

# Innovation Dynamics as Coevolution Processes: A Longitudinal Study of the Computer Services Sector in the Region of Attica, Greece

Ioannis N. Katsikis\*

Management Science Laboratory, Dept. of Management Science and Technology  
Athens University of Economics and Business, Greece

Extended Abstract of PhD

Innovation dynamics is a cross-discipline research area which involves a wide spread of sciences and brings together theories, methodologies and empirical results from areas such as innovation dynamics and organization studies, management science, regional development and systems theory. Although the exact link between economic development and innovation is unclear, most of the theories emphasize the complex aspect of innovation as an evolutionary and interactive process involving different types of learning (Dosi et al., 1998), interdependencies and feedback (Kline and Rosenberg 1986, Van den Bosch et al., 1999). The systemic and interactive practice of innovation also highlights the pervasive relationship between the firm and its environment. The numerous examples of regional clustering provide evidence that competitive advantage can be localized in spite of competition and economic activity becoming increasingly globalized (Asheim & Isaksen 2002, Maskell & Malmberg 1999, Porter 1998, Storper 1997).

The theory attempts to integrate the interplay between the adaptation of individual organizations, their competitive dynamics, and the dynamics of the institutional systems within which firms and industries are embedded. The theory of co-evolution (Lewin et al., 1999) assumes that organizations, industries and environments co-evolve, that their rate, pace, and patterns of change are distinct and interdependent, and that the direction of these changes is not unidirectional. This PhD research intends to elaborate on both the regional and sectoral perspectives of innovation and integrate them under one coherent approach. The regional and sectoral approach could be utilized, as a National Innovation System should be understood and analyzed as a complex of sub-systems that can be

---

\* Contact information: Mr Ioannis N. Katsikis, Evolution Observatory, Management Science Laboratory, Department of Management Science and Technology, Athens University of Economics and Business, MSL Room 204, 47<sup>A</sup> Evelpidon str, 11632, Athens, T: 30 2108203862, F: 30 2108828078, E: ioannis@aueb.gr

classified according to individual sector and region (Chung, 2002). A NIS is composed of both regional and sectoral systems of innovation. As the user–producer relationship of innovation is established in almost every region and industrial sector, the concept of innovation system will be very helpful for the enhancement of regional and industrial competitiveness by activating interaction and flow of qualitative information among major innovation actors in a region and sector. Following the classification of industrial sector, many sub-systems of a NIS can be formulated (Breschi & Malerba, 1997).

Coined by Pouder & St. John (1996), the notion of “Innovation Hot Spots - IHS” is employed by policy makers, regional and local authorities searching to promote growth and development in a region, as well as by business leaders searching to identify attractive locations for their businesses. In terms of innovation systems, the innovation hot spot is situated in the intersection between national, regional and industrial innovation systems (Carlsson et al, 2002; Chung, 2002; Moualart, 2003; Porter & Stern, 2001). Hence, it can combine the best of national support for basic research and venture funding (NIS), regional development incentives, transport and communication infrastructure, access to qualified workforce and access to a local market offered by the regional resources (RIS), and privately funded and driven R&D within established industry structures (SIS). Thus, we argue that the innovation hot spot framework can be considered and used as a synthesizing framework adopting a holistic approach when studying innovation systems dynamics.

The **Research Objective** of this PhD Research is to question the framework in which enterprises and greater organization forms, such as clusters, co-evolve in relation to other organizations, products or to their environment as living organisms. Coevolution is defined (Lewin et al., 1999) as “*the joint outcome of managerial intentionality, environment, and institutional effects.*” Lewin et al. (1999), make clear that co-evolution assumes that change may occur in all interacting populations of organizations. Moreover, the target is to describe the dynamics that rise from this coevolution as far as innovation is concerned, studied in both over time and in spatial scale. It comes to be of great importance to study not only to recognize the changes in which organizations have to go, in order to meet the environmental changes but also the way in which these changed organisms affect their environments which they change. The **Central Research Question** of this PhD research can be

defined as the following: “*How national, regional and sectoral innovation systems coevolve over time and space? The target is to examine the existence and intensity of relationships appeared, through the use of a coevolutionary framework.*”

Each one of these levels of analysis enriches the agenda of research questions and thus the answers that should be given. The research should question what are the mechanisms, determining factors and critical linkages, leading the covevolution process between different levels of analysis. Do we need national, regional or sectoral innovation policies? Which innovation policies and in which level of analysis, perform better and why? Is innovation a national, a regional or a sectoral phenomenon?

The basic ***Methodological Research Framework*** of this PhD proposal suggests the use of a qualitative research methodology, which will be empowered by descriptive quantitative data. The triangulation of quantitative and qualitative data can be achieved by using multiple qualitative sources and quantitative data (Jick, 1979), multiple theoretical lenses (Denzin, 1978), and multiple sense-making strategies (Langley, 1999). This research will also include characteristics of multilevel analysis, since coevolutionary research involves multiple levels of analysis (Lewin and Volberda, 1999; Candace, 2001). In our case, data at four different levels should capture processes and identify generative mechanisms at the firm, industry, regional and national level. The sample of the empirical part will be composed by companies from the *computer services sector*, forming the *sectoral innovation system*, operating within the Region of Attica and thus forming the *regional innovation system* (Region of Attica) within the *NIS* of Greece.

The longitudinal field research should be materialized through a retrospective way. The goal of the co-evolutionary enquiry in the retrospective field research scheme is to understand how the structure of direct interactions and feedback within organization-environment systems give rise to their dynamic behavior. This is operationalized with the use of selected case studies and other qualitative instruments.

The ***Computer Services Sector in the Region of Attica*** concentrates competence and innovation capability in both products and services, creating at the same time new business opportunities and contributing significantly to employment growth. Consulting, implementation,

operations management and support services will all enjoy similar growth since they are the complementary industries forming the Attica computer services innovation hot spot. This gearing-up of a wide range of players in the computer services cluster is a key characteristic of sustainable growth. These firms often work together, form both vertical and horizontal alliances in the production procedures while implement state of the art management practices. As a growing industry, it attracts better and better human capital. Today, it is estimated that over 100,000 people are already employed in more than the 400 ICT firms. Moreover, the Sectoral Innovation Scoreboard of the European Trend Chart of Innovation identifies Greece as the leading country in “*Computer Services and Related Activities*” for years 2004 and 2005, (no data for 2006 yet). Additionally, the sector itself was the most innovative sector in EU for 2004, third for 2005.

As the ***Expected Results*** of this analysis are concerned, we anticipate that the factors affecting the emergence of the Attica Innovation hot spot are in terms of resource conditions: the availability of well educated human capital, the existence of infrastructures and the favorable macroeconomic environment. The institutional processes encouraging the development of the hot spot were the funds of the 3<sup>rd</sup> EU CSF and the Athens 2004 Olympic Games. Both, important driving forces for the modernization of the local firms’ IT infrastructure. The third factor, concerning the management mental models of the sector, were the clustering and networking activities fostered by the fact the structure of the firms forming the hot spot provide supplementary services.

## References

- Archibugi D. and Lundvall B.A., (2001), *The Globalizing Learning Economy*, Oxford
- Asheim B. and Isaksen A., (1997), Location, Agglomeration and Innovation: Towards Regional Innovation Systems in Norway? *European Planning Studies*, 5:3, pp.299-330
- Asheim B. and Isaksen A., (2002), “Sticky” and Global “Ubiquitous” Knowledge, *Journal of Technology Transfer*, 27, pp.77-86
- Breschi, S., Malerba, F., (1997), Sectoral Innovation System: Technological Regimes, Schumpeterian Dynamics, and Spatial Boundaries. In: Edquist, C. (Ed.), *Systems of Innovation: Technology, Institutions and Organizations*. Pinter, London, pp. 130–156.
- Bunnell T., Coe N.M., (2001), Spaces and Scales of Innovation, *Progress in Human Geography*, 25: 4. pp. 569-589
- Carlsson B., Jacobsson S., Holmén M. and Rickne A., (2002), Innovation Systems: Analytical and Methodological Issues, *Research Policy* 31 pp.233–245
- Chung S., (2002), Building a National Innovation System through Regional Innovation Systems, *Technovation* 22, pp.485–491
- Doloreux D., (2002), Characterizing the Regional Innovation Systems of Sweden: A Tentative Typology, paper presented at the *International Conference: Dissemination of Innovation: Clusters, Regional Institutions and Telematics*, E.C. - URENIO, May 16-17 2002, Thessaloniki, Greece
- Dosi G., Freeman C., Nelson R., Silverberg G. and Soete L., (1988), *Technical Change and Economic Theory*, London, Pinter
- Lewin A. and Volberda H., (1999), Prolegomena on Coevolution: A Framework for Research on Strategy and New Organizational Forms, *Organization Science*, 10 (5), pp.519-534
- Lundvall B., ed., (1992), *National Systems of Innovation: Towards a Theory of Innovation and Interactive Learning*, Pinter, London
- Lundvall B.A., Borrás S., (1997), *The Globalizing Learning Economy: Implications for Innovation Policy*. Luxembourg.
- Maskell P. and Malmberg A., (1999), Localized Learning and Industrial Competitiveness, *Cambridge Journal of Economics*, 2, pp.167-185
- Nelson R.R., ed., (1993), *National Innovation Systems: A Comparative Analysis*. Oxford Univ. Press.
- OECD, (1996), *National Innovation Systems*. Paris.
- Porter M., (1998), Clusters and the New Economics of Competition, *Harvard Business Review*: 77-90
- Storper M., (1997), *The Regional World*, New York: The Guilford Press
- Van den Bosch F., Volberda H., de Boer M., (1999), Coevolution of Firm Absorptive Capacity and Knowledge Environment: Organizational Forms and Combinative Capabilities, *Organization Science*, 10 (5), pp. 551-568