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Regional innovation systems and entrepreneurial ecosystems: their value added to rethinking regional development policies

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ABSTRACT

Advances on the understanding the innovation process and phenomenon, principally coming from the regional innovation systems approach and from the theorization around the concept of entrepreneurial ecosystems, have given an impulse to entrepreneurship promotion. The aim of this paper is two-fold. On the one hand, the first objective is to contextualize and clarify the concepts of regional innovation systems and entrepreneurial ecosystems that have been gaining a growing importance in terms of regional policy. It will also address their differences and complementarities, proposing an analytical filter to enhance their understanding, both theoretically and operationally. The second objective is to formulate a set of recommendations about the role both concepts bring to local and regional development strategies, opening the way for a set of public policy interventions.

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1. Introduction

Globalization has been accentuating the change in the design of business strategies from a static price-based competition to a dynamic competition that favours regions that are able to (re)create knowledge and specific know-how more rapidly than their competitors (Barrichello, Santos, and Morano 2020; Jeannerat and Crevoisier 2022). The contemporary knowledge and learning economy is implicitly an economy that establishes its competitive advantages in the continuous request for innovation (Huggins and Thompson 2017). Innovation is accordingly understood primarily as the result of a collective, complex and interactive process (firms do not innovate alone), companies depending increasingly on the access and absorption of codified and tacit knowledge originating from diverse public and private actors (Jensen et al. 2007). It is therefore not surprising that in these circumstances the innovative firm is seen as a product of their local/regional environment, and this later one is understood as the true innovator agent, sustaining the idea that territorial competitiveness is increasingly dependent upon the capacity of promoting collective learning mechanisms and generating new forms of strategic knowledge and entrepreneurial activity (Camagni 2014; Isaksen, Tödtling, and Trippl 2016). This paradigm shift entails a new perception of the relationship between industrial dynamics

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and regional development: long-term regional competitiveness and sustainability have less to do with the traditional optimization of factors allocation and cost-efficiency and more to do with the capability of firms and institutions to innovate, thus demanding a constant flow of entrepreneurship promotion and start-up creation (Asheim, Smith, and Oughton 2011; Lerro and Jacobone 2014; Nijkamp 2003).

While the concept of entrepreneurial ecosystems is now, a prominent emergent topic and a relevant stream in innovation and entrepreneurship research, the question of how this approach is filiated on previous theoretical models and affirms its singularities, is still a neglected issue (Spigel 2017). With this paper, we address this research gap, trying to map a more rich and comprehensive innovation systems genealogy, namely by establishing a comparison with the more mature concept of regional innovation system. This paper tries to integrate this comparative perspective and connect it to the design and implementation of innovation policies.

The aim of this paper is two-fold. On the one hand, the first objective is to contextualize and clarify the concepts of regional innovation systems and entrepreneurial ecosystems that have been gaining growing importance in terms of regional policy. It will also address their differences and complementarities, proposing an analytical filter to enhance their understanding, both theoretically and operationally. The second objective is, linking theory with policy challenges, to formulate a set of recommendations about the role both concepts bring to local and regional development strategies and opening the way for a new set of public policy interventions.

The study is structured as follows. Section 2 presents a review of regional innovation systems and the entrepreneurial ecosystems approaches and the corresponding conceptual frameworks. Section 3 presents the implications both models have in terms of territorial innovation and entrepreneurship policies and the empirical results. Section 4 concludes and points to further research.

2. Regional innovation systems and entrepreneurial ecosystems: a theoretical *continuum*

The subject of innovation, with its business and territorial impacts, has been the subject of deep study, mainly by three schools of Regional Studies, whose analytical and operational similarities, moreover, place them more as complementary approaches: the Industrial District model, that emerged during the 80's, where a strong SME specialization and cooperation culture constitute the appropriate support of public goods and institutions related to a locally developing division of labour (Becattini, Bellandi, and De Propris 2009); since 1985, the theoretical framework constructed by the GREMI (Groupe de Recherche Européen sur les Milieux Innovateurs), with the core role of regional dynamics attributed to innovative networks that activate territories into innovative *milieux* (Camagni and Maillat 2006); and, emerging during the 90s and affiliated on the previous models, the Regional Innovation Systems approach (Cooke 2008; Cooke, Uranga, and Etxebarria 1997; Cooke, Uranga, and Etxebarria 1998), with its emphasis on collective learning processes within connected groups of technological or functional areas. Lundvall (1992) seems to synthesize and unify their contribution to better understand the dynamics territories are facing when he affirms: 'in the contemporary economy knowledge is the most important resource, while learning is the most important process'.

In this sense, innovation dynamics appear to be established on resources that embody specific territorial assets, not being therefore a foot-loose process (Asheim, Smith, and Oughton 2011). Production and innovation systems, territorially anchored, are increasingly seen as critical instruments to capture and recreate knowledge. A key focus of this concept is its focus on the relational aspects between different institutional stakeholders and how this helps the innovation process. It highlights the idea that innovation also encompasses a robust territorial and institutional organization which constitutes a crucial instrument in the process of techno-economic creation, assuming a strategic positioning on the continuous competitive renewal of industries and territories. In this theoretical perspective, on which predominates a relational and networking strategy, innovation is understood as the incorporation by the milieu of strategic information and resources, therefore, largely surpassing the narrow definition of innovation as a strictly technological and firm-centered event (Doloreux and Porto Gomez 2017; Santos and Simões 2014).

Building on this foundation, the more recent and still emerging research area of entrepreneurial ecosystems (Feld 2012; Isenberg and Onyemah 2016; Neck et al. 2004) takes an embedded interpretation of new business ventures and their progress. This new approach acknowledges that companies do not work in a vacuum and are in fact implanted in the broader social, cultural and institutional context that shapes their growth and adds to their chance of success.

The entrepreneurial ecosystem approach differs from the regional innovation system model by the fact that the entrepreneur, rather than the firm, is the focal point of analysis. The entrepreneurial ecosystem approach thus emerges from the entrepreneurial individual instead of the firm but also emphasizes the role of the social and economic context implicit in the entrepreneurial course. Most innovation system studies focus on firms and industries, including their dynamics (Clarysse et al. 2014; Mack and Mayer 2016). As opposed to the innovation systems literature, the focus of ecosystems research is placed mainly on the entrepreneur, his/her academic and business profile, and the startup rather than larger, more established firms or slower-growing SMEs. While the framework regional innovation systems do integrate a role for entrepreneurs (Audretsch et al. 2012; Feldman 2014; Stam and Welter 2021), the focus is not specifically on them but, instead, on the protagonism of entrepreneurs and startups within open systems of value creation and innovation. As a result, the regional innovation system approach habitually interprets startups as smaller varieties of larger, international firms rather than as peculiar organizational entities with different (and often more limited) capabilities and resources.

Spigel (2017) suggests that the advantages of an entrepreneurial ecosystem are associated with resources specific to the entrepreneurship process, such as startup culture and financing rather than other types of industrial advantages, underlining the importance of this complementary view either to comprehend or to stimulate local and regional competitiveness dynamics.

Entrepreneurship, however, goes beyond the Schumpeterian role of recombining resources into new market offerings (Tödtling and Trippl 2018). It is viewed as the individual and collective capacity to implement concrete projects to bring about change (Grillitsch and Sotarauta 2020). In this sense, territorial innovation policy should give prominence to entrepreneurship ecosystems that are not only about developing new

production, processes and market challenges but also about shaping the future social conditions of these opportunities (Stam and Van de Ven 2021).

It is important, however, to acknowledge the vast fields of intersection and complementary between the two approaches that, in fact, prevail over the differences. In fact, both models converge on the strategic aim of opening up new avenues of strong competitiveness, the innovation drivers coming mainly more from the supply side (regional innovation system) or more from the demand side (entrepreneurial ecosystem) (Tsvetkova, Schmutzler, and Pugh 2020). Freire-Gibb and Gregson (2019) underline this point, finding significant overlap between innovation systems and entrepreneurial ecosystems. Both concepts share common elements such as networks, institutions, and policies. However, their focus differs, with innovation systems being more institutional and policy-driven, whereas entrepreneurial ecosystems emphasize entrepreneurial activity and market-driven innovation. Nevertheless, they both are anchored on active networking, be they dominated by academic and R&D institutions or by firms, and they are very open structures, a critical dimension to exchange different formats of strategic knowledge. Both approaches aim to create a development path based on the systematic production of different innovation modalities that allow firms and territories to continuously renew their competitiveness profiles (Spigel and Harrison 2018).

Given these differences but also the vast array of similarities between the regional innovation systems and the entrepreneurial ecosystems approaches, Granstrand and Holgersson (2020) affiliate on the continuous rich debate of the systems approach in innovation studies occurring in the 1990s and the quest for meso-level concepts (such as industrial clusters or regional complexes). In fact, it is a research *continuum* stream whose roots come from the fertilization appeal of the systems approach with territorial development (Table 1).

It is usually agreed that entrepreneurship and entrepreneurial actors are at the heart of the entrepreneurial ecosystem model (Isenberg 2010; Stam 2015). Granstrand and Holgersson (2020) point out the importance of complementary/cooperative and substitute/competitive relations, often mixed and intertwined, assuming the dynamics conducive to innovation. Despite the fact that the systemic innovation research works depicts entrepreneurship as a kind of black box (Stam 2015; Stam and Spigel 2016), entrepreneurs and their associate entrepreneurial infrastructure do constitute the core stakeholders within this analytical concept. The entrepreneurial ecosystems exhibit conceptual strengths in terms of integrating entrepreneurs as economic actors (instead of firms as the smallest unit of analysis). In fact, it is the combination of unique localized features – be they social, institutional and relational – within ecosystems that provide the concept its explanatory potential.

Overall, this debate, enriched by the regional innovation systems and the entrepreneurial ecosystems models, about the nature of innovation-based entrepreneurship, and its implications a territorial level, led to the gradual recognition that innovation is neither a one-way diffusion process, nor a clear-cut factor-impact relationship between the creative innovative entrepreneur and the firm, but a process and/or an (eco)system where entrepreneurial culture dominates the profile of the local or regional economy. The pluralism of interpretations of the entrepreneurial and innovation dynamics converges however on the understanding of the importance of the collective learning processes, networking and governance. More profound and lasting effects of increased

Table 1. Regional innovation systems and entrepreneurial ecosystems: synoptic comparison.

	Regional Innovation System	Entrepreneurial Ecosystem
Emergence	Induced; as a cognitive and organizational entity	Spontaneous/Induced; as an entrepreurial and business entity
Predominant *culture*	RD&I culture	Entrepreneurial culture
Productive system	Industrial and tertiary; diversification of production from the standpoint of intra-industry division of labour; large and SMEs; quasi-vertical integration;	Industrial and tertiary; Micro, small and medium firms; start-ups and spin-offs; open namely via suppliers and clients
Non-mercantile relations among the firms	High intensity of extra-productive exchanges; diversity of non-market formal relations	High intensity of extra-productive exchanges; informal inter-personal networks of information flows
External relations	Strong opening to the outside; open namely via S&T partners; insertion on the international circuits of information and knowledge transfer	Strong opening to the outside, namely via market relationships (suppliers, clients, consultants); insertion on the business and financial international circuits
Reticular structures	networks with RD&I institutions (university, …)	Compacts; networks with leader enterprises or with pivot enterprises
Logics	Of partnership; institutional architecture as a lever of the territorial competitiveness; promotion of the innovation potential; closer to RD&I inputs creation	Of partnership; creation of collective learning mechanisms as vehicles of the competitive renewal of the productive basis; closer to the market dynamics and needs
Dominant forms of knowledge	Codified, global; Knowledge understood as a public good; institutional collective learning	Business, entrepreneurial as well as codified; global;
Dominant forms of learning	*By searching, by networking*	*By doing, by interacting, by networking;*
Dominant modalities of innovation	Incremental and radical – first of its kind; of the product, of the process and organizational; broad spectrum of innovative production (hard and soft, including also organizational, market and social innovations)	Incremental and radical – first of its kind; of the product, of the process and organizational; innovation as a means, not as a strategic aim; broad spectrum
Growth dynamics	Cross-fertilization; highly induced by the institutional universe; dynamic adjustment between the entrepreneurial and the institutional spheres; public policies strongly involved	Competition-cooperation; induced by the activation of knowledge flows; entrepreneurial risk is institutionally supported; public policies as facilitators

Source: own elaboration.

competitiveness can only be obtained if there are *milieu* conditions that endogenize entrepreneurship as the cross-beam of the regional innovation dynamics. Thus, entrepreneurship promotion must be associated with territorial policies and new governance models that may favour the mobilization, participation and growing qualification of the regional and local stakeholders. In this sense, the anchorage and embeddedness of entrepreneurship seem to be, to a large extent, proportional to the collective learning capabilities of the institutional and business stakeholders.

3. Regional innovation systems and entrepreneurial ecosystems: the challenge of redesigning public policies

It seems crucial to ensure that discussions over regional innovation systems and entrepreneurial ecosystems do not become entrenched in an ambiguous assumption that their proposals are necessarily positive developments in the business and territorial domains (Ahvenniemi et al. 2017; Angelidou 2015; Lerro and Jacobone 2014). It is imperative these models not to be simply void signifiers, and to question and discuss

what is fundamental in a way that allows urban and regional policy to thrive, and not to be removed from the need to rethink territorial competitiveness.

The majority of academics, nevertheless, understand (eco)systems primarily as spatial entities heavily path dependent and rooted in their historical and institutional course (Feldman and Tavassoli 2015; Jacobides, Cennamo, and Gawer 2018). As a result, every (eco)system is unique with its own distinctive idiosyncrasies and characteristics that are geographically, relationally and socially rooted. These arguments point to the need to adapt innovation policy instruments to take into account the specific problems faced by the diversity of regional economies. There is no one set of policy instruments or a 'one-size-fits-all' policy portfolio that responds mechanically and adequately to all types of socioeconomic regional peculiarities. From the systems viewpoint, policy instruments must be adapted to distinctive characteristics in individual territories, building on the analysis of regional innovation and entrepreneurial (eco)system barriers, e.g. features that inhibit the regional industrial milieu, its institutional set-up, obstacles related to attitude towards innovation and entrepreneurship, etc.

There is, however, a gap in the orthodox literature on regional innovation systems and entrepreneurial ecosystems. The vast majority of authors only care and address technological domains, often disregarding the immense change potential inscribed on other, softer, modalities of innovation, such as organizational innovation and marketing innovation (Santos and Simões 2014; Simões and Santos 2014), even at the local or regional levels. While technology in the form of local or regional infrastructure is an integral part of competitiveness, it should only be seen as an enabler to meet the needs of the economic stakeholders (Athey et al. 2008; Camagni, Capello, and Lenzi 2014; Jeannerat and Crevoisier 2022; Johnson 2008). Infrastructure development should therefore rely on an entrepreneur-centric approach that responds to the sustainable development needs of firms, avoiding the reductionist technology-centric approach. Infrastructural answers should be chosen and designed with a deep understanding of economic agents' profiles, needs and expectations. Entrepreneurial-focused initiatives in successful territories tend to be, thus, demand-driven rather than supply-driven, or there is usually a trade-off between the two approaches (Pitelis 2012; Romano et al. 2014) (see Table 2).

The regional innovation systems approach has basically emphasized the importance that the formal and informal mechanisms of production, dissemination and consumption of strategic information and knowledge have for the competitive performance of these systems (Asheim, Grillitsch, and Trippl 2016; McCann and Ortega-Argilès 2011). From the point of view of the formulation of innovation policies, this seems an enriching approach, especially for peripheral regions, because they allow to inquire about the set of fundamental conditions (on the quality of actors, externalities, in the processes of knowledge increase, networking, political-institutional culture, etc.) that need to be brought together so that a trajectory conducive to the promotion of regional innovation potential can take place in a competitive and sustainable way, beyond the reductive but complementary limits attached to orthodox industrial policies (Boschma 2017; Capello 2014; EC 2012; Feldman, Siegel, and Wright 2019; McCann and Ortega-Argilès 2011; Tsvetkova et al. 2017).

Both models, however, converge on the strategic mission of promoting the competitiveness of the productive system in a context of globalization of economic relations and the acquisition of competitive advantages resulting from the entrepreneurial ability to

Table 2. Diversity versus complementarity: RIS and EE policy approaches.

	RIS Policy Approach	Entrepreneurial Ecosystem Approach
Strategic objectives	Promote institutional systemic dynamics; innovation outputs	Support the local/regional entrepreneurial dynamics; business competitiveness
Industrial focus	Focus on high-tech firms; smart specialization logics; stimulating policies for reinforcement of productive basis along with the promotion of emerging S&T sectors	Special emphasis on start-ups and NTBFs; strategic bet on emergent stimulation of local and regional entrepreneurial dynamics
Competitiveness	RD&I competitive advantages	Business differential advantages; built advantages of the milieu.
Pivotal stakeholders	Based on R&D institutions;	Strategically focused on firms and, mainly, on the entrepreneurs of a specific socioeconomic milieu.
Entrepreneurship	Entrepreneurial processes as a no-problem situation – intermediation RD&I factors with the usual dynamic firms and new technology-based start-ups	Entrepreneurial dynamics as a key mechanism of change; search and stimulation of the hidden or latent entrepreneurial demand
Policy instruments	Demand-pull and science-push instruments, often in combination; hard (science parks, incubators, etc.) and soft infrastructure; funding/subsidies related measures; interface institutions; institutional networking	Interactive and systemic dynamics; pedagogical and experimental approach; predominance of soft instruments; entrepreneurial networking – main mechanisms of assistance are relational forms of support; support of entrepreneurial capabilities; entrepreneurial empowerment as a learning process
Main risks	Mechanical transfer of successful urban-metropolitan case studies; institutional sclerosis	Difficulties in guaranteeing a shared strategic vision; crowding out and lock-in situations; deficits of socioeconomic cohesion

Source: own elaboration.

innovate. It needs to be underlined that this new set of policy instruments, not being founded on large scales or in infrastructural projects, requires a high degree of decentralization in their design, delivery and management, as well as a consensual and cooperative work among the various actors involved, not forgetting the need for a clear territorial leadership without which it seems difficult to bring together the various rationales into play (Roundy, Bradshaw, and Brockman 2018). This suggests, of course, that an increase in regional capability for innovation inevitably involves new forms of organization and institutional partnership to help improve the structural competitiveness of the companies (Simões and Santos 2014; Vargo, Wieland, and Akaka 2015), developing innovative and entrepreneurial (eco)systems has to be a blend of top-down and bottom-up approaches.

The entrepreneurial ecosystem model adds a new challenge for public policies. A gradual transformation in territorial governance from a managerial to an entrepreneurial focus has to be accomplished. After all, there is a decisive requirement for businesses: public investments are often too marginal to be effective for a cost-intensive sustainable development. Companies representing private capital markets are needed to supply local and regional economies with enough sums of financial flows. These companies comprise, start-ups, small- and medium-sized enterprises, as well as large corporations. To attract them, local and regional governments have to provide advantageous conditions for businesses (Arancegui, Querejeta, and Montero 2012; Landabaso 2011; Santos and Caseiro 2015). This is based either on the idea that intervention should avoid the so-called start-ups bias or start-up monoculture (Stangler and Bell-Masterton 2015) – a public intervention directed almost exclusively to support those entrepreneurial initiatives –, either on the need to open up territorial economies to the world economy, profiting from opportunities those investments may inject on the local and regional

productive systems (Dawes, Cresswell, and Pardo 2009; Kourtit and Nijkamp 2013; Kraus et al. 2015).

The entrepreneurial ecosystem approach carries another interesting issue to this discussion, as it claims for a swifter governance model if compared to the regional innovation system model. This angle is intuitively attractive, as both the theoretical literature and published empirical case studies suggest that while some places are confronted by institutions that are too small or too few to facilitate growth, others have a multitude of actors, resulting not rarely in cacophonic participative processes and often on the tendency to crowding each other out (Paasi 2010). This is a process some authors associate with a misconception about institutional thickness (Santos and Simões 2014) – the belief that a wide mobilization and participation of territorial actors in the planning process has implied the idea that 'the more, the better'. Rodriguez-Pose (2013) has argued that the effectiveness of institutional arrangements is not necessarily a problem of having too many or too few institutions, rather it is a matter of having the right mix of engaged stakeholders, avoiding trajectories conducive to institutional sclerosis, and getting a dynamic and effective governance scheme. Several authors (Colombelli, Paolucci, and Ughetto 2019; Colombo et al. 2019; Rampersad 2016) emphasize the need to deepen the debate about governance, once the current literature focuses mainly on business stakeholders rather than the wider variety of players from government and higher education institutions who also play a key role on this process. Autio and Levie (2017) concluded that policy perspectives that focus on a more profound stakeholder engagement are likely to give rise to better informed, targeted, and more effectively executed policy projects in entrepreneurial ecosystems than will market and structural failure approaches.

Tomaney (2014) noted that, while there is inevitably an uneven geography to regional institutions, they, notwithstanding, contribute to the instrumental performance of regions, while, simultaneously, serving to affirm territorial identities. Public policies are thus challenged to apply a softer portfolio of instruments, to give entrepreneurial stakeholders a prominent role, to recognize the importance of different kinds of knowledge, including business knowledge, to mobilize a diversity of innovation and entrepreneurial stakeholders while adopting strategies that may respond to diversity and idiosyncrasy – it is not an easy task. Besides, a place-based innovation policy, simply understood as the continual search for an adequate equilibrium between science-push and demand-pull perspectives, seems not enough. If we agree that the intervention by the authorities should give priority to the implementation and reinforcement of a relational culture, then policies have to comply with the existing overall network architecture and its specific territorial assets, rather than focus more on punctual and atomized actions, thus reinforcing the mechanisms for horizontal coordination and partnership, as well as interface management, avoiding political intervention supported in sectorial logics or fragmented actions. In this respect, peer-based relational support mechanisms that promote flexibility, increase the dynamic capabilities and rise the outward orientation of companies may bring more positive impacts than traditional transactional instruments of support, such as grants and assistance with funding typically targeted towards the most promising business projects (Clarysse et al. 2014; Feldman, Siegel, and Wright 2019; Lerner 2010; Schmutzler, Pugh, and Tsvetkova 2022). Public intervention is challenged to assume different designs, namely to insert formal and informal mechanisms that

may allow for collective learning dynamics to emerge, otherwise, entrepreneurship and innovation, resulting mainly from individualistic behaviours and *ad-hoc* initiatives, may add less value than expected to local and regional economies.

From an ecosystem-based policy view, instead of trying to increase outright the number of new firms created through public investment, public intervention could take on a less direct role (Brown and Mawson 2016; Roundy, Bradshaw, and Brockman 2018). Entrepreneurs, as protagonists of entrepreneurial ecosystems, seem to constitute a privileged stakeholder in identifying the matters that should be addressed through public intervention. This does not mean that local or regional governments have no role in ecosystems: there are subjects, such as talent development and lack of local/regional investment capital which only the state, at various levels, can systematically address. Nonetheless, the entrepreneurial ecosystem approach implies the need for a distinct alliance between public institutions and the entrepreneurial fabric, with the state assuming a more facilitative role rather than directly pivoting entrepreneurial networks and support tasks.

This may assume the support of community dealmakers in their struggles to create more effective networks between entrepreneurs, promoting forums and events where entrepreneurs can meet, and helping stakeholders in the ecosystems detect challenges and building up consensus around how to address them (Porras-Paez and Schmutzler 2019). Cultivating the resources that already exist in an ecosystem helps support continuing entrepreneurial activities, the success of which will help attract other resources and, over time, help nurture a more entrepreneurial, innovative territorial profile.

Public interventions, such as public venture capital investments, fostering networking, or training schemes, can add resources to an ecosystem, making it stronger. Without sufficiently thick networks between entrepreneurs based on a supportive culture, however, these resources will likely have limited impact. Thus, the creation of strong, well-functioning ecosystems rests on leadership from the entrepreneurial community to create denser and more active networks based on a culture of trust, reciprocity, and risk taking, increasing the regional social capital stock (Malecki 2012).

4. Conclusion

Entrepreneurial ecosystems configure a step forward towards a more comprehensive understanding of the evolving dynamics of local and regional economies, constituting not a substitutive but an enriching complementary theoretical, analytical and policy tool to the regional innovation systems *apport*. There is yet a need for more profound theorization and empirical research that can bring new insights into this domain of the cause-effects relationships between entrepreneurship, innovation and local and regional dynamics and resilience. Some authors suggest, in particular, that the existing work on entrepreneurial ecosystems within popular business literature and academic research lacks a solid theoretical foundation, making entrepreneurial ecosystem somehow both ambiguous and immature concept and, thus, reducing its generalizability and policy relevance (Fritsch and Storey 2014; Mack and Mayer 2016). However, even acknowledging those limitations, there is a need to circumscribe some fundamental aspects that may contribute to the study, debate and intervention of the local and regional economic fields.

The entrepreneurial ecosystems approach clearly affiliates with the more mature regional innovation systems approach. It allows for an understanding of the territorial performance through the lens and the role of the entrepreneurs, highlighted as the main protagonists of regional structural change. The model systematically incorporates other entrepreneurship and innovation stakeholders, their social and economic relations, their knowledge exchanges, their cooperative and competitive behaviours, the sharing of a pool of similar cultural patterns. The prominent place given to the entrepreneurs themselves to build the entrepreneurial ecosystem and keep it sustainable is, in fact, an added-value to a more comprehensive understanding of local and regional dynamics. The model underlines interdependencies within the entrepreneurship *milieu*, and it provides a bottom-up exploration of the performance of regional economies, without fixating on singular entrepreneurs (Autio et al. 2014; Cavallo, Ghezzi, and Balocco 2019; Markkula and Kune 2015; Van Winden 2008). It can be argued to represent a contemporary iteration of ideas around systemic understandings and policy approaches to economic development, innovation, and entrepreneurship (Schmutzler, Pugh, and Tsvetkova 2022).

The function of knowledge generation can no longer be primarily situated in the research system. Other actors, such as user innovators, customers, new intermediaries, collaborative innovators and citizen innovators, make substantial contributions, especially to the newly recognized innovation types such as low-tech innovation and social innovation, but also to classical product, process, organizational and marketing innovation. There is now a call for redesigning policy instruments, not guided mainly by RD&I logic, but more directed to stages downstream, closer to the market needs and towards focusing on the mechanism that allows for the emergence and fertilization of entrepreneurship.

The approach also promotes the shift in entrepreneurship policy from a focus on quantity to an emphasis on the quality of entrepreneurship. This is very much in line with those who prefer to accept a systemic approach towards understanding entrepreneurship more usually through the concept of national systems of entrepreneurship (Acs, Autio, and Szerb 2014). This approach diverges from the innovation systems approach in that individuals in search of new venture formation and development are at the heart of the model. Nonetheless, while this focus on the entrepreneur is, as previously mentioned, a welcome advancement to the systemic literature, it fails to appropriately address the territorial specificities of entrepreneurship – which, in reality, keeps constituting a black-box that requires a special research agenda. Besides, several authors (Kirby and El-Kaffass 2021; Volkmann et al. 2021; Welter et al. 2017) are challenging a taken-for-granted belief that only certain types of entrepreneurship might lead to wealth and job creation; they are, thus, emphasizing the need to entrepreneurship policies to adapt to the global sustainability challenges, proposing new business models that recognize the interconnectedness of the global ecosystem and the importance to acknowledge and respond effectively to societal needs and cultural diversity on a more heterodox manner.

The entrepreneurial ecosystem seems to constitute a solid basis upon which innovation networks continually renew territorial assets, helping therefore (re)affirming regional competitiveness and sustainability. The theoretical approach behind the concept of entrepreneurial ecosystem needs additional attention for it still seems to need a more intense and coherent theoretical background that may allow to provide

more effective instruments for public policy intervention. The research agenda should also encompass a wider perspective, in order to enrich its scope and analytical tools, enabling a more fruitful exchange between different academic disciplines and practitioners. Specifically, there is a need for a cross-fertilization between the useful perspectives of the regional innovation systems, mainly on which concerns the role of institutional cooperation and learning, and the benefits that entrepreneurial (eco)systems brought with its focus on entrepreneurship dynamics (Crevoisier, Kebir, and Peyrache-Gadeau 2021; Ngongoni 2022). In fact, it seems these complementary approaches may accomplish a growing role as policy drivers of a more competitive and sustainable regional development trajectory. Institutions and firms, local or regional policy makers and entrepreneurs, R&D rationales and business needs, collaborative networking and individualistic behaviours, socio-cultural patters and market dynamics, the tentative redesign of an evolving territorial competitiveness policy is emerging somehow among those open frontiers.

Disclosure statement

No potential conflict of interest was reported by the authors.

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