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# Regional Development in the Context of an Innovation Process

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# Contents Page

# Tables and Figures

## Abstract

The purpose of this paper is to identify main components and driving forces behind an innovation process in order to support regions in organising their 'endogenous innovation process'. To that end, we study models of an innovation process and analyse the case of Sophia Antipolis. This theoretical study allows us to identify general inputs leading to creation of an endogenous innovation process in a region.


# 1 Introduction

Regions face a challenge with regard to the changing nature of globalisation which results in the necessity to respond to new circumstances. Nowadays, when long-term economic growth depends on knowledge accumulation and long-term output growth relies on the ability to introduce new products, processes, services, business models and organisational methods in companies (OECD 2011), the competitiveness of regions is being determined by their ability to organise beneficial environment for science, technology and innovation. In other words, to organise an 'endogenous innovation process'. To do so, the identification of components and driving forces behind an innovation process is crucial.

Figure 1: Regional development as a black box

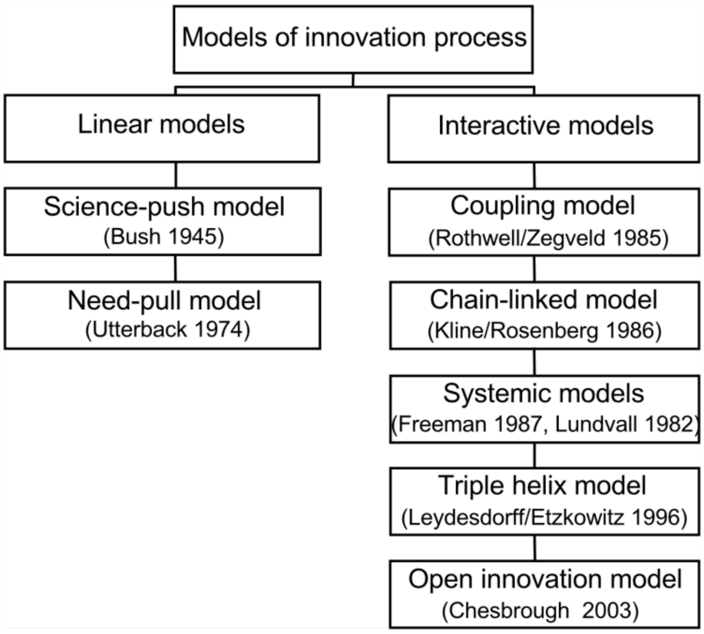

Source: Own figure

Regarding regional development as a 'black box' and assuming that we want to achieve the 'output' in the form of an endogenous innovation process in a region, our purpose is to identify the 'inputs' (Figure 1). The interior of the 'box' is a mechanism which explains the way regions develop, which means that the 'box' takes a form of regional development concepts which try to explain the nature of the development by binding inputs and outputs. We analyse several models of an innovation process as well as the case of Sophia Antipolis. The paper describes the following models of an innovation process: the science-push model, the need-pull model, the coupling model, the chain-linked model, systemic models, the triple helix model and the open innovation model. This analysis allows us to identify general conditions for regions and organisations to innovate. The next part of the paper is devoted to Sophia Antipolis, a technology park in France, as an example of the case where, in response to changing circumstances, a region transforms its structure in order to adjust its local environment to new requirements of companies. The case of Sophia Antipolis is an example of an initiative whose aim was to transform the profile of a region, in this case, from a farming area into one of major high-technology centres in southern Europe.

# 2 Models of an innovation process

An innovation process means a series of sequential changes, linked causatively, constituting stages of development of innovation. In other words, an innovation process is a sequence of events necessary for introducing an innovation to a market (Niedzielski 2008). An innovation process is described by models which could be divided into linear ones and interactive ones (Figure 2).

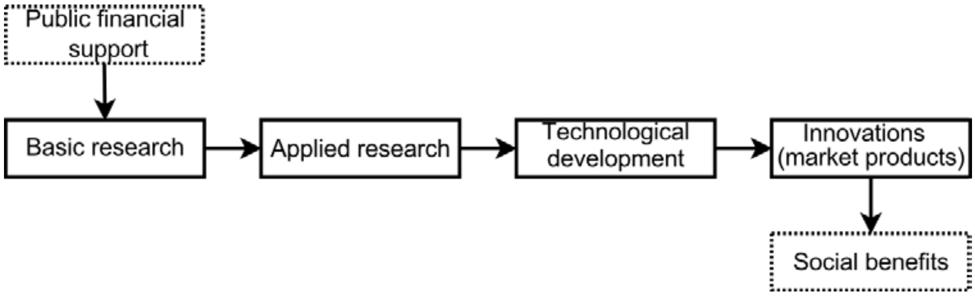
Figure 2: Models of an innovation process




Source: Own figure

According to some scholars (Gavin 2001), the beginnings of a linear model called the **science-push model** are directly linked with a report titled *Science: The Endless Frontier* prepared for President Roosevelt by Vannevar Bush (1945) – the Director of the Office of Scientific Research and Development. According to Bush, the progress of science is essential for technological innovations and for economic upswing, while knowledge needed for a rise of new products, new industries and new workplaces has its origin in basic research. Bush stated that science, especially basic research, should be a crucial objective of government policy. This policy ought to stimulate industry to conduct research by (1) clarification of the system of tax deductions with regard to incurred research and development expenditures and by (2) strengthening the patent system to reduce uncertainties. In his report, Bush focused mainly on socio-economic effects of knowledge application, such as: an increase of the number of workplaces, earnings, leisure time and time which can be devoted to learning, as well as a lift of standard of living. This model, where basic research supported by public funds is the starting point for creation of knowledge necessary for an innovation process, is illustrated on Figure 3.

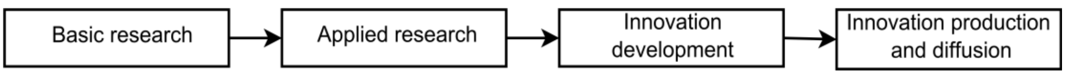
Figure 3: Linear model of an innovation process according to Vannevar Bush




Source: Own figure, based on Bush (1945)

The assumption with regard to the genesis of the science-push model based on the report *Science: The Endless Frontier* has been challenged by Benoît Godin (2006), who claims that the first developed version of a linear model was proposed in the 1920s by Maurice Holland of the Division of Engineering and Industrial Research of the U. S. National Research Council. Furthermore, Godin argues that the Bush's report is not a proper source to present a linear model because it is only a political document whose purpose is to persuade officials to increase public financial support for basic research. According to Godin, the innovation model is not a spontaneous invention suggested by Bush, but rather a process developed over the following three stages: (1) linking of applied research with outcomes of basic research, (2) adding experimental development to the process and (3) adding production and diffusion. Godin's linear model is presented on Figure 4.

Figure 4: Linear model of an innovation process




Source: Own figure, based on Godin (2006)

The linear approach to an innovation process means in simple terms that "science leads to technology and technology satisfies market needs" (Gibbons et al. 1994: 51). While the science-push model was adequate in the USA since the end of the World War II until the 1960s, later on it became the subject of criticism from many scholars (Edquist/Hommen 1999; Kline/Rosenberg 1986). One of the main objections was the lack of feedbacks from ongoing work, from a development process and even from sales figures and individual users. As Kline and Rosenberg (1986) stress, feedbacks are essential to assess the performance of a product, to plan further steps and to assess a competitive position. Moreover, they state that "the central process of innovation is not science but design" (ibid.: 286). They conclude the analysis of the linear approach by saying that "had the idea been true that science is the initiating step in innovation, we would never have invented the bicycle" (ibid.: 288). They proclaim the necessity of abandonment of linear models and, as a consequence, Kline and Rosenberg propose the chain-linked model instead, discussed further in this section.

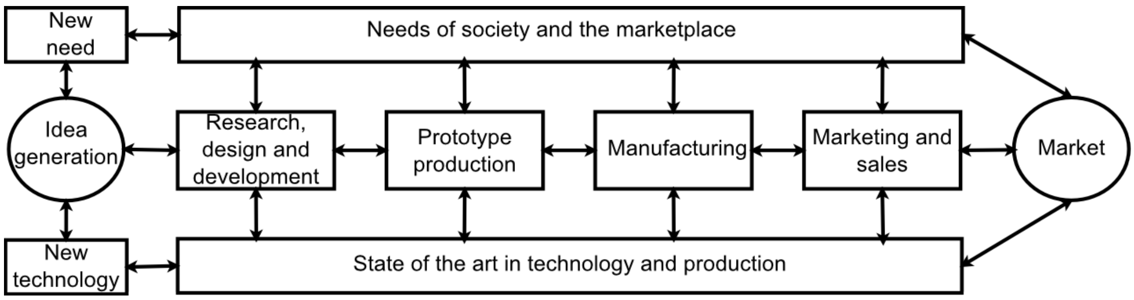
The second type of linear model is the **need-pull model**, in which market needs initiate an innovation process. Studies conducted in the 1960s and 1970s showed that between 60% and 70% of innovations occur as a result of market needs (Utterback 1974). This model is also called into question. The skepticism toward it can be summarises in the following questions: (1) how efficiently companies are able to reveal undisclosed needs, assuming the endless set of human needs, (2) do companies have sufficient access to methods which enable them to meet the variety of needs being expected to arise, (3) how far companies might venture from existing routines in order to satisfy unmet demands (Nemet 2009).

Italian scholars (Balconi et al. 2010) defend the science push model, claiming that, while the model has serious limitations, its criticism is to simplistic, mechanistic and is based on unwarranted assumptions. They undermine the foundation about the lack of feedbacks in the model, saying that the model can feature feedbacks and remain linear. They also stress that the science-push model is still usefully adapted in such industries as biopharmacy and semiconductors.

New models viewing an innovation process as a complex set of relations in which innovation may occur at any stage were formed in the 1980s as a result of the criticism of linear models and as an effect of efforts to link market needs and science into one model.

The **coupling model**, developed by Rothwell and Zegveld (Rothwell/Zegveld 1985)(1985), is an example of an interactive model. The model (Figure 5) is regarded by them as a logically sequential although not necessarily continuous process which can be divided into a series of independent and yet interacting stages. They regard an innovation process as a complex net of communication paths – within and outside an organisation – which links a company with a wider scientific and technological community as well as with a broader market. Rothwell and Zegveld conclude that an innovation process represents accumulated technological skills and market needs within a company framework (Rothwell 1994). It means that matching the company's technological capacity with market needs in the earliest possible stage of their appearance (identification) is a crucial factor for an innovation process.

Figure 5: The coupling model of an innovation process




Source: Rotwell/Zegveld (1985)

The next example of an interactive model is the **chain-linked model** developed by Kline and Rosenberg (1986) who defined within this model five stages and five paths of an innovation process (Figure 6).

The first stage comprises identification of needs based on a potential market. In the second stage, an invention and (or) a production of an analytic design takes place. The analytic design, as a new product or process, aims at meeting identified needs. The third stage is a combination of a detailed design and its testing. The forth stage consists of a modification of a project after which the production of a product takes place. The last stage is to distribute and market an innovation.

The five paths of an innovation process, described by Kline and Rosenberg, are showed on Figure 6 as: C, f and F, K-R, D, I and S.

**The first path**, called the central chain of innovation (C), goes through the five stages, beginning with a production of an analytic design and ending with the production and marketing of an innovation.

**The second path** is a series of feedbacks (f) occurring between adjacent stages of an innovation process. Besides feedbacks between adjacent stages there is a particularly important feedback (F) linking the last stage with the first one. This connection means that experiences gained by a company within the last stage of the process (based on information from customers) results in more effective identification of new markets (new customers needs) (UNIDO 2004).

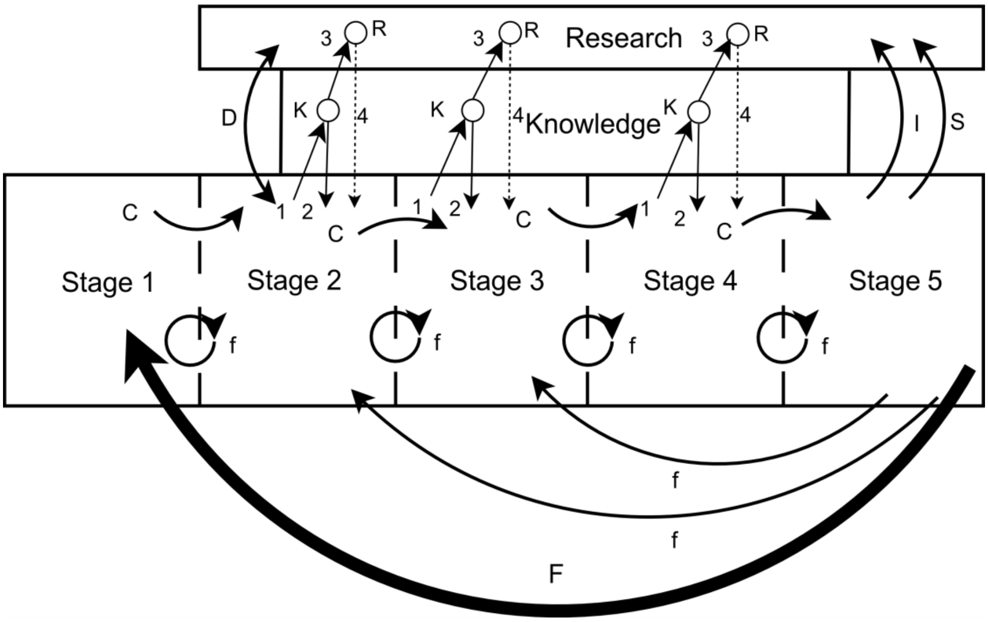
**The third path** are links between innovation and research development (D). This connection is determined by available sources of knowledge – if a problem arising during the five stages could be solved while relying on existing knowledge (at node K), then research is abandoned (the link 3 to R becomes redundant).

**The forth path** represents the situation when research outcomes in the form of new knowledge lead to the emergence of a radical innovation (D). According to Kline and Rosenberg, this case occurs rarely, nevertheless, if it happens, then this innovation revolutionises industries. Examples of such innovations are as follows: semiconductors, lasers, atom bombs and genetic engineering.

**The fifth path** denotes the impact of innovative products on research (I) as well as supporting the research by monitoring external developments (S). Kline and Rosenberg give an example of a microscope without which the work of Louis Pasteur would not have been possible, and in consequence it would have delayed the progress of medicine.

The next category of interactive models comprises **systemic models** developed in works of Freeman (1987), Lundvall (1992) and Nelson (1993). The concept of systemic models assumes social and evolutionary character of innovation. The social aspect refers to a learning process which is the main activity within systemic models stimulating interactions between people. Freeman (1987: 1) understood an innovation system as public and private institutions whose activities and mutual relations lead to creation, absorption, improvement and diffusion of new technologies. Lundvall (1992: 12) defines an innovation system as elements and relations which affect the creation, diffusion and use of new, economically useful knowledge. Nelson (1993: 4) describes an innovation system as a group of institutions where mutual interactions affect the innovation performance of national companies. According to Edquist (1997), whose works also contributed to development of the concept of innovation systems, innovation systems comprise all important economic, social, political and organisational factors which influence the development, diffusion and use of innovations.

Figure 6: The chain-linked model



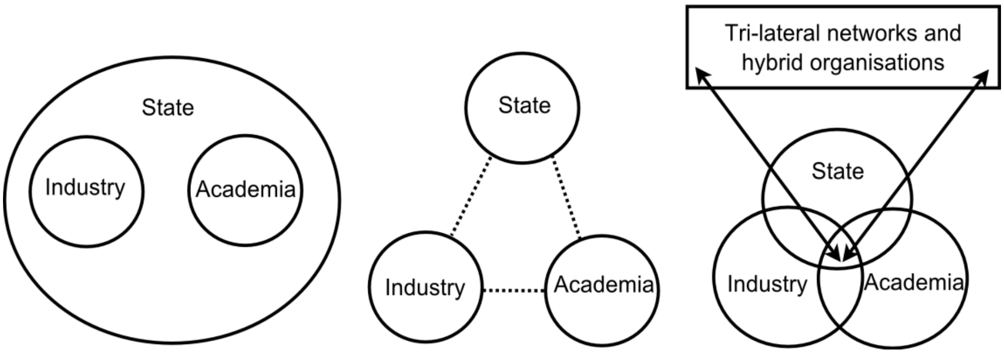

Source: Kline and Rosenberg (1986)

Another example of an interactive model is the **triple helix model** by Leydesdorff and Etzkowitz (1996). The assumption in this model is that interactions between science, industry and government are crucial factors determining conditions for an innovation process. This conception is distinct from the idea of systemic models, which consider the companies to be main actors in an innovation process (Etzkowitz/Leydesdorff 2000).

The triple helix model stresses reciprocal interceptions of functions in these three spheres, for example, entrepreneurship was originally assigned to industry, whereas nowadays it starts to characterise both science (through establishing companies such as spin-offs or spin-outs by academic staff) and government, which has the role of an animator of a local and regional socio-economic environment. Assuming new roles is done without a loss to their main functions (Etzkowitz 2003).

The role of these three helixes in an innovation process differs depending on changing relationships among science, industry and government. Etzkowitz and Leydesdorff (2000) identify three variants of mutual relations (Figure 7). The first variant refers to the situation when government, as the dominant actor, controls science and industry, directing relations between them, and is the owner of resources needed for new activities. In this case, the role of universities is limited mainly to educating human capital. In the second variant, which is based on *laissez-faire* conditions, science, industry and government work separately. The role of government is to constitute law and intervene only when market does not perform as expected. Companies in these circumstances have been set up and run rather by individuals than by groups of people. Apart from educating, universities also conduct research. Their function in relation to industry is to supply knowledge mainly in forms of publications; greater engagement of science into economic life is not expected.

Figure 7: Three forms of relations between government, industry and academia

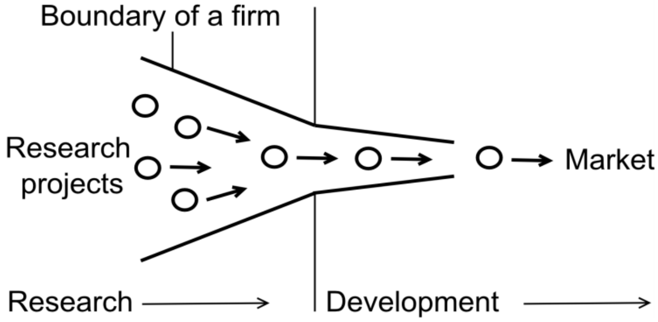



Source: Etzkowitz (2003)

The third variant is a form which matches the assumptions of the triple helix model. The relations among science, industry and government create an environment for the occurrence of hybrid organisations, such as: incubators, scientific parks or venture capital companies.

The last example of interactive models from the proposed division (Figure 2) is the **open innovation model** developed by Chesbrough (2003a; 2003b). The model contrasts its assumptions with the closed model of innovation (Figure 8), in which companies believe that "if you want something done right, you've got to do it yourself" (Chesbrough 2003b: 36). In the closed model, which worked efficiently during the 20th century, in order to create the most efficient ideas which could be quickly introduced on the market, entrepreneurs had to invest in own research labs and hire the most skilled employees (Chesbrough 2003a). New concepts were barred from competitors. Since the end of the 20th century, there have been changes due to the influence of the increased mobility among employees, which impedes keeping new ideas secret, and under the influence of growing accessibility of venture capital which facilitates funding currently set up companies and their efforts towards commercialisation of new ideas.

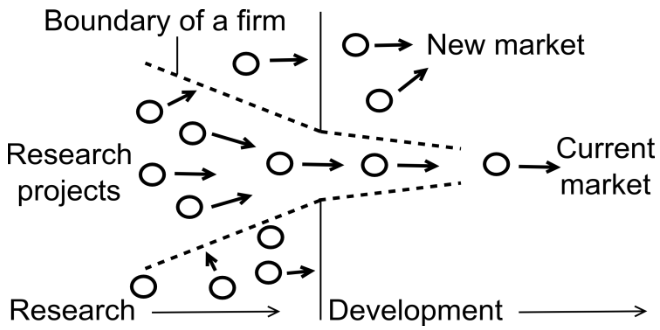
Figure 8: The closed innovation model




Source: Chesbrough (2003b)

In the open innovation model (Figure 9), companies commercialise ideas developed both within an organisation and outside it, without worrying that releasing their concepts will be disadvantageous. In that model, once companies are not able to develop all of their ideas, they are eager to share them with others, which implies a greater number of innovations in economy than if all ideas (even those which could not be embraced by a company) were barred from competitors. The establishment of spin-off companies and patenting activities – both patenting own ideas and taking advantage of already patented ideas from other actors – are a manifest of the open innovation model adhered to by an organisation. According to Chesbrough (2003b), there are specific industries which perform optimally within a closed model (for example, the nuclear industry) and probably they will never develop toward an open model. Nevertheless, many companies, mainly from biotechnology, pharmacy, semiconductors, telecommunication and IT, evolve toward foundations of the open innovation model.

Figure 9: The open innovation model




Source: Chesbrough (2003b)

It is widely believed that to enhance a competitive position in a global economy, regions have to adapt their economic and institutional structures as well as their policy to changing circumstances (Benz/Fürst 2002). As Lundvall (1995) claims, nowadays, capitalism has reached the stage when knowledge is a strategic resource and learning is the most important process. This means the necessity to develop a regional environment that would be beneficial for knowledge production, diffusion and absorption.

Based on analysed models of an innovation process, we can conclude that the main forces enabling regions to enhance their innovative performance are as follows:

- innovative interactions as a result of networking both among regional actors and between regional and external actors;
- science, public and private actors cooperating with each other and being highly engaged in socio-economic life in a region;
- monitoring of the external environment to draw from the experience, knowledge and skills of others;
- sharing with own knowledge, ideas and experiences with other companies, regions etc.

Similar conclusions come from the analysis of territorial innovation models (TIM) which also stress the importance of mutual interactions between actors (Table 1). Concepts of the TIM family consider innovation as an interactive process performing through exchange of resources between actors. This exchange takes advantage of various forms of connections. According to Benneworth and Rutten (2011), actors can perform efficiently within several networks and disseminate resources between them. Furthermore, the integral components of relationships are social networks. In that sense, social networks can be perceived as a set of socially embedded economic relations which means that they depend upon norms, institutions and assumptions shared among a group of actors as opposed to simply being a result of economic decisions (Gordon/McCann 2000). Social networks are assumed to affect diffusion of innovations by: (1) working as channels for communication, social construction and negotiation of innovations, (2) intensifying the monitoring of innovations and, accordingly, (3) diminishing the risk by eliminating novelty or uncertainty for potential actors that absorb innovations (Jippes et al. 2010).

Table 1: General circumstances in which regions and organisations innovate according to territorial innovation models and interactive models of an innovation process

| Territorial innovation models | | | | |
|---|---|---|---|---|
| Innovative milieu | Industrial districts | Clusters | Regional innovation systems | Learning regions |
| Formation of a region towards an incubator of innovation where companies from different branches are able to co-operate and exchange information | Concentration of companies determining sectoral specialisation in a region, competing with each other on the basis of innovativeness and cooperating in associations of producers | The presence of regional networks of interdependent companies, actors developing knowledge, customers, suppliers and other institutions contributing to networks' performance | Interactions between sources of knowledge development (e.g. universities, research institutions) and companies in a region | The ability of a region to respond to new circumstances by: adopting solutions being already applied successfully in other regions, adjusting these solutions to own specific regional structures or developing entirely new solutions |
| **Interactive models of an innovation process** | | | | |
| Coupling model | Chain-linked model | Systemic models | Triple helix model | Open innovation model |
| Communication paths combining an organisation with a wider scientific and technological community | Feedbacks occurring between organisation's departments as well as between the organisation and the environment (e.g. customers) | Interactions between public and private actors leading to creation, diffusion and absorption of knowledge as well as enhancing the learning process | Interactions between science, industry and government; additionally, reciprocal interceptions of functions in these three spheres | Sharing knowledge and ideas with other actors, which leads to commercialisation of ideas that originated both inside and outside an organisation |

Source: Own compilation

# 3 The case of Sophia Antipolis: The adaptation to the changing nature of globalisation

Companies engage in cooperation with other actors not only due to the possibility of decreasing costs and risks of research and development activities, but also in order to obtain access to new markets and technologies as well as to benefit from other people's skills. Networks performance is based on relations which were developed based on reciprocal trust and social coherence.

The analysis of the Sophia Antipolis case will allow better comprehension of the role of networks and identification of factors which reinforce regional development with regard to an innovation process.

The technology park of Sophia Antipolis is located in the South of France in Provence-Alpes-Côte d'Azur, between Nice and Cannes. In 2011, there were 1400 companies located in Sophia Antipolis, especially from the IT sector, and 30000 workplaces (Perez 2011). The idea to create this park commenced in the 1960s as a private initiative of Pierre Laffitte, a director of École nationale supérieure des mines de Paris in the years 1963–1984 and a senator from 1985 until 2008 (Barbera/Fassero 2011). Laffitte's intention was to transform the touristic-agricultural region into a "City of Science, Culture and Wisdom" (ter Wal 2010).

The park was created *ex-nihilo* – in a region without industry traditions, academic centres and human capital resources. The key factors which have decided about the locating companies in Sophia Antipolis were: the attractive climate of the French Riviera, a cosmopolitan tradition, excellent transport and touristic infrastructure, especially the convenient access to an international airport (Lazaric et al. 2008). The objective of the project was to attract companies from the IT sector in order to minimise negative external effects, such as pollution, which could threaten one of the main advantages of the region – the climate. In the initial stage of the project, a significant impulse came from the investments of France Télécom, which enhanced the competitiveness of the region by creating telecommunication infrastructure and fibre-optic networks (crucial facilities for the IT sector). In the 1970s, the project faced financial problems and was not able to be conducted as a private initiative any more. This led to the shift of the project into the public sector and since that time the local and regional government has played the main role. Public actions were then focused on the promotion of the region by international marketing. This resulted in an influx of foreign investments (Longhi 1999).

As a consequence of changing forms of globalisation, the park's competitiveness was weakened in the 1990s. Whereas in the 1980s the decisions on locating companies were based on low costs and access to infrastructural facilities, in the 1990s those decisions started to depend on the presence of specific features of a region which affect the innovation performance of companies (Lazaric et al. 2008). The local environment, from which a company draws knowledge through interactions with other actors, has become the key factor boosting innovation performance. These changing circumstances reduced the influx of new companies into Sophia Antipolis and also caused decisions of moving some firms from the park into another place (ter Wal 2010). Those companies which launched their R&D activities in Sophia Antipolis in the 1980s conducted their research within their own organisational structure without any external interactions on the local level. This led to the concentration of companies performing in isolation. The development of the park until the 1990s was affected by exogenous factors, taking mainly the form of foreign investments.

The abandonment of the technology park by international companies became a positive impulse for employees, who did not want to leave Sophia Antipolis and move along with a firm, to set up their own business. The creation of small and medium size companies commenced a formation of regional development based on endogenous factors constituted by networks among actors (Barbera/Fassero 2011). In order to enhance entrepreneurial performance of companies in the park and to promote networks cooperation, many of associations and clubs appeared. An example of one of such associations is *Sophia Start-up,* supporting firms in the beginning of their activity through formation of links between a company and a venture capital investor. An entrepreneur also gains aid in the form of access to education to enhance the skills necessary to run a business (Parker 2010).

The regional development based on small and medium size companies was soon supported by founding of scientific centres, both public and private, in the region. The Université de Nice located its research institutes and doctoral studies in Sophia Antipolis in 1986. The active collaboration and the engagement of the university in enhancing the scientific potential of the region and in forming human capital resulted in the emergence of such tight ties between the university and the park that the university decided to change its name to *Université de Nice Sophia Antipolis* in 1989 (Chambre régionale des comptes de Provence-Alpes-Côte D'Azur 2010). Subsequently, in 1991, Eurecom, a private graduate school, was established in Sophia Antipolis to educate in engineering fields, such as: multimedia information technologies, mobile communication as well as communications and computer security. These engineering studies were set up to meet the needs of the technological park.

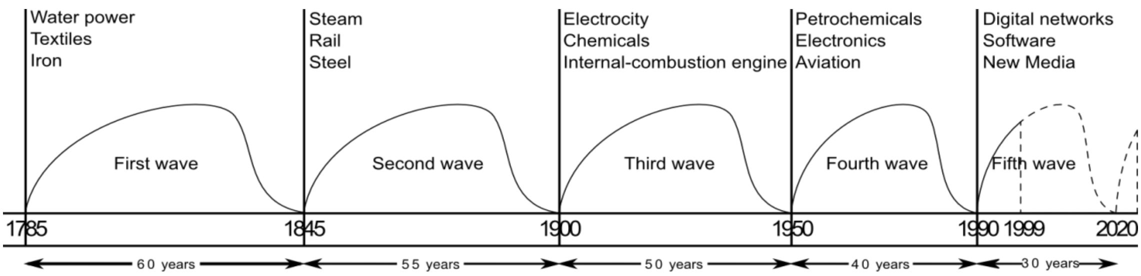
The next significant factor contributing to the enhancement of regional endogenous potential was the presence of such scientific institutes as: INRIA (Fr. Institut National de Recherche en Informatique et en Automatique), INRA (Fr. Institut National de la Recherche Agronomique), CNRS (Fr. Centre National de la Recherche Scientifique) and INSERM (Fr. Institut National de la Santé ed de la Recherche Médicale), which have already worked in Sophia Antipolis since the 1970s and 1980s, however, their impact on the park's development was irrelevant in those years due to international companies being independent from the local environment, working without any cooperation with colocated actors. The situation changed when the structure of Sophia Antipolis was transformed through human capital accumulation (as a result of the appearance of academic institutions and their educational activities) and the emergence of small and medium size enterprises. In those new circumstances, scientific institutes became the source of technology transfer through the foundation of start-up and spin-off companies. An example of that activity is INRIA, which has an active policy of technology transfer; since 1984 the institute has founded 16 companies (INRIA Sophia-Antipolis-Méditerranée 2009).

Changes which took place in Sophia Antipolis, caused the necessity to adapt its structure to changing circumstances, transforming the local economic system from an exogenous into an endogenous one. The development of the technology park is not determined by international companies any more, its competitiveness depends on the innovative environment based on small and medium size firms and scientific institutions. However, it does not mean that the park is closed for foreign investments, but greater attention is paid to strengthening the links between foreign and local companies.

# 4 Findings on regional development that originate from theories and the case of Sophia Antipolis

In conditions where innovations affect an economic upswing, regional development is determined by: (1) actors which are responsible for creation, diffusion and absorption of innovations, (2) actors which create institutional environment for innovations, (3) the inference of cooperating networks, (4) the resources of human capital in a region and (5) the quality of regional infrastructure needed by actors of innovation processes. Table 2, based on studies of models of an innovation process and the case of Sophia antipolis, gives more details with regard to determinants of regional development in the context of an innovation process.

Figure 10: Waves of incremental innovations occurrence




Source: The Economist (1999)

Taking into account that cycles of appearance of incremental innovations – which revolutionise technologies and change conditions essential for the rise of innovations – are becoming shorter (Figure 10), it is important to stress the validity of diversification of innovation activities in a region. In that situation, an eventual collapse of companies from a given innovative activity, as a result of developing of new technologies, would not be as threatening as in the case when a region is dominated by one type of innovation activities. Linking foreign and national companies with a local environment, where they are located, is also an essential factor for regional development. This increases the chance for the long-term growth in a region.

Table 2: Determinants of regional development in the context of an innovation processes

| Factors | Effects |
|---|---|
| The presence of universities which, beyond education and research, actively contribute to creation of links with other actors of local economic environment and the existence of universities whose academic staff is engaged in economic activities, like setting up spin-off or spin-out companies | Dissemination of knowledge and creation of cooperating networks |
| Higher education adapted to the needs of knowledge-based economy | Educated alumni starting their own companies or contributing to the work of existing innovative companies |
| The existence of cooperating links between companies within a region | Exchange of knowledge and ideas as well as building trust between firms |
| Cooperation with actors of an innovation process outside a region | Gaining new knowledge not available in a region |
| The presence of a heterogeneous structure of actors creating and disseminating knowledge, such as: business incubators, scientific parks and technology transfer centres | Increasing the diverse knowledge available for firms, which gives an impulse for new ideas |
| The presence of social capital in a region | Creation of mutual trusts and norms, which enhance the coordination of activities within networks |
| The presence of human capital, whose knowledge, skills and experiences coincide with the needs of companies and other actors engaged in an innovation process | Enhancement of the competitiveness of a region |
| Engagement of regional or local authorities in the process of creating a cooperation network among science and industries | A common vision of regional development; effective activities of local authorities towards formation of beneficial environment for innovation processes enhance the competitiveness of a region |
| Accessibility to transportation and communication infrastructure which meets the needs of innovative companies | Creation of beneficial conditions for high-tech manufacturing |

Source: Own compilation

# 5 Summary

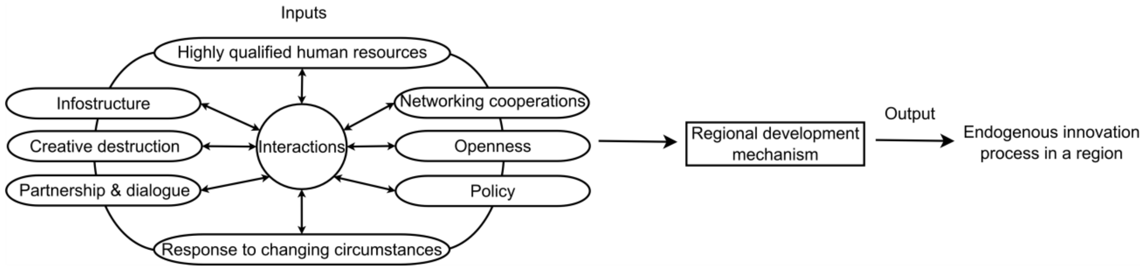
The analysis of models of an innovation process emphasises networks as the factor determining the emergence of innovations. The case of Sophia Antipolis proved this assumption, stressing the endogenous networking structure as the prerequisite for long-term development in a region. This theoretical study leads to the conclusion that well-performing networks are directly linked with: (1) multitude of actors which diversify sources of knowledge and information in a region, (2) including external actors into regional networks, which provide information unavailable within a region as well as new technology and new markets, (3) interactions in forms of cooperation and competition based on innovation, (4) the ability of regional actors to respond to new circumstances by adopting solutions that are being already applied by other actors, adjusting these solutions to own specific structures or creating entirely new solutions.

The changing nature of globalisation forces regions to perform as an innovative organisation which in this case means to base its structure on the following pillars:

1. Highly qualified human capital – the main challenge here is to bind well-educated people with a region to prevent them, in the case of outflow of companies from a region, from moving along with a firm. To do so, a region has to offer attractive living conditions.
2. "Infostructure instead of infrastructure" (Hassink 2005: 525) – which means infrastructure facilitating the flow of knowledge and learning process, like technology parks, business incubators, R&D institutes, business environment institutions etc.
3. The ability to learn from success and failure – taking advantage of changes in a region, such as the decline of an industry, to subsequently transform them into 'creative destruction' which allows the introduction of a new economic paradigm into a region.
4. Partnership and dialogue between regional actors resulting in a common vision of the development path of a region and creation of social capital.
5. Openness to external environment and endeavour to bind foreign actors to a regional structure.

To summarise, the analysis of models of an innovation process and the case of Sophia Antipolis allows the identification of general inputs, leading to the creation of an 'endogenous innovation process' in a region, presented in Figure 11.

Figure 11: Regional development mechanism leading to the creation of an endogenous innovation process in a region

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