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Fintech as a Source of Financial Innovations on the Polish Financial Services Market

Abstract. The paper presents the definition of innovation, advancement and development of the Fintech sector on the global scale, with particular emphasis put on Poland. Fintechs, i.e. IT companies that provide increasingly more modern solutions for customers active on the financial markets are not fully described in the literature on the subject. The aim of the paper was to present a comprehensive definition of Fintech, show the scale of this type of ventures around the world and in Poland, and analyze the forms and potential of the cooperation of Fintech companies with financial services entities, in particular with the banks. The article uses a critical analysis of the literature of mainly English-language studies from the last 5 years, indicating the state of financial innovations and their importance on the global scale. The author analyzed statistical data from PWC Global Fintech Report, CitiGPS reports, Capgemini reports and KPMG, which enabled her to present the value of global investments in Fintech. The performed cause and effect analysis indicates that investments in the Fintech sector are becoming more and more popular, that this market will be growing due to cooperation, among others, with the banks which want to meet the requirements of their customers using more advanced technologies.

Key words: Fintech, financial innovations, banks

JEL Classification: G21, O30

Introduction

The last several years have been characterized by processes of rapid development of modern technologies in the world around us. This situation also applies to events on the financial services market. Financial market participants introduce innovative products and services on a large scale or implement solutions developed by third parties, which in the long run significantly affects the management of human resources, relations with the customers and customers' assets. This is important not only for people employed in this sector or specialized investors operating on financial markets, but also for the customers. It should be pointed out that not only banks, enterprises or public administration units conclude tens of thousands of financial transactions on a daily basis, but this also applies to each and every customer. New ways of communication of the customer with their bank or insurer, additional functions in mobile banking and surprisingly simple payment methods - payments by phone or watch - these are just some areas of everyday contact between technology customers and products from the FinTech sector (PWC 2016). Financial innovations are perceived more and more often as the key factors of the success of modern business entities. Financial innovation, known in recent years as FinTech, has become the leading factor in the transformation of the financial sector on the global scale. Technological innovations change the entire economy, including the financial services sector. The financial crisis has significantly accelerated this process. Technological changes generate opportunities for both new entities (FinTech start-ups) and established

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institutions (eg FinTech banks), allowing one to reduce costs, increase the scope of the business or create new business models (Szpringer 2016).

FinTech companies are able to flexibly, quickly and deftly capture value from new technologies and transform it into new services that their customers expect. The FinTech sector has recently become more and more popular with researchers. FinTech therefore has great potential for financial integration and counteracting financial exclusion. Due to the strong competition of current suppliers, achieving success in this area will not be easy, and current and new suppliers will have no choice, but to cooperate with each other. The key role is played by several factors that seem to determine the success of FinTech: low margins, no need to invest in expensive assets, innovation, easy scalability and optimizing compliance with the law (Aspan 2015). The FinTech sector is not sufficiently described in the literature, the scientific studies focus only on one selected aspect, e.g. definition. The aim of the article is to show what FinTech is, the scale of global investments in the Fintech sector and the methods and results of cooperation with financial market entities. The article also presents a definition of innovation and the state of advancement of the FinTech sector in Poland. The author analyzed the main English-language studies from the last 5 years and statistical data from PWC Global Fintech Report, CitiGPS reports, Capgemini reports and KPMG.

Fintech as a financial innovation

Innovations in the modern world are at the core of modern strategies for economic growth, business development and creation of the welfare of the nations. We can observe dynamically shifting structures of developed economies towards industries and services mainly based on knowledge. The innovative process departs from a single event, focusing on a complex of events and phenomena that lead to the creation of new products, models, technologies and services. In addition, this process takes place in a specific model, which covers a network of enterprises, research and scientific institutions, the government and non-governmental organizations (Pietrusiński 1971).

J.A. Schumpeter, who was the first to introduce the concept of innovation into the field of economic sciences, should be considered a classic in this approach. He emphasized the fact that innovation was a significant change in the production function consisting in a different combination of production factors, or in the introduction of a new organization in the enterprise or finding new markets. J.A. Schumpeter claimed that economic development was stimulated by innovations in a dynamic process, in which the new technologies were replacing earlier solutions - this process was called creative destruction. According to Schumpeter, dramatic innovations can lead to great destructive changes, on the other hand incremental innovations continually push the process of change forward (Schumpeter 1960).

The economy in the modern world could not function without an efficient financial system defined as a set of markets, institutions and regulations, by means of which the financial services are provided. The modern financial system is characterized by a constant implementation of innovative financial solutions. Thus, financial innovations can be defined as financial services offering a new product to specific customers, as well as actions aimed at introducing or improving financial instruments, changes in the organizational structure of the system and the implementation of modern technology, as well as computerization (Levine 2008).

Financial innovations are not defined as a new phenomenon, since they have been associated with technological innovations since the very beginning and have been developing in parallel with them. Financial innovations make it possible to finance innovative technological projects in a situation of high investment risk. On the other hand, continuing technological and economic development has forced the financial markets to introduce significant changes to meet the requirements of business entities and to offset the increasing degree of risk (Ball-Woźniak 2012).

Considering the non-uniform definition of financial innovation in the literature on the subject, a differentiated classification of the concept and its functions has also been presented. Financial innovations can be classified according to various criteria, such as sources of innovation, factors influencing the process of the development of innovations, reasons for the application of innovations, elements of the financial system, the underlying instrument, types of innovations, and the moment of the creation of innovation. Financial innovations can belong to many classification groups (Bakalarczyk 2012).

The well-known classification of financial innovations is the one presented by the OECD organization, which distinguishes product, process, organizational and marketing innovations. It should be noted that financial innovations are often difficult to assign to one category, because the process of their creation requires changes in various areas of activity. Financial innovations in the literature on the subject are also assigned to different categories in terms of the functions that they perform in the system. For the sake of simplicity they can also perform functions corresponding to the financial system. (Krzyżkiewicz 1996).

In the last few years, Fintech companies have been identified as numerous financial innovations. FinTech, or financial and tech- technologies (financial technologies) is defined as the use of state-of-the-art solutions for improving financial services - incurring loans, borrowing and financial management, currency exchange or online payments. (Leong C., Tan B., Xiao X., Ter Chian Tan F., Sun Y. 2017). FinTech is an innovative way of making various types of transactions related to value management and the technologies that enable these processes. Technological companies that use ICT to provide financial services are used in this context. Fintech can therefore be a new category of parabanks that competes or cooperates within the value chain with institutions operating on the basis of an authorization, i.e. banks, insurance institutions, investment firms, payment institutions, and electronic money institutions (Nicoletti 2017). Financial innovations reduce the time necessary to provide new solutions to the customers and reduce the operating and process costs wherever the online transfer takes place. FinTech solutions can be offered by start-ups and mature financial institutions with an established position. The main purpose of financial technologies offered by entities from this sector is to improve the efficiency and availability of financial services, both from the perspective of the customer and the financial institution (PWC 2017).

Although FinTech has been mentioned in the context of novelty and innovations only for the last few years, the earliest mentions of this phenomenon appeared in the American press in the early 1980s. They concerned solutions based on computerization and mass telecommunications in banks and on financial markets. Undoubtedly, the dynamic development of FinTech companies is strongly correlated with the development of the Internet at the beginning of the 1990s. The first strictly "FinTech" companies of global reach were created together with a massive spread of new online services, eg PayPal in 1999, which worked perfectly on auction portals. The FinTech revolution began for good together with the mass popularization of smartphones, ie after 2010 (World Bank 2017).

Description of the Fintech market in Poland and in the world

Based on the analysis of CEE FinTech Report, it can be stated that the global investment market in FinTech is estimated at over USD 19 billion, or over EUR 15 billion. The reports forecast the investment growth rate in this industry at 55 percent annually until 2020. The Celent consulting company has calculated that last year European banks spent 5 billion Euros on information technology. The market of technologies supporting financial services in Central and Eastern Europe is worth approx. EUR 2.2 billion. In Europe, the FinTech sector grows the fastest in the UK. In 2015, FinTech companies from this country recorded revenues of approximately EUR 26 billion. In Central and Eastern Europe, they generate 2.2 billion revenues annually, which is twelve times less. Out of this, almost 40 percent falls on the Polish market (Deloitte 2017).

The growth potential of the industry in Central and Eastern Europe is generated by the large mobility of the region's residents - 75 percent of them have access to the Internet, and 55 percent to the smartphone. This facilitates quick adaptation of the customers to innovation. The fastest growing segments of the FinTech market in Central and Eastern Europe are technologies for banking, for payments, for raising capital and for finance management. Insurance industry companies cooperate with FinTech companies in the field of digitalization and telematics solutions, banks - in the introduction of digital banking (KPMG 2017). FinTech companies offer analytical tools supporting the investment decision making process by individual customers. The development of the FinTech industry in Central and Eastern Europe is correlated with the size of the financial sector, which is the core of FinTech's demand. For this reason, the largest potential for growth in the FinTech industry can be seen in Austria, Poland and the Czech Republic. The value of banking assets in Poland is EUR 360 billion, in the Czech Republic almost EUR 195 billion. In turn, in Austria, it is more than EUR one trillion (Deloitte 2017).

In 2018, CB Insights selected 250 best Fintechs from around the world. Since 2013, the companies included in the list have collected a total of USD 53 billion in 947 rounds of financing. The ranking includes 30 unicorns, that is companies valued at a minimum of USD 1 billion. The new unicorns include such companies as Revolut, Nubank or PolicyBazaar. Most of the unicorns come from the United States. Since 2017, 250 selected Fintechs have raised a total of USD 31.8 billion in 373 rounds of financing. In this respect the United States is followed by the United Kingdom and India. The largest venture capital investor in the Fintech industry is Ribbit Capital, which has supported such companies as Revolut, Nubank, PolicyBazaar, Robinhood, Coinbase, Gusto or Upgrade. The highest investment was a co-financing for the Chinese company Ant Financial from the Alibaba group. Chinese Fintech received USD 14 billion (Table 1) and its investors included among others, General Atlantic, (World Bank 2018). In 2018, Europe has reached 45% share of the global investment FinTech, America 25% and Asia 30% - four times its value increasing from the previous year. Fintech investments are spread both geographically and in sectors. In addition to early and prominent Fintech users such as United Kingdom, USA, China and India in 2018, new offers have appeared in Brazil, France, Switzerland, South Korea and Japan (KPMG 2018).

Table 1. Highest investments on the Fintech market in 2018

Fintech company	Value of transaction	Country
Ant Financial	14 billion dollars	China
WorldPay	12.9 billion dollars	Great Britain
Nets	5,5 billion dollars	Denmark
Blackhawk Network Holdings	3,5 billion dollars	USA
iZettle	2,2 billion dollars	Sweden
IRIS Software Group	1,8 billion dollars	Great Britain
PowerPlan	1,1 billion dollars	USA
Cayan	1,05 billion dollars	USA
OpenLink Financial	1 billion dollars	USA
Nordax Group	788 million dollars	Sweden

Source: own study based on The Pulse of Fintech 2018, KPMG, 2018. Accessed 15 July 2018 from: <https://assets.kpmg.com/content/dam/kpmg/xx/pdf/2018/07/h1-2018-pulse-of-fintech.pdf>.

In the first half of 2018, the total investment in 875 largest FinTech companies in the world reached a record value of USD 57.9 billion (Fig. 1), over 70% more than in the entire 2017. Almost half of this money was invested in two companies focusing on digital payment services: WorldPay and Ant Financial. Fintechs are more and more mature, larger, more stable and achieve higher revenues, which results in increasingly higher valuations in subsequent rounds of financing. The analysis of investments in Fintechs in 2018 shows that banks, insurance companies, venture capital funds or technology investors who are looking for new opportunities to use their digital skills, can choose between an increasingly wider number of solutions (KPMG 2018)

The total number of Fintech transactions in 2018 is 1778, including VC 1128 funds. Most transactions were awarded for large enterprises. The largest transaction concerned Flipkart, an Indian e-commerce solution provider, called the Indian Amazon. The company received from Softbank capital in the amount of USD 1.5 billion. Softbank also transferred half a billion dollars to the American Sofi loan platform, and \$ 300 million to finance the small and medium Kabbage business, also with the USA. The largest investment in the fintech sector in Europe, where the value of VC transactions increased by as much as 120 percent. It was Transferwise - 280 million dollars donated by a consortium of investors from Andreessen Horowitz and Index Ventures at the helm (KPMG)

Alternative digital banks enjoy greater interest - Revolut, already known in Poland, acquired USD 250 million in 2018. Also, a completely new, digital German bank N26 gained USD 160 million. Companies that offer solutions based on advanced data analytics, artificial intelligence or robotics are also very popular. More and more money is also being invested in the so-called Regtechs, or companies that build solutions enabling one to efficiently meet the increasingly complex regulatory requirements. KPMG predicts that given the increasing regulatory requirements aimed at consumer protection (eg GDPR), increased competition (PSD2) or financial stability of the sector (Basel), in the next two years one will see a significant increase in investment in companies developing such solutions (KPMG 2018)

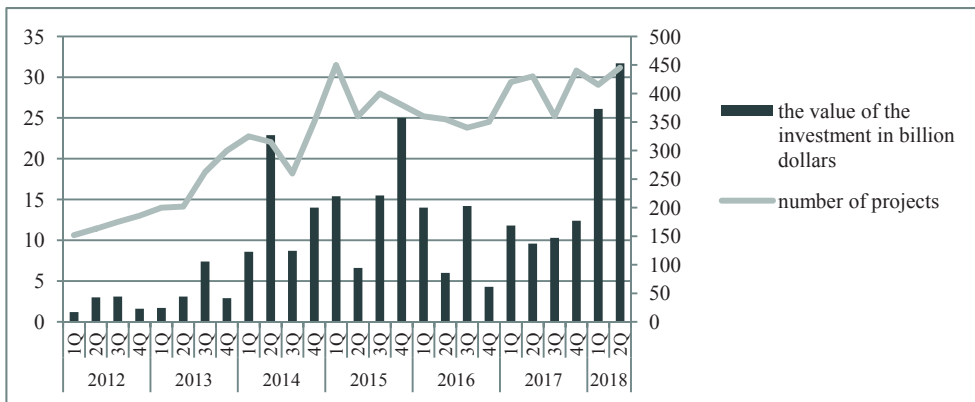


Fig. 1. Value of global investments in the FinTech sector
 Own study based on The Pulse of Fintech 2018, KPMG, 2018. Accessed 15 July 2018 from: <https://assets.kpmg.com/content/dam/kpmg/xx/pdf/2018/07/h1-2018-pulse-of-fintech.pdf>.

FinTech are emerging opportunities enabling one to change the financial sector, to question the existing models of business, services and regulations. The digital revolution has an increasingly bigger impact on the banks. Many financial institutions are technologically advanced. However, they do not view the technological progress in an integral, systemic manner, creating rather enclaves for various sectors of the services. In this respect, FinTech companies have an advantage over banks, especially in areas that are not fully regulated, based on open standards. To some extent, this helps one overcome the tendency to create the previously dominant closed "ecosystems" that bind the customer with only one service platform (Skinner Ch., 2014).

Previous experience shows that FinTech solutions can be offered independently by both innovative start-ups and mature financial institutions with an established position. The most promising, however, seem to be business models based on cooperation of innovative startups from the FinTech sector and banks, taking into account various links in the value chain (eg in payment services). FinTech companies can expand the market share by cooperating with licensed financial institutions, thanks to a new approach to the customer and innovative use of infrastructure (Cloud Computing) and databases (Big Data) (Chishti, Puschmann, 2018). In 2018, the value of the Polish FinTech market amounted to almost EUR 860 million. The analysis of the Polish FinTech market conducted in 2016 showed dozens of entities in the financial innovation sector in Poland. 37.6% of them are enterprises that have been functioning for less than 2 years, 25% of them have been operating on the market between 2 and 5 years, and 37.5 % have been active for more than 5 years. Most of the surveyed entities address their product offer to banks, financial institutions and business customers, and half of them want to reach directly the individual customers (KPMG 2018)

An important criterion influencing the development of activities by the entities from the financial innovation sector is the competitiveness of the economy. According to the World Economic Forum (WEF) ranking based on the Global Competitiveness Index (GCI) for the years 2016-2017, Poland was placed 36th in the ranking of competitiveness, ie 5 positions higher than in the previous year. Despite such a large advancement, our country is still included in the transition group between the efficiency-driven group and the most competitive group, which is the innovation-driven one (NBP 2017)

The activity of the Polish banks in the FinTech sector, which has been developing dynamically in recent years, consists in taking over the FinTech companies. An example of such an activity may be the takeover of Zencard by the PKO BP bank. Accelerators are also an area of activity of the leading Polish banks as regards FinTech (Table 2). This form of activity is also in line with the trend of stimulating financial innovations on the domestic market by banks, while maintaining control over the idea behind change and acquiring talents (KNF 2017).

Table 2. Accelerators in the Polish banking-examples

Name of bank	Name of accelerator	Scope of activity
Millenium	317G Coworking	Launched in cooperation with the Warsaw School of Economics, the Coworking Center is a space for students who have their own start-ups or plan to open them. This is the first center of this type at the Warsaw School of Economics and the only place adapted for this at the university.
Pekao	Social StartUp	Social StartUp is a program in which the most promising and innovative social enterprises selected in the competition receive advice and development grants. It is implemented by the Ashoka Foundation and UniCredit Foundation, in cooperation with Bank Pekao SA
ING	ING Accelerator	ING accelerator was created to develop innovative ideas and transform them into products and services attractive to customers. This is a place where teams work like startups, with the support of ING Group experts and external experts (eg service designer, growth hacker). Employees who work in the accelerator are posted there for 100% of the time.
mBank	mAccelerator	The mAccelerator is a venture capital fund that manages assets worth over EUR 50 million. It specializes in investments in the rapidly growing business in the early stages of development operating in different sectors of the economy. It focuses on unique technological solutions that have the potential to revolutionize entire areas of the economy
PKO BP	Let's Fintech	The acceleration program implemented by the Massachusetts Institute of Technology Enterprise Forum with the support of PKO Bank Polski serves to select and support the most interesting technological start-ups.
Alior Bank	Huge Thing	HugeThing is a 4-month program providing start-ups from the FinTech industry with necessary mentoring, as well as direct access to potential investors and finally commercialization of projects with the greatest potential. Alior Bank is the partner of the current fourth edition of the accelerator, which is looking for solutions related to blockchains, biometrics, and artificial intelligence.

Source: Own study based on: Report on the work of the Financial Innovation Working Group (FinTech), KNF (The Polish Financial Supervision Authority) 2017.

The financial institutions in Poland are largely satisfied with the entry of FinTech companies into the market, because the services offered by these companies are usually complementary, and not substitutable in relation to the banks' offer. Therefore, it is important to emphasize the fact that the financial institutions are rather focused on cooperation than competition with FinTech (Capgemini 2018)

There are many examples of this attitude on the market. One of them is the cooperation of ING with the company Kabbage and Twisto. ING has acquired equity interests in the US Fintech company Kabbage, a leading technology and data platform that provides automated loans to small and medium-sized enterprises (SMEs). The investment is part of a round of financing in which Kabbage raised USD 135 million in capital. Since launching in Atlanta four years ago, Kabbage has grown to provide funds worth of USD

one billion annually to consumers and SME, making it one of the fastest growing companies in the sector of small business finance. Kabbage significantly speeds up the loan application and approval process, enabling SMEs with an existing business account to obtain a loan ranging from USD 2,000 to USD 100,000 in a few minutes based on real-time business data (Integrated report of ING Bank Śląski 2017)

The agreement concluded between ING Bank with Twisto Polska is part of the Twisto Czechy EUR 5 million investment round, led by the ING Group in the company of UNIQA. Its goal is to establish a strategic partnership in the Central Europe region, with particular emphasis put on the Polish market. The company Twisto Czechy is also supported by the existing investors - ENERN and Partners. The ING Bank team worked on the challenge related to e-commerce payments. Cooperation with Twisto allowed them to find a solution - "buy now, pay later", ie a system of deferred payments. The service is based on the assumption that the customer buys, for example, shoes in an e-store, receives them, tries them on and pays for them on 14th day at the latest (or returns them to the store at no additional charge). Thanks to this, the customers do not freeze their cash before paying. In addition, they can try the products and have a very simple, quick purchase mechanism on their mobile phone. The advantage for the store is an increased conversion and an increase in the average value of the basket (Rudke 2018)

At the beginning of 2018, the Blockchain Competence Center was established at PKO Bank Polski. A team of experts focuses on research on this technology in the field of technology, business and regulatory issues, coordinating implementation work and seeking new areas of its practical application in the banking industry. The cooperation of this team with the Polish-British company Coinfirm, as part of the platform for the development of innovation and modern technologies "Let's Fintech with PKO Bank Polski!", resulted in sending new product regulations in digital form to over 5 million bank customers (Frączyk 2018).

It is the largest application of the blockchain technology in banking in Europe, used to confirm the authenticity and invariability of documents sent by the bank electronically. In electronic correspondence from the bank, the customers will find, among others, a 64-character unique hash identifier of the document and link to the bank's website, where without logging in, simply after pasting the hash identifier or after uploading the previously downloaded document, they will receive information telling them whether the document is authentic and when it was modified last time. Thanks to such a solution, the customers will have access to documents even after the termination of their cooperation with the bank. They can also be sure that the documents have not been modified. The documents are stored at the same time on the servers of PKO Bank Polski and Krajowa Izba Rozliczeniowa, and access to them is possible through the websites of these two institutions (Frączyk 2018)

Other elements of FinTech in Poland, apart from those focusing on cooperation with banks, are digital financial services, ranging from mobile payments, through cryptocurrencies (eg bitcoins) to advanced B2C and B2B transactional and relationship banking. One sees the emergence of new, previously unknown ways of financing ventures, such as crowdfunding or peer-to-peer lending (P2P lending), as well as automated consultancy (roboadvising) (KNF 2017).

InsurTech sector, which is FinTech specializing in insurance products and services, is also growing on the Polish financial innovation market. In quantitative terms, it certainly covers a smaller part of the entire market. The Polish InsurTech market includes both third parties providing services to insurance companies and insurers' internal projects or strategic

partnerships with FinTechs. Examples that certainly deserve to be mentioned are the Screenity application or the Play Insurance platform (KNF 2017)

Conclusions

Innovations in the financial sector, led by small, agile and flexible Fin-Tech companies increasingly more often force large market players (eg banks) to verify their business models. In the face of a sharp increase in the number of Fin-Tech companies using technologies to offer financial services, the existing market participants experience constant pressure on innovation, which permanently changes the financial sector. For many years, banks and other financial institutions have used similar and unchanging activity models that yielded large profits. However, it turns out that these models are not so effective compared to innovations introduced to the market by technology companies that have successfully started their operation in the financial sector (PWC 2017).

FinTech start-ups have an advantage over financial institutions which consists in the fact that they usually offer their services at definitely lower prices, which in turn forces large financial institutions to be more flexible and to invest not only in newer technological solutions, but also in customer satisfaction. These institutions have to develop in the area of risk assessment and become active in social media. Fintech is a customer-oriented phenomenon. Dynamic development makes life easier for small and medium entrepreneurs, and thus - stimulates the main sector of the modern global economy.

In terms of the structure of the areas of activity of the FinTech entities the Polish market follows the trends visible in the global market. In Poland, the largest number of companies comes from the area of electronic payments, in the world it is 84% of innovative enterprises (KPMG 2018). Such areas as the creation and operation of financial platforms, data analysis and machine learning as well as development of sales channels and crowdfunding are also of great interest. Electronic payments in the FinTech sector are very common. The most popular services offered in this category include integration of electronic payment methods for on-line stores and the so-called eBOKs, a modern electronic payment tool in stores and service outlets. Solutions using artificial intelligence and tools for robotic automation of processes that replace bank employees in repetitive, manual tasks, are becoming a standard. In addition to savings, other benefits resulting from robotisation include the reduction of operational risk and flexibility in managing the production capacity, depending on the market trends. Poland is a county open to innovation and the Polish society uses technological innovations in an intense manner, therefore there is a good chance that all these innovations will be implemented.

The Polish financial sector is actively involved in the development and promotion of new technologies and has the ambition of becoming the leader of the FinTech market in Europe. FinTech generates many ideas, actively cooperates with banks, providing them with new solutions, making them more attractive to their customers. Finance is a problem that many Polish FinTech companies have to cope with. More than half of them start their operations with their own funds.

Bibliography

- Bednarska-Olejniczak, D. (2011). Marketing w usługach bankowych (Marketing in banking services). Publishing house of Wyższa Szkoła Bankowa, Warsaw.
- Błach, J. (2010). Innowacje finansowe i ich znaczenie we współczesnym systemie finansowym – identyfikacja i systematyzacja problemu (Financial innovations and their importance in the contemporary financial system - identification and systematization of the problem). *e-Finanse*, 7(3), 14-28.
- Capgemini & LinkedIn & EFINA (2016). World FinTech Report 2017. Accessed 5 May 2017 from: <https://www.capgemini.com/service/introducing-the-world-fintech-report-2017/>.
- Czubała, A. (1996). Dystrybucja produktów (Distribution of products). PWE, Warsaw.
- E-Gospodarka (2015). Fintech zmienia sektor bankowy (Fintech changes the banking sector). Accessed 16 November 2018 from: <http://www.egospodarka.pl/125485,Fintech-zmienia-sektor-bankowy,1,39,1.html>.
- Frączyk, J. (2018). Blockchain w PKO BP. Bank przystąpił do międzynarodowej grupy kierowanej przez JP Morgan (Blockchain at PKO BP. The bank joined the international group led by JP Morgan). Accessed 8 December 2018 from: <https://www.money.pl/gospodarka/wiadomosci/artykul/blockchain-pko-bp-jp-morgan-chase,180,0,2417844.html>.
- Grzegorzczak, W. (1999). Marketing bankowy (Banking marketing). Biblioteka Menadżera i Bankowca, Warsaw.
- KNF (2017). Raport z prac Zespołu roboczego ds. innowacji finansowych (FinTech) (Report on the work of the Financial Innovation Working Team (FinTech)). Accessed 8 December 2018 from: https://www.knf.gov.pl/knf/pl/komponenty/img/Raport_KNF_FinTech_60024.pdf.
- KPMG (2018). The Pulse of Fintech 2018. Accessed 10 October 2018 <https://assets.kpmg.com/content/dam/kpmg/xx/pdf/2018/07/h1-2018-pulse-of-fintech.pdf>.
- Leong, C., Tan, B., Xiao, X., Ter Chian Tan, F., Sun, Y. (2017). Nurturing a FinTech ecosystem: The case of a youth microloan startup in China. *International Journal of Information Management*, 37, 32-45.
- Marcinkowska, M. (2012). Innowacje finansowe w bankach (Financial innovations in banks). *Acta Universitatis Lodzianensis Folia Oeconomica*, 266, 35-52.
- NBP (2017). Globalny raport konkurencyjności 2016-17 Światowego Forum Gospodarczego (Global competitiveness report 2016-17 of the World Economic Forum). Accessed 8 December 2018 from: https://www.nbp.pl/aktualnosci/wiadomosci_2016/20160928_awans.pdf.
- Nicoletti, B. (2017). The Future of FinTech: Integrating Finance and Technology in Financial Services. Palgrave Macmillan, Rome, 62-73.
- Rudke, M. (2018). Opóźnione płatności w Moim ING (Delayed payments in My ING). Accessed 8 December 2018 from: <https://www.parkiet.com/Oszczedzanie/309199899-Opozniione-platnosci-w-ING-Banku-Slaskim.html>.
- Skinner, Ch. (2014). Digital Bank. Strategies to Launch or Become a Digital Bank. Marshall Cavendish Int., Singapore.
- Chishti, S., Puschmann T. (2018). The Wealthtech Book: The FinTech Handbook for Investors, Entrepreneurs and Finance Visionaries. Wiley, United Kingdom; 39-78.
- Szpringer, W. (2017). Nowe technologie a sektor finansowy. FinTech jako szansa i zagrożenie (New technologies and the financial sector. FinTech as an opportunity and a threat). Poltext publishing house, Warsaw.
- World Bank (2017). The Global Findex Data Base 2017. Accessed 10 December: <https://globalfindex.worldbank.org/>.
- Zintegrowany Raport Roczny ING Banku Śląskiego 2017 (Integrated Annual Report of ING Bank Śląski 2017). Accessed 8 December 2018 from: <https://www.raportroczny.ingbank.pl/>.

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