Private entrepreneurial support organizations in European fintech entrepreneurial ecosystems

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Private entrepreneurial support organizations in European fintech entrepreneurial ecosystems

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Abstract

The importance of Entrepreneurial Support Organizations in promoting the development of Entrepreneurial Ecosystems is well recognized in the literature. Surprisingly, no research has addressed how governments can promote the emergence of *Private* Entrepreneurial Support Organizations in parallel with *Public* ones. Using the European FinTech Entrepreneurial Ecosystem as an empirical setting, we investigate through a Qualitative Comparative Analysis which enabling factors the government can intervene on to foster the development of *Private* Entrepreneurial Support Organizations. We then determine how much the same factors can influence the availability of such programs through a Poisson fixed effects model. The results suggest that *Private* Entrepreneurial Support Organizations are consistently present in regions with a combination of enabling factors that are conducive to market competition. Policies aimed at simultaneously increasing private R&D spending, reducing subsidies to industry, developing talent, strengthening the knowledge economy and increasing demand could not only encourage the emergence of more startups but also have a positive impact on the overall availability of *Private* Entrepreneurial Support Organizations.

Keywords Entrepreneurial ecosystem · Startup · Entrepreneurial support organizations · FinTech

JEL classification M13 · M2 · O11 · O25 · O38 · O52

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1 Introduction

Following the examples of successful entrepreneurial regions, such as Silicon Valley, the implementation of policies that can facilitate the development of startups, is becoming a priority for many governments around the world (Ács et al., 2008; Anyadike-Danes et al., 2009; Brown & Mawson, 2019). In this context, the Entrepreneurial Ecosystem (EE) concept has started to gain relevance in the literature, investigating what are the factors and mechanisms that might facilitate the emergence of startups in specific regions (Malecki, 2018; Stam & van de Ven, 2021). Most policies aimed at developing EEs focus exclusively on understanding which recipes of factors are able to produce a greater number of startups (Brown & Mawson, 2019), despite evidence that a greater number of startups are not directly linked to the creation of dynamic economies (Brown & Mason, 2017; Colombelli et al., 2016; Shane, 2009). Indeed, what characterizes these "regional hotbeds" is their ability to foster the growth of startups (Brown & Mason, 2017; Brown & Mawson, 2019). Entrepreneurs' possibility to access to resources within an ecosystem is emerging as a better indicator of an ecosystem's growth capacity (Shi & Shi, 2022; Spigel & Harrison, 2018). However, the assumption that resources flow freely and that everyone has equal opportunities to access them is extremely unrealistic, so some level of public intervention is expected (Sipola et al., 2016). In light of this evidence, several observers have argued that the nature of policy support should shift from a focus on correcting market failures (i.e. by providing 'transactional' support, such as R&D subsidies) to improving conditions that can mitigate network failures (Mason & Brown, 2014). Network failures occur when networks of actors are unable to sustain the development of desirable activities (Schrank & Whitford, 2011). The typology of support required to mitigate these failures, defined as 'relational support' (Mason & Brown, 2014), should focus on improving firms' market orientation and ability to connect and engage with 'external (re)sources of innovation capacity (Mason & Brown, 2014), thereby improving firms' marketing and commercial capabilities. In this regard, facilitating the emergence of Entrepreneurial Support Organizations (ESOs)—organizations created with the main purpose of catalyzing entrepreneurial activity by providing structured support activities (Bergman & Mcmullen, 2022; Ratinho et al., 2020)—might play an important role in policymakers' strategies to develop EEs (van Rijnsoever, 2020, 2022). These organizations facilitate the development of EEs by bridging and connecting different networks (Spigel, 2022; van Rijnsoever, 2022), orchestrating resource exchanges (S. Cohen et al., 2019a, 2019b; Edler & Yeow, 2016; Eveleens et al., 2017), shaping the interests and motivation of EE actors (Tjong Tjin Tai et al., 2015), and facilitating the formation of local trust-based communities (Feld, 2020; Goswami et al., 2018), thus contributing to increasing local resource availability and resource dynamism (Shi & Shi, 2022). As with any other industrial policy, in addition to direct intervention, governments need to develop policies that facilitate the attraction of private sector actors in EEs (Mason & Brown, 2014; Porras-Paez & Schmutzler, 2019). Governments should therefore act as orchestrators (Shi & Shi, 2022) and complement top-down policies with bottom-up initiatives provided by the private sector (Brown & Mawson, 2019; Isenberg, 2011; Spigel & Harrison, 2018), especially to develop aspects of EEs that are difficult to develop through policy, such as entrepreneurial culture and network creation (Mack & Mayer, 2016). Facilitating the emergence of a dense and diverse infrastructure of ESOs (Mason & Brown, 2013) could therefore be a potential starting point to spur the growth of EEs, as the implementation of holistic strategies could help to facilitate the exploitation of complementarities between EE actors (Godley et al., 2021) and improve

ESO effectiveness (Theodoraki et al., 2022; van Rijnsoever, 2022). Unfortunately, little is known about whether potential public policies could stimulate the emergence of *Private* ESOs within EEs. Thus, our study attempts to fill this gap in the literature by investigating whether governments, by intervening on more tangible elements such as local 'resource endowment factors' of the EE framework, might be able to promote the development of *Private* ESOs in their regions. In order to gain insight into this matter, the European Union's FinTech industry is employed as an empirical context of study for a number of reasons. First, the development of the FinTech industry has started to play an important role in the agenda of European policymakers (European Commission, 2015), due to the strong market interest in it- the FinTech industry has been able to consistently attract more than 20% of all invested capital in EU startups since almost a decade (The State of European Fintech, 2019, 2023)—and to the prominent impact it has on the overall activity of European regions (Gomber et al., 2018). Second, a rich stream of literature focused on FinTech found that the development of FinTech EEs suffers greatly from a lack of relational support (Lee & Shin, 2018; van Rijnsoever, 2022). Focusing on how this particular industry can be further nurtured by facilitating the emergence of specific *Private* ESOs should therefore be of interest to governments, given the spillover effects that strengthening existing ESOs can have on the competitiveness of regions (Saxenian, 1996). Considering the knowledge gap identified in the literature and our focus on FinTech EEs, the paper aims to answer the following overarching research questions:

RQ1: What are the combinations of EE factors that need to be sufficiently developed in a country to enable the emergence of FinTech programs provided by Private ESOs?

RQ2: To what extent is the total number of Fintech programs offered by *Private* ESOs in a country influenced by specific EEs' enabling conditions?

From an empirical viewpoint, we collected data on the number of *Private* ESO programs for FinTech startups in each of the 28 EU countries (including the UK) during a 5-year time window (2016–2020) and we complemented such data with country-level Resource Endowments measures retrieved from the European Innovation Scoreboard database. The results of the Qualitative Comparative Analysis (QCA) used to investigate RQ1 highlight that only a recurring configuration of conditions consistently enabled the presence of *Private* ESO programs. This configuration highlights the importance of enhancing industry competitiveness by increasing the demand side of entrepreneurship. These results were complemented by examining the effect of variation in the level of EE factors on the total number of FinTech programs promoted by *Private* ESOs (RQ2). Using a Poisson panel regression, we highlight that different factors can positively influence the number of *Private* ESOs (even though only for a specific subset of private programs provided directly by Corporations). Moreover, the results suggest that policy makers need to be cautious when implementing policies that simultaneously promote the development of other elements of the ecosystem, as there may be strong negative effects on the number of Private ESO programs, potentially hindering the overall development of the EE (Mason & Brown, 2014). Given the systemic effect that ESOs could have on EE development (van Rijnsoever, 2020, 2022), these findings make a valuable contribution to the EE literature by providing empirical evidence on how governments could facilitate the development of a denser infrastructure of ESOs, potentially capable of increasing resource dynamism in regions. The paper also contributes to the understanding of the orchestration role that government might play in facilitating the evolution of related EEs by favoring the involvement of private actors (Brown & Mawson, 2019; Mack & Mayer, 2016; Mason & Brown, 2014). The remainder of the paper is organized as follows. In Sect. 2, we review the literature on what kind of government intervention might favor the growth of start-ups, highlighting the importance of facilitating the emergence of Private ESOs. Section 3 presents the empirical context we identified to investigate the research question, the data collection process and the methodologies employed. We present the results obtained in Sect. 4, discuss the main implications in Sect. 5, and conclude in Sect. 6.

2 Theoretical background

2.1 Ecosystems to support the development of startups

The implementation of policies to accelerate the development of startups is increasingly at the center of policymakers' attention due to the potentially beneficial effects that such firms can have on local economies (Audretsch et al., 2020; Brown & Mawson, 2019). In this context, the EE concept has begun to gain relevance in the literature and in policymaking by investigating, through a complex systems perspective, the factors that may facilitate the emergence of startups in specific regions (Malecki, 2018; Stam & van de Ven, 2021). EEs can be defined as "systems of actors and factors that by working together enable productive entrepreneurship to emerge in a particular region" (Stam & van de Ven, 2021). Building on van De Ven's (1993) concept of "Infrastructure of Entrepreneurship", the EE framework identifies resources that are considered critical for the development of new entrepreneurial activities (identified as "Resource Endowments") and factors that can facilitate or hinder the development and circulation of such resources (identified as "Institutional Arrangements"). Efforts to understand whether different elements of the proposed framework are relatively more important for the development of EEs have therefore proliferated in the literature (Cavallo et al., 2019; Wurth et al., 2023). Although successful ecosystems are often empirically associated with those with a high number of startups (such as Silicon Valley, London or Shenzhen), evidence suggests that having a greater number of startups does not directly correlate with creating more dynamic economies (Brown & Mason, 2017; Colombelli et al., 2016; Shane, 2009). Despite this, most of EE policies focus exclusively on understanding which recipes of factors are able to produce more startups (Audretsch et al., 2020; Brown & Mawson, 2019), which may explain their lack of effectiveness in creating hotbeds of startups (Brown & Mawson, 2019; Lerner, 2010). Nevertheless, this framework has recently been used to examine in more detail the evolutionary dynamics that have led to the development of high-performing geographical areas (Spigel & Harrison, 2018). One of the first attempt to identify such mechanisms was carried out by Spigel, who analyzed how relationships among EEs' enabling factors (and underlying actors) influence the competitiveness of new ventures in specific regions such as Calgary and Waterloo in Canada (Spigel, 2017). In these regions, different mechanisms were capable of driving the emergence of strong EEs. On the one hand, Calgary ecosystem developed around a driving local industry that was capable of attracting skilled workers and financial capital, thus generating a tight network of innovative startups and support players. On the other hand, Waterloo ecosystem was characterized by a stronger cultural support for risk and technological entrepreneurship generated by successful examples of local entrepreneurship, such as Blackberry. This underlying entrepreneurial culture was able to foster dense social networks between entrepreneurs, workers, and investors, encouraging successful entrepreneurs to participate in such an ecosystem and helping to strengthen the image of entrepreneurs in the region (Spigel, 2017). Access to networks and mentoring opportunities are core elements, also identified by Spigel and Harrison (2018) as important for EE development. The authors argue that 'locally available resources' are only useful if entrepreneurs are able to access and use them: the ability of entrepreneurs to access resources within an ecosystem could determine the ability of an ecosystem to grow (Spigel & Harrison, 2018). Similarly, Godley et al. (2021) suggest that the success of an EE depends on the efficiency with which each actor can build on the work of other EE actors. Actors who can facilitate coordination are therefore needed for the EE to grow. A well-functioning ecosystem is consequently characterized by the emergence of dense, trust-based social networks that increase the ability of entrepreneurs to acquire resources (Feld, 2020), and that improves the ability of resources to move within EEs (Shi & Shi, 2022; Spigel & Harrison, 2018). However, it is highly unrealistic to assume that resources flow freely and dynamically and that all entrepreneurs have equal opportunities to access them, as actors may not be properly connected to each other (Mason & Brown, 2014). Providing relational support to startups (Mason & Brown, 2014) and increasing resource dynamism (Shi & Shi, 2022) are therefore two of the main activities that policymakers should act on to facilitate the development of local EEs.

2.2 Role of ESOs in the development of EEs

Facilitation of the emergence of ESOs can play an important role in the overall development of EEs (van Rijnsoever, 2020, 2022). ESOs are organizations created with the main purpose of catalyzing entrepreneurial activity through the provision of structured support activities, especially in the early stages of startups' lifecycle when they are inherently more vulnerable (Bergman & Mcmullen, 2022; Ratinho et al., 2020). Although different forms of ESOs—such as science parks, incubators and accelerators, whether public or private—have emerged in recent decades, all ESOs act to some extent as intermediaries, helping entrepreneurs to reduce barriers to venture creation and expansion, and facilitating access to relevant networks (Clayton et al., 2018; Howells, 2006; Zhang & Li, 2010). Although the literature on the effectiveness of ESOs on the survival and development of startups shows contrasting results at the level of individual firms (Bergman & Mcmullen, 2022; Crişan et al., 2021), there is agreement that such actors play an important role in the development of EEs by encouraging and facilitating the sharing of resources and information between different actors (S. L. Cohen et al., 2019a, 2019b; Edler & Yeow, 2016; Eveleens et al., 2017; van Weele et al., 2017). ESOs facilitate the development of EEs through different mechanisms (Goswami et al., 2018; Pustovrh et al., 2020; van Rijnsoever, 2020). First, ESOs orchestrate resource exchanges through the reduction of information gaps that prevent the creation of valuable relationships among different actors (McEvily & Zaheer, 1999), bridging and connecting knowledge, financial, and business networks (Spigel, 2022). Second, they cover the important function of developing and coordinating EEs by shaping the interests and motivation of different actors. By fostering the formation of local trust-based communities (Feld, 2020; Goswami et al., 2018), ESOs are able to influence actors' relationships and actions (Tjong Tjin Tai et al., 2015). Finally, they can act as catalyzers for the development of other important actors for the ecosystem, facilitating the emergence of new local investors and increasing investments in local startups (Fehder et al., 2014). Great quantitative examples of how the described support mechanisms provided by ESOs affect the development of EEs are provided by simulated agent-based models by van Rijnsoever (2020, 2022). In his 2020 work, by testing for different forms of support mechanisms provided by ESOs, the author showed that such organizations consistently help to overcome networking problems between startups and the financial support network represented by investors, thereby increasing the total number of links between such actors (van Rijnsoever, 2020). In his work of 2022, van Rijnsoever also shows that the presence of ESOs successfully restores limitations in the formation of financial support networks (and the related circulation of resources in the form of venture capital investments) when local ecosystems are characterized by the presence of institutionally or technologically constrained startups, thus effectively contributing to the development of the overall EE (van Rijnsoever, 2022). By supporting resource circulation “within and beyond the ecosystem” (Pustovrh et al., 2020), ESOs thus play an important role in increasing resource dynamism within the local EEs (Shi & Shi, 2022).

2.3 Government role in growing EEs

Most EEs show some degree of ’incompleteness’, as not all actors (and related competences) are present in sufficient numbers to support their growth (Eliasson, 1997; van Rijnsoever, 2022). Depending on the local completeness of the ecosystem, a certain degree of public intervention is thus expected and should be considered in research (Sipola et al., 2016). Facilitating the growth of actors able to foster relational connections among stakeholders and to improve the coordination of other actors’ responses within an EE is therefore strategic for government (Brown & Mawson, 2019; Godley et al., 2021). However, an EE is a complex adaptive system (Roundy et al., 2018; Stam & van de Ven, 2021). Therefore, government interventions should focus on setting the conditions that facilitate the development of the ecosystem, rather than attempting to control and direct its evolution (Brown & Mawson, 2019; Mack & Mayer, 2016; Shi & Shi, 2022; Spigel & Harrison, 2018). As with any other industrial policy, in addition to direct interventions to address market and network failures, the government must act as an orchestrator (Bonomi Santos et al., 2023; Colombelli et al., 2019) in order to develop policies and actions that can facilitate the attraction of private actors in the EE (Cao & Shi, 2021; Colombo et al., 2019; Porras-Paez & Schmutzler, 2019). In this vein, Cao and Shi report that EEs *“should be realized by motivating private parties, creating a hub of connections, encouraging commitment and collaborations among supporting organizations, and aligning benefits for all participants*” (Cao & Shi, 2021). Consequently, governments should supplement top-down policies capable to increase Resource Endowments of EEs (Stam & van de Ven, 2021) with bottom-up initiatives by encouraging the involvement of private actors capable of leveraging the local pool of resources (Brown & Mawson, 2019; Isenberg, 2011; Mason & Brown, 2014; Spigel & Harrison, 2018). This is especially important in the development of “important aspects of the ecosystem that cannot be formally managed”, such as a strong entrepreneurial culture and dense networks of entrepreneurs and mentors (Mack & Mayer, 2016), namely those Institutional Arrangements outlined in the Stam and van de Ven (2021) framework. Governments are therefore suggested to facilitate the development of "modularized and specialized venture creation processes" to effectively support entrepreneurs (Shi & Shi, 2022) by increasing the availability of ESOs (Mason & Brown, 2014; van Rijnsoever, 2022). This can be achieved by fostering the creation of ESOs linked to local governments and public universities (Audretsch et al., 2015, 2024). This is particularly important at the initial stages of ecosystem development (Brown & Mawson, 2019; Colombelli et al., 2019). Nevertheless, the exclusive involvement of publicly incentivized actors may impede the emergence of crucial co-opetition mechanisms, which have been demonstrated to enhance the performance and impact of local ESOs (Theodoraki et al., 2022). Furthermore, this approach may not fully address the diverse needs of startups at different stages of their lifecycle (Bergman & Mcmullen, 2022). Consequently, local governments should prioritize the establishment of a diverse and complementary set of ESOs (Hruskova et al., 2022). Policymakers must therefore consider the fostering of private ESO initiatives as a means of complementing public initiatives. However, there is a paucity of evidence regarding the efficacy of government actions aimed at promoting the development of local EEs in stimulating the emergence of *Private* ESOs.

3 Data and method

To provide an answer to the two research questions and provide guidance on how the government might facilitate the emergence of *Private* ESOs, we analyze a built-on-purpose panel dataset consisting of count data regarding the number of *Private* ESO programs for FinTech startups available across all 28 European Union countries[1] during the period 2016–2020. We complemented the dataset of *Private* FinTech ESOs located in Europe with country-level EE enabling factors retrieved from the database provided by the European Innovation Scoreboard (EIS).[2] Since most policies are developed at country level rather than at regional level (such as education, innovation invectives, and competition policies), we argue that working at country-level might better reflect the expression of strategic industrial policies (Ács et al., 2014, 2017), thus better align the level of analysis and the locus of intervention. To test our hypotheses, we employ fuzzy-set Qualitative Comparative Analysis (fsQCA) and Poisson Panel Regression techniques to i) identify configurations of specific EEs' factors that consistently enabled the presence of programs provided by *Private* ESOs; and ii) to understand to what extent the variation of EE factors might influence the numerosity of such programs.

3.1 Context

We focused on European FinTech EEs since in the last decade the development of the FinTech industry has started playing a significant role in the agenda of European policymakers (European Commission, 2015). The term FinTech delineates processes and practices at the interface of finance and digital/online information and communication technologies with the potential to transform the entire financial industry. Examples of FinTech companies include alternative payment solutions, cryptocurrencies, and challenger banks among others (Gomber et al., 2018; Haddad & Hornuf, 2019). Due to the strong market interest and the prominent impact of the financial industry on the overall activities of regions in which they operate (Gomber et al., 2018), a whole stream of literature regarding the development of FinTech EEs has recently started to emerge. Recent studies found that the development of FinTech EEs suffers greatly from a lack of relational support (Lee & Shin, 2018; van Rijnsoever, 2022) and that providing better connectivity among different actors might accelerate its development (Spigel, 2022; van Rijnsoever, 2020). Additional findings

[1] EU member countries are: Austria, Belgium, Bulgaria, Croatia, Republic of Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain and Sweden. United Kingdom was also considered in the analysis since during the timeframe of the research it was still part of the EU.

[2] https://ec.europa.eu/research-and-innovation/en/statistics/performance-indicators/european-innovation-scoreboard/eis

point out that successful FinTech hubs like Singapore and London were able to grow only after the emergence of *Private* ESOs capable of influencing intermediation and interaction dynamics (Alaassar et al., 2022; Harris, 2021). Evidence suggests that FinTech EEs can therefore benefit from an increased presence of *Private* ESOs. It is therefore of interest to governments to consider how this particular industry can be further nurtured through the facilitation of the emergence of *Private* ESOs.[3]

3.2 Data collection process

We first collected data on *Private* ESOs providing FinTech programs available across the European Union between 2016 and 2020. The selection of the timeframe was constrained by two factors. Before 2016, little or no FinTech *Private* ESO programs were identified. On the other side, 2020 is taken as the last year of reference due to the potential exogenous shock on program numerosity caused by COVID-19. We built our panel dataset following a multiple-step process. We first defined a research protocol to identify *Private* ESOs. We identified those organizations interested in cultivating innovative solutions for the financial market, and we tracked *Private* ESOs in which *European Banks* were involved (as providers or as strategic partners). Utilizing the archives provided by the "European Banking Authority Credit Institution Register"[4] to identify the different banking groups in Europe, we performed a thorough process of archival research to screen programs in which banks were involved.[5] For each bank identified, we used ten different keywords to perform an online search of *Private* ESO programs, and we analyzed the first thirty results provided by the search engine while typing "bank name" + "keyword" (e.g., Barclays start-up programs).[6] In the case of multiple brands belonging to the same banking institution, the screening was extended to each of these sub-organizations. A total of 41 banking institutions were involved in at least one program during the timeframe of the analysis. Websites of identified programs have been thoroughly analyzed to identify whether they are characterized as initiatives provided by *Private* ESOs,[7] and information regarding the country in which these programs were provided was collected. We complemented such data with additional information regarding the typology of provider (i.e., delivered by a Corporation or by a Specialized Intermediary) to test also whether different typologies of *Private*

[3] Moreover, the focus on FinTech enable us to extend our sample to all 28 countries of the European Union since the phenomenon is not restricted to a few countries (as it could happen with more specialized industrial clusters), allowing us to consider a greater number of observations which are inherently highly heterogeneous (both intra-year and intra-country).

[4] https://www.eba.europa.eu/risk-analysis-and-data/credit-institutions-register For the purpose of the analysis, only CDR credit institutions and EEA Branches were analyzed due to the focus on European countries.

[5] We decided to operate at program level (and not at the Private ESO level) since it allowed us to consider in the analyses the diversity of offerings available in a country in any given year. Private ESOs offering multiple programs in the same location and the same year however were a negligible minority, thus the number of Private ESO mostly coincides with the number total number of Private ESO programs identified. Further data are available upon request.

[6] We used the following list of keywords: Program for start-ups, Start-up program, Call for start-ups, Accelerator, Incubator, Idea competition, Hackathon, Open Innovation program, Start-up services, Entrepreneurial program.

[7] For the sake of clarity, we included FinTech focused Incubators, Accelerators, Corporate Incubators, Corporate Accelerators, Hackathons, Specialized networking events, and Challenge-based programs into the database.

players can be influenced through similar policy interventions. We triangulated the results obtained from corporate websites with external websites (e.g., the website of the Specialized Intermediary organization providing the program) to obtain a solid screening of initiatives and refine the information collected. Following this process, we have identified a total of 109 different private programs provided across the region and the timeframe considered. We then checked whether these programs were also tracked by commercial databases, such as CrunchBase, which is increasingly being considered a reliable source of data regarding startups and related actors (Dalle et al., 2017). After aligning the names (for example by removing Gmbh, Srl, and typos in both files), and controlling for country localization, to our surprise only 8 out of 109 *Private* ESOs were found in CrunchBase dataset.[8] Of these 8 programs, two were found in Spain, two in the UK, and the other 4 in 4 other different countries. Our database therefore provides a more realistic picture of European *Private* ESOs focused on the FinTech industry across Europe. We aggregated the identified programs at year and country levels for subsequent analyses. To investigate whether and to what extent specific EE enabling factors might facilitate the establishment of FinTech *Private* ESO initiatives, we complemented the dataset with country-level data of factors potentially influencing the EE retrieved from the database provided by the European Innovation Scoreboard (EIS), similar to what has been done in previous studies (e.g., Leendertse et al., 2021). Adopting a resource endowments perspective to provide more tangible insights, we selected variables that represent measures of available *Talent*, VC investments (*Finance)*, investments in R&D by private sectors (*R&D Private*), presence of *Physical Infrastructure* and *Knowledge Workers* capable to support resource circulation, *Demand* sophistication, and a measure of the level of *R&D Subsidies* provided by the government. The list of variables and relative description is available in Appendix A, together with descriptive statistics. To summarize, our dataset contains data over five years for the 28 EU countries, consisting of a total of 140 country/year observations.

3.3 Analytical approach

This study aims to investigate two interrelated research questions: i) What are the specific combinations of EEs' enabling conditions that must be sufficiently developed in a region to enable the emergence of FinTech programs provided by *Private* ESOs (RQ1), and ii) To what extent the total number of these programs in a country is influenced by specific EEs' factors (RQ2). To answer such questions, we resorted to two different methodological approaches: fsQCA to explore RQ1 and Poisson Panel regressions to explore RQ2.

3.3.1 RQ1 – fsQCA

Qualitative Comparative Analysis (Ragin, 1987, 2000, 2009) is a method that allows one to recognize and reveal common patterns among data (Schneider & Wagemann, 2010). QCA techniques use a set-theoretic approach based on complex causality to establish logical relationships between different conditions, allowing to capture of equifinality of outcomes. Equifinality refers to the fact that systems under investigation can reach the same outcome through different paths even if starting from different initial conditions (Fiss, 2007). Moreover, methods based on complex causality (as QCA techniques) enable researchers to

[8] Downloaded in June 2023.

Table 1 QCA Calibration values, referred to 2016

Variables	Obs	Mean	Std. Dev	Min	Max
TALENT	28	.764	.41	.1	1.7
INFRASTRUCTURE	28	11.143	5.986	0	25
FINANCE	28	.07	.046	.004	.174
R&D_SUBS	28	.117	.108	.004	.373
R&D_PRIV	28	.969	.696	.09	2.26
DEMAND	28	33.42	8.887	16.399	49.642
KNOWLEDGE_W	28	13.8	3.838	6.6	22.9

evaluate separately both necessary and sufficient conditions for the manifestation of specific outcomes. This provides a powerful tool to overcome the limitations of classical quantitative methods (like regressions) which allow to investigate only conditions that are at the same time necessary and sufficient (Schneider & Eggert, 2014). Among the different techniques existing under the QCA portfolio, we resorted to the fuzzy-set QCA[9] (fsQCA) which has the advantage of characterizing membership scores based on a gradual scale (any value between 0 and 1 is allowed). In addition to helping to improve knowledge of the complementarities and substitutes in configurations, results obtained with fsQCA analyses can provide insight into which components are potentially more important to obtain a desired outcome, as also how to combine them to obtain such an outcome (Fiss, 2007). Moreover, given the multiple and conjunctive nature of the phenomenon under investigation, the use of fsQCA is particularly suitable (Kraus et al., 2018). We started our analysis with the calibration of data. Calibrating the data requires the definition of thresholds that determine the level of membership of each case to a specific set. For each condition three values should be identified: the "fully in" value (above which set membership is set to 1), the "crossover point" (where cases are neither in nor out), and the "fully out" value (below which set membership is set to 0) (Misangyi & Acharya, 2014). In our specific case, the calibration of conditions considered for this investigation was performed following the criteria established by the European Commission to classify the level of innovativeness of countries based on the scores obtained in the European Innovation Scoreboard. Based on this ranking method, countries with related index value that is above 125% of the EU average are considered *Innovation Leaders*, countries with performance between 100 and 125% are considered *Strong Innovators*, while countries whose performance is between 70 and 100% of the EU average are defined as *Moderate Innovators* (Hollanders & Pereira, 2022). Therefore, we calculated the average of each condition, and we performed calibration by assigning full membership to countries whose condition outperformed 125% of the average value across Europe of that condition, while full non-membership was assigned to countries with values of the condition below 70% of the average. For each condition, the indifference point was set at the average value. We anchored the thresholds used for calibration purposes to the measures observed during the first year of the analysis.[10]

Descriptive statistics of the sample are available in Table 1.

[9] A fuzzy-set analysis based on Zadeh (1965).

[10] The anchorage of the thresholds to the average measures of the first year of the analysis, and subsequent usage of these thresholds across all the timeframes, help us to identify improvements of performance over time across specific dimensions and consequent possible shifts in membership occurring over time for each specific observation.

We continued our analysis by minimizing the truth table. Consistently with previous literature (Ragin, 2006, 2009), we adopted a frequency threshold of 1 and a consistency threshold of 0.75. Finally, we applied the Quine-McCluskey algorithm (Quine, 1952) to elaborate solutions, and we retained only those solutions with a consistency level equal to or above 0.9 to include only robust results in the analysis (Ragin, 2006, 2009). On top of sufficient conditions, we also analyzed the presence of necessary conditions setting the consistency threshold equal to 0.9 to consider conditions as necessary, as suggested by Schneider and Wagemann (2010). Given the longitudinal nature of data, we ran different QCA models for each year available in the dataset (i.e., five years) to search for configurations that are robust over time, irrespective of possible environmental changes (Aversa et al., 2015). In doing this, we took into consideration that the relationship between EEs' enabling conditions and the presence of *Private* ESOs in a country cannot occur in the same year but should occur with a certain lag. Although innovation-related factors are often slow in yearly change, we introduced a one-year lag to all the theoretical conditions included in our analyses. Therefore, for each QCA analysis, the outcome is measured at time *t*, while factors are measured at time *t-1*.

3.3.2 RQ2—Poisson panel regression

To test RQ2, we resorted to panel Poisson regression techniques. We controlled for boundary conditions that may influence the outcome as i) the gross domestic product of each country to account for differences among countries in their well-being; ii) the availability of labor force to control for shortage/surplus of labor workforce availability; iii) the number of banking institutions available in each country to account for potential ex-ante differences in the supply of *Private* ESO programs. We also included a set of year fixed-effects to account for potential time-invariant unobserved heterogeneity. As for the QCA analysis, to minimize reverse causality issues, we included in our models all the independent variables with a time lag of one year with respect to the dependent variable. A note must be made regarding possible issues of collinearity between the variable *Knowledge Workers* (which measures the percentage of people employed in knowledge-intensive activities), and our dependent variables, which represent the number of different *Private* ESO programs available in that country in a given year. Even though people working in personnel working in such programs can be considered part of Knowledge Workers, we are sure that the impact of such personnel on the percentage over total employment of our independent variable is negligible.[11]

[11] Using an extreme as an example, we can consider Luxembourg. People employed in knowledge-intensive activities are around 22%, resulting in around 65,000 persons. The maximum number of programs active in Luxembourg during the timeframe is 5 different programs. Even though is not possible to retrieve how many people directly work in these programs, we can reasonably assume that actual number of people working in these programs do not exceed some millesimal of unit, resulting in almost null collinearity among variables.

Table 2 Analysis of Sufficient conditions for the presence of programs provided by Private ESOs, irrespectively of the provider (Outcome variable: Pres_P_ESO)

Year	2016		2017	2018				2019				2020
TALENT		●	●	●		●	○	○		●	●	●
INFRASTRUCTURE	●			●	●	●	○					●
FINANCE	●	○		●	●		●		○	●		●
R&D_SUBS		○	○	○	○	○	●			○	○	○
R&D_PRIV	○	●	●			●	●		○			●
DEMAND		●	●		●		○					●
KNOWLEDGE_W		●	●			●	○				●	●
Consistency %	92	98	97	94	98	96	98	91	100	97	97	99
Raw coverage %	22	11	12	11	16	11	3	42	44	17	17	11
Unique coverage %	17	9	7	3	8	3	3	12	16	4	3	9
Overall consistency %	84		85	91				94				91
Overall coverage %	50		63	57				80				60

Table 3 Analysis of Sufficient conditions for the presence of Private ESOs programs provided by Corporations (Outcome variable: Pres_P_Corp)

Year	2016	2017	2018				2019		2020
TALENT	●	●	●	●		○	●	●	●
INFRASTRUCTURE			●	●	●	○			
FINANCE	○		●		●	●	●		●
R&D_SUBS	○	○	○	○	○	●	○	○	○
R&D_PRIV	●	●		●		●		●	●
DEMAND	●	●			●	○			●
KNOWLEDGE_W	●	●		●	●	○		●	●
Consistency %	96	96	91	95	95	98	94	90	98
Raw coverage %	13	12	11	12	13	3	29	15	13
Unique coverage %	12	8	3	3	5	3	9	3	10
Overall consistency %	76	84	90				88		89
Overall coverage %	43	63	59				74		66

4 Results

Our first research question aimed at identifying the configurations of EEs' enabling factors that consistently enabled the presence of *Private* ESOs over time (RQ1). We report in Tables 2, 3, and 4 the results of the fsQCA analyses. For each outcome variable we ran a different analysis for each year. For each outcome, we reported the results on the same configuration chart to better identify the presence of recurrent patterns over time. Subsequent tables illustrate the results of sufficiency analyses. For each configuration, filled circles (●) indicate that the presence of the condition is associated with the occurrence of the specific outcome. On the other hand, white circles (○) indicate that the absence of the condition is associated with the occurrence of the outcome. Empty cells represent conditions that can be either present or absent for the outcome to manifest. Intermediate solutions are

Table 4 Analysis of Sufficient conditions for the presence of Private ESOs provided by Specialized Intermediaries (Outcome variable: Pres_P_SI)

Year	2016	2017	2018			2019		2020
TALENT	●	●	○	●	●		●	●
INFRASTRUCTURE			●	●		●	●	●
FINANCE	○		●			○		●
R&D_SUBS	○	○		○	○		○	○
R&D_PRIV	●	●	○	●	●	○	●	●
DEMAND	●	●	●		●	●		●
KNOWLEDGE_W	●	●		●	●		●	●
Consistency %	95	95	91	93	95	95	97	97
Raw coverage %	17	23	22	21	21	15	22	16
Unique coverage %	15	22	20	0,4	4	14	19	16
Overall consistency %	70	79	85			92		90
Overall coverage %	36	54	55			48		38

displayed, and results were analyzed similarly to Aversa et al (2015) to look for common elements that consistently led to the presence of the outcome. When considering the availability of all *Private* ESO programs in a specific country (irrespective of the provider), a minimum recurring pattern of sufficient conditions emerged. As highlighted in Table 2, countries with a higher availability of *Talent*, a higher availability of *Knowledge Workers*, and in which the state is providing low levels of *R&D Subsidy* to the private sector seems to provide a favorable environment for the establishment of *Private* ESOs.

This configuration is the only consistent configuration that persists over time. According to the analysis of the necessary conditions, no condition was deemed necessary in any year for the emergence of a support ecosystem for startups.[12] A finer-grained analysis that examines the programs provided either by Corporations or by Specialized Intermediaries was performed to better disentangle potential different phenomena.[13] These two analyses highlighted that similar configurations of sufficient conditions recur. While considering programs separately, on top of the sufficient factors cited before, the additional presence of sufficiently high levels of *R&D from Private sectors* seems to enable the emergence of *Private* ESOs, either provided directly by Corporations or by Specialized Intermediaries (Tables 3 and 4).

After having identified the minimum configurations of factors that consistently enabled the presence of *Private* ESOs in a country, the second step of our analysis was to investigate whether the same EEs' enabling factors can influence the number of *Private* ESOs' programs. We thus adopted a Poisson fixed effect model which allowed us to estimate the net effect of the variation of each EEs' factor on the total number of *Private* programs offered, controlling for several country-related factors and for time-specificities, as introduced before. Table 5 reports the Incidence Rate Ratios (IRRs) values and standard deviations of regressors of the different analyses (fine-grained analyses showing also controls

[12] Necessary condition tables are available in Appendix B.

[13] While considering the overall availability of programs, some information was lost due to the aggregation (or non-specification) of the typology of supplier. For example, the outcome = 1 condition could be obtained having only internal programs, only external programs, or a mix of both. The analysis differentiated by provider provide a more nuanced understanding of possible configurations leading to the presence of such programs.

Table 5 Poisson fixed effect panel regression results, IRR values

	(1)	(2)	(3)
	P_ESO	P_Corp	P_SI
TALENT	1.564	2.722*	.035
	(1.05)	(1.629)	(.071)
INFRASTRUCTURE	1.003	.99	1.013
	(.027)	(.034)	(.027)
FINANCE	.369	.133*	.792
	(.401)	(.143)	(3.01)
R&D_SUBS	2.805	9.266	.236
	(4.099)	(14.6)	(.96)
R&D_PRIV	4.299**	8.656***	1.328
	(2.439)	(6.284)	(.822)
DEMAND	1.005	1.034**	.975
	(.019)	(.017)	(.026)
KNOWLEDGE_W	1.049	.905	1.057
	(.241)	(.2)	(.341)
Control Variables	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes
Observations	115	100	75

Standard errors are in parentheses

*** $p<.01$, ** $p<.05$, * $p<.1$

omitted in subsequent tables are available in Appendix C). As it can be seen, considering the totality of *Private* ESOs available in a country as the dependent variable, the only significant factor is the amount of investment in R&D directly made by businesses, a proxy of the level of *Knowledge*. As for RQ1, to better understand whether the number of programs is influenced by the same factors irrespective of the provider, we performed further analyses considering both programs provided by corporations and by specialized intermediaries. As far as programs provided by corporations are concerned, several significant factors emerged. First of all, increases in the availability of *Talent* lead to the activation of a higher number of initiatives. Similarly, the same effect holds considering the level of *Demand* for innovative products and services. As found in previous regressions on the totality of programs, the growth of R&D investments at the firm level (*Knowledge*) has a very strong multiplicative effect on the total number of *Private* ESO programs. Interestingly, a strong detrimental effect appears when Venture Capital expenditure (*Finance*) grows. The IRR value of a few decimals of this regressor seems to point out that when external capital availability grows, the number of *Private* ESO programs organized by private corporations drops. When considering programs organized by specialized intermediaries, it seems that no EEs' enabling factors can influence the numerosity of this typology of programs.

5 Discussion

Our initial research question (RQ) employed fsQCA techniques as outlined in Aversa et al. (2015) with the objective of identifying the "robust" configurations of factors that have the capacity to facilitate the emergence of *Private* ESOs at the local level. A recurring pattern of conditions emerged as sufficient factors that were capable to enable the local presence of *Private* ESOs over time. This pattern suggests that countries where the quality of human resources is high, the knowledge-intensive sector is well developed, and where the government provides low levels of subsidies to the economy were constantly capable to attract *Private* ESOs' programs within their borders. On top of the sufficient factors cited above, the additional presence of sufficiently high levels of R&D carried out by firms seems to enable the emergence of different typologies of *Private* ESOs (either supplied by Corporations or supplied by Specialized Intermediaries). The results of this study indicate that the same factors that facilitate the emergence of a greater number of startups within EEs can also facilitate the development of complementary actors such as *Private* ESOs. Our work contributes to the literature on EE development by confirming the overall importance of having talented people and well-developed knowledge-intensive sectors as fundamental elements for the emergence of private organizations within an EE (Mason & Brown, 2014; Schrijvers et al., 2021). This suggests that government actions aimed at creating the underlying conditions required to facilitate ecosystem development may also facilitate the creation of a denser network of actors theoretically capable of bridging complementarities between ecosystem players (Godley et al., 2021) and reducing network failures (van Rijnsoever, 2020, 2022). Endorsing the private sector's open innovation activities through actions capable of increasing the local "demand side of entrepreneurship" (i.e., entrepreneurial opportunities) (Verheul et al., 2001) and resource circulation (Shi & Shi, 2022) can be therefore a useful tool for policymakers willing to accelerate the development of local EEs (Pustovrh et al., 2020). In some configurations, the level of development of the infrastructure, the availability of finance, and local demand are part of the mix of sufficient conditions. Nevertheless, no homogeneity across the overall timeframe emerges, indicating that the influence of these factors (while significant) is not a prerequisite for the emergence of *Private* ESOs. Moreover, these results imply that developing these factors without concurrently improving the common "base factors" is unlikely to improve the preconditions for the emergence of *Private* ESOs. This underscores the potential value of set-theoretic approaches in identifying overarching relationships among diverse factors (Kraus et al., 2018). The second RQ was employed to ascertain the extent to which single factors are capable of influencing the number of *Private* ESO programs in a region. Using a Poisson panel fixed effect model, we estimated the net effect of the variation of different factors on the total number of programs offered by *Private* ESOs. The only factor that significantly influences the total number of programs is the amount of investment in R&D directly made by the private sector. This suggests the important role that government has in fostering private intervention in the market to support the emergence of EEs. Findings obtained from analyzing ESOs provided by different private organizations yielded more intriguing findings. For corporate-related programs, an increase in the availability of *Talent* leads to the activation of a greater number of initiatives, as well as an increase in the *Demand* level. The factor that exerts the most significant influence on the number of programs is the interest of private sectors in investing in R&D activities (*R&D_PRIV*). Interestingly, a strong detrimental effect appears when Venture Capital expenditure grows, suggesting a potential crowding out effect on Private ESOs programs supplied by Corporations. The results of this study confirm that it is more important for governments to focus on improving the general conditions of a country's economic framework than adding resources without having the necessary support network in place to sustain the development of the EE (Audretsch et al., 2020; Brown & Mawson, 2019). When considering programs organized by Specialized Intermediaries, it seems that no enabling factors can significantly influence the total number of *Private* ESOs, suggesting that a potential government intervention focused on stimulating the emergence of such sub-category of private players might be ineffective. This paper makes a valuable contribution to the field of EE on several grounds. First of all, our findings provide a first evidence of how government, by investing in Resource Endowments, might facilitate the development of EEs through the creation of *Private* ESOs capable to increase resource dynamics within the context in which they operate, contributing to advance the knowledge regarding the much-debated role of the state in the development of EEs (Brown & Mason, 2017; Brown & Mawson, 2019). Although no causal statement can be derived from the analyses performed, the results indicate that interventions aimed at improving specific factors may facilitate the development of diverse private actors, thereby further stimulating the breadth of ESOs required to support the development of EEs (Brown & Mawson, 2019; Mack & Mayer, 2016; Theodoraki et al., 2022). Furthermore, our findings contribute to the body of literature on EEs which suggest that EEs follow evolutionary dynamics that necessitate further investigation (Wurth et al., 2023) to provide better guidance to policymaking. In this regard, results of this paper are also significant since they provide an overview of how governments could foster the emergence (and subsequent increase in numerosity) of *Private* ESOs. First of all, the study highlights that the same factors capable to foster the emergence of corporate initiatives are also able to propel initiatives provided by other private Specialized Intermediaries. Government, by leveraging on these results, might therefore design policies targeting factors capable to favor the emergence of a network of *Private* ESOs by leveraging on a specific subset of EEs' factors. While there are potential avenues for action that could facilitate the accelerated emergence of *Private* ESOs provided by Corporates, it appears that there are few viable options for accelerating the establishment of a greater number of programs provided by Specialized Intermediaries. Furthermore, an undue emphasis on improving the availability of risk capital by government may inadvertently hinder the efforts of other policies that are more instrumental to build the support infrastructure for EEs to become more dynamic. This study is not free of limitations. It should be noted that the research is focused exclusively on the FinTech industry in Europe. Consequently, the results may not be generalizable to other industries or other territories. However, the FinTech industry has consistently attracted around 20% of all capital invested in startups in Europe over the past decade (The State of European Fintech, 2019, 2023), and the development of a solid financial industry is a fundamental and pervasive factor in the advancement of any country. We argue that a focus on how this particular industry can be further nurtured should be of interest to policymakers, considering the rippling effects that the creation of well-developed EEs around specific sectors can have on the creation of additional startups (Saxenian, 1996; Spigel & Harrison, 2018; Walsh et al., 2023). Future research could overcome such limitations by investigating how EE factors affect the presence of *Private* ESOs for other industries, as well as whether different configurations in other regions allow the presence of such important actors for the ecosystem. Another potential drawback of the study can be the limited timeframe of the analysis. *Private* ESO programs for FinTech startups have been implemented only since 2016, and the exogenous shock caused by COVID-19 in 2020 can have impacted program numerosity in subsequent years. Adding observations from subsequent years and controlling for such exogenous factors could further test findings validity. Another limitation is related to the complete identification of all *Private* ESOs available. As mentioned in the methodology section, we focused on programs in which corporate partners were involved, either as direct providers or as main beneficiaries. Programs organized by Specialized Intermediaries without the involvement of a major financial player were therefore not included. We are confident, however, that this category represents only a negligible minority of *Private* ESOs tracked with our method since the lack of involvement of any major player might signal a lack of credibility of that initiative. Finally, we assume that the nature of the support provided by different types of private ESOs is similar, as has been done in other studies investigating the systemic impact of ESOs on EE development, such as van Rijnsoever (van Rijnsoever, 2020, 2022). Rather than focusing on the effectiveness of individual initiatives, we assumed that increasing their numbers might be beneficial at least in terms of the potential relational support that could be provided. By better identifying and mapping the typology of support provided by different ESOs (Private and Public), future research could further investigate the impact of the degree of completeness of the local relational support system on EE development, as suggested by the initial evidence provided by Hruskova et al. (2022). Moreover, after understanding the theoretical mechanisms that can lead to the development of such actors, future research could use techniques such as simulations to test whether specific policies are able to influence the emergence of local Private ESOs.

6 Conclusions

Prioritizing the development of a network of *Private* ESOs is a fundamental ingredient to foster the development of EEs (Brown & Mawson, 2019; Mack & Mayer, 2016; Spigel & Harrison, 2018; van Rijnsoever, 2020). These organizations facilitate the development of EEs by bridging and connecting different networks (Spigel, 2022; van Rijnsoever, 2020), by orchestrating resource exchanges (Cohen et al., 2019a, 2019b; Edler & Yeow, 2016; Eveleens et al., 2017), by shaping the interests and motivation of EE actors (Tjong Tjin Tai et al., 2015) and by facilitating the formation of local trust-based communities (Feld, 2020; Goswami et al., 2018). ESOs contribute to increasing resource dynamism within EEs, a fundamental element in creating dynamic entrepreneurial regions (Shi & Shi, 2022). A better understanding of how government can facilitate the emergence of a dense EE infrastructure could be a starting point for facilitating the growth of EE. Despite the proliferation of public ESOs, it can be reasonably assumed that the majority of EEs still lack the capacity to facilitate the growth of local startups. This is due to the fact that the ecosystems in question have not yet reached a critical mass of actors capable of sustaining such growth (Eliasson, 1997; Spigel & Harrison, 2018). A certain degree of intervention from the government, aimed at complementing top-down policies with bottom-up initiatives is thus expected (Sipola et al., 2016). In this context, governments are therefore suggested to foster the intervention of *Private* ESOs (Brown & Mawson, 2019; Spigel & Harrison, 2018). To our knowledge no study has investigated how governments can foster the emergence of *Private* ESOs' programs. This paper provides initial insights into the factors of EEs that might facilitate the emergence of such actors, highlighting the fact that stimulating the "demand side" of entrepreneurship might also stimulate the emergence of important actors for the development of the overall ecosystem, such as *Private* ESOs. By contributing to the literature on EE by identifying a set of parameters that are likely to favor the establishment of *Private* ESOs (and thus increase the vibrancy of local ecosystems), this paper provides initial guidance on the levers that could be used to stimulate the creation of a dense infrastructure of ESOs thanks to the intervention of private actors in the market.

Appendices

Appendix A—Variables description and descriptive statistics

See Tables 6, 7, 8 and 9.

Table 6 Variable description

Variable Name	Description	Source	Use
Outcome (Dependent Variables)			
$P\_ESO_{i,t}$	Number of *Private* ESO FinTech programs available in each country *i* at year *t*, *irrespectively from the provider*	Data collection	Regression
$P\_Corp_{i,t}$	Number of *Private* ESO FinTech programs provided by Corporates in each country *i* at year *t*	Data collection	Regression
$P\_SI_{i,t}$	Number of *Private* ESO FinTech programs provided by Specialized Intermediaries in each country *i* at year *t*	Data collection	Regression
$Pres\_P\_ESO_{i,t}$	Dummy variable equal to 1 if at least one *Private* ESO FinTech program has been delivered in country *i* at year *t,* 0 otherwise	Elaboration of data collected	QCA
$Pres\_P\_Corp_{i,t}$	Dummy variable equal to 1 if at least one *Private* ESO FinTech program has been delivered by Corporates in country *i* at year *t,* 0 otherwise	Elaboration of data collected	QCA
$Pres\_P\_SI_{i,t}$	Dummy variable equal to 1 if at least one *Private* ESO FinTech program has been delivered by Specialized Intermediaries in country *i* at year *t,* 0 otherwise	Elaboration of data collected	QCA
Conditions (Independent Variables)			
$TALENT_{i,t}$	New doctorate graduates in country *i* at year *t* in Science, Technology, Engineering and Mathematics (STEM) per 1000 population aged 25–34	EIS Database	QCA and Regression
$INFRASTRUCTURE_{i,t}$	Number of enterprises in country *i* at year *t* with an internet connection of at least 100 Mb/s, divided by the total number of enterprises	EIS Database	QCA and Regression
$FINANCE_{i,t}$	Venture capital expenditures in country *i* at year *t* (seed, start-up, expansion and replacement capital), divided by total gross domestic product	EIS Database	QCA and Regression
$R\&D\_SUBS_{i,t}$	Direct government funding and government tax support for business R&D in country *i* at year *t*, as percentage of gross domestic product	EIS Database	QCA and Regression
$R\&D\_PRIV_{i,t}$	R&D expenditure in the business sectors in country country *i* at year *t*, as percentage of gross domestic product	EIS Database	QCA and Regression
$DEMAND_{i,t}$	Number of SME's introducing business process innovation in country country *i* at year *t*, as share of total number of SMEs	EIS Database	QCA and Regression
$KNOWLEDGE\_W_{i,t}$	Employment in knowledge-intensive activities in country country *i* at year *t,* as percentage of total employment	EIS Database	QCA and Regression
Control variables			
$GDP_{i,t}$	Natural logarithm of GDP at current prices in country country *i* at year *t*, in millions of Euro	Eurostat	Regression
$LabForce_{i,t}$	Natural logarithm of the number of people in country country *i* at year *t* aged 15 and older who supply labor for the production of goods and services. It includes people who are currently employed and people who are unemployed but seeking work as well as first-time job-seekers	International Labour Organization	Regression
$BankInst_{i,t}$	Natural logarithm of the number of banking institutions established in country country *i* at year *t*	European Banking Authority	Regression

Table 7 Descriptive statistics of the EE measurements

Variables	Obs	Mean	Std. Dev	Min	Max
P_ESO	140	2.493	2.88	0	12
P_Corp	140	1.543	2.048	0	9
P_SI	140	0.95	1.597	0	6
TALENT	140	0.785	0.449	0.1	3.4
INFRASTRUCTURE	140	13.779	7.85	0	42
FINANCE	140	0.09	0.077	0.004	0.397
R&D_SUBS	140	0.118	0.111	0.002	0.41
R&D_PRIV	140	0.972	0.659	0.09	2.4
DEMAND	140	33.346	10.18	7.88	54.587
KNOWLEDGE_W	140	13.993	3.683	6.6	22.9
LabForce	140	15.183	1.377	12.246	17.59
GDP	140	12.177	1.531	9.21	15.061
BankInst	140	4.699	1.182	2.833	7.478

Table 8 Correlation matrix

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)
(1) TALENT	1.000						
(2) INFRASTRUCTURE	0.314*	1.000					
	(0.000)						
(3) FINANCE	−0.019	0.296*	1.000				
	(0.794)	(0.000)					
(4) R&D_SUBS	0.409*	0.039	0.162*	1.000			
	(0.000)	(0.592)	(0.024)				
(5) R&D_PRIV	0.688*	0.393*	0.025	0.532*	1.000		
	(0.000)	(0.000)	(0.732)	(0.000)			
(6) DEMAND	0.282*	0.113	0.207*	0.312*	0.362*	1.000	
	(0.000)	(0.115)	(0.004)	(0.000)	(0.000)		
(7) KNOWLEDGE_W	0.262*	0.203*	0.533*	0.302*	0.390*	0.549*	1.000
	(0.000)	(0.004)	(0.000)	(0.000)	(0.000)	(0.000)	

**** $p<0.01$, ** $p<0.05$, * $p<0.1$*

Table 9 Descriptive statistics of the sample

Category	Stat	2016	2017	2018	2019	2020
Totality of programs (P_ESO)	Number of programs	50	63	78	75	83
	Min	0	0	0	0	0
	Max	7	9	12	10	11
	Countries with programs	15	20	20	22	21
Corporate (P_Corp)	Number of programs	28	39	53	45	51
	Min	0	0	0	0	0
	Max	5	9	8	9	9
	Countries with programs	12	18	18	17	19
Specialized Intermediary (P_SI)	Number of programs	22	24	25	30	32
	Min	0	0	0	0	0
	Max	5	5	6	6	6
	Countries with programs	9	10	10	12	14

Appendix B – QCA Analysis of Necessary Conditions

See Tables 10, 11 and 12.

Table 10 Necessary conditions analysis for the emergence of Private ESO (either Corporate or by Specialized Intermediaries) (P_ESO)

	2016		2017		2018		2019		2020	
	Consist	Coverage	Consist	Coverage	Consist	Coverage	Consist	Coverage	Consist	Coverage
TALENT	0.539	0.609	0.469	0.707	0.444	0.665	0.467	0.727	0.481	0.726
INFRASTRUCT	0.483	0.559	0.396	0.609	0.516	0.677	0.584	0.715	0.800	0.746
FINANCE	0.552	0.622	0.479	0.658	0.532	0.732	0.487	0.719	0.584	0.754
R&D_SUBS	0.485	0.649	0.359	0.639	0.310	0.556	0.311	0.631	0.376	0.703
R&D_PRIV	0.531	0.663	0.414	0.684	0.379	0.655	0.367	0.714	0.414	0.725
DEMAND	0.537	0.542	0.504	0.678	0.529	0.717	0.488	0.728	0.597	0.732
KNOWLEDGE_W	0.536	0.575	0.463	0.667	0.452	0.642	0.454	0.700	0.458	0.656

Table 11 Necessary conditions analysis for the emergence of Private ESO provided by corporates (P_Corp)

	2016		2017		2018		2019		2020	
	Consist	Coverage	Consist	Coverage	Consist	Coverage	Consist	Coverage	Consist	Coverage
TALENT	0.493	0.445	0.450	0.610	0.456	0.615	0.466	0.561	0.479	0.654
INFRASTRUCT	0.466	0.431	0.387	0.537	0.462	0.545	0.512	0.484	0.778	0.657
FINANCE	0.619	0.558	0.478	0.591	0.516	0.639	0.566	0.646	0.584	0.681
R&D_SUBS	0.373	0.400	0.290	0.465	0.291	0.469	0.246	0.385	0.364	0.616
R&D_PRIV	0.522	0.520	0.412	0.613	0.420	0.653	0.375	0.563	0.405	0.641
DEMAND	0.484	0.391	0.488	0.591	0.491	0.599	0.491	0.565	0.579	0.642
KNOWLEDGE_W	0.581	0.498	0.493	0.640	0.494	0.632	0.500	0.596	0.451	0.585

Table 12 Necessary conditions analysis for the emergence of Private ESO provided by Specialized Intermediaries (P_SI)

	2016		2017		2018		2019		2020	
	Consist	Coverage	Consist	Coverage	Consist	Coverage	Consist	Coverage	Consist	Coverage
TALENT	0.752	0.510	0.678	0.511	0.533	0.400	0.603	0.512	0.533	0.536
INFRASTRUCT	0.537	0.372	0.571	0.440	0.725	0.476	0.760	0.508	0.838	0.521
FINANCE	0.487	0.329	0.559	0.384	0.622	0.428	0.525	0.423	0.658	0.566
R&D_SUBS	0.547	0.439	0.499	0.444	0.301	0.270	0.400	0.443	0.464	0.579
R&D_PRIV	0.710	0.531	0.673	0.556	0.492	0.425	0.559	0.593	0.542	0.633
DEMAND	0.664	0.402	0.698	0.470	0.684	0.464	0.625	0.508	0.742	0.607
KNOWLEDGE_W	0.638	0.410	0.674	0.486	0.589	0.419	0.605	0.509	0.575	0.550

Appendix C—Conditional fixed-effects Poisson panel regressions

See Tables 13, 14 and 15.

Table 13 Regression on total number of Private ESO available

P_ESO	IRR	St.Err	*t*-value	*p*-value	[95% Conf	Interval]	Sig
TALENT	1.564	1.05	0.67	0.505	0.42	5.83	
INFRASTRUCT	1.003	0.027	0.12	0.901	0.951	1.058	
FINANCE	0.369	0.401	−0.92	0.358	0.044	3.094	
R&D_SUBS	2.805	4.098	0.71	0.48	0.16	49.157	
R&D_PRIV	4.299	2.439	2.57	0.01	1.414	13.069	**
KNOWLEDGE_W	1.049	0.241	0.21	0.836	0.668	1.646	
DEMAND	1.005	0.019	0.26	0.797	0.969	1.042	
LabForce	0.015	0.067	−0.94	0.346	0	91.686	
GDP	0.336	0.654	−0.56	0.575	0.007	15.19	
BankInst	0.813	0.386	−0.44	0.662	0.321	2.06	
2016b	1						
2017	1.303	0.13	2.66	0.008	1.072	1.583	***
2018	1.691	0.3	2.96	0.003	1.194	2.394	***
2019	1.621	0.429	1.82	0.068	0.964	2.724	*
2020	1.81	0.564	1.90	0.057	0.982	3.333	*
Mean dependent var	3.035	SD dependent var	2.908				
Number of obs	115	Chi-square	153.231				
Prob > chi2	0.000	Akaike crit. (AIC)	254.656				

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table 14 Regression on total number of Private ESO initiatives provided by Corporations

P_Corp	IRR	St.Err	*t*-value	*p*-value	[95% Conf	Interval]	Sig
TALENT	2.722	1.629	1.67	0.094	0.842	8.797	*
INFRASTRUCT	0.99	0.034	−0.29	0.771	0.926	1.059	
FINANCE	0.133	0.143	−1.88	0.06	0.016	1.086	*
R&D_SUBS	9.266	14.6	1.41	0.158	0.422	203.275	
R&D_PRIV	8.656	6.284	2.97	0.003	2.086	35.911	***
KNOWLEDGE_W	0.905	0.2	−0.45	0.653	0.587	1.397	
DEMAND	1.034	0.017	2.00	0.045	1.001	1.068	**
LabForce	0.038	0.148	-0.84	0.403	0	80.463	
GDP	3.773	6.121	0.82	0.413	0.157	90.666	
BankInst	1.063	0.446	0.14	0.885	0.467	2.419	
2016b	1						
2017	1.405	0.188	2.53	0.011	1.08	1.827	**
2018	2.041	0.42	3.47	0.001	1.364	3.055	***
2019	1.533	0.389	1.69	0.092	0.933	2.519	*
2020	1.61	0.536	1.43	0.153	0.838	3.091	
Mean dependent var	2.160	SD dependent var	2.131				
Number of obs	100	Chi-square	401.153				
Prob > chi2	0.000	Akaike crit. (AIC)	199.965				

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table 15 Regression on total number of Private ESO programs provided by Specialized Intermediaries

P_SI	IRR	St.Err	*t*-value	*p*-value	[95% Conf	Interval]	Sig
TALENT	0.035	0.071	−1.63	0.103	0.001	1.964	
INFRASTRUCT	1.013	0.027	0.48	0.628	0.962	1.066	
FINANCE	0.792	3.01	−0.06	0.951	0	1363.415	
R&D_SUBS	0.236	0.96	−0.36	0.722	0	676.252	
R&D_PRIV	1.328	0.822	0.46	0.647	0.395	4.465	
KNOWLEDGE_W	1.057	0.341	0.17	0.863	0.562	1.99	
DEMAND	0.975	0.026	−0.96	0.338	0.926	1.027	
LabForce	22.414	172.44	0.40	0.686	0	79259604	
GDP	0.015	0.056	−1.13	0.259	0	22.015	
BankInst	0.538	0.328	−1.02	0.309	0.163	1.774	
2016b	1						
2017	1.079	0.122	0.67	0.501	0.864	1.347	
2018	1.163	0.319	0.55	0.581	0.68	1.99	
2019	1.864	1.005	1.15	0.248	0.648	5.364	
2020	2.117	1.524	1.04	0.297	0.516	8.68	
Mean dependent var	1.773	SD dependent var	1.820				
Number of obs	75	Chi-square	37190.405				
Prob > chi2	0.000	Akaike crit. (AIC)	142.063				

**** $p<0.01$, ** $p<0.05$, * $p<0.1$*

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Data availability The built-on purpose dataset is available upon request.

Declarations

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References

Ács, Z. J., Autio, E., & Szerb, L. (2014). National Systems of Entrepreneurship: Measurement issues and policy implications. *Research Policy, 43*(3), 476–494. https://doi.org/10.1016/j.respol.2013.08.016

Ács, Z. J., Desai, S., & Hessels, J. (2008). Entrepreneurship, economic development and institutions. *Small Business Economics, 31*(3), 219–234. https://doi.org/10.1007/s11187-008-9135-9

Ács, Z. J., Stam, E., Audretsch, D. B., & O'Connor, A. (2017). The lineages of the entrepreneurial ecosystem approach. *Small Business Economics, 49*(1), 1–10. https://doi.org/10.1007/s11187-017-9864-8
Alaassar, A., Mention, A. L., & Aas, T. H. (2022). Ecosystem dynamics: Exploring the interplay within fintech entrepreneurial ecosystems. *Small Business Economics, 58*(4), 2157–2182. https://doi.org/10.1007/s11187-021-00505-5
Anyadike-Danes, M., Bonner, K., Hart, M., & Mason, C. (2009). Measuring business growth: High-growth firms and their contribution to employment in the UK.
Audretsch, D., Belitski, M., & Desai, S. (2015). Entrepreneurship and economic development in cities. *Annals of Regional Science, 55*(1), 33–60. https://doi.org/10.1007/s00168-015-0685-x
Audretsch, D., Colombelli, A., Grilli, L., Minola, T., & Rasmussen, E. (2020). Innovative start-ups and policy initiatives. *Research Policy, 49*(10), 104027. https://doi.org/10.1016/j.respol.2020.104027
Audretsch, D., Khurana, I., Dutta, D. K., & Tamvada, J. P. (2024). Creating effective university innovation and entrepreneurial ecosystems: A commitment system perspective. *Journal of Technology Transfer*. https://doi.org/10.1007/s10961-024-10090-w
Aversa, P., Furnari, S., & Haefliger, S. (2015). Business model configurations and performance: A qualitative comparative analysis in Formula One racing, 2005–2013. *Industrial and Corporate Change, 24*(3), 655–676. https://doi.org/10.1093/icc/dtv012
Bergman, B. J., & Mcmullen, J. S. (2022). Helping entrepreneurs help themselves: A review and relational research agenda on entrepreneurial support organizations. *Entrepreneurship Theory and Practice, 46*(3), 688–728.
Bonomi Santos, J., Fernandes, A. R., de Oliveira, P. T., Maia, L. M., & Partyka, R. B. (2023). Increasing entrepreneurial ecosystem-level outcomes through orchestration: A proposed framework. *Technovation*. https://doi.org/10.1016/j.technovation.2023.102873
Brown, R., & Mason, C. (2017). Looking inside the spiky bits: A critical review and conceptualisation of entrepreneurial ecosystems. *Small Business Economics, 49*(1), 11–30. https://doi.org/10.1007/s11187-017-9865-7
Brown, R., & Mawson, S. (2019). Entrepreneurial ecosystems and public policy in action: A critique of the latest industrial policy blockbuster. *Cambridge Journal of Regions, Economy and Society, 12*(3), 347–368. https://doi.org/10.1093/cjres/rsz011
Cao, Z., & Shi, X. (2021). A systematic literature review of entrepreneurial ecosystems in advanced and emerging economies. *Small Business Economics, 57*(1), 75–110. https://doi.org/10.1007/s11187-020-00326-y
Cavallo, A., Ghezzi, A., & Balocco, R. (2019). Entrepreneurial ecosystem research: Present debates and future directions. *International Entrepreneurship and Management Journal, 15*(4), 1291–1321. https://doi.org/10.1007/s11365-018-0526-3
Clayton, P., Feldman, M., & Lowe, N. (2018). Behind the scenes: Intermediary organizations that facilitate science commercialization through entrepreneurship. *Academy of Management Perspectives, 32*(1), 104–124. https://doi.org/10.5465/amp.2016.0133
Cohen, S., Bingham, C. B., & Hallen, B. L. (2019a). The role of accelerator designs in mitigating bounded rationality in New Ventures. *Administrative Science Quarterly, 64*(4), 810–854. https://doi.org/10.1177/0001839218782131
Cohen, S., Fehder, D. C., Hochberg, Y. V., & Murray, F. (2019b). The design of startup accelerators. *Research Policy, 48*(7), 1781–1797. https://doi.org/10.1016/j.respol.2019.04.003
Colombelli, A., Krafft, J., & Vivarelli, M. (2016). To be born is not enough: The key role of innovative startups. *Small Business Economics, 47*(2), 277–291. https://doi.org/10.1007/s11187-016-9716-y
Colombelli, A., Paolucci, E., & Ughetto, E. (2019). Hierarchical and relational governance and the life cycle of entrepreneurial ecosystems. *Small Business Economics, 52*(2), 505–521. https://doi.org/10.1007/s11187-017-9957-4
Colombo, M. G., Dagnino, G. B., Lehmann, E. E., & Salmador, M. P. (2019). The governance of entrepreneurial ecosystems. *Small Business Economics, 52*(2), 419–428. https://doi.org/10.1007/s11187-017-9952-9
Crișan, E. L., Salanță, I. I., Beleiu, I. N., Bordean, O. N., & Bunduchi, R. (2021). A systematic literature review on accelerators. *Journal of Technology Transfer, 46*(1), 62–89. https://doi.org/10.1007/s10961-019-09754-9
Dalle, J.-M., den Besten, M., & Menon, C. (2017). *Using Crunchbase for Economic and Managerial Research.* https://doi.org/10.1787/6c418d60-en
Edler, J., & Yeow, J. (2016). Connecting demand and supply: The role of intermediation in public procurement of innovation. *Research Policy, 45*(2), 414–426. https://doi.org/10.1016/j.respol.2015.10.010

Eliasson, G. (2003). The venture capitalist as a competent outsider. In K.-J., Alho, & Y.-A .Lassila-Pekka (Eds.), *Economic research and decision making-essays on structural change, growth and economic policy*. ETLA, Helsinki.
European Commission. (2015). *Directive (EU) 2015/ of the European Parliament and of the Council of 25 November 2015 on payment services in the internal market*.
Eveleens, C. P., van Rijnsoever, F. J., & Niesten, E. M. M. I. (2017). How network-based incubation helps start-up performance: A systematic review against the background of management theories. *Journal of Technology Transfer, 42*(3), 676–713. https://doi.org/10.1007/s10961-016-9510-7
Fehder, D. C., & Hochberg, Y. V. (2014). *Accelerators and the regional supply of venture capital investment.* https://ssrn.com/abstract=2518668
Feld, B. (2020). *Startup communities: Building an entrepreneurial ecosystem in your city*. New Jersey: John Wiley & Sons.
Fiss, P. C. (2007). A set-theoretica approach to organizational configurations. *Academy of Management Review, 32*(4), 1180–1198.
Godley, A., Morawetz, N., & Soga, L. (2021). The complementarity perspective to the entrepreneurial ecosystem taxonomy. *Small Business Economics, 56*(2), 723–738. https://doi.org/10.1007/s11187-019-00197-y
Gomber, P., Kauffman, R. J., Parker, C., & Weber, B. W. (2018). On the Fintech revolution: Interpreting the forces of innovation, disruption, and transformation in financial services. *Journal of Management Information Systems, 35*(1), 220–265. https://doi.org/10.1080/07421222.2018.1440766
Goswami, K., Mitchell, J. R., & Bhagavatula, S. (2018). Accelerator expertise: Understanding the intermediary role of accelerators in the development of the Bangalore entrepreneurial ecosystem. *Strategic Entrepreneurship Journal, 12*(1), 117–150. https://doi.org/10.1002/sej.1281
Haddad, C., & Hornuf, L. (2019). The emergence of the global fintech market: Economic and technological determinants. *Small Business Economics, 53*(1), 81–105. https://doi.org/10.1007/s11187-018-9991-x
Harris, J. L. (2021). Bridging the gap between 'Fin' and 'Tech': The role of accelerator networks in emerging FinTech entrepreneurial ecosystems. *Geoforum, 122*, 174–182. https://doi.org/10.1016/j.geoforum.2021.04.010
Hollanders, H., & Pereira, T. (2022). *European Innovation Scoreboard 2021- Methodology Report*. https://ec.europa.eu/docsroom/documents/45664
Howells, J. (2006). Intermediation and the role of intermediaries in innovation. *Research Policy, 35*(5), 715–728. https://doi.org/10.1016/j.respol.2006.03.005
Hruskova, M., Mason, C., & Herzog, S. (2022). Mapping entrepreneurship support organisations: An examination of the 'cluttered landscape' critique. *Local Economy, 37*(7), 541–563. https://doi.org/10.1177/02690942231173655
Isenberg, D. (2011). *The entrepreneurship ecosystem strategy as a new paradigm for economic policy: Principles for cultivating entrepreneurship*. Institute of International and European Affairs.
Kraus, S., Ribeiro-Soriano, D., & Schüssler, M. (2018). Fuzzy-set qualitative comparative analysis (fsQCA) in entrepreneurship and innovation research – the rise of a method. *International Entrepreneurship and Management Journal, 14*(1), 15–33. https://doi.org/10.1007/s11365-017-0461-8
Lee, I., & Shin, Y. J. (2018). Fintech: Ecosystem, business models, investment decisions, and challenges. *Business Horizons, 61*(1), 35–46. https://doi.org/10.1016/j.bushor.2017.09.003
Leendertse, J., Schrijvers, M., & Stam, E. (2021). Measure twice, cut once entrepreneurial ecosystem metrics. *Research Policy*. https://doi.org/10.1016/j.respol.2021.104336
Lerner, J. (2010). The future of public efforts to boost entrepreneurship and venture capital. *Small Business Economics, 35*(3), 255–264. https://doi.org/10.1007/s11187-010-9298-z
Mack, E., & Mayer, H. (2016). The evolutionary dynamics of entrepreneurial ecosystems. *Urban Studies, 53*(10), 2118–2133. https://doi.org/10.1177/0042098015586547
Malecki, E. J. (2018). Entrepreneurship and entrepreneurial ecosystems. *Geography Compass*. https://doi.org/10.1111/gec3.12359
Mason, C., & Brown, R. (2014). *Entrepreneurial ecosystems and growth oriented entrepreneurship* (Vol. 30, pp. 77–102). Final report to OECD, Paris.
Mason, C., & Brown, R. (2013). Creating good public policy to support high-growth firms. *Small Business Economics, 40*(2), 211–225. https://doi.org/10.1007/s11187-011-9369-9
McEvily, B., & Zaheer, A. (1999). Bridging ties: A source of firm heterogeneity in competitive capabilities. *Strategic Management Journal, 20*(12), 1133–1156. https://doi.org/10.1002/(SICI)1097-0266(199912)20:12%3c1133::AID-SMJ74%3e3.0.CO;2-7
Misangyi, V. F., & Acharya, A. G. (2014). Substitutes or complements? A configurational examination of corporate governance mechanisms. *Academy of Management Journal, 57*(6), 1681–1705. https://doi.org/10.5465/amj.2012.0728

Porras-Paez, A., & Schmutzler, J. (2019). Orchestrating an entrepreneurial ecosystem in an emerging country: The lead actor's role from a social capital perspective. *Local Economy, 34*(8), 767–786. https://doi.org/10.1177/0269094219896269

Pustovrh, A., Rangus, K., & Drnovšek, M. (2020). The role of open innovation in developing an entrepreneurial support ecosystem. *Technological Forecasting and Social Change*. https://doi.org/10.1016/j.techfore.2019.119892

Quine, Wv. (1952). The problem of simplifying truth functions. *The American Mathematical Monthly, 59*(8), 521–531. https://doi.org/10.1080/00029890.1952.11988183

Ragin, C. C. (1987). *The comparative method: Moving beyond qualitative and quantitative strategies*. University of California Press.

Ragin, C. C. (2000). *Fuzzy-set social science*. University of Chicago Press.

Ragin, C. C. (2006). Set relations in social research: Evaluating their consistency and coverage. *Political Analysis, 14*(3), 291–310. https://doi.org/10.1093/pan/mpj019

Ragin, C. C. (2009). Qualitative comparative analysis using fuzzy sets (fsQCA). *Configurational Comparative Methods: Qualitative Comparative Analysis (QCA) and Related Techniques, 51*, 87–121.

Ratinho, T., Amezcua, A., Honig, B., & Zeng, Z. (2020). Supporting entrepreneurs: A systematic review of literature and an agenda for research. *Technological Forecasting and Social Change*, *154*, 119956. https://www.sciencedirect.com/science/article/abs/pii/S0040162518311399

Roundy, P. T., Bradshaw, M., & Brockman, B. K. (2018). The emergence of entrepreneurial ecosystems: A complex adaptive systems approach. *Journal of Business Research, 86*, 1–10. https://doi.org/10.1016/j.jbusres.2018.01.032

Saxenian, A. (1996). *Regional advantage: Culture and competition in Silicon Valley and route 128*. Harvard University Press.

Schneider, C. Q., & Wagemann, C. (2010). Standards of good practice in qualitative comparative analysis (QCA) and fuzzy-sets. *Comparative Sociology, 9*(3), 397–418. https://doi.org/10.1163/156913210X12493538729793

Schneider, M. R., & Eggert, A. (2014). Embracing complex causality with the QCA method: An invitation. *Journal of Business Market Management, 7*(1), 312–328.

Schrank, A., & Whitford, J. (2011). The anatomy of network failure. *Sociological Theory, 29*(3), 151–177. https://doi.org/10.1111/j.1467-9558.2011.01392.x

Schrijvers, M., Stam, E., & Bosma, N. (2021). *Figuring it out Configurations of high-performing entrepreneurial ecosystems in Europe*. www.uu.nl/use/research

Shane, S. (2009). Why encouraging more people to become entrepreneurs is bad public policy. *Small Business Economics, 33*(2), 141–149. https://doi.org/10.1007/s11187-009-9215-5

Shi, X., & Shi, Y. (2022). Unpacking the process of resource allocation within an entrepreneurial ecosystem. *Research Policy, 51*(9), 104378. https://doi.org/10.1016/j.respol.2021.104378

Sipola, S., Puhakka, V., & Mainela, T. (2016). A start-up ecosystem as a structure and context for high growth. *Advances in International Management, 29*, 179–202. https://doi.org/10.1108/S1571-502720160000029012

Spigel, B. (2017). The Relational Organization of Entrepreneurial Ecosystems. *Entrepreneurship: Theory and Practice*, *41*(1), 49–72. https://doi.org/10.1111/etap.12167

Spigel, B. (2022). Examining the cohesiveness and nestedness entrepreneurial ecosystems: Evidence from British FinTechs. *Small Business Economics, 59*(4), 1381–1399. https://doi.org/10.1007/s11187-021-00589-z

Spigel, B., & Harrison, R. (2018). Toward a process theory of entrepreneurial ecosystems. *Strategic Entrepreneurship Journal, 12*(1), 151–168. https://doi.org/10.1002/sej.1268

Stam, E., & van de Ven, A. (2021). Entrepreneurial ecosystem elements. *Small Business Economics, 56*(2), 809–832. https://doi.org/10.1007/s11187-019-00270-6

The State of European Fintech. (2019). www.finchcapital.com

State of European FinTech 2023. (2023). www.finchcapital.com

Theodoraki, C., Messeghem, K., & Audretsch, D. B. (2022). The effectiveness of incubators' co-opetition strategy in the entrepreneurial ecosystem: empirical evidence from France. *IEEE Transactions on Engineering Management, 69*(4), 1781–1794. https://doi.org/10.1109/TEM.2020.3034476

Tjong Tjin Tai, S.-Y., Veraart, F., & Davids, M. (2015). How the Netherlands became a bicycle nation: Users, firms and intermediaries, 1860–1940. *Business History, 57*(2), 257–289.

van De Ven, A. H. (1993). The development of an infrastructure for entrepreneurship. *Journal of Business Venturing, 8*(3), 211–230.

van Rijnsoever, F. J. (2020). Meeting, mating, and intermediating: How incubators can overcome weak network problems in entrepreneurial ecosystems. *Research Policy, 49*(1), 103884. https://doi.org/10.1016/j.respol.2019.103884 van Rijnsoever, F. J. (2022). Intermediaries for the greater good: How entrepreneurial support organizations can embed constrained sustainable development startups in entrepreneurial ecosystems. *Research Policy, 51*(2), 104438. https://doi.org/10.1016/j.respol.2021.104438

van Weele, M., van Rijnsoever, F. J., & Nauta, F. (2017). You can't always get what you want: How entrepreneur's perceived resource needs affect the incubator's assertiveness. *Technovation, 59*, 18–33. https://doi.org/10.1016/j.technovation.2016.08.004

Verheul, I., Wennekers, S., Audretsch, D., & Thurik, R. (2001). *An Eclectic Theory of An Eclectic Theory of Entrepreneurship Entrepreneurship*. http://www.tinbergen.nl

Walsh, K., Nelles, J., & Stephens, S. (2023). Recycling in entrepreneurial ecosystems: The phenomenon of boomeranging. *R and D Management, 53*(4), 709–727. https://doi.org/10.1111/radm.12572

Wurth, B., Stam, E., & Spigel, B. (2023). Entrepreneurial ecosystem mechanisms. *Foundations and Trends in Entrepreneurship, 19*(3), 224–339. https://doi.org/10.1561/0300000089

Zadeh, L. A. (1965). Fuzzy sets. *Information and Control, 8*, 338–353.

Zhang, Y., & Li, H. (2010). Innovation search of new ventures in a technology cluster: The role of ties with service intermediaries. *Strategic Management Journal, 31*(1), 88–109. https://doi.org/10.1002/smj.806