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

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Purpose:
Most studies are undertaken using the differences in regional characteristics to either explain variations in the creation of innovation or interpret regional development forms based on innovative activities inside a region. However, many researchers suggest that businesses instead of regions are those that produce innovation, combining in their research the use of business data together with local characteristics. 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:
In summary, 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).

Research limitations/implications:
Consequently, the present study was based on a literature review. The analyzes of the theoretical method of Stra.Tech.Man (initiated by the regionalism question in this study) are aimed at encouraging future research on innovation measurement in less-developed areas.

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

JEL Classifications
O30, R11

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

1. Introduction: The particularity of producing innovation in less developed regional ecosystems.

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 & 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 Albadaajo, 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 (Vlados, Katimertzopoulos & Blatsos, 2019).

2. Enhance the logic of regional innovation systems

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 (Eskekilen, Hannibalsson, Malmberg, Maskell and Vatne, 2002; Karlsson, Andersson & 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 follows (Asheim, 1998): 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. 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 Vlados, 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, 1999). Among the internal factor 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
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 & 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, 2003; Gereffi and Lee, 2014; Todtling and Trippi, 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 hell 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 (see Figure 1).

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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, & Hilliard, 2018; Sá, Casais & 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 (Nambissan and Baron, 2013).

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 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) (see Figure 2).
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 & 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, & 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 (see 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 Vlados, 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: Towards enriching modern methodologies by evaluating the Stra.Tech.Man approach**

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 & 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 & 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 Katimerztopoulos, 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 introductive 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.

References

Acs, Z. and Audretsch, D. 2005. Entrepreneurship, Innovation and Technological Change. Foundations and Trends in Entrepreneurship, 1(4), 149-195.

Aghion, P. 2005. Growth and institutions. Empirica, 32(1), 3-18.

Ahlström, D. 2010. Innovation and growth: How business contributes to society. Academy of Management Perspective, 24(3), 10–23.

Altuf, A., Hassan, I. E. and Batool, S. 2018. The role of ORIC in the evolution of the triple helix culture of innovation: The case of Pakistan. Technology in Society, 56, 157–166.

Altmontone, C. and Bekes, G. 2016. Measuring Competitiveness in Europe. Resource Allocation, Granularity and Trade, rapport Bruegel, http://bruegel.org/.

Anderson, A. 2000. Paradox in the Periphery: an entrepreneurial reconstruction? Entrepreneurship and Regional Development, 12(2), 91-109.

Annoni, P. and DiJkstra, L. 2013. Regional Competitiveness Index 2013, JRC Scientific and Policy Reports of the European Commission.

Arrow, K. 1962. 'Economic welfare and the allocation of resources for invention’, in The Rate and Direction of Inventive Activity, Nelson R.R. (ed.), Princeton University Press, Princeton, NJ, pp. 609-626.

Asheim, B. and Gertler, M. 2005. 'The Geography of Innovation: Regional Innovation Systems’, in The Oxford Handbook of Innovation, Fagerberg, J., Mowery, D. & Nelson, R. (eds), Oxford University Press, New York.

Asheim, B. 1998. 'Territoriality and Economics on the Substantial Contribution of Economic Geography’, in Economic Geography in Transition, Johnsson, O. & Olander, L. (eds), The Swedish Geographical Yearbook, 74, Lund, pp. 98-109.

Asheim, B. T. and Coenen, L. 2005. Knowledge bases and regional innovation systems: comparing Nordic clusters. Research Policy, 34(8), 1173-1190.

Audretsch, D. 1995. Innovation and Industry Evolution. Cambridge, MA: MIT Press.

Audretsch, D. and Feldman, M. 1996. Innovative clusters and the industry life cycle. Review of Industrial Organization, 11(2), 253-273.

Audretsch, D. and Lehmann, E. 2005. Does the knowledge spillover theory of entrepreneurship hold for regions?. Research Policy, 34(8), 1191-1202.

Autoio, E., Kenney, M., Mustar, P., Siegel, D. and Wright, M. 2014. Entrepreneurial innovation: the importance of context. Research Policy, 43(7), 1097–1108.

Cooke, P. 2002. Knowledge Economics: Clusters, Learning and Cooperative Advantage. London: Routledge.

Cooke, P. and Morgan, K. 1998. The Associational Economy: Firms, Regions and Innovation. Oxford: Oxford University Press.

Crescenzi, R. 2005. Innovation and regional growth in the enlarged Europe: The role of local innovative capabilities, peripherality, and education. Growth and Change, 36(4), 471-507.

Crossan, M.M. and Apaydin, M. 2009. A Multi-Dimensional Framework of Organizational Innovation: A Systematic Review of the Literature, Journal of Management Studies, 47(6), 1154-1191.

Dicken, P. and Malmberg, A. 2001. Firms territories: a relational perspective. Economic Geography, vol. 77(4), 345-363.

Doloreux, D. and Parto, S. 2005. Regional innovation systems: Current discourse and unresolved issues. Technology in Society, 27(2), 133-153.

Eskelinen, H., Hannibalsson, I., Malmberg, A., Maskell, P. and Vatne, E. 2002. Competitiveness, Localised Learning and Regional Development. London: Routledge.

Etzkowitz, H. and Leydesdorff, L. 1995. The Triple Helix – University-Industry-Government Relations: A Laboratory for Knowledge Based Economic Development. EJSST Review, 14(1), 14–19.

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Etkowitz, H. and Leydesdorff, L. 1998. The endless transition: A “Triple Helix” of University-Industry-Government relations: Introduction. Minerva, 36(3), 203–208.

Etkowitz, H. and Leydesdorff, L. 2000. The dynamics of innovation: From National Systems and “Mode 2” to a Triple Helix of university–industry–government relations. Research Policy, 29(2), 109–123.

Evangelista, R., Iammarino, S., Mastrosteфано, V. and Silvani, A. 2002. Looking for regional systems of innovation: evidence from the italian innovation survey. Regional Studies, 36(2), 173–186.

Gatrell, J. 1999. Re-thinking economic development in peripheral regions. The Social Science Journal, 36(4), 623–639.

Geels, F.W. 2002. Technological transitions as evolutionary reconfiguration processes: a multi-level perspective and a case-study. Research Policy, 31(8–9), 1257–1274.

Geels, F.W. 2004. From sectoral systems of innovation to socio-technical systems: in-sights about dynamics and change from sociology and institutional theory. Research Policy, 33(6–7), 897–920.

Geels, F.W. and Kemp, R. 2007. Dynamics in socio-technical systems: typology of change processes and contrasting case studies. Technology in Society, 29(4), 441–455.

Geels, F.W. and Schot, J. 2007. Typology of sociotechnical transition pathways. Research Policy, 36(3), 399–417.

Gereffi, G. and Lee, J. 2014. Economic and Social Upgrading in Global Value Chains and Industrial Clusters: Why Governance Matters. Journal of Business Ethics, 133(1), 25–38.

Gerschenkron, A. 1962. Economic Backwardness in Historical Perspective and Other Essays. Cambridge, MA: Harvard University Press.

Gibbons, M., Limoges, C., Nowotny, H., Schwartzman, S., Scott, P., and Trow, M. 1994. The new production of knowledge. The dynamics of science and research in contemporary societies. Retrieved from http://sk.sagepub.com/books/the-new-production-of-knowledge

Goodall, B. 1987. The Dictionary of Human Geography. London: Penguin.

Gössling, T. and Rutten, R. 2007. Innovation in regions. European Planning Studies, 15(2), 253–270.

Gulati, R. 1995. Does familiarity breed trust? The implications of repeated ties for contractual choice in alliances. Academy of Management Journal, 38(1), 85–112.

Iansiti, M. and Levien, R., 2004. ‘National and regional contexts for innovation’, in Regional Innovation Policy for Small–Medium Enterprises, Ashim, B., Iansiti, A., Nauwelaers, C. & Tödfling, F. (eds), UK, Cheltenham: Edward Elgar, pp. 49–77.

Karlsson, C., Andersson, M. and Norman, T. 2015. Handbook of Research Methods and Application in ECONOMIC GEOGRAPHY. USA, Massachusetts: Edward Elgar Publishing, Inc.

Katimertzopoulos, F. and Vlados, C. M. (2017). Local support mechanisms for entrepreneurship: The approach of local development and innovation institutions. International Journal of Business and Economic Sciences Applied Research, 10(1), 30–41.

Katimertzopoulos, F. and Vlados, C. M (2019). “The three dimension of innovation in local development systems, based on the StraTechman approach”, Proceedings of the 6th International Conference on Applied Economics “INSTITUTIONS & THE KNOWLEDGE ECONOMY”, 2019, Volos, Greece.

Lebas, C. (2003). « La théorie évolutionniste de la firme : état des lieux raisonné et implications pour l’analyse stratégique », WP, centre Walras, université Lyon 2. Cambridge: Cambridge University Press.

Li, Y., Lee, S., Li, X., and Liu, Y. (2010). Knowledge codification, exploitation, and innovation: The moderating influence of organizational controls in Chinese firms. Management and Organization Review, 6(2), 219–241.

Lundvall, B.-Å. 1992. National Innovation Systems: Towards a theory of innovation and interactive learning. London: Pinter Publishers.

Maskell, P., Eskelinen, H., Hannibalsson, I., Malmberg, A. and Vatne, E. 1998. Competitiveness, localized learning and regional development—Specialisation and prosperity in small open economies. London: Routledge.

Nambisan, S. and Baron, R.A. 2013. Entrepreneurship in innovation ecosystems: entrepreneurs' self-regulatory processes and their implications for new venture success. Entrepreneurship Theory and Practice, 37(5), 1071–1097.

Neely, A. and Hill, J. 1998. Innovation and Business Performance: a literature review. The Judge Institute of Management Studies, University of Cambridge.

OECD. 1992. OECD proposed guidelines for collecting and interpreting technological innovation data— OSLO manual. Paris: OECD.

OECD. 2005. OECD Oslo Manual: Guidelines for collecting and interpreting innovation data. European Communities/OECD.

Oughton, C., Landabaso, M. and Morgan, K. 2002. The Regional Innovation Paradox: Innovation Policy and Industrial Policy. Journal of Technology Transfer, 27(1), 97–110.

Pérez, R. (2003). La Gouvernance de l’entreprise, Paris, La Découverte, coll. « Repères ».

Rip, A.K.R., 1998. Technological Change. In: Rayner, S., Malone, E.L. (Eds.), Human Choice and Climate Change. Battelle Press, Columbus, OH, pp. 327–399.

Piperopoulos, P. 2012. Entreprenarship, Innovation and Business Clusters. London: Routledge.

Rodriguez-Pose, A. 2001. Is R&D investment in lagging areas of Europe worthwhile? Theory and empirical evidence. Papers in Regional Science, 80(3), 275–295.

Romijn, H. and Albaldalje, M. 2002. Determinants of innovation capability in small electronics and software firms in southeast England. Research Policy, 31(7), 1053–1067.
Ryan, P., Geoghegan, W. and Hilliard, R. 2018. The microfoundations of firms’ explorative innovation capabilities within the Triple Helix framework. *Technovation*, 76–77, 15–27.

Sá, E., Casais, B., and Silva, J. 2018. Local Development Through Rural Entrepreneurship, from the Triple Helix Perspective: The Case of a Peripheral Region in Northern Portugal. *International Journal of Entrepreneurial Behavior & Research*, 21(1), 5–26.

Stam, E. 2015. Entrepreneurial Ecosystems and Regional Policy: A sympathetic Critique. European Planning Studies, 23(9), 1759–1769.

Sternberg, R. and Arndt, O. 2001. The firm or the region: what determines the innovation behavior of European firms? *Economic Geography*, 77(4), 364–382.

Storper, M. 1997. *The Regional World*. New York: Guildford Press.

Thomas, I.D. and Autio, E., 2014. The fifth facet: the ecosystem as an organizational field. Innovation and Entrepreneurship Group Working Papers.

Todtling, F. and Trippl, M. 2005. One size fits all? Towards a differentiated regional innovation policy approach. *Research Policy*, 34(8), 1203-1219.

Vlados, C. and Hatzinikolaou, D. (2019). Development on Helix Theory: Exploring a Micro-Evolutionary Repositioning in Stra.Tech.Man Terms. *International Journal of World Policy and Development Studies*, 5(10), 87-99.

Vlados, C. and Katimertzopoulos, F. (2019). The “Mystery” of Innovation: Bridging the Economic and Business Thinking and the Stra.Tech.Man Approach. *Business and Economic Research*, 9(1), 236-262.

Vlados, C., Katimertzopoulos, F. and Blatsos, I. (2019). Innovation in Stra. Tech. Man (Strategy-Technology-Management) Terms. *Journal of Entrepreneurship and Business Innovation*, 5(2), 1–26.

Yuawawutto, S., Smitinont, T., Charoenanong, N., Yokakul, N., Chatratana, S. and Zawdie, G. 2010. A Triple Helix Strategy for Promoting SME Development: The Case of a Dried Banana Community Enterprise in Thailand. *Industry and Higher Education*, 24(3), 177–187.

Zaheer, A., McEvily, B. and Perrone, V. 1998. Does trust matter? Exploring the effects of inter-organizational and interpersonal trust on performance. *Organization Science*, 9(2), 141–159.

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