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## THEORY AND PRACTICE OF INNOVATION DEVELOPMENT IN THE BANKING SECTOR

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DOI: 10.15611/fins.2019.2.06

JEL Classification: G2, O3

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**Abstract:** The aim of this article is to systematise the approach to innovation in the economic theory and to define the indicators used to measure the innovativeness of world economies. The considerations are focused on innovation in the banking sector as it is one of the most innovative sectors worldwide. The identification of the stages of innovation development in this branch is worth emphasising, along with the description of its economic and legal determinants.

**Keywords:** economic theory of innovation, innovations in banking industry, banks, FinTechs, start-ups.

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## 1. Introduction

Nowadays, the word *innovations* is ever-present, but the scientific analysis of the theory of innovation is driven by widely understood technologies. However, the issues related to technical progress are nothing new – they were first raised a long time ago by the first exponents of the classical movement. Later, at the beginning of the 20<sup>th</sup> century, Joseph Schumpeter distinguished the theory of innovation as a separate research category [Glapiński 2003, pp. 108-112]. Henceforth, not only have the definitions of innovation, but also the quantitative and qualitative methods of its measurement gained significant importance. This is indicated for example by research on the innovative character of economies, which has also contributed to the establishment of innovativeness as one of the key aspects of today's economic policy all around the world. The aim of this research paper is to systematise the approach to

innovation in economic theory and to determine the breakthrough moments, e.g. at what point it started to be treated as a separate research category.

The pace of technological development is accelerating, which is undoubtedly challenging for the economic sciences, their objective being to provide a thorough interpretation of the ongoing changes as well as to compare them with business practice. The banking sector is one of the most innovative and this paper is therefore also focused on innovations in this area. A special emphasis will be placed on the identification of the stages of innovation development in the banking industry, as well as on the determination of the economic and legal conditions for such development. To this extent, the authors present the hypothesis that innovations, despite being currently one of the most important topics in banking activity, have an evolutionary rather than a revolutionary character. The considerations are based mainly on the interpretation of the literature, as well as on the critical selection of research and analyses carried out by commercial entities. Due to the current characteristics of the research problem, the considerations are supported by case studies, the selection of which results from the cautious observation of the market.

## **2. Innovations – from economic theory to business practice**

The interest in technical progress and its impact on the production process were the first manifestation of the economic perspective on innovation. Such attempts were visible in the works of the first exponents of classical economics. In particular, they interpreted progress in terms of the positive impact of the use of machines and new solutions in the production process, although some of them did fear its negative aspects as well. Adam Smith noticed that the division of labour, being a key factor behind increasing the wealth of nations, supports the creation of inventions. In his opinion, employees who focus on a highly specialised part of the production process are able to actively search for its improvement. Due to such improvements the efficiency of manufacturing goods is increasing, while at the same time it is reducing the human effort (i.e. number of the engaged employees) [Smith 1904]. David Ricardo, in turn, translated the use of machines and improvements in the production process into the condition of the whole economy and the labour market, noting, on the one hand, the rising unemployment, and on the other, its extensive duration that allows to mitigate this negative effect [Ricardo 1821]. Meanwhile, Jean Baptiste Say directly used the term *benefits of innovation*, defining it as one of the positive results of technical progress that could be achieved thanks to creating new workplaces not only in the machine construction branch, but also in new emerging sectors [Say 1855]. John Stuart Mill realised that new solutions and inventions could provide exporters with a competitive advantage over importers. Therefore, access to manufacturing technologies should be limited in the case of countries specialising in export activities [Mill 1874]. When analysing industrial districts, Alfred Marshall noticed that geographical concentration resulted in the faster exchange and diffusion

of new ideas, thus enabling the more effective development of innovative solutions [Marshall 1920]. The continuator of his research, Arthur Pigou, divided inventions into those that introduced savings of capital, labour savings and neutral savings. He also noted that the majority of inventions generate an increase in real income, which also results in an increase in the total income at country level [Pigou 1932].

In the first decades of the 20<sup>th</sup> century, Joseph Schumpeter in his research on economic growth established innovation as one of the key elements of his theory. He was the first economist to clearly separate the terms of invention and innovation [Schumpeter 1939, p. 84]. Starting with the analysis of business cycles, he defined three basic stages of economic growth. The first stage is based on discovering and creating inventions. According to his theory not every invention is an innovation, so there is a need for the commercialisation process, which is the second stage of the cycle. It is also then that it becomes widely popular and leads to the appearance of imitations of innovative solutions that are put on the market by the so-called imitators, and then, according to Schumpeter, comes an economic recovery. With the disappearance of the positive impact of innovation on the market, the cycle enters its third and final stage, characterised by an economic recession. The next economic growth is possible due to the emergence of another innovation, which destroys the ineffective solutions and institutional structures created within the previous cycle. This phenomenon has been described as *creative destruction* [Schumpeter 1994]. In Schumpeter's theory, innovations are responsible for economic growth, but at the same time they disrupt the market equilibrium. Moreover, the supply side of the market is considered to be a source of innovation since it is associated with creative entrepreneurs. Schumpeter also defined the specific determinants of economic development caused by innovations that could occur in one of the five proposed combinations [Schumpeter 1960]:

- launch of a new product (or an already known, but modified product),
- opening of a new market,
- application of new methods of product manufacture,
- acquiring new sources or materials for the production or more efficient use of existing ones,
- introduction of new organisational structures in the sector.

Since Schumpeter's theory came into widespread use, a great number of scientific definitions of innovation has been created. However, all of them were more or less related to the theses proposed by the Austrian economist. Edwin Mansfield, Christopher Freeman and Luc Soete all emphasised the difference between inventions and innovations [Mansfield 1968; Freeman, Soete 1997]. Moreover, the groundbreaking nature of innovations was recognised by Homer Barnett, Simon Kuznetz and Alvin Harman [Barnett 1953; Kuznetz 1959; Harman 1971]. The currently predominant view is represented by the model that, as a source of innovation, considers the demand side of the market, not as suggested by Schumpeter – the supply side. For Schumpeter, the economic changes were the

result of the activity of entrepreneurs, but for example Peter Drucker considered those same changes as an opportunity to propose new solutions by entrepreneurs [Drucker 1992]. What is more, Everett Rogers stressed the necessity of accepting innovations by their end recipients [Rogers 2003]. Taking this a step further, Eric von Hippel proposed a concept according to which innovations in general are created by clients that in the digital era are called users [von Hippel 2005].

It has become modern practice to apply a definition of innovation that does not directly refer to any of the scientific approaches quoted, but to the interpretation formulated by the European Commission and the Organisation for Economic Co-operation and Development (OECD). These organisations, in order to systematise the concepts and establish a standard for research on innovation, jointly published the *Oslo Manual* in 1992. Since then, two further editions have been published, the latest one in 2005<sup>1</sup>. The methodology adopted therein defines innovations as the practical application of a new or significantly improved product or service, process or even improvement at the marketing or organisational level. However, the classification based on such a definition is subjective because the entity implementing the new solution decides on its own whether it is an innovation or not. This definition is also a source of the basic categorisation of innovations whereby innovations are divided into product, process, marketing and organisational ones [*Oslo Manual... 2005*, p. 3].

The *Oslo Manual* also clearly indicates that innovation is not the same thing as innovativeness or innovative activity, but they are an element connecting them. Innovative activity is the activity of business entities in the implementation of innovations. Innovativeness, on the other hand, is described as a characteristic attribute of enterprises that are capable of implementing new solutions. It is innovativeness that is subject to measurement and quantitative analysis. Such research takes different forms, and most often comes down to conducting surveys at the level of individual enterprises, the results of which, after aggregation, provide the basis for determining the innovativeness on country level. Alternatively, there are two types of indicators used to measure innovativeness:

- input indicators – e.g. the human or money capital involved in research and development activity (R&D),
- output indicators – e.g. the number of patents or number of implemented innovations.

It has been proved that these indicators, regardless of whether they are from the input or output group, have a positive impact on economic growth, which is why innovativeness has become one of the key aspects of economic policy across many countries. This is reflected in the research on innovativeness of economies conducted over recent years on the basis of complex indexes that incorporate a number of variables from both the input and output group. In Europe, the most commonly used index is the SII (*Summary Innovation Index*), and in the global context – the GII

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<sup>1</sup> In late 2018 the next edition of the publication was already announced.

(*Global Innovation Index*) as well as the GCI (*Global Competitiveness Index*) in the section dedicated to innovations [*Potencjal innowacyjny...* 2016, pp. 23-28].

According to the mentioned indexes, Switzerland is currently the most innovative economy in the world. The Scandinavian countries as well as the Netherlands, Germany, Great Britain and the USA are also ranked among the top countries. Poland comes low in these rankings. According to the SII research that covers 36 European countries, the Polish economy is ranked 5<sup>th</sup> from bottom [*European...* 2017, p. 62]. The GII index ranked Poland in 38<sup>th</sup> place out of 127 countries [*The Global Innovation...* 2017, p. 277], which is a positive result in comparison with the survey carried out as part of the GCI in the sub-index focused on innovations, where the Polish economy took 59<sup>th</sup> position out of the 137 participants [*The Global Competitiveness...* 2017, p. 241]. The above analyses usually indicate the following weaknesses of the Polish economic system: business environment implicating a low level of innovative activity, especially in the segment of small and medium-sized enterprises, underdeveloped partnerships in innovation between the public and private sectors, but also between business and scientific institutions (i.e. universities) and the low level of expenditure on research and development. Even with a gradual improvement, Poland is globally perceived as a non-innovative country. Nonetheless, there are exceptions such as individual enterprises or sometimes even sectors, of which the banking sector is a clear example [Zaleska 2014, p. 48].

### 3. Innovations in the banking activity

The banking industry is one of the sectors where innovation plays an important role, not only in Poland. Technology development in the banking sector dates back a long time and so far it has definitely changed the way banks operate. The recent example of electronic banking seems to be representative here. Nowadays, the latest technologies even affect the business model of banks, threatening the profits of these traditional institutions, which so far have been stable. This is inextricably linked to the growing importance of FinTech [Lee, Shin 2018, pp. 35-46], which originally meant any combination of finance and technology, but is now associated mainly with young technology companies (i.e. start-ups) that enter the financial services market. Therefore, one of the essential aspects of the innovation context in banking activity is the definition of their development stages.

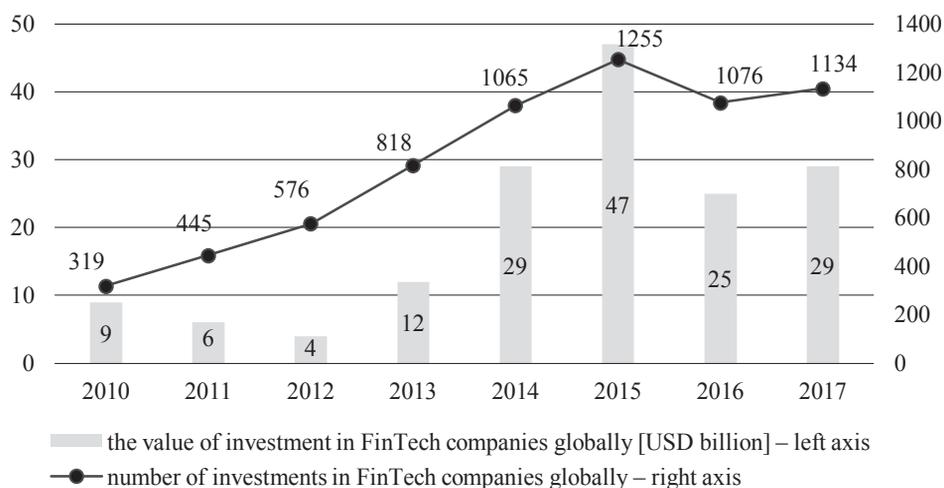
The second attribute of innovation characteristics is the specific classification of innovations in the banking sector. The traditional classification of innovations defined by the *Oslo Manual* (i.e. product, process, organisational or marketing-oriented innovations) could be applied also in the context of banking. It is possible to indicate particular examples from banking practice for each of these innovation groups. However, over recent years, banks have implemented new technologies to such an extent that the burden of banking business has significantly shifted to digital channels. The result is that the aforementioned classification of innovations

is inadequate nowadays. Electronic banking could be a good example here, as it could be perceived as following product, process, marketing and organisational innovations, forcing them to be associated only with the digital transformation. The characteristics of the innovation development in banking activity should therefore be expanded to include the determinants of their development.

### 3.1. Stages of innovation development in banking activity

The first examples of technology applied in financial services date back to the first half of the 19<sup>th</sup> century. It was then that the telegraph was developed and the telegraph cable was laid across the Atlantic Ocean, connecting Europe and America. These events resulted in establishing a permanent connection between the two continents which allowed the further internationalisation of financial services. According to the theory of the gradual evolution of financial technologies, that moment marked the beginning of the so-called *FinTech 1.0* period. Due to the traditional market structure, the leading role at that time was played by traditional institutions, mainly banks that used the available technologies, thus strengthening their position. The end of this stage and the beginning of the next one, called *FinTech 2.0*, was related to the introduction of the ATM for general use in 1967 in one of the largest banks in the United Kingdom, i.e. Barclays. Since then, banks have started to use technologies more and more actively, entering the next stage of development, namely the age of electronic banking and digitisation. During this period, banks were also the key players in the development of innovations in the financial services, although in the 1990s the first technology companies interested in providing financial services, such as PayPal, were established. In the first decade of the 21<sup>st</sup> century, both the slowly changing structure of the market and the beginning of the global financial crisis gave rise to yet another, third stage of the evolution of financial technologies – *FinTech 3.0*. As a result of the financial crisis, investors were alarmed by the state of the banking industry, the sharp decline in bank shares pricing at stock exchanges all around the world and the excessive number of institutional regulations. Therefore they started looking for new investment goals, focusing their interest on the emerging sector of financial start-ups (i.e. companies similar to the aforementioned PayPal). It is estimated that the scale of investment in financial start-ups has tripled over the last seven years, reaching the highest level in 2015 [Figure 1]. In the period of *FinTech 3.0*, the burden of developing innovations in the financial market was therefore shifted from traditional institutions of the sector, called incumbents, to technology-enabled start-ups [Arner et al. 2015, pp. 5-20]. During this period, the definition of FinTech itself was clarified, as it is currently used to describe start-ups operating on the periphery of the world of technology and finance.

The development of the financial start-ups market led to the creation of a strongly connected network between these companies and the incumbents. Therefore, there is a growing need to distinguish the next stage of market development which, according



**Fig. 1.** Global investment in FinTech companies in 2010-2017.

Source: own study based on KPMG, 2010-2017, *The Pulse of FinTech*.

to the adopted terminology, should be called *FinTech 4.0*. The main argument to identify a new stage of the described development is the emergence of the digital ecosystems created by FinTech companies, banks and other digital service providers [Nicoletti 2017, pp. 17-18]. The analysed changes forced the banks to become more open to the external world, both in terms of business and technology. In the latter area, the activity of banks became known as open banking, based on providing access to the banking infrastructure through publicly available application programming interfaces – APIs. The new market configuration means, on the one hand, many opportunities for the development and creation of new business cases and business models (i.e. the platform business model) in the financial services including banking, but on the other hand – increased competition between banks and the new entities on the market may have negative effects not only on the banks themselves, but also on their clients [Siciliani 2018]. As a result, a new systemic risk is identified, which currently it is at an acceptable level. Nevertheless, in the near future an even better risk management will require a number of actions from all market participants, highlighting the role of the market supervisory authorities [Financial... 2017].

### 3.2. Determinants and challenges of innovation development in banking activity

The shape of innovations in the banking sector is influenced by a number of factors. The most important ones are, as has been stressed many times, technological determinants. The long history of the use of technological solutions by the banks is

the reason why they are now widely recognised as one of the most innovative among the traditional services sectors. It has also given them a sound basis for further development in this direction. This is confirmed by a large number of case studies that show that representatives of the banking market all over the world actively participate in the creation and development of the new technologies. The synergy effects are visible here not only in terms of operational effectiveness (i.e. automation of processes), but also in terms of sales capabilities (i.e. personalised offer). Artificial intelligence, distributed ledgers (especially blockchain) and cloud computing [Hon, Millard 2018, pp. 4-24] are just some of the latest trends that occupy experts in banks. It should be emphasized that technologies in this sense depend mainly on the access to financing capabilities and therefore banks should appear to be the natural pioneers of their implementation. However, practice shows that among start-ups and large technology companies the adaptation of modern solutions is even faster. This is primarily a result of the mentality of the bank management staff. As traditional institutions with centuries-old history, they are not accustomed to reacting flexibly to changes in the field of technology and making bold decisions. Thus, banks have to face a new type of challenges not only in terms of technological transformation, but also in terms of mentality changes. Banks that do not fear to invest in technological innovations and establish a practice of efficient implementation within their structures, will be able to maintain their market position and even build a unique competitive advantage [Zaleska 2018b, p. 68].

Gaining such an advantage is strongly correlated with another factor determining the development of innovations in banking, which is demography. For the years to come, it is the next generation entering the financial services market that will become one of the most profitable segments of bank customers, i.e. the millennials. This generation is raised in the age of technology. The change of customer expectations today is already a powerful factor which year to year will significantly gain importance. Customers expect from their banks the same standards as those offered by other digital services that they use on a daily basis. Financial management should, in their opinion, be as simple and intuitive as the use of any social media account. The change of customer experience in the digital era has not however changed the level of security required from the banks, which they are obliged to ensure as institutions of public trust. Maintaining a highly regulated environment guarantees systemic control over the technologies introduced by the banks. The safe development of innovations in the banking activity is based on trust. Therefore, it seems important to highlight the role of educating the public about the financial services offered and to build awareness of the banking sector's security. Such activities should be systemic, covering in particular all levels of the education system. Ignorance poses a risk to clients who entrust their funds to companies not covered by guarantee mechanisms (e.g. deposit guarantee schemes), cryptocurrencies seem to be a good example here. The cryptocurrency market has both its supporters and critics, however there is no doubt about the technology itself which became popular

because of the cryptocurrencies (i.e. Distributed Ledger Technology – DLT) and which in the nearest future may revolutionise banking as well [Zaleska 2018a, pp. 36-37].

The latest technologies are merely a way to meet the clients' needs. Unquestionably, technology will play an increasingly significant role in the banking sector, enabling banks to concentrate on customers and prepare personalised offers, especially in the context of the new generation of clients entering the financial market and their behaviour shaped from an early age. However, at the same time, banks are perceived by their clients as institutions of public trust. This implies that when following changes, they should also recognise and counteract new types of risks imposed on their activity. Therefore, cybersecurity will be a challenge of the utmost importance to banks.

The next determinant of the innovative character of banking activity is the high level of competition on the market, which encourages the sector players to take advantage of the newest technologies. On the one hand, the innovations, despite the fact that they require financial investment during the implementation phase, usually lead to the optimisation of processes and generate savings in the long run. On the other hand, thanks to the preparation of an attractive and modern range of products, they ensure high retention and make it possible to attract new customers. It is precisely the scale in terms of the size of the client base that has already become the crucial factor determining the profitability of banks in the environment of high cost pressure. In addition, when analysing the competitive environment of banks, it is important to include start-ups and other technology companies that are entering the market more and more effectively. An innovation-friendly environment in financial services outside the banking sector may also significantly stimulate the willingness of the banks to experiment with technologies. For example, in Australia and in Singapore, favourable conditions for the development of FinTech companies have influenced the active attitude of banks. In these markets, there are specific regulatory solutions that facilitate financial innovations outside the banking sector, such as the regulatory sandbox concept (the idea of creating a dedicated environment under supervision of the market authorities allowing start-ups to conduct tests and verify their solutions in practice [Koleśnik 2017, pp. 90-99]).

The traditional banks have repeatedly proved their understanding of market mechanisms and the ability to adapt to new circumstances. That is why nowadays they not only actively implement innovations by developing them internally, but they also use external sources, establishing cooperation with technology companies and start-ups. In addition, they initiate a wide range of initiatives in order to stimulate the development of the financial start-ups, including the establishment of dedicated investment funds or the organisation of acceleration or incubation programmes. These actions prove the experience of banks and their ability to adapt not only to regulatory changes but also to new market requirements. This is illustrated by banks in Poland that are not afraid to experiment with new solutions and, as a result of their

experience, they play an active role in shaping the domestic start-up market, while building their competitive advantage on this basis [Kondraciuk, Kurkliński 2018, pp. 233-255].

However, one of the most important conditions for the development of innovations in banking activity is legislation. The regulatory factor in the field of new technologies in banking is multi-faceted. First of all, there is the systemic limitation of the use of some technologies due to the insufficient level of security. This is exemplified by the restrictions on using cloud-based solutions imposed on banks in some parts of the world. On the other hand, regulatory measures that promote the development of innovations in the banking sector are also visible. For example, the United Kingdom has created an ecosystem that encourages not only the development of financial start-ups, but also modern banks, which are called neo-banks or challengers (e.g. Starling Bank, Atom Bank and Monzo). There is no doubt that legislation is also the weakest point in the innovation development on the banking market, because the lengthy legislative process contradicts the dynamic changes in the world of technology. Therefore, the fact that legislation is left behind the technological developments is also one of the major challenges for banks.

#### **4. Conclusions**

For the economic sciences, innovations are a highly topical issue which means that they should not only be discussed from a purely theoretical perspective, but also supported by the observation of economic practice. The banking industry, not only in Poland, is one of the sectors that actively implements innovations. Today's market changes in terms of emerging technologies and financial start-ups influence the functioning of the banks themselves and even affect their business model. The banking industry, although it will likely have to undergo significant changes and modifications, will survive because of the banks' ability to adapt and because of strong customer trust and high security level, to name just a few. It is therefore important to further strengthen this trust through safe innovations and by providing clients with access to the appropriate financial education from an early age. Access to the latest technologies is not only a matter of price, although it is the most important issue, but also a matter of adapting traditional organisations, including their management, to skilfully implement and manage them in new conditions characterised by higher dynamics, agility, but also risk. However, one of the most important tasks that banks have to face is to maintain compliance of the implemented innovations with legislation, which is often behind the described technological changes.

Based on the analysis in this paper, the hypothesis on the evolutionary character of innovation development in banking activity is to be confirmed. The existence and development of innovations in the banking sector is undeniable, however even the most revolutionary solutions are usually milestones from the technological point of view only. Therefore, it is controversial to overestimate their significance in

comparison with, for example, the abandonment of gold parity or the creation of the dual banking system.

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## TEORIA I PRAKTYKA ROZWOJU INNOWACJI W SEKTORZE BANKOWYM

**Streszczenie:** Celem opracowania jest usystematyzowanie podejścia do innowacji w teorii ekonomii oraz pokazanie wskaźników służących do pomiaru innowacyjności. Główny nurt rozważań został odniesiony do rynku bankowego ze względu na jego wysoki poziom innowacyjności. Na podkreślenie zasługuje wyodrębnienie etapów rozwoju innowacji w działalności bankowej oraz scharakteryzowanie jego ekonomicznych i prawnych uwarunkowań.

**Słowa kluczowe:** innowacje w teorii ekonomii, innowacje w bankowości, banki, FinTechy, start-upy.