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INNOVATION IN ECONOMIC THEORY AND THE DEVELOPMENT OF ECONOMIC THOUGHT

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Abstract. The article presents the theory of innovation in the attainment of economic sciences. It reviews the economics literature and looks at the importance of innovation in different economic models. It begins with an analysis of the views of representatives of classical economics, including those of Adam Smith, David Ricardo and Jean-Baptiste Say. This is followed by a discussion of the theory of innovation today, as it is handled in the knowledge-based economy. In analysing the achievements of economic thought, it shows the growing importance of innovation, research and science for socio-economic growth.

Key words: innovation, economic growth, progress, economic models

INTRODUCTION

Today, innovation enjoys continuous and growing interest in both economic theory and practice. This stems from the perception that innovation increases management efficiency and is a tool enterprises can use to achieve competitive advantage. Until the 1990s, economists did not take great interest in the issue of innovation. While it was perceived and defined in various ways, economists seemed to underestimate its impact on economic growth. In the 1990s, the paradigm of the knowledge-based economy was put forth to draw attention to the characteristics of the modern economy, increasingly benefiting from knowledge capital, and such knowledge being the source of all novelties in the market. An important step in the development of the theory of innovation was the OECD programme (the Technology/Economy Programme – TEP) initiated in 1988, which resulted in publications drawing attention to the significant impact of research and innovation on the economy and society.

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The purpose of the article is to present the theory of innovation in the achievements of economic sciences, taking into account some major economic trends and models. Over the years, the development of economics as a science evolved, and was in part related to the changing conditions of management. Changing paradigms require the creation of new theories or the reinterpretation of existing ones. Leading representatives of different economic models point to the significance of various factors, ranging from traditional ones such as land and capital, to soft factors including knowledge and information. In these changing models, the approach to innovation and its role in the economy was varied and, for a long time, literally underestimated.

MATERIAL AND METHODS

These considerations are theoretical. For the purposes of the study, the economics literature was reviewed in terms of how important innovation was in different economic models, beginning with an analysis of views of representatives of classical economics, including Adam Smith, David Ricardo and Jean-Baptiste Say, and moving on through to modern times and the model of the knowledge-based economy. While analysing the subject of innovation, particular attention should be paid to the views of Joseph Schumpeter, who introduced the concept of innovation in the economics literature for the first time. Although unpopular at the time, his views had a significant influence on the theory of economic growth in later periods. In analysing the achievements of economic thought, the article shows the growing importance of innovation, research and science for socio-economic growth. The change in the approach to the importance of innovation for economic development was accompanied by the changing definition of innovation. Initially, innovation was associated mainly with technological aspects and the first application of the invention. Nowadays, the importance of non-technological innovation – e.g. organisational or marketing innovation – is emphasised, and it is defined as anything that is perceived by a person, or another entity adopting it, as new, regardless of the objective novelty of the product, technology or organisational solution.

A REVIEW OF SELECTED ECONOMIC THEORIES AND MODELS IN THE CONTEXT OF THE IMPORTANCE OF INNOVATION

Initially, the concepts of innovation, invention and novelty occasionally appeared in different economic theories, but generally speaking, the importance of innovation for the economy was marginalised. The development of the economic theory of innovation dates back to the 1950s and is associated with the economic growth research and theories Schumpeter had previously put forth.

Adherents of classical economics did not regard innovation as an important factor contributing to economic processes. In comparison with other factors, such as land, capital or labour, innovation was marginalised. Adam Smith believed that the division of labour in the economy was one of the forces determining a country's wealth. According to Smith, a growing and deepening division of labour promotes the creation of new inven-

tions, and workers who are able to focus on a narrow area of the production process are more likely to reflect on how to improve their work. Such processes, according to Smith, created opportunities for innovation and novelty. However, Smith treated inventions as a result of human curiosity and focused his attention instead on the effects of planned activities. He wrote that inventions (mainly machines) facilitated work and made it more efficient, and allowed for the generation of goods at lower labour expense [Smith 1904]. At the same time, in his book *The Wealth of Nations*, he criticised banks extending loans to fund "mad" projects. Another adherent of this economic trend, D. Ricardo drew attention to technological progress, while emphasising its insignificance for economic growth. In his book, *On the Principles of Political Economy and Taxation*, he devoted one chapter (*On Machinery*) to the role machinery and new equipment played in the economy. He also emphasised that unemployment and the displacement of labour by machines would grow in parallel with the progress of capitalism [Ricardo 1821]. Demands went up for the pace of progress to be scaled back in order to prevent layoffs.

French economist Jean-Baptiste Say, in one of the chapters in his publication *Traité d'économie politique*, presented the economic effects of introducing machinery into production. He wrote about the "benefits of innovation" achieved by using such machinery. One of the benefits was that new machines had to be developed, which gave rise to new jobs often ones that had never existed. Say also emphasised the benefits of innovation for consumers, such as lower prices of products that would become more refined and precise [Say 1855].

Representatives of mainstream classical economics were criticised for an excessive focus on physical capital and for highlighting its role in the management process, while ignoring the role intellect and skills played. These underestimated factors became the centre of attention for Schumpeter, who authored the theory of economic growth and the business cycle induced by groundbreaking innovation. He argued that the strength of economic growth lies in the key innovations that emerge on a regular basis. His theories gave rise to Schumpeter economics, and he believed that a "healthy" economy was not a balanced one (equilibrium economy) but one that was continuously disturbed by technological innovation. He wrote that "capitalism (…) should never become stationary" [Schumpeter 1994]. His theory focuses mainly on technological innovation with a dynamic nature and the potential to be applied in many fields. The view that innovation is only the first application of the solution, whereas any dissemination thereof would be referred to as imitation, is a defining characteristic of Schumpeter economics. Schumpeter is also known for creating the theory of the business (economic) cycle, and perceiving innovation as the cause of the ups and downs in the cycles. According to him, every business cycle is unique and attributable to completely different industries. A cycle's recovery phase begins with the entry of a new innovation into widespread use. This model was exemplified by hydropower, textiles and iron markets in the eighteenth century; steam power, railroads and the steel industry in the nineteenth century; and electricity, the internal combustion engine, chemicals and the Internet in the twentieth century. Once the technology has reached its maturity and the benefits arising therefrom begin to diminish, the recovery finally disappears. This phase is followed by an inevitable depression, after which a new wave of innovation will begin, destroying the old institutional structure, and then replacing it by new, more effective conditions for an impending recovery cycle.

Schumpeter referred to this phenomenon as "creative destruction". This concept shows that the demise of companies does not necessarily mean only negative consequences for the economy and society, because new, more effective companies may emerge in place of those that are ineffective and fail [Schumpeter 1994]. This drives economic growth, which improves following the recession. Schumpeter's theory is clearly associated with the theory of competitiveness. While revising various conceptions and economic models of competitiveness, Siudek and Zawojska [2014] pointed out Schumpeter's theory, noting that the company's ability to innovate that is a key for achieving competitive advantage over its rivals. Schumpeter's economic theory, apart from the theory of innovation and the entrepreneur, is based on other concepts, such as Juglar's theory of medium-term economic cycles and Kondratieff's long-term economic cycles. Schumpeter's theory was not popular among economists in the first half of the twentieth century because the link between scientific, inventive and production activity was not easily discernible. This relationship was only observed later, in the second half of the twentieth century [Fiedor 1979].

In the 1980s, inspired by Schumpeter's theory and Darwin's theory of evolution, Nelson and Winter produced their evolutionary theory of economics. The basis was the search for similarities between the phenomena occurring in nature and the economy. Nature is dominated by the struggle for survival, as a result of which only the strongest individuals can survive. In similar fashion, entrepreneurs compete against each other in order to achieve a better market position, and for this purpose they need to operate more efficiently than their competitors. To truly succeed, they must also implement innovation

At around the same the same time, in 1986, Paul Romer published his breakthrough article *Increasing Returns and Long-Run Growth*, which is widely regarded as the origins of the new growth theory (the theory of endogenous growth). Romer's theory is a variation of Arrow's "learning by doing" model. A key element of Romer's model is its demonstration of how the creation of new knowledge by individual companies can produce positive externalities in terms of the production capacity of other companies, which is due to the fact that knowledge is not entirely patentable [Romer 1986]. Any company operating in the economy uses technologies characterised by fixed revenues. As a result, investments undertaken across the sector generate, as a side effect, new knowledge which is subsequently disseminated (spill-over effects). Because knowledge accumulated within a single company has the properties of public goods, other companies gain access to the innovation thanks to the investment decisions the single innovative company made. Thus, such "external benefits" raise the general level of knowledge throughout the economy. The new growth theory emphasises the significance of technological progress as an endogenous variable, and also draws our attention to R&D, human capital and investments.

According to some economists, the existing theories of economic growth have not devoted enough space to institutions and institutional change [Freeman 1994]. Another trend in economics to emerge from and be seen in the context of innovation is an attempt to institutionalise it, although the concept of the institution itself has not been clearly explained. Representatives of the New Institutional Economics claim that institutions are an important factor differentiating economic capacity. Their quality and character influence the pace of economic growth. The economic meaning of institutions lies in the fact that

they restrict the freedom of behaviour of individuals in order to reduce uncertainty and provide order to the entire economic structure.

Institutions understood as common customs prevailing in the sphere of the economy are sociological in their character [Spychalski 1999]. These are certain rules of the game, applicable social arrangements, various types of legal solutions, standards, regulations and ordinances, as well as codes of behaviour, moral and ethical principles which impose on individuals a specific mode of procedure in the management process. According to Boland [1979], institutions are a certain form of knowledge. Representatives of institutionalism have emphasised the importance of the relationship between institutions and technological innovation. The creation of new solutions and technologies, as well as their being chosen and disseminated, results in the need for changes in the methods of procedure, standards, and the like in institutions. One proponent of making such changes is Veblen [2008], who believes that institutions need to change, adapt to and evolve together with each technological change or each change in the socio-economic situation. He associates technology both with the quality of technological equipment and technological expertise or skills (qualifications). The presence of this relationship and the pronounced emphasis on the impact of the technological sphere on institutions form the basis of Veblen's theory of economic growth.

Although the theme of innovation appears in different economic models, in practical terms it was difficult, until the end of the 1980s, to determine the relationship between economic growth, research and innovation. The international OECD programme (Technology/Economy Programme – TEP), initiated in 1988, contributed to a significant change of views in this regard. It resulted in publications pointing to the need to search for sources of technical progress through economic, scientific and innovative policy, and the development of a new methodology for measuring the results of scientific research and the application of technology, which became the primary manual (*Oslo Manual*) used by researchers and statistical offices. Thanks to the implementation of the TEP programme, more and more publications frequently drew attention to the importance of research and innovation for the economy and society [Grzelak 2011]. The appearance of successive OECD publications in the field of science – technology – innovation – economy coincided with the demand for developing economies based on knowledge. Economists were beginning understand that costs and prices were not enough to determine the competitiveness of a company, and knowledge and innovation should be seen as factors stimulating modern economic growth. The subject of the role of innovation was also reflected in the Polish literature. Those who have emphasised the relationship between innovation and economic growth include: Poznański, Fiedor, Gomułka, Romer and Kalecki [Fiedor 1979, Poznański 1981, Kalecki 1986, Romer 1990, Gomułka 1998].

The literature on innovation is vast and heterogeneous. This concept appears in a variety of sources – encyclopaedias, dictionaries, technical economics literature and studies related to economic (business) practice. As a result, there are numerous interpretations, and there is no single, universally accepted definition. Despite its great significance for economic growth, innovation has not been the subject of an in-depth study in economic theory, and the pioneering work of J. Schumpeter on the economic aspects of innovation did not exert any profound influence on later researchers [Skawińska 2009]. However,

Schumpeter is widely regarded as a pioneer of innovation theory, and believed it was involved in the following five cases [Schumpeter 1960]:

- the introduction of a new product, i.e. a product that consumers have not dealt with before;
- the introduction of a new method of production, i.e. a method that has not been tested in the industrial sector;
- the opening of a new market, i.e. a market in which the specific type of domestic industry has not operated before, whether or not such a market has previously existed;
- the acquisition of a new source of raw materials or semi-finished products, either previously existing or newly created;
- the introduction of a new organisation in a specific industry, e.g. creating or breaking up a monopoly.

Schumpeter's approach to innovation is strongly tied to the concept of "new", as he associated innovation with the first application of a solution. He did not recognise the process of the solution's popularisation as part of innovation, and referred to that process as imitation.

Today, economic sciences offer many definitions of innovation. Many stem from Schumpeter's approach; however, they present a different attitude to the degree of novelty, the area of changes, and the effect for the company and the market. The current understanding of innovation is reflected in its definitions going beyond technological aspects and incorporating organisational innovation (related to the sphere of "organisation and management") and pertaining to the relationship with the environment [Brzeziński 2001]. Kornelia Karcz [1997] explains that different attitudes to innovation result from different research purposes, a different range of analysis, the choice of approach and the interpretation of the concept of novelty. This is probably due to the fact that the theoreticians, who each define innovation differently, represent various disciplines, including management, marketing, economics and business administration, and the scope of their interest in the innovation-related issues is not uniform. Table shows definitions of innovation according to different authors. An analysis of these definitions indicates that although they vary in terms of the degree of novelty, the area of change and the influence on the company or the market, some remain faithful to Schumpeter's approach.

The analysis of these definitions implies a common feature of all innovation, namely the fact that it invariably relates to something new. At the same time, the evolution of this concept also stands out. Initially, definitions strongly emphasised technological aspects. In contemporary definitions of innovation, however, technological aspects give way to organisational and marketing terms. Today, special attention is paid to the dynamics of economic systems, with a particular focus on creativity, the flow of knowledge and learning.

Inevitably, along with the changes in the definitions of innovation, there have been changes in their typology. With the object of innovation as the basic criterion, we distinguish innovation in terms of product, technology, organisation and marketing. Another important criterion for distinguishing different types of innovation is the scale of change following its implementation. Taking this criterion into account, we can distinguish breakthrough innovations which result from long-term research and development and potentially lead to changes in the nature of the entire economy. Medium-incremental

Table. Definitions of innovation according to different authors

Author	Definition of innovation
J.A. Allen	Introduction of new products, processes or procedures to widespread use
L. Białoń	Introduction of new products and new technological process to production, and introduction of new organisational systems in order to achieve higher economic efficiency
J. Bogdanienko	Turning an invention into material reality; first application of a new idea in practice
J. Brilman	Application of a creative idea, which is a factor contributing to the development of a company and enabling it to meet challenges posed by competitors
H.G. Burnett	Every idea or thing that is new, as it is qualitatively different from the existing, well-known standards
F. Damanpour	Product, service, process, programme or device that is new to the organisation adopting or implementing it
P.F. Drucker	A specific tool used by entrepreneurs in order to introduce changes giving rise to new economic activity or new services. Changes to product design, marketing methods, prices and services offered to the customer, and changes to the organisation and management methods
Ch. Freeman	The first commercial introduction (application) of a new product, process, system or device
Ph. Kotler	Goods, services or ideas which are perceived by someone as new
E. Mansfield	The first application of an invention
Oslo Manual	Introduction of a new or significantly improved product (goods or services); a new or significantly improved process; a new marketing method; or a new organisational method in terms of business practice, organisation of the workplace or relationship with the external environment
Z. Pietrasiński	Changes deliberately introduced by man or designed by cyber systems, involving substitution of the existing state of affairs by another which has been positively evaluated in terms of specific criteria and which ultimately constitutes progress
A. Pomykalski	A process including all activities related to the creation of an idea, development of an invention, and its subsequent implementation in the form of a product or process
D.M. Rogers	Anything that is perceived by a person, or another entity adopting it, as new, regardless of the objective novelty of the idea or thing

Sources: Burnett [1953], Allen [1966], Mansfield [1968], Pietrasiński [1971], Białoń [1976], Freeman [1982], Damanpour [1991], Drucker [1992], Kotler [1994], Pomykalski [2001], Brilman [2002], Rogers [2003], Bogdanienko [2004], *Oslo Manual* [2005].

innovations lead to changes in the characteristics of enterprises, while minor ones involve improvement in the quality and functionality of products or processes and are essential in a company's ongoing operations. This criterion is also related to the degree of originality of such changes. Accordingly, there are creative innovations that give rise to a completely new state of affairs; imitative innovations involving the duplication of previously existing solutions; and apparent innovations that often mislead users by suggesting a novelty offer but are in fact not innovations.

CONCLUSIONS

The review of the economics literature conducted for the purposes of this article, clearly indicates a significant increase in the role of innovation, beginning from classical economy models, where innovations were absent from the discussion, until modern times and the knowledge-based economy model. Currently, one of the basic conditions for achieving competitive advantage and a prerequisite for maintaining competitiveness by enterprises is their engagement in innovative activity. Any company that wishes to develop needs innovation in the form of new products, technologies and organisational systems. The concept of innovation is directly associated with activities aimed at implementing changes that will lead the organisation to become more modern and competitive.

Attitudes to innovation and the methods of its creation in enterprises change regularly, along with the meaning, definition of, and theoretical approaches to innovation. These changes are directly related to the emergence of new concepts and methods which define, in an increasingly comprehensive manner, the process of creating innovation, and appreciate its impact on the development of companies and economic growth. These new innovation trends stem from market development and relate not only to the process of creating new products but also to changes in the structure of the company (in terms of organisation and marketing, this includes non-technological innovation). These new forms of innovation (non-technological innovation, user-driven innovation, open innovation, and social innovation) require new skills from economic operators while also calling for an active pro-innovation policy, in order to stimulate the creation of this type of innovation.

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Słowa kluczowe: innowacje, wzrost gospodarczy, postęp, nurty ekonomiczne

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