THEORY OF INNOVATION IN SPATIAL PERSPECTIVE

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Abstract: The situation where European regions will fall behind with regard to defined categories of clusters with relation to their equivalents on the scale of the world economy can become a significant factor in the low competitiveness of the regions in a global economy. This particularly refers to the new EU member countries in which the previous centralized economy system enforced top-down location of entire industrial branches regardless of their possible effectiveness. Cluster and network structures in these countries significantly differ in the level of development and experience in the sphere of increasing competitiveness. (JEL: D24, D51, F01, F15, K33)

Key word: innovations, innovations theory, spatial perspective.

Introduction

There are four main theorems for identified how to explain the reason why innovation is relatively concentrated in some places rather than others.
1) Agglomeration theory (Marshall, Hoover, Vernon). The main reasons why innovations are concentrated in larger cities are because those cities provide more encouraging environments for the formation of new firms and therefore the early incubation phase. 2) Networked production theory (Becattini, Scott and Storper). The key features of this theory were the breakdown of vertically integrated corporations and the adoption of flexible specialization among the resulting networks of smaller firms. 3) Knowledge economy theory (Lundvall). In this theory the main reasons why innovative firms group together in space is that some places are better at learning than others. This is because they have a combination of adaptable innovation systems and labour markets that provide supplies of highly qualified and knowledgeable labour. 4) New competition and trade theory (Vernon, Porter, Krugman). Specialization and greater division of labour is one route by which regions in the advanced economies may achieve absolute international competitive advantage. The city regions in the advanced economies that can provide high levels of specialization, sophisticated and highly qualified labour together with international trading capabilities. In these theories the reasons why innovation is concentrated in space are a complex mixture of international trading capabilities, combined with regional specializations, high quality local factor conditions, sophisticated local and national customers, supporting industries and innovation oriented firm strategies.

Probably the different combinations of elements of these theories offer the best explanation of the nature and working of innovation systems in different regions [16] as well as general regional geography theory [11].

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Networks and cluster theories

Thanks to the spatial proximity and network interaction between firms in the cluster, synergy appears between sectors and knowledge is accumulated that is appropriate for a given industrial centre [16]. This knowledge decides on the abilities of the clusters to generate the breakthrough innovations which can lead to the formation of new sectors [6]. The basic attribute of clusters in the form of the geographical proximity of enterprises is a factor of particularly significant meaning in the case of fundamental technological change. In the case of radical technological change, new technologies that have not yet been documented are becoming accessible in the form of tacit knowledge. In this situation, personal contacts that are facilitated thanks to the proximity of enterprises are key to the exchange of this type of knowledge. The significance of proximity seems to be lower in the case of gradual technological changes as this type of innovation requires codified knowledge more, thus enabling the ease of transfer over long distances. In effect, the theory presented that clusters are becoming more valuable for firms or developing new technologies than for firms based on gradual innovations [8].

Most concepts entered into the systemic trend towards innovativeness are based on regional network interactions in a spatial sense. They incorporate units representing the sphere of business, institutional and the scientific and research environment. The development of regions based on knowledge and innovativeness constitutes a level for related models of learning regions, local innovative environment, clusters, or finally, regional systems of innovation. Converging assumptions of these concepts are particularly reflected in the policies of regional development realized by EU member countries.

The models exposing the role of knowledge and innovation to a large extent get their inspiration from the evolutionary output of economics, evolutionary theory of technological changes, as well as new theories of innovation assuming a non-linear nature of the process of innovation [15]. This topic was initially undertaken by the Nordic school which introduced the term of the learning economy. According to it, the keys to these processes are learning and transferring knowledge, sharing knowledge and creating innovation, interaction and trust arising from the cultural context and the local environment. The Nordic school also underlines that the spatial essence of the proximity of firms and units facilitates the accumulation of knowledge and the associated innovation, as well as the transfer of knowledge between players of a given location. This particularly refers to tacit knowledge that is based on experience. The pro-development element is also emphasized here in the form of a system of relations. "Innovation and knowledge are systemic and collective and only operate in the complex system of firms connected together in a network of interaction and institutions. Therefore, the role of social networks and local institutions is decisive in this process" [1].

The characteristics of the cluster therefore emerge from the individual activities of entrepreneurs and organizations and institutions that co-evolve

to support them. Once the first ventures have been started, the process of entrepreneurship is a classic trial-and-error and learning-by-doing process. In this way, the ability of local firms to learn and adapt to new events is an important determinant in the development of the cluster.

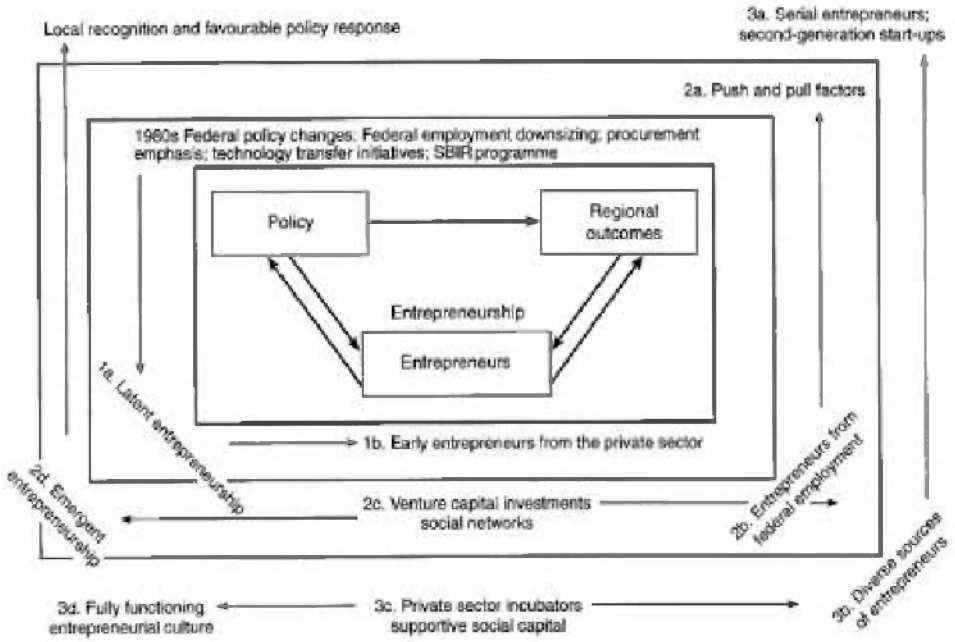

Figure 1. Development of the entrepreneurial cluster
Source: [4]

In the earliest stages, although a region may have the type of human capital or prominent research universities that is often associated with industrial clusters, few start-ups would exist, and there would be little or no venture capital activity in the area. The second phase is dominated by increased entrepreneurial activity. During this stage, entrepreneurs define resources to promote and protect their interests. In this way, the independent actions of entrepreneurs are catalytic components of a self-organizing system. The ultimate result, following figure 1, is stage three, where a fully functioning entrepreneurial environment within an innovative and adaptable industrial cluster emerges [4]. The characteristics of the cluster therefore emerge from the individual activities of entrepreneurs and organizations and institutions that co-evolve to support them. Once the first ventures have been started, the process of entrepreneurship is a classic trial-and-error and learning-by-doing process. In this way, the ability of local firms to learn and adapt to new events is an important determinant in the development of the cluster.

The Systems of innovation

Further approaches emphasizing the fact that the factors of competitiveness of enterprises first and foremost emerge in conditions of regional development and are referred to as *learning regions*. The dominating role of knowledge in regional development was observed by such authors as: Florida, Morgan, Cooke, Lundvall, who led to the spread of the notion of a learning region in literature. The main driving force of the learning region is that of constant innovation and the ability to adapt to changing market conditions. This means the role of public authorities whose opinion should be stimulated by all the factors responsible for the development of science, research, improvement of personnel and the application of high technology in the enterprises [5] as well as place marketing [12] of the learning region.

The concept of a learning region is based in a particular way on the assumptions of dynamic models of the interactive process of innovation. The process approach to innovation grew on the basis of criticism regarding the traditional linear model of innovation "pushed through" by science or "pulled along" by the market. Innovations are understood as an interactive process emerging between firms and the scientific infrastructure, while also between producers and users at the inter-organizational level and between firms and the wider institutional environment. Therefore, the process of innovation should be seen as an interactive process of learning, in which a large role is played by institutional mechanisms [10].

The basic attribute of a learning region can be acknowledged as the *regional innovative network* which is a successful mechanism of collective learning and generation of innovation. The networks constitute the main source of learning. According to the accepted interactive model of innovation, the processes of innovation in the region take place through networking rather than within the framework of hierarchical structures and markets. Therefore, for the realization of the concept of a learning region, as in the case of the systems of innovation and clusters, key significance is given to the regional dimension of the phenomenon of networking.

Using the flows of knowledge in a spatial dimension as a mechanism which stimulates the innovative ability of a region is also emphasized from the perspective of creating effective systems of innovation. The concept of innovative systems constitutes a higher level of development in terms of the concept of innovative networks, the learning region, the local innovative environment and clusters. This is to a greater extent based on the theory of systems and the role of social networks in the flow of knowledge and the creation of innovation in the region [14]. The afore-mentioned terms are attempted to be combined as one presenting it as successive stages in the development of the region in question – from the innovative cluster to the learning region, right up to the highest forms of development in the shape of a regional system of innovation [3]. The learning region is seen as a particularly effective type

of regional system of innovation [2]. A regional system of innovation is based on flexible network arrangements which generate the basis for innovativeness in the economy of the region [17].

The regional system of innovation should be seen in the categories of cooperating organizations involved in the processes of creating, diffusion and using knowledge and innovation in the region in question. The system of innovation in a regional dimension is a "public and private forum of interaction in the world of business, local and state administration, scientific and research and educational institutions, as well as supra-governmental institutions facilitating the activation of local factors of growth and better use of resources"[17]. The system of innovation is the flexible socio-economic arrangement of wide ranging connections, which is capable of using local resources and factors determining the processes of production appropriately to the specifics of the regional market. It is necessary to underline that it is not possible to define one universal model of such a system.

The capacity of local firms to exploit collective learning may be interpreted in a Schumpeterian way as entrepreneurial expertise to turn knowledge, even if socialized into a business idea. Once a *milieu innovateur* is achieved positive feedback from the innovative process reinforces the elements of continuity (labour market, interSME's linkages) and dynamic synergies [2,19] (interactive mechanisms leading to innovation) see figure 2.

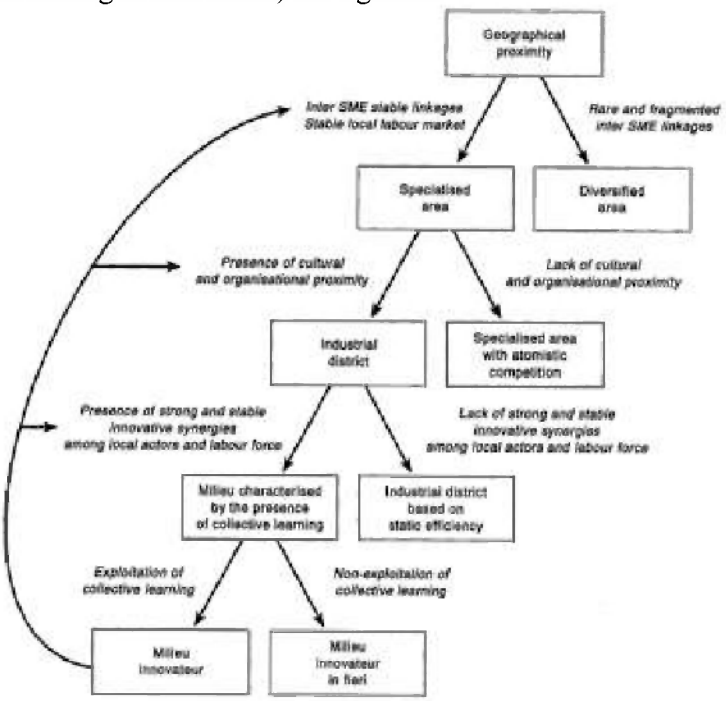

Figure 2. Characteristic of local innovative systems conditions

Source: [2]

Summary

The diagram below (figure 3) presents a variety of approaches to innovation as development concepts in the territorial perspective. Various approaches may be considered in three areas: *structuralist-organizational* with approaches such evolutionary economics, "californian school', "MIT school"; *social-institutional* with collective learning process approach, innovative milieus or neo Marshalian nodes and *cognitive approach* with knowledge communities theory, "buzz and pipelines" concept.

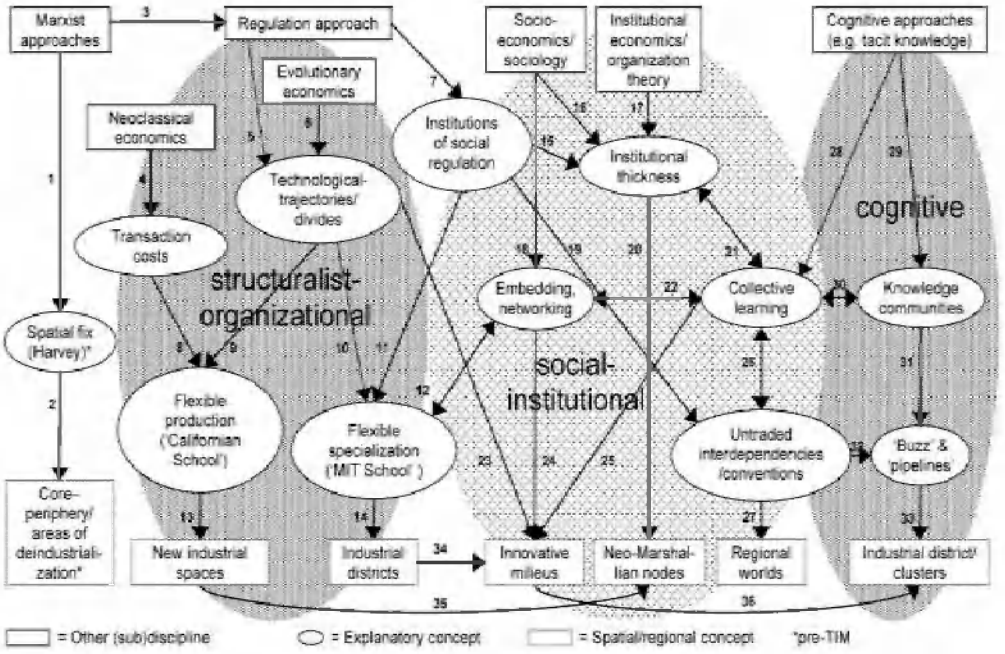

Figure 3. The map of approaches to regional innovativness theories
Source: [9]

It should be noted that research on the process of innovation territories are developing in different directions. The concept, which will dominate for a few years it is not known. Moreover, in many cases we can not copy a variety of solutions in this area. It seems that with the development of economic theory and research on the process of globalization will emerge a new approaches to creating innovative cities, regions, states. It is important that the Polish scientific community were actively involved in the creation and uses the concept of innovation systems at the level of spatial analysis.

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Streszczenie: Sytuacja w której regiony europejskie pozostaną w tyle w odniesieniu do określonych kategorii klasterów w stosunku do ich odpowiedników w skali gospodarki światowej może stać się istotnym czynnikiem niskiej konkurencyjności regionów w gospodarce globalnej. Dotyczy to zwłaszcza nowych krajów członkowskich UE, w którym poprzedni systemu gospodarki scentralizowanej egzekwował pozycjonowanie lokacji całych gałęzi przemysłu, niezależnie od ich możliwej efektywności. Struktury klastrowe i sieciowe w tych krajach znacznie różnią się poziomem rozwoju i doświadczenia w zakresie podnoszenia konkurencyjności.