
Towards a New Approach of Innovation in Less Developed Regional Business Ecosystems*

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Abstract:

Purpose: The purpose of this article is to propose a new approach to innovation in less developed regional business ecosystems, focusing on the integration of business' strategy, technology and management dynamics.

Design/Methodology/Approach: By performing a literature review, the purpose of this article is to investigate whether the policy on innovation is able to either aim at improving regional innovation conditions or focus more on the specific needs of SMEs in those regions. All these are envisaged and enhanced under the prism of a new approach to regional innovation systems: the *Stra.Tec.Man* (Strategy, Technology, Management) method.

Findings: It seems that innovation may be concentrated on a practical field, with distinct targeting, but it must transplant the organism's intrinsic capability (material or intangible) in the particular circumstances of its external environment, within the specific regional dynamics. Its productivity, its innovativeness and, finally, its ability to survive and expand is always synthetically coordinated by the business (and its specific physiology), the industry (and its special dynamics) and the socio-economic environment (and its particular historical evolution).

Practical Implications: To be used by local authorities as a guide tool for regional business development.

Originality/value: The main objective of this study is to present the *Stra. Tech. Man's* multidimensional analytical specter, including the theoretical approach of innovation in order to map the factors that affect business ecosystem growth and development in less developed regions.

Keywords: Peripherality, innovation, regional and local under-development, business dynamics and physiology, multi-level competitiveness, *Stra.Tech.Man* approach.

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1. Introduction

Innovation is the creation and adoption, assimilation and exploitation of value-added transformations in the social and economic spheres; the expansion and renewal of services, products and markets; the development of new production methods; and the establishment of new management systems (Crossan and Apaydin, 2009). The final analysis concerns any outflow or method that contributes to increasing the profitability of each socio-economic organization. Here innovation is perceived at the same time as a process and as a result.

Innovative activity is a highly complex process that unfolds combined and simultaneously at national, regional and global level. National innovation systems show a range of characteristics that vary from one region to another, and it is therefore necessary to place as well parallel emphasis on regional innovation systems (Doloreux and Parto, 2005). These, of course, depend on the internal organization of the hosted businesses, the nature of the inter-business relations, the capacity to absorb external resources, the role of the public sector and government policy, the institutional structure of the financial sector, the degree to which the system is opened, the intensity and organization of R&D, the institutional framework, the character of the production system, the learning ability, and the hierarchical center-periphery forces (Evangelista, Iammarino, Mastrostefano & Silvani, 2002; Oughton, Landabaso and Morgan, 2002).

Peripherality is 'of a socio-economic system (defined at the same time in complex terms such as economic, geographic, communicative, cultural, etc.) away from their geographical core growth or the control center of the economy (Goodall, 1987). So the "general principles" that apply to central urban areas do not always have the ability to capture and explain the economic development and crisis of "remote" areas, often characterized as "underdeveloped" (backward), "stagnant" or developmentally lagging behind (Gatrell, 1999).

There are researchers who use the differences in regional characteristics either to explain the deviations in innovative performance or to interpret the different forms of regional development based on regional innovative activities (Gossling and Rutten, 2007). On the other hand, some researchers argue that it is not the regions that innovate but firms, and therefore they use combined data at the enterprise level along with regional characteristics (Sternberg and Arndt, 2001).

Great importance has been given to the fact that firms in distance regions are often deprived of well-trained staff and ease of physical communication (Romijn and Albaladejo, 2002). Due to this fact, they are forced to pay additional costs to provide services or produce goods, as their access to business advice and professional work is limited, since their larger customers and suppliers are far away from their region (Katimertzopoulos and Vlados, 2017; Anderson, 2000).

This study examines the peculiarities and variables that influence the creation and the diffusion of innovation in regional ecosystems. Also in this study, the meso and micro environment of innovation will be approached and studied through the theoretical approach of Stra.Tech.Man innovation (Vloudos, Katimertzopoulos and Blatsos, 2019).

2. Literature Review

Innovation is an important factor affecting the performance and regional development (Gossling and Rutten, 2007). Regional innovation systems play an important role in strengthening the geographic concentration of innovation (Asheim, 1998; Isaksen, 2003; Cooke, 2002). A regional innovation system can be defined as a locally concentrated network of actors, public and private institutions whose activities and interactions create, import, modify and diffuse new technologies (Evangelista *et al.*, 2002).

The logic of regional innovation systems is based on the recognition of existence of technology trajectories based on localized learning in an area. The theory of regional innovation systems argues that regions can become more innovative and competitive by promoting stronger relationships between businesses and a regional knowledge infrastructure. Institutions and foundations play a central role in promoting innovation-based regional development (Eskelinen, Hannibalsson, Malmberg, Maskell and Vatne, 2002; Karlsson, Andersson and Norman, 2015).

The emergence of the concept of regional innovation systems coincides with the success of theories on regional clusters and industrial areas in the post-Fordist era (Asheim and Gertler, 2005). Types of regional innovation systems could be analyzed as territorially embedded regional innovation systems, where businesses base their innovative activity on locally-integrated learning processes supported by geographic social and cultural proximity, without any direct interaction with knowledge organizations (Asheim, 1998). An example of particular type of regional innovation system is the media networks in industrial areas (Asheim and Gertler, 2005).

There are also regionally networked regional innovation systems, where firms and organizations are embedded in a specific area and are characterized by locally concentrated learning (Katimertzopoulos and Vloudos, 2017; Asheim, 1998). In this type of regional innovation system and with the assistance of policy interventions (such as, strengthening the role of R&D institutes, training organizations, etc.) institutional infrastructure is empowered. Examples of this type of regional innovation systems are the clusters found in Austria, Scandinavia and Germany (OECD, 2005).

Finally regionalized national innovation systems, which differ from the above, since parts of the industry and institutional infrastructure are integrated functionally in the national or international innovation systems, because of the fact that external factors

and relationships play an important role. In these systems, cooperation is mainly developed between people with a similar scientific background, as such the community of practice is promoted. A typical example of this type of innovation system is science parks (Karlson *et al.*, 2015; Asheim, 1998).

In order to study the environment of the region and whether and to what factors the innovation is affected by, the firm is essential to perform an analysis of the barriers to innovation, both "internally" and "externally" (Neely and Hii, 1998; OECD, 1992). Among the internal factors are included the conservatism, the lack of insight and motivation, the rigid organizational structures, the hierarchical communication structures etc. The external obstacles include lack of appropriate legislation, lack of infrastructure, the inappropriate education systems and training systems (Katimertzopoulos and Vlados, 2017). On the other hand, OECD (2005) refers to barriers due to economic factors (high costs and risk, lack of resources), market (competition, uncertain product demand), operational factors (insufficient innovation potential, organizational rigidity), and in institutions (lack of infrastructure, regulations and legislation).

The progress in modern visual exploration of innovation's phenomenon in organizational and operational literature shows the gradual deepening of the study towards the intra-organizational dimensions (Ahlstrom, 2010; Li, Lee and Liu, 2010). Nonetheless, to a large extent, the necessary dynamic and coexistence perception of the socio-economic environment of innovation continues to be perceived in a relatively timid and restrictive manner (Lebas, 2003; Perez, 2003). At the same time, the preservation and reproduction of a peculiar "interpretive tripolism" is observed, with the rendering of the analytic primacy in either strategy or technology or in management, while in contrast, it becomes progressively clear that the innovative phenomenon can always and necessarily have a mixed and synthetic content, both in strategic terms and in terms of technology and management (Stra.Tech.Man innovation theory) (Vlados and Katimertzopoulos, 2019).

3. Innovation in Less Developed Business Ecosystems

3.1 Contemporary Approaches

Prior research has explored whether innovation policy can either aim to improve regional innovation conditions, in particular through a modern approach to regional and local innovation systems, or focus more on the specific needs of SMEs in these areas (Sternberg and Arndt, 2001). These surveys are studied and enriched in the light of theoretical methodology for Stra.Tech.Man innovation (Vlados, Katimertzopoulos and Blatsos, 2019).

Based on the previous analysis, the concepts of peripherality and accessibility come into the sphere of study, and therefore a spatial dimension is given to innovation

policy. Crescenzi (2005) argues that it is more productive to concentrate innovation efforts in the more accessible areas, while Rodriguez- Pose (2001) argues that, in a Sumbeterian view, the presence of increasing returns on investment, concentration economies and a minimum investment threshold, make investment in R & D in distance areas less attractive than in the central areas. Crescenzi (2005), on the other hand, argues that, given the technological gap, the intention to imitate would lead to a strengthening of the contribution of innovative activities to the development of those regions that are lagging behind. Neoclassical perspective regional policy views also emphasize the ease of support for innovative activity in regions lagging behind (Rodriguez-Pose, 2001).

Therefore, in the perspective of evolutionary economics, development and innovation are depicted as the end product of innovative knowledge, in large terms, referring in this way to policies that facilitate business and innovation, technological diffusion and interactive relationships between cooperative business, while exploring the structural influences on the innovation systems that create, reproduce and expand in the localized innovative environments in which they operate (Altomonte and Bekes, 2016; Annoni and Dijkstra, 2013).

Thus, based on the specific characteristics of the regions, some innovative systems have been developed in analytical terms, such as the ‘innovation environment’, ‘innovative regions’, ‘industrial clusters’, ‘knowledge clusters’ (Asheim and Coenen, 2005; Gereffi and Lee, 2014; Todtling and Trippel, 2005; Cooke, 2002; Cooke and Morgan, 1998; Audretsch and Feldman, 1996), ‘Business clusters’ (Piperopoulos, 2012), ‘Entrepreneurial ecosystem’ (Geels and Schot, 2007).

By examining the notion of the entrepreneurial ecosystem in this study, it enables to illustrate a lack of relationships and links between the Triple Helix actors and the company's business operations as well as the niche innovation project (Autio, Kenney, Mustar, Siegel and Wright, 2014; Geels and Kemp, 2007). Geels and Kemp (2007) defined the socio-technical structure as a structure produced with the following components: “technology, science, regulation, user practices, markets, cultural meaning, infrastructure, production and supply networks” (Geels and Kemp, 2007). The supply and demand side actors generate, maintain and treat these elements (Geels and Kemp, 2007). The first is composed of businesses, universities, research establishments as well as policy makers. The second is composed of many different clients, users and other stakeholders (Geels and Kemp, 2007).

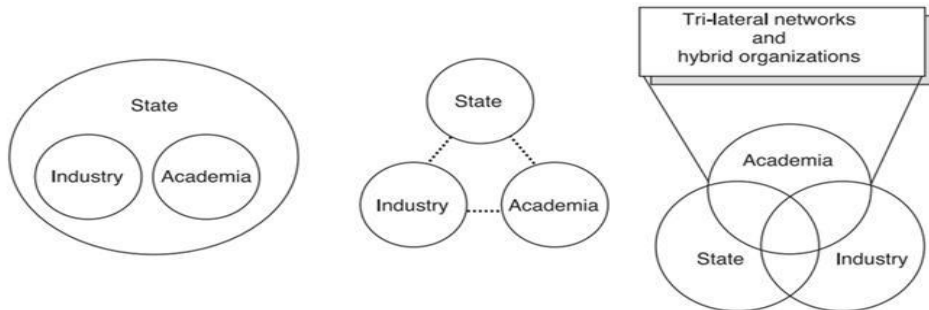
In general terms, the triple helix theory seems particularly interesting in approaching the innovation inadequacy that characterizes many less developed regional ecosystems. In particular, the helix theory is established as a "laboratory for economic development based on knowledge," which conceptualizes the numerous organizational actors responsible for developing the conditions for a thriving innovation environment particularly at regional level (Etzkowitz and Leydesdorff, 1995). Such knowledge-based development leads to a "endless transition"

phenomenon where the three helix realms of institutionalization are interconnected with a process of technological innovation and ongoing organizational reform (Etzkowitz and Leydesdorff, 1998).

The triple helix model differs analytically from alternative models of knowledge creation and innovation, such as Mode 2 and National Systems of Innovation. Mode 2 is the new mode of knowledge production, which is interdisciplinary and differs from the traditional mode of knowledge, as argued in the analysis of. This transformation is undertaken into a new mode of knowledge production, replacing the old paradigm for existing institutions, scientific disciplines, practices and policies. Moreover, National Innovation Systems reflect the flow of information and technology between individuals, companies and organizations that is vital to the advancement of innovation at the national level. According to this theory, implemented in the late 1980s, the creation of innovation and technology benefits from the complex relationships between the actors in the process, especially between businesses, universities and government research institutes (Lundvall, 1992; Gibbons *et al.*, 1994).

In summary, as a result of co-evolving inter-institutional linkages, this first theoretical step attempts to explain innovation. The method of Etzkowitz and Leydesdorff (2000) indicatively parallels this development phase in helix theory, in which the triple helix paradigm differs from the 'state-oriented' or laissez-faire (market-oriented) model as it involves trilateral and hybrid organizations (Figure 1).

Figure 1. From “statistic” and “laissez-faire” to the triple helix



Source: Adjusted from Etzkowitz and Leydesdorff (2000).

A micro-level dynamics perspective seems gradedly better suited to the analysis of the triple helix model of local development rather than a macro-level perspective. Finally, we are aware from this last step that the three helix models have the potential to be implemented at local, regional, national and, more specifically, at a global and transnational level for specific innovation policies (Ryan, Geoghegan and Hilliard, 2018; Sá, Casais and Silva, 2018).

The multi-level perspective of the Triple Helix configuration of actors also includes three heuristic levels known as niche technologies, socio-technical regimes and social-technical landscapes (Geels and Schot, 2007; Geels, 2002; Rip, 1998). These can be compared with the space in which innovation develop, the set of institutions and regulations that define the ecosystem boundaries and the business environment of an ecosystem. The successful interaction between domestic culture and both political and legal systems and entrepreneurial cognition lead to successful communication between ecosystem members (Nambisan and Baron, 2013).

Triple Helix's actors are the main components of the current system. Socio-technical systems combine the institutions and the rules of an economy driven by technology (Geel and Kemp, 2007). According to Geels and Schot (2007) this regime "accommodates this broader community of social groups and their alignment of activities". In particular, this might be seen in regional business ecosystems consisting of interdependent actors situated in close geographical proximity, who co-evolve and share economic interests (Geels and Kemp, 2007). However the sense of belonging to the society between ecosystem members can be expressed in interdependencies in case of inter-organisational and in specific inter-firm relations (Geels and Kemp, 2007).

At the Knowledge Spillover Theory of Entrepreneurship, the same conclusion as Arrow (1962) is reached: knowledge is not perceived as being the same as economically relevant knowledge, suggesting that diffusion may occur automatically. The Knowledge Spillover Theory of Entrepreneurship recognizes that there are diffusion mechanisms that determine the rate at which the knowledge pool is converted into economically useful operational knowledge as well as it points that these diffusion mechanisms are a graphical representation (wedge) that filters the knowledge of the economic knowledge (Audretsch, 1995; Acs and Audretsch, 2005; Audretsch and Lehmann, 2005).

Thus, high levels of innovative activity that may characterize some areas are highly dependent on the operation of knowledge diffusion filters. Looking back and through modern multiperspectivity to Aghion's (2005) and Gerschenkron's (1962) view of development policies, it can be argued that innovation policies affect innovation activity differently depending on the efficiency of an socioeconomic space in exploiting knowledge and its distance from the global frontier of knowledge exploitation. At this point it could be argued that the unobserved factors that generate the gap in innovation across regions are the filtering mechanisms that prevent regions from achieving higher innovation rates regardless of the observed characteristics of their businesses.

3.2 Towards a Theoretical Reformulation

By regarding the multiprismity of the theoretical approaches to macro, meso and microenvironment, Stra.Tech.Man's approach attempts to analytically link these

three environments by holistically analyzing the development of effective innovation. So, according to Stra.Tech.Man, the "heart" of every living, real firms - that wants to innovate and develop in local and regional environments - is always at the innermost level of analysis within the three fundamental structural spheres: These spheres are the strategy, technology and management that any firm possesses and mobilizes. Within these fundamental functional spheres, each company compiles and reconsolidates its available potential (material and immaterial) for effective innovation that will allow it to compete for survival and growth within its ever evolving socio-economic environment (Vlados and Katimertzopoulos, 2019; Vlados, Katimertzopoulos & Blatsos, 2019) (Figure 2).

Figure 2. *The evolutionary core of business. Vlados, Katimertzopoulos & Blatsos, (2019)*



Innovation can start from one point, focus on a functional area with a distinct focus, but every innovation necessitates, at all times, combined repositioning and adjustments for the entire organization (Vlados and Katimertzopoulos, 2019; Vlados, Katimertzopoulos and Blatsos, 2019):

- a) in the strategy and/or its relations with its customers, and/or in the markets, and/or value proposition and/or in the product mix;
- b) in the technology and/or tools of, and/or working in, and/or the expertise, and/or the production process;
- c) and in firm management and/or programming, and/or the organization and/or staffing, and/or the management and/or control and/or coordination and communication.

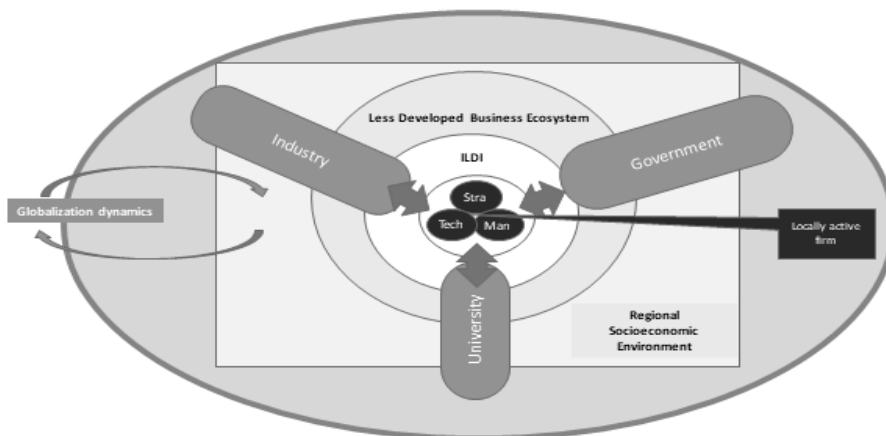
In these terms could be repositioned the whole perspective of the theory of the triple helix. In this direction, a new business ecosystems policy proposal is presented, called "Institutes of Local Development and Innovation" (ILDI) (Katimertzopoulos and Vlados, 2017). Such institutes will be founded in the Greek regions, as proposed by the authors. The goal of the ILDIs is to link together public and private actors, that are characterized by loose coordination (banks, chambers of commerce, universities, and any other actor that can stimulate local development), at the

regional level. The "living firm" in Stra.Tech.Man is a cellular element of a local business ecosystem, which works as both a policy intervention receiver and a generator of the development process. This type of government policy is both top up and bottom up.

By resembling examples of intermediary organizations in triple helix systems, the ILDI follows a cyclical procedure (Altaf, Hassan and Batool, 2018; Yuwawutto *et al.*, 2010). It diagnoses the organization's innovative prospects in Stra.Tech.Man (business ' physiology ') terms and provides an extensive business consulting and consulting framework with a view to enhancing local entrepreneurship's innovative potential, while activating feedback and monitoring mechanisms to monitor development results. The operation of the ILDI is focused on and can unify all the co-determined dialectic levels — local, regional, global — that the "living business" transforms with innovation from Stra. Tech. Man.

In this context, this study proposes to integrate in a Stra. Tech. Man micro-level analysis the triple helix model of university-industry-government relations as a theoretical methodological structure for linking structural organizational actors in a socio-economic system (Figure 3).

Figure 3. *The helix theory in Stra.Tech.Man terms*



In particular, the living organization (in terms of Stra. Tech. Man) operates as the interactive and unifying epicenter of the helix mechanism at the center of the socioeconomic system (Katimertzopoulos and Vloudos, 2019). At the same time, the ILDI intermediary entity draws and disseminates know-how matrix from the three helices, while the overall socio-economic environment with the cultural, philosophical, conceptual and political dimensions — the "civil society" in a quadruple helix theory context—participates in the existing transformation dynamics

in the system's developmental or under-developmental path (Vlados and Chatzinikolaou, 2019).

4. Conclusions

This study explored why the analysis of regional innovation performance differences is an important research issue with major policy implications. Dicken and Malmberg (2001) concluded that the capacity for innovation and competitiveness has apparently a territorial nature, regardless of whether it can be defined in terms of Porter's dynamic (Porter, 1990), or related relational assets (Storper, 1997) or spatially localized competences (Maskell, Eskelinen, Hannibalsson, Malmberg and Vatne, 1998). Empirical results support the view associated with the innovation environment that, when attempting to explain regional differences in innovation, the region is important as an environment for business development (Gossling and Rutten, 2007).

There are also researchers who come in partial opposition to this bibliography. Sternberg and Arndt (2001) argue that critical determinants of business-related innovation are more important than those related to external factors or the region itself. As a result, innovation policy can either aim at improving regional conditions for innovation, for example through an approach to regional innovation systems, or focus more on the specific needs of SMEs in these areas (Katimertzopoulos and Vlados, 2017; Sternberg and Arndt, 2001).

Regarding the entrepreneurial ecosystem, it does not appear to develop autonomously but through the participation of players and social groups such as the socio-technical systems (Geels, 2004). Collective value development and trust-based communication between members of ecosystems are essential (Iansiti and Levien, 2004; Thoms and Autio, 2014). The willingness to develop new interconnections and interdependence at both interpersonal and inter-organisational level (Zaheer, McEvily and Perrone, 1998) is affected by trust. While exploring factors that explain the choice of governance structures in inter-firm alliances, Gulati (1995) found evidence that supporting trust and familiarity are essential factors in inter-firm cooperation.

A company integrated into a local ecosystem could therefore profit from a reduction in transaction costs in the pursuit for prospective partners. These ecosystem features may form a significant part of the development of support structures for niche innovation projects. In addition, the interrelationship of technology, which can reinforce the bond of niche innovation project and the local industry (future providers in the development scheme) is considered as an integral element of an ecosystem (Thomas and Autio, 2014).

In the perspective of this research, every innovation seems to always be *Stra.Tech.Man*, either provoked by internal or external factors in micro, meso or

macro environment. Therefore, it always contains a part of Strategy, a part of Technology and a part of Management (Vlados and Katimertzopoulos, 2019). No innovation can be achieved and implemented effectively without starting and without resulting, at the same time, to some changes in the three inner realms of the business: the strategy, technology and the management of a firm.

In order for a composition of Stra.Tech.Man to prove effective, it has to transplant the organism's intrinsic capability (material or intangible) in the particular circumstances of its external environment, within the specific regional dynamics. Its productivity, its innovativeness and, finally, its ability to survive and expand is always synthetically coordinated by the business (and its specific physiology), the industry (and its special dynamics) and the socio-economic environment (and its particular historical evolution).

The present study was therefore based on a comparative literature review. The analysis of Stra.Tech.Man's theoretical approach (launched in this research on the basis of the problem of regionalism) was intended to stimulate future research into the measurement of innovation in less developed regions. The present study attempts in an introductory effort to crystallize the multidimensionality and the theoretical approach of innovation by Stra.Tech.Man in order to map the factors that influence the growth and development of business ecosystems in less developed regions.

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