mason (2017), Kuratko et al. (2017), Roundy (2017), Malecki (2018), Thompson et al. (2018), Cavallo et al. (2019), Colombelli et al. (2019), Ghio et al. (2019), Roundy (2019), Audretsch and Belitski (2021), Donaldson (2021), Leendertse et al. (2022), Cho et al. (2022), Daymond et al. (2023), Roundy and Lyons (2023), Wurth et al. (2023), Roundy and Randy Evans (2024)
Geographic + non geographic	specific territory, entrepreneurial environment	Schäfer and Henn (2018), Brown and Mawson (2019), Buratti et al. (2023)
	institutional, geographic, economic or industrial contexts	Feldman et al. (2019)

1.3.3 Results

Having completed the descriptive part of the analysis, it is time to summarize and critically comment on the results.
For this purpose, the author compares the results obtained in the descriptive analysis with those of previous review studies and conceptual works included in the sample. Apart from the review studies, the criterion used when selecting the conceptual works for confrontation was choosing the ones most relevant to the purpose of the study. Thus, the author selected the ones dealing with the structure and dynamics of entrepreneurial ecosystems.

In setting up the discussion, the author followed the structure of the definition identified previously and, therefore, the five parameters mentioned earlier.
Following the *intension* approach mentioned earlier, it must be remembered that, first, the *genus* is that of the ecosystem (therefore, a system that tends to be adaptive and self-regenerating) and, second, that the identification of the final objective is the central part, allowing the distinction between the object of the definition and others. Therefore, to critically analyze the results, the discussion proceeds backward from the outcomes and outputs to the elements and conditions of an entrepreneurial ecosystem.

1) *Entrepreneurial Ecosystem's Activities, Outcomes and Outputs*
   From the previous analysis, it has been deduced that the definitions diverge on the type of entrepreneurship an EE promotes, posing doubts regarding the most appropriate form of entrepreneurship it should enable.
   The answer to this question is found in the EE's raison d'être. On the one hand, indeed, the framework of EEs has been developed and studied as a result of territorial phenomena whereby some areas of the world with high levels of high-growth entrepreneurship and an enabling culture experienced much higher economic growth than other areas, as in the case of Silicon Valley (Wurth et al., 2023). On the other hand, the framework has been developed as an evolution of other constructs such as that of Marshallian districts (Markusen, 1996), national systems of innovation (Lundvall, 1992), learning regions (Keeble et al., 1999), the Triple Helix (Etzkowitz and Leydesdorff, 2000), clusters (Porter, 1998), and regional innovation systems (Cooke, 2001), which focus mainly on innovation.
   Therefore, the first part of the definition seems consistent with the one defined by Stam (2015) and then updated by Kuratko (2017), which sees an EE's ultimate goal as '*foster productive entrepreneurship in a specific region.*'
   However, there is a missing piece in this part of the definition. As we said before, an ecosystem can be defined as such if it can maintain a certain stability over time. In our case, this means making innovative entrepreneurship thrive – and, consequently, generating greater aggregate economic value – over time. While it is unnecessary to include this temporal attribute in the definition, as the

ecosystem concept already includes it, it is crucial to consider it when dealing with ecosystems' dynamics.

Therefore, it can be said that the ultimate goal of an ecosystem is to *foster productive entrepreneurship in a specific region.*

Considering what has just been said, it is clear that in order to ensure that an EE is precisely a system in which some elements exist, coexist, and relate with the ultimate goal of increasing the level of productive entrepreneurship in a specific *locus* and over time, it will be necessary to set up all those processes that influence not only the growth of innovative companies but also their birth (Grimaldi and Grandi, 2005; Kuratko, 2005; Rothaermel et al., 2007).
However, these activities are not explicitly mentioned in the previously analyzed definitions. Instead, most definitions refer to two activities (or functions) that ecosystem actors and factors should perform: 1) *creating a favorable environment* for productive entrepreneurship to proliferate, and 2) *monitoring performance* and *coordinating activities*.
On the one hand, although it was already evident in the literature, this detail makes it clear that a certain mix of conditions is necessary for productive entrepreneurship to be there (i.e., *a favorable environment*). Also, considering that an EE's goal is to maintain a certain balance over time, this mix of conditions must persist, or if they are lacking, there needs to be an underlying system capable of recreating them.
Thus, it can be said that if one theorizes the goal of an ecosystem as that of fostering productive entrepreneurship over time and also affirms that some conditions are necessary to do this, then it seems clear that the '*monitoring'* activity is inherent in these two portions of the definition of an ecosystem. Therefore, it is not necessary to include this function in the definition.
Also, if we go further in the discussion and consider the concept of '*coordination,'* it is clear why it must be included in a definition. More specifically, if we think about the conditions that enable high-growth entrepreneurship (Mason and Brown, 2013), these can be created through the interactions between a range of actors and factors that represent the elements of an ecosystem (Stam and Van de Ven, 2021). On this topic in particular, the studies carried out by Stam and Van de Ven (2021), Wurth et al. (2021), and Wurth et al. (2023) are very exhaustive, as they analyze not only the structure of an ecosystem but also its underlying mechanisms.
However, if the set of political, economic, social, and cultural actors and factors - which pertain to formal and informal institutions (Urbano et al., 2019) – have the potential to enable the creation and growth of high-growth companies, this does not mean that this potential is automatically exploited.

Formal and informal interactions between the elements must occur, and be coordinated (Spigel, 2017; Spigel and Harrison, 2018). Without coordination, given the human error, the system will proceed, but it will likely be ineffective in the long term.

Therefore, for the moment, we can conceive of the ecosystem as a set of elements coordinated to *foster productive entrepreneurship in a specific region.*

2) Entrepreneurial Ecosystem's Elements, their Character and Context

Again, when trying to identify the actors and factors responsible for achieving the final goal, there is a discrepancy within the definitions. However, in this case, such discrepancy is only apparent.

Indeed, the actors who can positively or negatively influence the production of high-growth entrepreneurship within a specific territory have already been abundantly identified by the work of Etzkowitz and Leyerdesoff (2000) and Carayannis et al. (2018), who classify the actors within groups belonging to the so-called triple and quadruple helixes.

Therefore, in a definition, it is not necessary to specify who the actors are: once we have stated the objective, the issue is to determine the limits of the definition, which is enough to outline the actors with the potential to influence the output and the outcome.

Similarly, the factors have already been identified in the old literatures related to economic development, economic geography, industrial districts, clusters, and national/regional innovation systems, and then grouped by Isenberg (2010) within six dimensions that capture the essence of the formal and informal structure of an ecosystem. In this regard, it should be noted that, for the moment, any definition refers to actors and factors that only have the "*potential to be responsible for the performance*." Indeed, although an actor may belong to a specific category, it may not have the actual ability to perform that specific function.[1]

Finally, when discussing the context, many authors display an ecosystem as existing within a specific region or territory. Others, instead, avoid using such specification, probably seeing it as a limit to the opening of the ecosystem to the outside world.

After all, in a digital economy, it seems logical for an ecosystem not to refer only to the relationships between its elements, in the territorial context of reference. Instead, it is more likely to consider an ecosystem an 'open' entity, with positive and negative implications. Indeed, on the one hand, when an ecosystem lacks some services that can be found digitally, opening up to a digital and globalized

[1] The concept of ecosystem's functions and roles will be discussed in the next chapter. For the moment, the topic is only introduced.

context becomes an advantage. On the other hand, however, this same opening could cause a loss of value in the ecosystem if not monitored.[2]
Also, it is good to remember that an ecosystem displays the characteristics of both an economic and social system, and it is precisely this need for human sociality that still gives importance to the spatial and, above all, the regional dimension of the ecosystem.
That being said, the author concludes that the definition presented by Stam (2015) and then updated by Kuratko (2017) already represents a complete definition of an EE that summarizes all its characteristics. Thus, we can define an entrepreneurial ecosystem as:

"An interdependent set of actors and factors that is coordinated in such a way as to enable high-growth entrepreneurship in a region."

1.4 Entrepreneurial Ecosystems as Organization: Formal vs Informal, Managed vs Decentralized.

This paper aims to provide more conceptual clarity on the entrepreneurial ecosystem construct. Precisely, it does so with the final goal of expanding the knowledge regarding the development of entrepreneurial ecosystems. To date, whether an entrepreneurial ecosystem emerges or can be created is still questioned.

Thus, by looking for a better conceptualization of the EE construct and by searching the need for governance and management in its definition, the paper aims to set the basis for new research regarding its development and evolution.

That being said, building on the previous results, this last paragraph deals with two main topics: 1) the organizational character of an entrepreneurial ecosystem and 2) the necessity and possibility for management.

The organizational character of ecosystems and the need for management

Labeling entrepreneurial ecosystems as "organizations" is a conceptual extension. Traditionally, an organization is understood as a structured group with defined roles and objectives (Daft, 2015). However, entrepreneurial ecosystems can be conceptualized as a type of meta-organization comprising various interconnected entities like individuals, companies, and institutions. These entities collectively pursue the broader goal of fostering high-growth entrepreneurship (Carayannis et al., 2018; Cavallo et al., 2019). This perspective is justified by the systemic nature of these

[2] Take, for example, digital businesses that receive funds locally but hire staff who work remotely. If this were, for example, an informal practice within the ecosystem, then it would be necessary to monitor it and find Hey Tell Me response mechanisms to avoid the loss of value.

ecosystems. Like organizations, they have stakeholders (entrepreneurs, investors, mentors, etc.), objectives (encouraging innovation and economic growth), and structures (both formal and informal networks).
The key difference, however, lies in their complexity and the decentralized nature of control. Ecosystems are more fluid and dynamic than traditional organizations, with roles and relationships constantly evolving (Stam, 2015; Acs et al., 2017). This viewpoint aligns with modern organizational theories that recognize the importance of networks, relationships, and ecosystems in the business world (Stam and van de Ven, 2021; Kuratko et al., 2017).

However, this also poses some questions regarding its management. Indeed, if an ecosystem has to be decentralized, its success will depend entirely on the actors' ability and will to cooperate with the other actors to produce innovation, entrepreneurship, and knowledge spillovers. Nevertheless, this situation is quite utopian. After all, even in such a situation, considering that the health of the ecosystem depends on the health of all its components, then, as in a natural ecosystem, the actors should be able to constantly monitor what is happening in the rest of the ecosystem, and be aware of what is happening. After all, the goodness of the ecosystem depends also and above all on the maintenance of certain framework conditions.

So, it seems logical that, in reality, an EE needs governance, but above all it needs someone who takes care of the monitoring and maintenance of the "ecosystem" organization: a manager.
However, the task of an ecosystem manager is not simple precisely because of the decentralization of power and the informality of agreements. Therefore, the only way to manage the ecosystem successfully appears to be through a combination of informality and formality, between management and decentralization.

Although these considerations allow new research topics and doubts to emerge, these can be addressed in future research. For the moment, the author limits himself to saying that an ecosystem is an organization, and as a complex organization, it needs management and strategy. This organizational perspective on entrepreneurial ecosystems allows for a strategic approach to their development and management, which is essential for nurturing entrepreneurship and innovation in various regional contexts.

Chapter 2. Towards the Strategic Management of Entrepreneurial Ecosystems.

Introduction

Considering the analysis made in the last chapter, what emerges is that an entrepreneurial ecosystem is an organization that has both formal and informal characters. In order to last over time, it needs either to be managed or all actors to be well aware of their role of responsibility within this ecosystem and not stop playing that role. However, this second option seems somewhat utopian, considering human error and assumed unpredictability.
Therefore, to continue answering the central question of this study – which is to understand "*how to create* and *develop an entrepreneurial ecosystem within a low-growth lagging region of the EU?*" – the next step will be to understand the strategic dynamics that allow us to understand what the steps are to be taken in order to create (or activate) one.

In this regard, the literature has already attempted to define evolutionary dynamics and, at the same time, procedural dynamics in order to operationalize the construct of the entrepreneurial ecosystem.
As far as evolutionary dynamics are concerned, a first group of studies has analyzed them, presenting in some cases a life cycle model and in other cases a conceptualization.
On the one hand, Mack and Mayer (2016) present an adaptation of the industry life cycle, highlighting the change that occurs within the dimensions identified by Isenberg (2010) along each evolutionary stage of the life cycle. In the same way, Cantner et al. (2021) present an adaptation of the industry life cycle but explain that, in the initial stages, one can talk of an entrepreneurial ecosystem and, in the later phases, of a business ecosystem.
On the other hand, Kantis and Federico (2020) try to explain the logic behind the evolution of an EE. In particular, they conceptualize the evolution of EEs as a self-reinforcing process that sees EEs as being constructed and evolving over time, thanks to processes of co-evolution and interaction between framework conditions and five dynamics. Nevertheless, their work seems to leave little space for operationalization.
On their side, Cho et al. (2022) state that the creation and evolution of an ecosystem can be organic (*bottom-up*) and alternately or simultaneously accompanied by the invisible hand of government. In addition, it refers to four emerging research questions in the literature. One related to whether adopting a life-cycle approach or an adaptive system approach to describe an EE's evolution. Another is related to the way in which the boundaries of an EE change as the ecosystem evolves. Another is

related to the governance of evolving ecosystems. Finally, the last one calls for the use of longitudinal methodologies for the study of entrepreneurial ecosystems.
On the other hand, a second group of studies has analyzed the process dynamics of EEs, attempting to explain the underlying logics and create process frameworks (Stam, 2015; Stam and Van de Ven, 2021; Wurth et al., 2022; Wurth et al., 2023).
However, if the first group of studies offered ideas about the possible evolutionary process of entrepreneurial ecosystems, some of them did not do so with sufficient justifying powers. In contrast, others in that group left little room for operationalization in the concepts without linking them to the phenomenon of planning and governance.
Instead, while the second group of studies offered the basis for operationalization, presenting frameworks of entrepreneurial ecosystems, they did not explain the sequential dynamics that would allow us to understand how to create or develop an entrepreneurial ecosystem.

In light of this, a gap remains in understanding how to put together structure and dynamics in order to understand how to create or develop an ecosystem.

Considering these ideas and the speech on the need for strategic governance of an ecosystem, this chapter aims to help define the starting point for creating an entrepreneurial ecosystem.
To do this, the author first proceeds to describe – based on the work of Carayannis et al. (2018) and Stam and Van de Ven (2021) – what are the actors and factors of an ecosystem (operationalizing the latter as the functions of the organization), and the relational mechanisms. Subsequently, a literature review was carried out, which allowed the author to identify more precisely the relational dynamics between actors and high-growth firms and how these relationships occur within ecosystem functions. Finally, the author proceeds to underline some principles useful for the initial phases of an ecosystem-building process.

2.1 Literature Background

As we have already mentioned before, the literature on entrepreneurial ecosystems takes its cue, on the one hand, from the literatures on the Marshallian districts, the learning regions, regional or national innovation systems, triple helix, and clusters (Cooke, 1992; Freeman, 1995; Porter, 1998; Asheim et al., 2011; Ranga and Etzkowitz, 2015), and on the other hand from the literature on the entrepreneurial environments of the 1970s (Birch, 1979; Porter, 1990; Saxenian, 1994). This period marked the beginning of a shift in economic development theories, focusing more on the role of entrepreneurship in regional development. Scholars began to emphasize the interplay of regional economic conditions, government policies, and cultural factors in fostering entrepreneurship. Especially, Saxenian's 1994 research on Silicon Valley and Route 128 analyzed regional cultures and networks, demonstrating how they impact entrepreneurial dynamics.

This literature has made it possible to lay the foundations of some fundamental concepts for entrepreneurial ecosystems. On the one hand, the literature on the triple helix has made it possible to define the actors that have the potential to stimulate innovation in a specific geographical area (Leyerdesoff and Etzkowitz, 2000). On the other hand, theories on business environments have an essential relevance not only to the role of entrepreneurship for territorial development but also to the role of informal institutions in this sense (Dubini, 1989; Granovetter, 1992; Saxenian, 1994).

Therefore, the study of entrepreneurial ecosystems – conceptualized as systems made of elements, relations, and objectives - should start from these antecedents, which tell us precisely what the actors, the factors, and the dynamics are between the two.

Entrepreneurial ecosystem actors

The logics behind the composition of the actors of an ecosystem are rooted in theories that underscore the centrality of knowledge and innovation in economic development. These roots can be traced back to early economic thinkers like Adam Smith and Karl Marx, who explored the roles of labor, capital, and technological change in economic progress. Building on these ideas, Joseph Schumpeter introduced the concept of "creative destruction," highlighting the disruptive yet progressive role of innovation in economic change (Schumpeter, 1934; 1942). Robert Solow and Paul Romer later advanced these ideas, with Solow's growth model emphasizing the impact of technological progress on economic growth (Solow, 1956) and Romer's endogenous growth theory focusing on the role of knowledge creation and innovation in economic development (Romer, 1990). These theories underscore the critical importance of knowledge and innovation as economic growth and development drivers.

After that, the Triple Helix model (Etzkowitz & Leydesdorff, 2000) evolved from this foundation, emphasizing the collaborative dynamics between universities, industry, and government for fostering innovation: a view that has guided the definition of innovation policies in the last two decades.

In the past 20 years, however, the theory has evolved, including other helices and new perspectives from the innovation ecosystem (Adner, 2006) and the entrepreneurial ecosystem approach. Among the last advances is the 'Quadruple Helix' model (Carayannis & Campbell, 2009), which expanded upon this by incorporating the role of civil society, influenced by theories recognizing the significance of social dynamics and public engagement in the innovation process (Carayannis & Campbell, 2009).

In the context of innovation ecosystems, Carayannis et al. (2018) identify several key actors that are central in spurring innovation. These actors include:

1) **Government**: This actor sets the regulatory framework and provides support through policies and funding, influencing the innovation environment.
2) **Universities**: As knowledge centers, universities contribute through research, education, and technology transfer, fostering innovation through academic inquiry and collaboration with industry.
3) **Industry**: Corporations and businesses in various sectors drive innovation by applying new technologies and processes to create marketable products and services.
4) **Civil Society**: This includes non-governmental organizations, community groups, and the public. Their role is increasingly recognized for contributing user perspectives and grassroots innovations.
5) **Environment** (*Quintuple Helix Model*): This actor focuses on ecological and sustainability aspects, integrating environmental considerations into innovation processes.

Although the quadruple helix model has been designed to fit the concept of the innovation ecosystem, the underlying principles allow the use of the same classification for an entrepreneurial ecosystem, with the only precaution being to find within these categories also those groups of actors who are responsible not only for innovation but also for stimulating entrepreneurship. For this study, thus, the author picked the actors among the groups listed above, considering the first three as active members of an ecosystem, and the fourth as a passive member, which will therefore not be included in any analysis.

Entrepreneurial ecosystem functions

As far as the factors of an ecosystem are concerned, the most recent studies start from the work of Isenberg (2010), which has been one of the studies that mainly caused the interest in the literature to explode in those years, parallel to the global diffusion of the interest in startups and startup communities.

He emphasizes ecosystems' self-organizing and self-sustaining nature, suggesting that entrepreneurial ecosystems function similarly, and identifies several key dimensions. These include: 1) the regulatory framework, 2) market dynamics, 3) access to funding, 4) the presence and quality of human capital, 5) a culture that supports entrepreneurial endeavors, and 6) the availability of support services like mentorship and professional networks. Each dimension contributes to the overall health and effectiveness of the entrepreneurial ecosystem, impacting the likelihood of successful entrepreneurship in a given environment.

Starting from this work, as previously anticipated, other researchers have made it possible to better identify the components of an entrepreneurial ecosystem. In particular, for the purposes of this chapter, the author refers to Stam and Van de Ven's (2021) work, which is the most complete and appropriate work. Precisely, expanding on the dimensions given by Isenberg (2010), that study provides a

comprehensive analysis of entrepreneurial ecosystems, a measurement instrument for these elements, and proposes an entrepreneurial ecosystem index. In particular, it explores the interdependence of various elements within these ecosystems, which the researchers identify in: 1) formal institutions, 2) culture, 3) networks, 4) physical infrastructure, 5) demand, 6) leadership, 7) talent, 8) finance, 9) knowledge, and 10) intermediate services.

These elements represent the skeleton of an EE and can be compared - if we see an ecosystem as an organization to be managed - to the set of functions necessary for an organization to achieve its goal. So, for this study, the author looks at these ecosystem elements and talks about them in the text as the "functions" of an EE.

Entrepreneurial ecosystem mechanisms

Finally, considering the structure of the definition of ecosystem, composed of elements - in our case, they are actors and functions - relationships between them, and objectives, and considering that the objective, the actors, and functions of an EE are now known, what remains to be analyzed are precisely the relational dynamics between these actors, within the functions.

In this regard, while a first attempt has been made by Spigel (2017) with his work on the relational organization of entrepreneurial ecosystems – that is also the most cited work in the whole literature – an outstanding work has been done on the topic by Wurth et al. (2023). Indeed, they systematically reviewed empirical studies to understand the mechanisms that intervene in an EE and their impact on entrepreneurship and economic development. In doing so, they identify five key mechanisms that can be summarized as follows:

1) **Interdependence of Elements:** the various elements within an ecosystem, such as institutions, culture, and networks, are interconnected and mutually influential.
2) **Ecosystems and Entrepreneurial Outputs**: given their inherent characteristics, entrepreneurial ecosystems have a natural predisposition to influence the birth and growth of high-growth firms.
3) **Socio-Economic Outcomes**: an entrepreneurial ecosystem is rooted in both an economic and social system and thus impacts the overall socio-economic environment.
4) **Downward Causation and Path Dependencies:** Ecosystems are characterized by path dependencies and downward causation, which describes how the existing structures and conditions of the ecosystem (macro-level) influence and shape individual behaviors and opportunities within it. This dynamic interplay highlights the reciprocal relationship between the elements of an ecosystem and the activities it encompasses.
5) **Links Between Ecosystems:** different entrepreneurial ecosystems can be interconnected, influencing each other. In this regard, transnational and

immigrant entrepreneurs are crucial in connecting and enhancing entrepreneurial ecosystems across different regions and countries. Also, this can be fostered by digitalization, which helps overcome spatial barriers and facilitates greater access to resources.

That being said, these five factors govern the relational logics inside and outside the ecosystem, making us understand, on the one hand, how the ecosystem is characterized not only by an upward causal mechanism but also by a downward one, considering that the actors are mutually interconnected and influence each other; on the other hand, and fundamentally, that the ecosystem is not only guided by economic logics but above all by social ones, which regulate the behavior of the actors from a network perspective.

In light of this, therefore, in order to properly analyze an entrepreneurial ecosystem, it is necessary to look at both economic and social relationships. With these considerations in mind, the work can proceed in the following sections.

2.2 Identification of relevant papers.

To identify the relevant papers, we applied an approach similar to the one used in the previous chapter, with some slight differences.

We developed a systematic literature review, again following Tranfield et al.'s (2003) process, by: 1) planning the review by defining a research protocol; 2) carrying out the review by identifying and selecting the publications to include in the sample based on the criteria of inclusion and exclusion; 3) finally, analyzing in detail the publications included in the sample.

Thus, we replicated the multistage process, again with new slight differences. Like in the previous review, the author chose Scopus over Web of Science or other databases for the same motivations as before (Pranckutė, 2021).

Secondly, concerning the topic selection, the choice was to search for the connection between the actors of the triple helix (Leyerdesoff and Etzkowitz, 2000) and "high growth firm(s)" or "productive entrepreneurship" or "startup(s)," in order to understand how they influence or are influenced by them, by searching thus for the processes of *downward causation* or *upward causation* mentioned earlier, and in what domain/function that interaction should be located. In using and searching for the word startup, the author also critically verified the correct use of the word within the context of reference and excluded all those studies that use the word startup as a synonym for any new company.

Concept	Construct	Definition	Element
Institutions	Formal institutions	The rules of the game in society	Formal institutions
	Informal institutions	Cultural context	Culture
	Social networks	The social context of actors, especially the degree to which they are socially connected	Networks
Resources	Physical resources	The physical context of actors that enables them to meet other actors in physical proximity	Physical infrastructure
	Financial resources	The presence of financial means to invest in activities that do not yet deliver financial means	Finance
	Leadership	Leadership that provides guidance for, and direction of, collective action	Leadership
	Human capital	The skills, knowledge and experience possessed by individuals	Talent
	Knowledge	Investments in (scientific and technological) knowledge creation	Knowledge
	Means of consumption	The presence of financial means in the population to purchase goods and services	Demand
	Producer services	The intermediate service inputs into proprietary functions	Intermediate services
New value creation	Productive entrepreneurship	Any entrepreneurial activity that contributes (in)directly to net output of the economy or to the capacity to produce additional output	Productive entrepreneurship

Table 1. "Constructs of entrepreneurial ecosystem elements and outputs". Source: Stam and Van de Ven (2021).

Moreover, in identifying the role of actors within the ecosystem and the causal mechanisms governing the relationships between actors and elements, the author considered the entrepreneurial ecosystem model by Stam and Van de Ven (2021), as depicted in Table 1.

Industry	("hub" OR "hubs" OR "co*working")	AND	("high*growth firm*" OR "productive entrepreneur*" OR startup*)
Industry	("multinat*" OR "large corp*" OR "corporat*")	AND	("high*growth firm*" OR "productive entrepreneur*" OR startup*)
Industry	(accelerator* OR "incubator*" OR "pre*accelerat*")	AND	("high*growth firm*" OR "productive entrepreneur*" OR startup*)
Industry	("venture capital*" OR "VC*" OR "Business Angel*" OF	AND	("high*growth firm*" OR "productive entrepreneur*" OR startup*)
Industry	(SME*)	AND	("high*growth firm*" OR "productive entrepreneur*" OR startup*)
Government	(government*)	AND	("high*growth firm*" OR "productive entrepreneur*" OR startup*)
Government	(develop* agenc*)	AND	("high*growth firm*" OR "productive entrepreneur*" OR startup*)
Academia	(universit* OR "research cent*")	AND	("high*growth firm*" OR "productive entrepreneur*" OR startup*)

Table 2. Keyword search in Scopus

Thus, the author used the groups of keywords found in Table 2 by decomposing each broad category into subcategories (when applicable).

Category	Sub-Category	Initial Sample	1st Exclusion	2nd Exclusion
Industry	Hub(s)/Co-Working	91	56	18
Industry	Multinational(s)/Large Corporations/Corporat(ion)	592	404	140
Industry	Accelerator(s)/Incubator(s)/Pre Accelerator(s)	448	310	112
Industry	Venture Capital/Busines Angel(s)/Private Equity	645	469	216
Industry	Small and Medium Enterprises	220	130	35
Government	Government	646	446	101
Government	Developmental Agencies	7	0	0
Academia	Universit(ies)	636	385	133

Tab 3. Initial and Final sample after applying exclusion criteria

As can be observed in Table 3, the result was an initial sample of more or less 600 papers per subcategory, apart from the ones related to hubs and co-working spaces, small and medium enterprises (SMEs), and developmental agencies. The first

exclusion criteria was selecting only articles and reviews to avoid repetitions in the sample.

The second phase, then, follows precisely the one done for the first chapter – therefore, the one used by Wurth et al. (2022) – and concerns the application of exclusion criteria based on the journal of publication. For journal selection, the author used the latest 2022 edition of the Scimago Journal Rankings again. Once more, the most relevant journals were selected among the top 25% of journals in the following areas: Business and International Management; Business, Management, and Accounting Miscellaneous; Management of Technology and Innovation; Strategy and Management; Economics, Econometrics, and Finance Miscellaneous; Economics and Econometrics; Geography, Planning and Development; Social Sciences Miscellaneous; and Urban Studies, which results in 741 journals. After excluding the papers published in the journals not present in this last selection, the author reduced the sample by more than 50%.
Then, in the third and last sampling stage, the author proceeded to carefully read the titles and abstracts and select – where possible - the top 5 papers that clearly address the relationship between the actor in the subcategory and high-growth firms, or that explain the role of the actor in the ecosystem. After that, the author proceeded to carefully read the papers in order to be able to define the relation each actor has with HGFs and how these relations fall under a specific function of the ecosystem,

2.3 Actors and their role in functions

In this section, an analysis of the research results – based on the reading of the publications in the sample - is carried out. The author, indeed, proceeds by describing the results for each subcategory, describing for each one which causal mechanism is activated, and reporting this information within the matrix presented below.

Academia

In general, universities are the leading actors responsible for knowledge production and talent, thanks to their threefold mission concerning education, research, and its commercialization. They can act as hubs of knowledge, innovation, and entrepreneurial spirit, impacting startups by providing knowledge spillovers, fostering entrepreneurial mindsets, and facilitating practical support. Conversely, startups offer

Category	Sub-Category	Author(s)	Article Title	Year	Journal
Academia	University	Audretsch (2014)	From the entrepreneurial university to the university for the entrepreneurial society	2014	Journal of Technology Transfer
Academia	University	Audretsch et al. (2005)	University spillovers and new firm location	2005	Research Policy
Academia	University	Åstebro et al. (2012)	Startups by recent university graduates and their faculty: Implications for university entrepreneurship policy	2012	Research Policy
Academia	University	Motohashi (2005)	University-industry collaborations in Japan: The role of new technology-based firms in transforming the National Innovation System	2005	Research Policy
Academia	University	Wright et al. (2017)	An emerging ecosystem for student start-ups	2017	Journal of Technology Transfer

Table 4. Top Articles linking University to High Growth Firms

universities avenues to apply research, enhance their relevance in the modern economy, and diversify the innovation landscape.

So, there are two mechanisms in this case: that of upward causation sees the university having an impact on the ecosystem, providing physical infrastructure, stimulating entrepreneurial culture, creating and disseminating knowledge, and finally facilitating practical support to startups; that of downward causation, which sees startups having an impact on universities' ability to apply their research and expand the possibilities of knowledge spillover.

In this regard, Audretsch (2014) highlights how the university's role has evolved in tandem with economic shifts, from a focus on physical capital to knowledge and entrepreneurship. In the entrepreneurial society, universities are not just sources of technology transfer and knowledge-based startups, but they also play a critical role in enhancing entrepreneurship capital and fostering an entrepreneurial mindset by promoting creativity and freedom of inquiry, influencing various aspects of university life, and emphasizing the broader societal impact of these values. These features imply that universities are now instrumental in creating an environment conducive to entrepreneurial success.
Instead, Audretsch et al (2005) discuss how high-technology startup firms in Germany strategically locate near universities to access knowledge spillovers. It emphasizes that these startups benefit from proximity to universities, leveraging research and human capital spillovers in various fields. However, the nature of these benefits is influenced by specific factors like the type of knowledge and spillover mechanisms. This suggests a mutual benefit where startups gain knowledge and universities potentially influence and collaborate with the surrounding economic ecosystem.

On the other hand, Åstebro et al. (2012) shifted the focus from faculty-led spinoffs to startups initiated by recent science and engineering graduates. It argues that encouraging students and recent graduates to start businesses might be a more effective strategy for universities to stimulate entrepreneurial economic development than focusing solely on faculty-led startups. This indicates a significant impact of university education and environment in nurturing entrepreneurial talents among students.

Motohashi (2005) then, observes that small, new technology-based firms in Japan are increasingly involved in collaborative activities with universities. These collaborations appear to be more productive for smaller firms than larger ones, suggesting a trend where universities are becoming crucial in diversifying Japan's innovation system beyond large corporation-dominated R&D. This represents a reciprocal relationship where startups gain innovation advantages, and universities extend their impact beyond academia.

Finally, Wright et al. (2017) discuss the shift in student entrepreneurship education towards experiential learning and the development of an ecosystem to support student startups. It outlines the need for university mechanisms to facilitate entrepreneurship, involving various actors like entrepreneurs, investors, and support entities. This shows universities' proactive role in educating and practically supporting and nurturing student-led startups.

Government

Government interventions and policies can play a pivotal role in the growth and sustainability of HGFs. This role can take various forms, from providing financial support and technical assistance to acting as a mediator and facilitator in startup development and innovation.

Governments can influence not just the economic viability of startups but also their strategic direction and innovation capabilities.

Category	Sub-Category	Author(s)	Article Title	Journal
Government	Government	Doblinger et al. (2019)	Governments as partners: The role of alliances in U.S. cleantech startup innovation	Research Policy
Government	Government	Giraudo et al. (2019)	Entrepreneurship policy and the financing of young innovative companies: Evidence from the Italian Startup Act	Research Policy
Government	Government	van Winden and Carvalho (2019)	Intermediation in public procurement of innovation: How Amsterdam's startup-in-residence programme connects startups to urban challenges	Research Policy
Government	Government	Zhao and Ziedonis (2020)	State governments as financiers of technology startups: Evidence from Michigan's R&D loan program	Research Policy
Government	Government	Butler et al. (2016)	Public funding for startups in Argentina: an impact evaluation	Small Business Economics

Table 5. Top Articles linking Government to High Growth Firms

Then, the primary mechanism is *upward causation*, with the government having a major impact on the knowledge, network, finance, and services functions.

In particular, Doblinger et al. (2019) emphasize government alliances' crucial role in accelerating innovation in cleantech startups. Government partnerships are shown to significantly boost the patenting activity of these startups and attract private-sector investments. The findings underline the government's role not just in funding R&D but also in directly interacting with startups, thereby enhancing their technological development and market appeal.

Giraudo et al. (2019), instead, explore the effectiveness of different policy instruments to support YICs, using Italy's Startup Act as a case study. They highlight a division of labor between government-guaranteed bank loans and fiscal incentives for venture capital investments. The study shows that these mechanisms cater to different types of startups and that government interventions can have nuanced impacts, including reducing a startup's likelihood of accessing certain types of financial support when they receive others.

Van Winden and Carvalho (2019) analyze a public procurement of innovation (PPI) process involving startups in urban innovation. The government's role here is as an intermediary, fostering conversations and interactions between startups and local government. The program leads to institutional innovations and offers a model for engaging startups in addressing urban challenges, albeit with limitations in more complex settings.
Zhao and Ziedonis (2020) then provide evidence of state government-funded programs' effectiveness in influencing startups' performance trajectories. In Michigan, startups receiving public R&D program funding showed higher survival rates and were more likely to receive follow-on venture capital investments. The impact was particularly notable for younger firms and those outside major entrepreneurial hubs, indicating that government support can be critical in mitigating private market frictions.
Finally, Butler et al. (2016) investigate a policy in Buenos Aires aimed at fostering innovative startups through funding and technical assistance. The findings indicate significant positive effects on enterprise creation, survival, and employment, demonstrating that government policies can effectively assist entrepreneurs in overcoming barriers to firm entry and better allocate their entrepreneurial talent.

Industry – Venture Capital (VC), Business Angels (BA) and Private Equity (PE)

For what concerns the field of professional investors, prima di tutto è da notare che la ricerca presenta soprattutto dati circa i venture capital, e molto meno rispetto ai business angels. Come è facile immaginare poi, tra i paper più rilevanti selezionati non è presente alcuna azienda di private equity tenendo conto il loro tipico interesse ad aziende compra fili di età più avanzati. In general, however, the papers suggest that venture capital firms and business angels can be depicted as active and central entrepreneurial ecosystem members, providing financial support, strategic guidance, market signaling, networking opportunities, and management expertise. However, their involvement can also introduce complexities and inefficiencies, highlighting the nuanced nature of their impact on startups.

Category	Sub-Category	Author(s)	Article Title	Journal
Industry	Venture Capital/Busines Angel(s)/Private Equity	Davila et al. (2003)	Venture capital financing and the growth of startup firms	Journal of Business Venturing
Industry	Venture Capital/Busines Angel(s)/Private Equity	Elitzur and Gavious (2003)	Contracting, signaling, and moral hazard: A model of entrepreneurs, 'angels,' and venture capitalists	Journal of Business Venturing
Industry	Venture Capital/Busines Angel(s)/Private Equity	Nanda and Rhodes-Kropf (2013)	Investment cycles and startup innovation	Journal of Financial Economics
Industry	Venture Capital/Busines Angel(s)/Private Equity	Chang (2004)	Venture capital financing, strategic alliances, and the initial public offerings of Internet startups	Journal of Business Venturing
Industry	Venture Capital/Busines Angel(s)/Private Equity	Gifford (1997)	Limited attention and the role of the venture capitalist	Journal of Business Venturing

Table 5. Top Articles linking Venture Capital firms, Business Angels and Private Equity firms to High Growth Firms

Thus, given the papers examined, the author proceeds to confirm that an upward causation mechanism impacts entrepreneurial (and ecosystem) culture, networks, finance, leadership, knowledge, and intermediate services.

Davila et al. (2003) investigate the association between venture capital presence and the employee growth of startups. They highlight the signaling effect of VC financing on company growth and explore the interplay between growth and the need for VC. The study finds a correlation between startup financial valuation growth and an increase in the number of employees, suggesting that VC investment not only brings in capital but also acts as a positive signal to the market, potentially aiding in further growth.

Elitzur and Gavious (2003) examine the dynamics between entrepreneurs, angels, and VCs, from the seed investment by an angel to the exit stage. The study discusses the equilibrium contracts among these parties and the signaling effects involved. It also addresses the moral hazard problems entrepreneurs and VCs face and notes inefficiencies due to the free-rider phenomenon, indicating the complex interplay and challenges in these relationships.

In their research, Nanda and Rhodes-Kropf (2013) find that startups receiving initial VC investment in hot markets are more likely to fail, yet those that go public are valued higher, have more patents, and garner more citations. It suggests that VCs in hot markets invest in riskier and more innovative startups, indicating that VCs' behavior can significantly influence the nature and risk profile of the startups they fund.

Chang (2004) shows that for Internet startups, the reputation of VCs and strategic alliance partners, the amount of money raised, and the size of a startup's network positively influence the time to an initial public offering (IPO). This highlights the crucial role of VCs in not just funding but also in enhancing a startup's network and reputation, which are key factors in accelerating its journey to an IPO.

Finally, Gifford (1997) delves into the incentives for venture capitalists to maximize profits for both entrepreneurs and the limited partners of a venture fund. It explains

how VCs manage their time and attention between current ventures and evaluating new ones and how their involvement is critical in addressing high-tech startups' management and financial needs. The study underscores the comprehensive role of VCs, which extends beyond funding to include active management and strategic guidance.

Industry – SMEs & Large Corporations

When it comes to other companies and their relation with innovative startups, from the papers analyzed it is evident that the interplay between SMEs, startups, and large corporations centers around innovation and efficiency, with a general *downward causal relationship* that influences the knowledge function and allows companies to stay competitive through innovation. In this sense, the *upward causal relationship* stays in the provision of finance by large corporations through acceleration and venture capital.

Category	Sub-Category	Author(s)	Article Title	Journal
Industry	SMEs	Abbasi et al. (2021)	FinTech, SME efficiency and national culture: Evidence from OECD countries	Forecasting and Social Change
Industry	SMEs	Lingens et al. (2021)	Even a Small Conductor Can Lead a Large Orchestra: How Startups Orchestrate Ecosystems	California Management Review
Industry	Large Companies	Weiblen and Chesbrough (2015)	Engaging with startups to enhance corporate innovation	California Management Review
Industry	Large Companies	Kohler (2016)	Corporate accelerators: Building bridges between corporations and startups	Business Horizons
Industry	Large Companies	Kurpjuweit and Wagner (2020)	Startup Supplier Programs: A New Model for Managing Corporate-Startup Partnerships	California Management Review
Industry	Large Companies	Park and Bae (2018)	When are 'sharks' beneficial? Corporate venture capital investment and startup innovation performance	and Strategic Management
Industry	Large Companies	Huang and Madhavan (2021)	Dumb money or smart money? Meta-analytically unpacking corporate venture capital	Entrepreneurship Journal

Table 6. Top Articles linking either SMEs or Large Companies firms to High Growth Firms

For SMEs, adopting new technology created by startups represents a strategic move towards operational efficiency influenced by cultural factors. On the other hand, with their agility and innovative capabilities, startups offer SMEs opportunities to redefine their roles within the business ecosystem. Large corporations, instead, seem to be leveraging their resources to tap into startups' agility and innovative potential through various models, including corporate accelerators and venture capital investment.

In particular, for what concerns SMEs, Abbasi et al. (2021) analyze a case study in the FinTech industry, showing that financial technologies are linked to improved efficiency in SMEs, with cultural factors influencing this relationship. The study advocates for policies to encourage FinTech adoption by SMEs, suggesting it as a means to enhance efficiency. Conversely, Lingens et al. (2021) report that startups can lead and innovate within ecosystems, affecting SMEs by altering their roles and opportunities within the local networks.

Then, coming at the papers on large corporations, Weiblen and Chesbrough (2015) first report how large tech corporations are incorporating startups' innovations using

various models that emphasize agility over control, suggesting a strategic shift in corporate-startup engagement. Furthermore, Kohler (2016) discusses corporate accelerators (CA) as tools for leveraging startup innovation, emphasizing their careful design to bridge the gap between the entrepreneurial agility of startups and the resource-rich environment of corporations.

Both Park and Bae (2018) and Huang and Madhavan (2021) offer studies on corporate venture capital (CVC) programs. The first shows that CVC investments are most beneficial for startup innovation in the human biotechnology sector when following initial independent VC funding and considers the startup's pre-existing patent stock as influential. The second carries out a meta-analytic study highlighting that CVC creates value for both investing corporations and ventures, with the extent and nature of these benefits varying, suggesting a complex interplay of outcomes.

Finally, Kurpjuweit and Wagner (2020) introduce startup supplier programs as a complementary model to other engagement programs of startups by large corporations such as CVCs and CAs. In their words, startup supplier programs are "[...]*outside-in programs that enable firms to get access to innovations that increase the competitiveness of products or productivity of processes by engaging with startups based upon supplier relationships* [...]".

Industry – Hubs, Incubators, Accelerators, and Pre-Accelerators

Finally, regarding the role of Hubs, Incubators, Accelerators, and Pre-Accelerators, the author excluded all publications that comprised topics already covered in the other sections (so, for example, avoiding selecting publications about corporate accelerators, etc.).

Category	Sub-Category	Author(s)	Article Title	Journal
Industry	Hubs	Angrisani et al. (2023)	Framing the main patterns of an academic innovation ecosystem. Evidence from a knowledge-intensive case study	International Journal of Entrepreneurial Behaviour and Research
Industry	Accelerators, Pre-Accelerators, Incubators	Cohen et al. (2019)	The design of startup accelerators	Research Policy
Industry	Accelerators, Pre-Accelerators, Incubators	Zedtwitz and Grimaldi (2006)	Are service profiles incubator-specific? Results from an empirical investigation in Italy	Journal of Technology Transfer
Industry	Accelerators, Pre-Accelerators, Incubators	Lamine et al (2018)	Technology business incubation mechanisms and sustainable regional development	Journal of Technology Transfer
Industry	Accelerators, Pre-Accelerators, Incubators	Yang et al. (2020)	What signals matter for social startups? It depends: The influence of gender role congruity on social impact accelerator selection decisions	Journal of Business Venturing
Industry	Accelerators, Pre-Accelerators, Incubators	Crișan et al. (2021)	A systematic literature review on accelerators	Journal of Technology Transfer

Table 7. Top Articles linking either Hubs or Accelerators, Pre-Accelerators, Incubators and High Growth Firms

Delving into the analysis, collectively, the papers explore the nuances of how these entities interact with and influence startups and entrepreneurial ecosystems. Most of all, they allow a deeper understanding of how various forms of entrepreneurial support organizations contribute to startups' growth and the entrepreneurial landscape's vitality.

In the field of hubs, Angrisani et al. (2023) analyze a case study and suggest that a technology hub can effectively orchestrate technology transfer, innovation, and entrepreneurial ecosystems, promoting knowledge exploitation from universities to industry. It underscores the role of such hubs in managing the flow of knowledge and supporting startup and spinoff creation, suggesting that such relations can foster collaborative innovation.

Cohen et al. (2019) investigate the structural variation among accelerator programs and relate these differences to theories of entrepreneurial performance. By examining the correlation between program design elements and startup success, the paper suggests a comprehensive framework for future research on the operational effectiveness of accelerators and their impact on venture growth.

Zedtwitz and Grimaldi (2006) categorize incubator types based on their foundational principles and strategic intentions. Through case studies in Italy, it examines how different types of incubators (such as university, regional business, and commercial incubators) deliver and manage their key services, shaped by their competitive focus and whether they are profit-oriented. In parallel, Lamine et al. (2018) discuss the importance of technology business incubators (TBIs) in fostering regional EEs focusing on sustainable development. The study highlights the diverse roles of TBIs, from promoting startups associated with universities to challenges in green technology and their function in linking educational programs with regional economic advancement.

Instead, Yang et al. (2020) apply signaling theory and gender role congruity theory to understand how social impact accelerators (SIA) select startups. The study observes that SIAs favor startups that project strong signals of economic viability and social impact, and it also comments on the interplay between these signals and the gender of the startup founders. Thus, this lets the author infer that, perhaps, this behavior of accelerators can direct the level of communication and knowledge sharing inside the ecosystem.

Finally, Crişan et al. (2021) review accelerators and use a structured analytical framework to dissect the operation and impact of accelerators on entrepreneurship and innovation. It identifies key mechanisms through which accelerators support startups, including idea validation and market access, and calls for more rigorous research to close the gaps in our understanding of their effectiveness.

A holistic view of entrepreneurial ecosystems

Considering these results, the objective of this analysis was not to make a comprehensive review of the entire literature but only to make a general review of the primary roles of the actors within the ecosystem through a critical analysis of the articles.

Another way this operation could have been done would have been to look for the impact of each actor in the ecosystem within a specific function (to be identified, as we said before, in the different elements identified by Stam and Van de Ven, 2021).

However, such a methodology has not been used because, in any case, as Wurth et al. (2023) also report, an ecosystem cannot be understood simply by analyzing individual actors or individual bidirectional relationships between pairs of actors since its complexity is far greater.
Indeed, a complete analysis would be to study hyper-complex, multi-level, and multi-dimensional relationships (Carayannis et al., 2018). It would, therefore, be a matter of analyzing a relationship between two actors and how this relationship impacts the rest of the ecosystem.
Starting from the fact that, however, these studies have not already been done, it is clear that, in any case, such an option would still be too complex from a strategic point of view. It is, therefore, necessary to reduce the complexity in this regard.
This can be done by building on some key points of the definition, particularly on the final output. Indeed, the previous chapter and the clarification of the definition precisely served this purpose: to provide the author with a clear and solid tool to set up all subsequent research work.

This is why the selection was made by imagining the reciprocal relationships that an actor and an HGF can have to monitor within which function (or domain, or element) of the ecosystem these relationships have an impact. Analyzing this relationship allows us to understand the main relational nodes, in terms of *upward causation* and *downward causation*, between an actor and HGFs within each ecosystem function. The results are reported in the following table (Table 8).

	Institutions			**Resources**						
	Formal Institutions	Culture	Network	Infrastructure	Finance	Leadership	Talent	Knowledge	Demand	Intermediate Services
University										
Industry										
VCs, BAs										
ACCs, INCs										
SMEs, LCs										
Government										
Primary Role										
Secondary Role										

Table 8. Upward Causation of Ecosystem actors on HGFs along the different functions

At first glance, the prevalence of each actor's impact on the network function can be seen. Moreover, this confirms the entrepreneurial ecosystem's systemic and social character (Granovetter, 1992). Next, the demand and leadership functions are the least covered when looking at the relationship between actors and HGFs.

This allows the author to justify the main feature of the entrepreneurial ecosystem, which is to enable high-growth companies. Therefore, it is logical that there is no significant influence on the direct demand for products and services of HGFs; in fact, the only categories of actors that represent clients for these companies are SMEs and large firms.

When looking at the other functions, the finance and support services functions are the ones that are most populated after the network one: this, indeed, also justifies the fact that, in order to grow quickly in an uncertain context, HGFs need financial resources and technical and professional support.
On the other hand, the talent and knowledge functions assume a medium relevance within the ecosystem, considering that HGFs are also producers of knowledge and innovation.
Finally, if the formal institutions' function - not described in any of the articles analyzed but implicitly linked to the government – is not considered, the last two functions that are least affected are those of culture and infrastructure.
However, the author supposes that the lack of references in this regard is caused by the fact that the review was based on a small number of articles.

2.4 Towards the Strategic Management of Entrepreneurial Ecosystems

Considering the research work carried out, and to offer a strategic path for the development of entrepreneurial ecosystems, the literature of management, particularly strategic management, can help define the phases of strategic management.

1) *The need for management, the Ecosystem "Act," and the birth of a new ecosystem actor: the Ecosystem Manager*

As is evident to management scholars, and as we said earlier in chapter one, the need for management arises when an organization becomes highly complex (Drucker and Maciariello, 2008).
However, in the context of entrepreneurial ecosystems, identifying the need for management is challenging, considering the difficulty of conceptualizing the ecosystem as a formal or informal organization.
In the previous chapter, however, the author proposed that the ecosystem, in order to be such in the long run, needs a formalized structure. Therefore, as in the case of the creation of a company, the author proposes that the first step needed to proceed with the definition of ecosystem development strategies would be that of 'signing' an '*Ecosystem Act*' or '*Ecosystem Deal*' with clear, strategic goals and a 'board of directors.'
This intentional act allows the consolidation of the relational essence of the ecosystem, thus empowering the actors to contribute to performance in the long term.

However, at this point, a question arises: *who should be responsible for managing the ecosystem?* Indeed, given the complexity, this role could not be assigned to a single person but rather to an organization.
Different researchers have discussed the possibility of assigning the " orchestrator " role to different ecosystem actors.
However, considering Table 8, which allows us to see what the areas of specialization of each actor within the ecosystem are and that each actor in the ecosystem has its

own objectives and needs, it seems inappropriate at this point to assign to one of the three main actors of the ecosystem the role of ecosystem leader and manager.

Therefore, there is a need to create an external organization called the '*Ecosystem Manager*,' which is chosen or created democratically by the ecosystem actors and which contains within it all the professionalism necessary to be able to coordinate the different functions of the ecosystem and to monitor their progress, in order to achieve the ultimate goal: enabling productive entrepreneurship.

2) Proposal of a strategic process of entrepreneurial ecosystem

At this point, leaving aside the answers to questions such as "*What activity should such a manager carry out with respect to each actor in the ecosystem*?" or "*Is there any actor that an ecosystem manager should privilege*?" which will be the subject of future research, the first step from a strategic point of view is that to define a process to define strategy. Given the limited amount of data and research available, however, for the purposes of this study, the author used a simple strategy definition model based on an identification phase, a strategy definition and formulation phase, and an implementation and monitoring phase.

a. Ecosystem Actors' Mapping

The first step in defining a development plan will, therefore, be identifying and mapping the representations of the actors and functions within the ecosystem analyzed.

Therefore, the first step will be to identify the high-growth companies and the players that fall within the categories listed above. In this regard, it is crucial to consider the importance of the network. In fact, the formal communities of an ecosystem also represent an entity, considering that formally established communities (in the form of trade associations, for example) have the potential to play a dealmaker role, helping to strengthen and consolidate the relational dynamics within the ecosystem.

b. Ecosystem Elements' Assessment

The second phase of defining a strategy for the development of an ecosystem would need a two-step approach: 1) in the first step, the goal should be that of assessing the state of health of the ecosystem through an analysis of its elements (Stam and Van de Ven, 2021); 2) in the second step, proceeding into a deep evaluation of both the actors' capabilities and possibilities to engage in entrepreneurship and innovation enabling (and exploiting) mechanisms, and the industrial specialization of the region. Given the twofold nature of ecosystems (social and economic), in this phase, particular attention should be put to the social and economic perspectives of every actor and function. In this phase, a hierarchical definition of the priorities in terms of resources, institutions, and actors' capabilities improvements should also be carefully considered.

c. *Ecosystem's Strategy Definition and Execution*

While the first and the second phases left space for intuition, this last stage leaves space for many doubts. Indeed, if we think of strategy as a response to a challenge/criticality, the first part of defining it should be that of defining short-term and long-term goals, key performance indicators to assess progress, and also to define roles in this regard. However, as mentioned in the previous chapter, while the governance question is intuitive, it is still challenging to imagine an act of responsibility for a function in an ecosystem.

Indeed, as mentioned before, economic agents have their own goals and aspirations, and thus, it would hardly be possible for them to be responsible for any of the functions as a whole. However, that is the challenge of the ecosystem manager: to have actors fulfill a function collectively without them being responsible for it.

That being said, as simple as this perspective on the strategic management of entrepreneurial ecosystems can be, it offers a starting point for their development and long-term sustainability.

Chapter 3. Developing Entrepreneurial Ecosystems in Low-Growth Lagging Regions of EU: The Role of Cultural Change

Introduction

In the last chapters, the author proceeded to demonstrate that ecosystems, as organizations, can and should be managed and that, to learn how they evolve, we first need to have a deep understanding of the underlying logics and the conditions necessary for them to exist.

Building on the previous literature, the author already defined ecosystems, their components, and logics and proposed a strategic path for their development that builds on the intersection between structure and dynamics.

Now, coming at the end of this thesis, it is possible to go back to the initial question, that is: "*How do we develop entrepreneurial ecosystems in regions that show problems of stagnant growth and lack the necessary conditions to activate an ecosystem?*"

In this regard, an exemplary case of these regions is that of the lagging regions of the European Union, particularly the ones experiencing extremely low growth. Low-growth lagging regions, especially in Southern Europe, face challenges that go beyond low productivity growth. They exhibit declining employment rates annually, with job creation lagging behind productivity gains, unlike 'low-income' and 'nonlagging' regions. (Farole et al., 2018) These areas also struggle with low levels of innovation, reflected in limited R&D spending and patent registrations. The absence of higher education institutions hampers knowledge spillovers and innovation. Furthermore, low skill levels contribute to a lack of foreign investment in R&D, creating a negative cycle. The labor market issues, exacerbated by the 2008 crisis, also result in low activity rates, high long-term unemployment, and elevated youth unemployment, posing long-term economic and social issues (Brown et al., 2017)

Among those regions, extremely low-growth ones are those with Gross Domestic Product (GDP) per capita growth of less than half of the EU average between 2000 and 2018. They can be classified into two types: divergent regions, which have low GDP per capita and very low growth (e.g., some regions in Greece, Italy, and some parts of Spain, Belgium, and Ireland.), and richer regions, which, despite being wealthier, experience very low growth (e.g., Brussels-Capital Region, Groningen in the Netherlands, and northern and central Italy) (European Commission, 2017b).

Over the years, the European Union has tried to invest in these regions to enhance entrepreneurial and innovation development through various development policies such as RIS3 – Smart Specialization Strategies. However, in many of these contexts – such as Italy's Mezzogiorno, which is the worst-performing of extremely-low-growth

regions (European Commission, 2017a) - these policies did not result in bringing (Farole, Goga, & Ionescu-Heroiu, 2018) any growth on the long term (European Commission, 2017a).

Moreover, as already anticipated by others (Mason and Brown, 2014; Wurth et al., 2022), the deficit of these development policies, which were intended to bring economic growth within the selected regions through innovation, is twofold.

In fact, first of all, ignoring a systemic (or ecosystem) vision of the dynamics of regional development, these strategies have tried to address the problem of economic growth by intervening only on the dimensions of support, capital, policy, and, sometimes, talent, totally ignoring the issue of informal institutions. Secondly, in addressing the problem by intervening in those dimensions, the strategies did so in isolation. Each intervention was thought of as an intervention in itself and not in strategic connection with other interventions on the other dimensions (or functions) of the ecosystem (Mason and Brown, 2014).

Therefore, especially in the case of a lagging region, trying to restart growth cannot be separated from considering institutional, and therefore social and cultural, logics.

Nevertheless, clarification needs to be made in this regard. If, hypothetically, the typical actors of an ecosystem within a given geographical area had the enabling culture and a level of knowledge sufficient to be capable of following the logics that allow an ecosystem to exist, then any regional development policy aimed at intervening in the dimensions (as identified first by Isenberg, 2010; and then by Stam, 2015), would work.

This is because, in any case, the actors would respond by maximizing the use of resources according to co-creative and co-evolutionary logics. However, if, on the other hand, the typical actors of an ecosystem in a specific geographical area do not follow either the enabling institutional logics, nor do they have an adequate level of knowledge that allows them to perceive the convenience of ecosystem logics, then any development policy that does not follow an ecosystem approach and does not lead the actors to follow it, can only have results that tend to the dispersion of value in the long term.

It can, therefore, be deduced that in regions such as those in the European Union that are experiencing extremely low growth, the most appropriate option to be able to start processes of ecosystem development would be to first use a multi-actor and multi-stage approach, starting from processes that mix the improvement of the quality of the ecosystem resources (as defined by Stam and Van de Ven, 2021) with the inclusion of institutional logics that favor the development of the ecosystem, and especially those related to entrepreneurship and innovation development (Urbano et al., 2019).

Especially, on the basis of the work done in the previous chapters, it seems logical to think that, in a situation of stagnation, depopulation, job destruction, and low productivity, productive entrepreneurship can be helpful in reestablishing growth. (Baumol, 1990). Considering, therefore, the need to increase the number of high-

growth firms (HGFs) in the region and the inability of past entrepreneurship and innovation support policies to help existing enterprises grow and foster the creation of new HGFs locally, the objective of new development policies should be twofold: to make existing enterprises more innovative, and to promote the creation of new innovative enterprises, following strategies based on economic, socio-cultural, community-based and discursive factors (Roundy, 2019).
In this sense, there is plenty of research focusing on the processes that help foster innovative entrepreneurship at the local level – tracing back to the literatures on the Marshallian districts, the learning regions, regional or national innovation systems, triple helix, and clusters (Cooke, 1992; Freeman, 1995; Porter, 1998; Asheim et al., 2011; Ranga and Etzkowitz, 2015) – and the processes that stimulate new venture creation – that can be found for example in the realms of entrepreneurial education, incubation, acceleration programs (Grimaldi and Grandi, 2005; Kuratko, 2005; Rothaermel et al., 2007).
However, considering the composition of an entrepreneurial ecosystem and what has been said in the previous chapters, we can affirm that said processes aimed at stimulating innovation and entrepreneurship development are not enough to create a self-sustaining system – or at least not if the underlying culture (and, therefore the institutional logics of said region) is not enabling for entrepreneurship and innovation. In fact, in the presence of an adverse culture, attempts to stimulate the growth of companies and the creation of new innovative companies can generate very unsatisfactory results (Mueller, 2001; Isenberg, 2010). Having said that, then, considering the discourse in the last paragraph of the previous page, it seems logical to assume that the extremely low-growth regions of the European Union do not present an enabling culture. The action that will be necessary, then, will be precisely that of carrying out a process also called *economic gardening* (Grace, 2012), which in this case will have to deal with starting a process of cultural change, necessary to be able to spread a culture that is an enabler of entrepreneurship and innovation.

In light of this reasoning, therefore, some questions emerge: 1) the first concerns with the type of culture that is linked to entrepreneurship and a person's innovative and entrepreneurial impetus; 2) the second question is, and above all, what are the logics that govern a person's choice in this sense; 3) the third, finally, concerns with the processes that allow inserting these logics within a context that does not adopt them. For the purpose of this study, and since the first question is still debated in the literature, we will answer only the second and the third ones.

That said, to answer these two questions, the chapter is organized as follows: 1) the first paragraph describes the cultural issues related to the phenomenon of entrepreneurship and innovation. In particular, reference will be made to the theories and facts that link the cultural problem to the phenomenon of business development and innovation; 2) the second paragraph, on the other hand, will deepen what was analyzed in the first paragraph, focusing on the concept of agency and describing how

it is possible to stimulate a person's sense of agency. 2) Then, the third chapter will present a proposal for the process of grafting an enabling culture for the ecosystem through an adaptation of Rogers' (1962) model of diffusion of innovations. 4) Finally, the chapter closes with the conclusions and recommendations for future research.

3.1 The intersection between social system, culture, and entrepreneurial behavior: theories and facts

Entrepreneurial behavior explains how people spot and use opportunities to start and grow new businesses (Bird and Schjoedt, 2017). Thus, understanding what composes entrepreneurial behavior and what influences it can help us predict the creation of new ventures in an environment. That is, entrepreneurial action.

Among the early works on entrepreneurial behavior, Krueger and Carsrud (1993) propose that (planned) behavior is strictly connected to entrepreneurial intentions, which are the most reliable predictors of entrepreneurial action and, in turn, can be influenced, together with their attitudes, by exogenous factors. It is the case, for example, of entrepreneurial education (Izquierdo and Buelens, 2011), which can help develop entrepreneurial intentions and consequent action by having an impact on self-efficacy: the relation between the perception of self-ability to start a venture and the intentions to do it (McGee et al., 2009).

It is also the case for entrepreneurial culture (Morrison, 2000), which is said to have a positive impact on national and local economies (Baumol, 1968; Hayton & Caciotti, 2013; Kleinhempel et al., 2022). According to the entrepreneurial ecosystem construct, culture is part of the informal institutions of an entrepreneurial ecosystem that holds the system together, encompassing beliefs and attitudes towards entrepreneurship. However, cultural attributes can influence entrepreneurial intentions and orientation in many ways, both positively and negatively, especially by being able to normalize entrepreneurship (Spigel, 2017; Stam and Van de Ven (2021) or to discourage it, as suggested by Mueller and Thomas (2001). In this sense, when talking about the relational organization of entrepreneurial ecosystems, Spigel (2017) mentions both the cultural attributes and the social attributes, confirming the prevalence of the role that institutional logics have on the whole ecosystem.

In particular, he builds an argument that explains both the relevance of culture and the relevance of personal and professional networks. Concerning the latter, he focuses on a few mechanisms that impact entrepreneurship and innovation development in a region, of which we report a few (i.e., the ones related to culture and education): 1) knowledge and opportunity transmission; 2) development of entrepreneurial skills and mindsets; 3) the role of mentors and dealmakers, which provide guidance and connections – and thus having the potential to impact culture; 4) skilled workers, both technical and managerial, which are vital for high growth

firms – but at the same time contribute to upgrading the culture of a specific place, by simply living in it.
It is, therefore, clear that if, in order to be able to stimulate the entrepreneurial and innovation culture within an ecosystem, it is necessary to intervene in the entrepreneurial intentions and self-efficacy of a person, on the other hand, this task can be carried out by a multiplicity of actors and be conditioned by a multiplicity of factors. This conditioning, in fact, is related to the path-dependency mechanisms (Wurth et al., 2023) of EEs that are both social and economic.

In this sense, we are in the realm of the Actor-Network-Theory (ANT) (Latour, 1996), which originated in the early 1990s in Science and Technology Studies (STS). ANT is based on material relationalism or material semiotics, advocating for the treatment of all entities (e.g., human, nonhuman, natural, social) as potential actors in a network. It challenges traditional distinctions between subjects and objects, posing that both human and non-human actors (such as technologies and objects) play crucial roles in shaping social networks and outcomes.
Therefore, it is precisely within this theory that we can find the relational logics that exist within an entrepreneurial ecosystem, which can allow us to understand how to change the fate of a territory.

3.2 Agency, constraints, and entrepreneurial action

Going back to the initial problem of the lack of entrepreneurial culture and the lack of willingness and predisposition on the part of the population within an ecosystem to create new businesses and, above all, to innovate, we have seen that these dynamics are linked to the concepts of entrepreneurial intentions (Krueger and Carsrud, 1993) and self-efficacy (Bandura, 1977).

In this regard, it should be noted that the ANT theory is closely linked to the concept of self-efficacy. In fact, if, on the one hand, ANT offers a comprehensive view of the intricate networks and interactions within social systems and how social networks can be shaped, self-efficacy theory delves into the individual's belief in their capability to execute behaviors necessary to produce specific performances.
Therefore, the application of the ANT theory to be able to reduce the perception of *constraints* in an individual and increase their self-efficacy can represent a way to induce entrepreneurial behavior and generate the acquisition of an entrepreneurial culture in the population.

Understanding Actor-Network, Self-efficacy, and Social-Diffusion mechanisms

ANT, indeed, presents a framework where both human and non-human actors are seen as equally potent in forming networks that influence social outcomes. It emphasizes the material-semiotic nature of these networks, suggesting that all entities, whether people, objects, or concepts, play active roles in these networks. ANT

challenges traditional dichotomies, viewing networks as dynamic and ever-evolving rather than static channels between predefined nodes (Latour, 1996).
Long (1997) describes how the relationships between actors happen in two main settings: *domains* and *arenas*. Domains are defined as areas of social life organized by interlocking practices and values, recognized as loci of certain norms and values. In the sphere of entrepreneurial ecosystems, these would be called "institutions" (Urbano et al., 2019). Arenas, on the other side, are social encounters or situations where contests over resources, values, and representations take place. These are spaces where actors confront each other, mobilize social relations, and deploy discursive and cultural means to achieve specific ends.
If ANT focuses on the role of networks in shaping the social relations inside domains and arenas, on the other hand, self-efficacy focuses on the individual's perception of their ability to perform actions effectively (inside these settings). Research demonstrates that higher levels of self-efficacy lead to greater confidence in one's abilities, resulting in more effective action and perseverance in the face of adversity. This theory is grounded in cognitive processes, where beliefs about personal capabilities significantly impact behavior and performance (Bandura, 1977).
In this regard, Bandura (2019) explains how the logics of social diffusion through media coverage can influence behavior. Especially, recent research on the topic (Ye et al., 2021) confirms that individual behaviors can influence social diffusion, and specifically, two behavioral mechanisms have a role in this. It is the case of *inertia*, seen as the preference to stick with current decisions, and *trend-seeking*, which is the sensitivity to population-level changes. In particular, they demonstrate how individual-level mechanisms significantly impact the collective pattern of social diffusion, showing that diffusion can be delayed by inertia but become explosive due to trend-seeking once it begins.

In the context of entrepreneurial ecosystems, *inertia* could represent resistance to adopting new entrepreneurial norms or to engaging in entrepreneurial action. At the same time, *trend-seeking* aligns with the tendency to adopt new practices as they become popular or successful within a network, such as the development of innovation and the creation of new ventures.
Considering this reasoning, in order to solve the dilemma of the emergence of an entrepreneurial culture in territories where it is not present, it may be appropriate to try to work on these two psychological and social mechanisms. This, precisely, could be done through the use of practices that intervene in the generation of new trends that have as their object the development of innovation and the creation of businesses. This will be discussed in the next section, in which a model for the dissemination of entrepreneurial culture is presented.

3.3 Setting the base of Entrepreneurial Ecosystem Building in culturally adverse places

In this chapter, we clarified the relevance of informal institutions for the creation of an entrepreneurial ecosystem, explaining that, even in the presence of investments in resources (as contextualized in the model of Stam and Van de Ven, 2021), the absence of an enabling entrepreneurial culture prevents the ecosystem from being born (or activated).
In order to understand how to create an enabling entrepreneurial culture, therefore, we have referred to the theories of entrepreneurial intentions (Krueger and Carsrud, 1993), self-efficacy (Bandura, 1977), actor-network theory (Latour, 1996), explaining the need to intervene on the one hand on the mechanisms of *agency* and *constraint* (Long, 1997), and on the other hand on the mechanisms of *inertia* and *trend seeking* (Ye et al., 2021).

However, to find the appropriate framework to use in this regard, we must consider that the final goal is still that of creating an entrepreneurial ecosystem. Indeed, in the previous chapters, we have shown how an entrepreneurial ecosystem should maintain its characteristics over time; otherwise, we could call it a "system." In particular, in this chapter, we have shown how an entrepreneurial culture and the will to create new businesses are fundamental and necessary characteristics for the existence of an entrepreneurial ecosystem. In light of this, the issue of entrepreneurial culture needs to be crucially addressed over time.

Based on this, therefore, to adopt and apply the theories presented in this section and the previous one and generate a long-lasting entrepreneurial culture in a territory, it is necessary to adopt an approach that: 1) on the one hand, allows to generate a trend-setting mechanism, 2) on the other hand allows it to be maintained over time.

The "Diffusion of Innovations" model and Entrepreneurial Culture

A particularly appropriate model is Rogers' (1962) model of diffusion of innovations (DOI). In simple terms, the model explains how, over time, an idea or product gains momentum and spreads within a social system. The key elements of this model include: 1) the innovation itself; 2) communication channels; 3) time, and 4) the social system. In particular, the model identifies five categories of adopters, namely *innovators*, *early adopters*, *early majority*, *late majority*, and *laggards*, all represented in the social system in different percentages.
The model seems to be in line with the theories presented above and suitable to be applied for our purposes, as it shows how each group of actors adopts the innovation at different stages, influenced by factors like social norms, peer pressure, and perceived benefits or barriers. Particularly, the model emphasizes the role of key individuals and communication in the spread of new ideas.

All these characteristics, in fact, seem to fit perfectly with what has already been said by other researchers about the cultural and institutional issue of entrepreneurial ecosystems (Spigel, 2017; Urbano et al., 2019; Stam and Van de Ven, 2021).

That being said, in order to be able to apply this model to the issue of entrepreneurial culture in entrepreneurial ecosystems, it is necessary to integrate the perspectives of ANT, self-efficacy, social diffusion, and an entrepreneurial ecosystem's structure and dynamics inside the model.

First, regarding the innovation element of the model, in the case of adaptation of the DOI model to entrepreneurial ecosystem development, innovation would consist of *the local entrepreneurial culture* and *the creation of high-growth firms*. Although the DOI model is mainly used for the development of high-growth companies (and, thus, to monitor how an innovative product fits into the market), it is also designed for the dissemination of ideas.

In this regard, if we look at the strategic side of entrepreneurial ecosystems, and thus at the democratic view of its governance, this aspect should be defined by diverse actors (educators, policymakers, entrepreneurs, media), which should collaboratively define and develop the concept of entrepreneurial culture to be spread in the ecosystem.

Second, for what concerns the communication channels, which have to be intended as the means by which information about the innovation is transmitted among members of a social system (Rogers, 1962), in the case of entrepreneurial ecosystems these might be slightly different.

Starting from the concepts of *domain* and *arena* (Long, 1997) typical of actor-oriented theories, indeed, the channels for such an operation should be constituted not only the offline and online tools of direct communication, but also the places where these communications take place. Thus, considering the network-based nature of entrepreneurial ecosystems (Spigel, 2017) and the culture-based and media-based nature of the public in entrepreneurial ecosystems (Carayannis et al., 2017), we will have two main mechanisms of communication, namely: *networking and community engagement,* and *communication through media* (different types).

a) *Networking and Community Engagement*: Through networking events, workshops, and community programs, the principles of entrepreneurial culture are disseminated. These events act as platforms for sharing knowledge, resources, and encouragement.
b) *Communication through media*: Media plays a crucial role in highlighting the benefits and successes of adopting an entrepreneurial mindset, thus motivating a broader audience to engage with this culture.

Applying those changes to the DOI model can have a long-term impact on the development of an entrepreneurial ecosystem. Indeed, if, on the one hand, using a social diffusion model can help influence a population's entrepreneurial behavior in the long-term and thus ensure that the entrepreneurial culture persists in the ecosystem, on the other hand, such a process also reinforces the links within the ecosystem, by enhancing the engagement of all actors in relations that need to be activated during the whole process.

Conclusions

The goal of this dissertation was to explore and deepen the understanding of entrepreneurial ecosystems, with a specific focus on low-growth lagging regions within the European Union. In particular, the research stems from a central question that was unanswered in the literature: "*How is it possible to create an entrepreneurial ecosystem in low-growth lagging regions of the EU?*"

To answer this question, the author developed three chapters: the first one to provide a more precise conceptualization of the term "entrepreneurial ecosystem" by means of a Systematic Literature Review and, finally, find a justification for the use of one or another definition. In that same chapter, he looks at ecosystems as organizations and proposes that, as with every organization, an entrepreneurial ecosystem needs management and managers.

The second chapter, instead, explores the application of strategic management literature to entrepreneurial ecosystems. Building on the previous chapter, which recalls the need for management in complex organizational structures, such as entrepreneurial ecosystems, the chapter outlines the initial steps toward creating a strategic framework for their development. Among the main discussions, the chapter acknowledges the complexity of entrepreneurial ecosystems and the difficulty in conceptualizing them as formal or informal organizations. It proposes the idea of an "Ecosystem Act" to formalize the structure of these ecosystems, emphasizing the need for clear goals and a governance body. These discussions led to the introduction of the concept of an "Ecosystem Manager," an external organization created democratically by ecosystem actors that is responsible for coordinating different ecosystem functions and monitoring progress toward enabling productive entrepreneurship.

Finally, it introduces a proposal for a strategic process needed for ecosystem development that has three main stages: 1) ecosystem actor's mapping; 2) ecosystem element's assessment; 3) ecosystem's strategy definition and execution. The thesis ends by highlighting the challenge for the Ecosystem Manager to facilitate actors in fulfilling ecosystem functions collectively, without direct responsibility.

The third chapter, instead, has examined the issue of the development of entrepreneurial ecosystems in low-growth lagging regions of the EU, with a focus on the role of cultural change. An essential element of this discussion is the concept of entrepreneurial intentions (Krueger and Carsrud, 1993), which explains the propensity of individuals to engage in entrepreneurial activities. Without a significant level of entrepreneurial culture and a rate of high-growth firms among the population, efforts to stimulate these ecosystems might not achieve their full potential. Considering this, enhancing entrepreneurial intentions becomes fundamental to

fostering a virtuous cycle of new high-growth firm creation and thus allows the emergence and sustenance of entrepreneurial ecosystems.

Based on this, and the connection between entrepreneurial intentions, the self-efficacy of individuals (Bandura, 1977), and the essence of entrepreneurial ecosystems (Kuratko et al., 2017), thus, the application of Actor-Network Theory (ANT) provides a deeper understanding of the intricate networks and interactions that shape these ecosystems. Specifically, ANT (Latour, 1996) offers insights into the complex dynamics between human and non-human actors and how these relationships influence the development of entrepreneurial culture. Especially, Bandura (2019) explains how this influence can happen through a process of social diffusion, through media coverage. Building on this, and on the two psychological mechanisms of *inertia* and *trend-seeking* presented by Ye et al., (2021), the author proposes the adaptation of the diffusion of innovation model (DOI) (Rogers, 1962) to the issue, as its adaptation can offer a strategic approach to understanding and enhancing the spread of entrepreneurial norms and practices within these ecosystems. The DOI model, indeed, offers a perspective on the mechanisms through which new ideas and behaviors are adopted, highlighting the importance of communication channels, social systems, and time.

Theoretical implications

For academics, the chapter expands on the literature regarding the development of entrepreneurial ecosystems, its relational dynamics, and its evolutionary mechanisms. In particular, then, through the clarification of the definition, it allows you to have no doubts about the use of one definition or another. As far as the actor-factor matrix presented in the second chapter is concerned, it allows us to offer a starting point for studying the mix of relationships of an ecosystem. In addition, the connection between entrepreneurial ecosystem governance management opens new research avenues. Finally, the use of a model for the dissemination of entrepreneurial culture is an original novelty that gives prevalence to the informal character of the ecosystem.

Managerial implications

For managers and policymakers, the work offers a rich source of strategic insights and practical approaches to developing and managing entrepreneurial ecosystems, particularly in regions that are not traditionally known for high levels of entrepreneurial activity.

It highlights the importance of cultural elements and provides a comprehensive framework for understanding and influencing the dynamics of these complex systems. For managers, particularly those in organizations that play a pivotal role in entrepreneurial ecosystems, this thesis provides a strategic framework. This framework can guide them in understanding and enhancing their role within the ecosystem, focusing on fostering a conducive environment for entrepreneurship.

Moreover, the emphasis on the role of cultural change in developing entrepreneurial ecosystems is particularly relevant for policymakers. It suggests that before attempting to foster entrepreneurship and innovation in a region, there should be a focus on cultivating a solid entrepreneurial culture. This is a critical insight for regions that are lagging in terms of growth and are looking to stimulate economic development. In this regard, the Actor-Network Theory (ANT) and the Diffusion of Innovation (DOI) model offer a novel approach for both managers and policymakers. For managers, understanding these models can aid in strategizing business practices and innovation processes. For policymakers, these theories provide a lens through which to view the propagation of entrepreneurial norms and practices, aiding in the formulation of effective policies.

Limitations

Despite its contributions, the dissertation clearly shows some limitations.
First of all, while the work introduces new concepts like the Ecosystem Act, Manager, Strategic Planning, and a new perspective on cultural change processes, the conceptual nature of the study might weaken the robustness of the research.

Also, many unsolved questions in the literature prevented the author from expanding on those new concepts, thus making the contribution less powerful. Indeed, while the dissertation emphasizes the need for governance in EEs, it does not extensively explore the specific policy measures and governance structures that are most effective in fostering entrepreneurial activity in lagging regions. Further research could investigate the roles of various governance actors (e.g., government, academia, industry, and civil society) and policy instruments in nurturing EEs, particularly in the context of cultural change and regional development.

Since the study is directed toward extremely low-growth lagging regions of EU, almost no data is available regarding the new ecosystem metrics introduced by Stam and Van de Ven (2021), so no evaluation of an ecosystem's health could be possible for these regions. Such an issue prevented the work to have any quantitative character.

Also, the dynamic and evolving nature of EEs means that the framework proposed may require adaptation as new insights emerge from both academic research and practical experiences in fostering entrepreneurship and innovation in lagging regions. Especially, since there is no longitudinal study regarding an EE's evolution, all the process theories are less reliable. Longitudinal studies, indeed, would be needed to understand how EEs adapt and change, and how these changes affect their capacity to foster entrepreneurship and innovation.

Finally, the dissertation suggests cultural change as a pivotal element in cultivating EEs in lagging regions but does not delve deeply into how to operationalize and measure cultural change. Future research should explore methodologies and indicators for assessing cultural change within regions and its direct impact on entrepreneurial activity and ecosystem health.

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