

## INNOVATION THEORY – AN EPISTEMOLOGICAL ASPECTS

Aneta Pachura\*

**Abstract:** The character and intensity of the innovations process of goods, processes or organisational structure depend on both corporate research and development initiatives and on transfer of technology and know-how from the external environment. The character of innovative processes as well as their degree and development are thus dependant on a number of endogenous (shaping the potential of the company's close environment) and exogenous factors (relating to the global economic and technological development). The paper present epistemological introduction to theory of innovation.

**Keywords:** innovation, technology, knowledge, enterprise

JEL codes: O32, O33

### Introduction

Complex approach to innovativeness enables one to compare innovative activity to the search for innovative ideas and solutions covering a complex process originating in research and finding its end in complete implementation of the particular innovation [1]. Primary, strategic and science – based research lay at the basis of relations observed between science, technology and innovations. In order to ensure smooth flow of scientific, technical and innovative processes, covering:

- theoretical background and model development,
- technical models,
- industrial development,
- innovations and imitations,
- distribution of goods and technology,
- innovation application

it is necessary to gather the right human resources, knowledge, as well as material and financial resources.

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\* **PhD. Aneta Pachura**, Faculty of Management, Poland, Częstochowa University of Technology,

✉ corresponding author: [aneta@zim.pcz.pl](mailto:aneta@zim.pcz.pl)

The problem of technological innovations has not been considered a priority by the classic theorists [2]. Due to the fact, no special importance is ascribed to the innovation development theory, in spite of the fact that Smith, Ricardo, Marks, Marshall, Keynes and Solow are almost unanimous, stating that long-term efficiency growth is inextricably related with introduction and diffusion of technological and organisational innovations. Joseph Schumpeter has stressed the role of innovation by pointing to the special interdependence between economic development and innovation development observed in the process of qualitative and quantitative application of innovations in business practice. However, the neoclassical theory does not identify any special role of innovation development, as it focuses on removing market imperfections and return of price and wage flexibility [2]. Subsequent development of institutionalism has resulted in research on the existence, power and character of the correlation between economic development and innovation development. Interest in the process of learning in the light of economic results has changed the perception of the role of innovation.

This approach has enabled deep understanding of the sources and determinants of technological changes, thus enriching the classical approach focused on the impact of technology on economy [2]. Since that time, innovations have been considered to have major importance on socio – economic development. Researchers are now of the opinion that economy development does not depend on material, capital or human resources but mostly on modern technologies [3].

It is commonly believed that the character and intensity of the process of implementing innovations in the field of goods, processes or organisational structure depend on both corporate research and development initiatives and on transfer of technology and know-how from the external environment of the particular organisation. The character of innovative processes as well as their degree and development are thus dependant on a number of endogenous (shaping the potential of the company's close environment) and exogenous factors (relating to the global economic and technological development). Moreover, business practice proves the increasing role of actions undertaken by public institutions, supporting innovative initiatives.

The relations between the production and the R&D sectors (and especially the global academic potential) are considered special factors determining the current status of innovations in the world.

At the same time, one may observe evolution of the approach to the issue of innovative processes. Until recently, innovation development was considered a linear process, starting with primary research and lasting until the implementation stage. Consequently, pro-innovative actions focused mostly on demand, and

especially on investment in research infrastructure\*. Huge research centres were established, concentrating academics and scientists. Presently, the trend is to support projects related with promoting “innovation culture” by education, cooperation networks and strengthened relations between enterprises and research and development centres. In result of the fact, the linear model of innovative processes evolves into a dynamic, interactive concept, creating the so called “technological constraint”. Supply and demand for new technologies depend on interactive relations between innovation authors and users (the so called bottom up model) [4]. From the point of view of retrospective analysis, the character of innovative processes has undergone great transformations, from the linear model to the network integration approach.

### **Innovations as system approach**

Due to the dynamics of the phenomena taking place in the global, international, regional and local environments [5], it seems necessary for enterprises to ensure close cooperation with their environment. Systemic approach to organisation operation, perceiving a company as a system of mutually related and interdependent elements may be the concept facilitating the implementation of strategic objectives, including innovative activity aims, and thus ensuring better market position. An enterprise should function as an open, learning system.

There is a number of factors exerting impact on innovative activity, both during the stage of decision-taking and practical implementation of the idea. These factors may be identified both in the internal environment of a company (endogenous character) and in the external environment (exogenous character).

Environment elements exerting direct impact on innovative changes in a company are for example the following: natural environment, character of the particular industry, market, competition, research and development activity, social and cultural environment.

In result of technological changes, new work objects are established, being new or so far unknown combinations of natural resources. Due to limited resources, it is considered a priority to minimise the natural resources used. It opens a possibility to work out the same production results with the application of less material resources. Investment in environment protection is undoubtedly necessary in this respect.

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\* The demand approach is based on a linear correlation between the intensity of research and the number of innovations. According to this theory, the more extensive the research, the greater number of innovations introduced.

The stock and quality structure of a particular industry sector influences the character of the new technological solutions introduced. High level of innovativeness of a particular sector may stimulate actions aiming at further improvement of goods. Due to strong market competition, these actions are mostly undertaken to achieve product parameters that would be better than the ones offered by other competitors.

The flow of goods, services, information and money observed on the market and especially organisations and market participants are often considered stimuli of innovative changes among cooperating business entities. The market may thus inspire manufacturers to undertake innovative initiatives. Moreover, as an inspiring mechanism, the market may often decide on the necessity of applying a particular, new technical solution or idea.

Changes of competition configuration observed in a particular branch of industry may be also considered a motive power of innovation boom. Corporate competitive advantage achieved thanks to own R&D and innovation potential is a resultant of innovation efficiency and effectiveness. Due to the fact, research and development activity has become a must for contemporary enterprises.

Nowadays, it is stressed that the changes taking place in the corporate social environment exert strong impact on companies and constitute one of the primary causative factors of innovations. Not only the external social environment plays an important role in the process of shaping the scope and character of innovation initiatives. It is also the endogenous environment that matters greatly. There is a common belief that every reorganisation in a company influences its social potential. It seems thus necessary to gain social consent to the introduction of innovative changes.

Innovative activity is also undoubtedly related with the corporate cultural environment, characterised by the cultural and historical tradition, systems of values, ethical norms and behaviour standards. These elements may be observed in the attitudes towards innovations, adopted by employees.

Systemic approach to the management of a contemporary enterprise perceives every organisation as a uniform system comprising of mutually related elements [6]. The systemic approach applied to innovative activity management enables one to distinguish the factors having direct influence on innovative processes implementation and to point the relations between them. One may thus identify and classify innovation implementation factors. Wide spectrum of innovative activity enables one to distinguish a number of determinants of corporate innovative activity. Literature studies point to the possibility of analysing the identified factors from the point of view of organisation environment. The assumed thesis justifies

the attempt to relate the theoretical classification to the two-level corporate environment (external and internal). Academic research based on innovation management theory (studying the impact of external and internal environment on innovation development) enables us to identify and analyse the basic determinants of innovation implementation as well as their types.

### **Conclusion**

Technological progress, achieved thanks to innovative activity, is commonly considered the basic indicator and stimulus of economic growth. Complexity and dynamics of social, economic and political phenomena influence the innovative potential in its global, international, cross-regional and regional scale.

The correlation between innovation development degree and socio – economic growth of a country is commonly stressed, determining the outlay of resources spent on innovative activity. Competence to conduct primary, applied and development research depends on the internal and external character of the R&D and innovation potential. Factors such as: human resources, new competence creation, knowledge transfer and application, financing, innovativeness and its commercialization are often considered the primary strategic areas conditioning innovation development.

Theoretical studies on innovations confirm the interest in the problem of innovative activity both among theorists and practitioners of organisation and management sciences. Comparative approach to the innovation theory in classicism, neoclassicism and institutionalism may be the basis for considerations on the importance of innovative activity in the contemporary global economy.

Relation to the growth theory and especially to the uneven rate of growth of different societies enables one to consider the views on the role of innovations in economy. There are both opinions attributing little importance to innovations and the ones confirming strong correlation between economic growth and innovation development. In the latter case, it is characteristic to institutionalism to perform analyses of the relations between innovative potential and technical and organisational progress as well as economic development. This approach enables one to distinguish determinants of innovative activity. Direct role of innovative activity in the process of technology and competitiveness growth is thus confirmed in its regional, cross-regional, international and global scale.

Innovative activities are considered some of the most important factors shaping key competences necessary to improve company competitiveness. Innovative activity is thus considered an area of special interest of companies, including the ones operating in the sector of small and medium enterprises. Innovative activity

taking the form of technical and organisational changes may be considered a stimulus of new technical solutions and a determinant of success on the market.

Changing frequency of innovations and inventions in the sphere of science and technology results in shortened lifecycles of many products. Development cycle of innovations, especially the product and process ones is reflected in the lifecycle of products. Technological progress is the stimulus of the observed tendency to shorten development cycles of innovations in the sphere of goods and technologies.

Minimisation of development cycles is a premise of a system protecting companies from the so called "late innovations". A product lifecycle usually begins already during the final stage of its development cycle and its course curve and duration time are not constant. Lifecycles are characterised by constant changes resulting from technological progress and changing market conditions. Speeding up development cycles of innovations and lifecycles of products facilitates the possibility of early improvement and modernisation of the range of goods offered as well as business processes taking place in a company (primary, auxiliary and management processes). On the other hand, lengthening lifecycles of products seems unjustified as competitive advantage may be achieved mostly thanks to the improvement of the structure and quality of the goods offered. Introduction of minor, instead of radical innovations (based on thorough technical and technological changes) often results in failure to reach the right level of competitiveness on the global market.

Intensification of innovative undertakings necessitates coordination of particular subsystems of a company, that is the technical (product or technology), information, economic, marketing and human resources management subsystems. Efficiency of innovative activity depends more and more often on external conditions such as for example technology and know – how transfer. In the light of changing external and internal conditions, the degree of corporate innovativeness is frequently determined by a number of exogenous and endogenous factors.

The ongoing internationalisation and globalisation of markets necessitate constant identification of factors, having the key impact on innovativeness [7]. Conditions and principles of cooperation and competition on the widely understood market, including the European Union market, necessitate constant analysis of innovation determinants in particular sectors of the economy. Definition of a complex set of innovation determinants undoubtedly results in better adaptation of companies to new conditions of the global external environment.

### **Closing remarks**

Research based on innovation theory may be the basis for the formulation of the following general conclusions:

- technical and economic progress is determined by intensity of innovative undertakings,
- regional, cross-regional, international innovation development depends on a number of factors, both of endogenous (shaping the external conditions) and exogenous (shaping the external conditions) character,
- external and internal environment factors may be considered causative factors of innovative undertakings,
- there is a possibility to distinguish a number of causative factors of different character: technical, informational, economic, legal, political, social and organisational,
- the level of corporate innovativeness, considered a resultant of initiatives undertaken in the spheres of: products, processes, systems, organisational structure and others, is determined by a number of social factors (qualifications, employee norms and attitudes, culture, information and engagement of the teams responsible for innovative activity),
- analysis of social determinants points the development direction for actions aimed at improving the human resources of companies, including the ones operating in the SME sector,
- there is a close correlation between a company's preparedness to implement innovations and the social factors influencing the process,
- ability to identify the key social factors, having the greatest impact on successful innovation implementation conditions corporate innovativeness level.

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**Abstrakt:** Artykuł prezentuje zagadnienia teorii innowacji w relacji do zmieniających się uwarunkowań w otoczeniu organizacji oraz zmieniającej się roli wiedzy w rozwoju gospodarczym i społecznym. Współczesne podejście do innowacyjności wymaga zastosowania podejścia systemowego czyli uwzględnienia wielu elementów wpływu często o coraz bardziej globalnym charakterze.

### 创新理论——一个认识论方面

**摘要:** 创新过程中产品的品质和特性，流程或组织结构取决于两个方面：企业的研发项目

和技术转让，以及如何从外部环境获知。因此，创新过程的特点以及它们的程度和发展创

新的过程，以及他们的程度和发展的特点是依赖于大量的内部（塑造公司封闭环境的潜力）

和外在因素（有关全球经济和科技发展）。本文进行关于创新理论的