Excerpt

Public and Private Law and the Challenges of New Technologies and Digital Markets. Volume II. Legal Aspects of FinTech

Part 1.
New Technologies on the Financial Market. General Problems

FinTech – Conceptual and Regulatory Problems. Some Introductory Remarks

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Summary

This general chapter introduces the issue of new technologies in the financial market and is designed to give some guidance in this area without going into detail. The authors of the following chapters of this monograph are going to discuss both general problems (including regulatory policy and legislative activities in the field of FinTech technology in the European Union, Poland and other countries, the problem of education, cybersecurity in the financial market, digital consumer finance) and more detailed regulatory and practical issues concerning particular types of financial services and products delivered with the use of new technologies.

Meanwhile, the author of this chapter is going to present the definitions around the term "FinTech" and general regulatory and supervisory issues related to the application of new technologies in the financial market. The author will also address opportunities, risks and challenges for the regulator and market participants to ensure a secure and stable functioning of the financial market and to protect users of innovative financial services (especially consumers) irrespective of their provider.

Keywords: FinTech, digitalisation, financial services, cybersecurity, new technologies, consumer protection in the financial market, digital risks, benefits and threats, challenges.

1. Introduction

Technological progress that has been made in recent years, known as the fourth industrial revolution, has had a significant impact on the functioning of the modern market and its participants. It is based on the use of information and communication technologies (ICT) as well as Big Data processing and applications.[1]

These processes are also noticeable in the financial market, as the financial sector is the largest user of digital technologies, which are the main driving force behind the digital transformation of the economy and society. FinTech[2] is therefore at the interface between financial services and the digital single market. It results in the emergence of new types of financial services (crowdfunding, online investment, peer-to-peer lending) and entities which offer them or provide new technologies for their implementation. It requires transformation of the existing financial institutions, focusing on the needs of the client and adapting the scope and channels of offered services. The growing importance and use of mobile devices contribute to a change of the way of communicating with clients[3] and to a shift in their preferences in using financial services.

FinTech, like technological innovation in general, is the driving force behind the development of the financial sector, offering great opportunities in terms of access to financing, operational efficiency, cost savings and competition.[4] Alternative sources of finance, such as crowdfunding or peer-to-peer loans, directly combine savings with investment, facilitate market access for innovative entrepreneurs, new companies and small businesses.

As a result of technological development, the financial services sector has recently undergone nothing short of the revolution.[5] Financial technologies

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[1] M. Olender-Skorek, "Czwarta rewolucja przemysłowa a wybrane aspekty teorii ekonomii," *Nierówności Społeczne a Wzrost Gospodarczy* 2017, No. 51 (3): 41.

[2] The word "FinTech" is a portmanteau of the terms "finance" and "technology," meaning the merger of the financial services market with the world of technology.

[3] D. Rozkrut, "Zjawiska i procesy kształtujące rozwój społeczeństwa informacyjnego i gospodarki cyfrowej w Polsce," *E-obywatel. E-sprawiedliwość. E-usługi*, edited by K. Flaga-Gieruszyńska, J. Gołaczyński, D. Szostek (Warsaw: C.H.Beck), 3–14.

[4] Available at https://ec.europa.eu/info/sites/info/files/business_economy_euro/banking_and_finance/documents/2020-digital-finance-strategy-consultation-document_en.pdf

[5] P. Gomber, R. J. Kauffman, C. Parker, and B. W. Weber. "Interpreting the Forces of Innovation, Disruption, and Transformation in Financial Services," *Journal of Management Information Systems*, 35(1): 220–265, available at https://doi.org/10.1080/07421222.2018.1440766; A. Ross Sorokin, "Fintech's Power Grab," *New York Times*, 7 April 2016, Section F, Page 1 of the New York edition, available at https://www.nytimes.com/2016/04/07/business/dealbook/fintech-firms-are-taking-on-the-big-banks-but-can-they-win.html (accessed on 4 May 2020); R. Alt, R. Beck, and M. T. Smits,

were first mentioned as early as in the mid-20th century, when the first payment cards and ATMs were introduced and the first stock exchange with an electronic share purchase and sale system started operating. The development of the technological industry began to accelerate in the 1980s and 1990s, when banks and other financial institutions started using computerisation, telecommunications and the Internet on a massive scale. This has had an impact on the current and still growing FinTech sector[6] – a highly innovative and competitive industry based on the latest technological developments: mobile solutions; advanced data (Big Data) analytics; artificial intelligence (algorithms, neural networks, machine learning); robotisation and automation of processes; biometrics and identity identification; blockchain technology.[7]

FinTech companies force traditional financial institutions to compete with them in order to maintain their existing customers and attract new ones, especially from the younger generation, for whom digital space is the only reality in which they are operating and are familiar with.[8] In the financial services market, a new category of customers ("mobile only") has emerged, who no longer use any access channels apart from the mobile one. Financial institutions are therefore forced to compete not only on the quality of the service and its price, but also on the convenience and speed of access to it.[9]

Globalisation, digitisation and the blurring of physical borders between countries, and the social transformation that follows, are forcing a change in the way financial service providers operate. Financial innovation centres (FinTech hubs) are being established, as well as new centres not previously associated with the financial service sector, following the example of already

"FinTech and the Transformation of the Financial Industry," *Electron Markets* 2018, No. 28: 235–243, available at https://doi.org/10.1007/s12525-018-0310-9 (accessed on 4 May 2020); K. Pousttchi, and M. Dehnert, "Exploring the Digitalization Impact on Consumer Decision Making in Retail Banking," *Electronic Markets* 2018, No. 28(3), available at https://doi.org/10.1007/s12525-017-0283-0 (accessed on 4 May 2020). D.W. Arner, J. Barberis, R. P. Buckley, "The Evolution of Fintech: a New Post-Crisis Paradigm?," University of New South Wales Law Research Series 2015, Research Paper No. 047, 6.

[6] F. Desai, "The Evolution of Fintech," available at https://www.forbes.com/sites/falgunidesai/2015/12/13/the-evolution-of-fintech/ (accessed on 4 May 2020).

[7] *Redrawing the Lines: FinTech's Growing Influence on Financial Services*, Global FinTech Report 2017, PwC, 2017, 9.

[8] For more on this, see: P. Kisiel, "Millennialsi – Nowy uczestnik życia społecznego?," *Studia Socialia Cracoviensia* 2016, No. 1(14): 83–94; M. Ratajczyk, "Jak kupuje generacja Y?," *Studia Ekonomiczne. Zeszyty Naukowe Uniwersytetu Ekonomicznego w Katowicach* 2017, No. 330: 184–193; D. Rozkrut, "Zjawiska i procesy," 3–14; M. Swacha-Lech, "Oczekiwania millenialsów w zakresie usług finansowych," *Zeszyty Naukowe Wyższej Szkoły Bankowej w Poznaniu* 2017, No. 2: 167–179; A. Wachnicka, "Usługi finansowe."

[9] Cambridge Center for Anternative Finance, *The Future of Finance is Emerging: New Hubs, New Landscapes, Global FinTech Hub Report*, 2018, 21–22.

existing international financial centres (IFC) and IT centres.[10] Thus, a close correlation between the requirements of high-tech clusters and modern finance is visible, and the agglomerations of FinTech companies can be classified as digital-based industries. Globally, mainly European, Chinese and American centres and single examples in Singapore, Tokyo, Tel Aviv, Sydney and Toronto shall be indicated.[11] According to the Global Financial Centres Index, valuing attractiveness, competitiveness and regulation, the largest European FinTech agglomerations are: London, Frankfurt, Paris, Berlin, Amsterdam and Dublin.[12]

FinTech businesses are subject to lower regulatory pressure and have more freedom to offer unconventional solutions for traditional services.[13] They are spreading in the market so quickly that regulations ensuring safety and security of trading and adequate protection of service users, especially consumers, fail to keep pace with them. In some areas, the market is evolving beyond the existing regulations, forcing also legislators and supervising authorities (both at EU, national and even global level) to take appropriate regulatory and monitoring action. On the one hand, the objective is to create an open and favourable regulatory and legal environment for the FinTech sector. On the other, it is important to ensure security, stability of the financial market, as well as protection for all participants, especially customers using modern financial services.

As new financial technologies can facilitate access to financial services and improve the efficiency of the single financial market and the retail financial services market, various actions are being taken at EU level,[14] including legislative ones, to enable the financial sector to benefit from the rapid advances in new technologies (blockchain, artificial intelligence and cloud services). They are designed to increase market security and make it easier for new entrants to access it, to the benefit of consumers, investors, financial institutions and new

[10] See D. Wójcik, E. Knight, V. Pazitka, "What Turns Cities into International Financial Centres?," *Journal of Economic Geography* 2018, No. 18: 1–7; M. Gazel, A. Schwienbacher, "Enterpreneurial Fintech Clusters," *SSRN Electronic Journal* 2018, No. 1: 8–10.

[11] *Financial Services Clustering and Its Significance for London* (London: Corporation of London, 2003), 24–25.

[12] European Commission, European Cluster Observatory, *European Cluster Trends* 2015, 29–30; GFCI 25 Report, CDI & Z/Yen, 2019; European Innovation Scoreboard 2019; Regional Innovation Scoreboard 2019.

[13] Cf. P. Y. Arjunwadkar, *FinTech: The Technology Driving Disruption in the Financial Services Industry* (Boca Raton: CRC Press, 2018).

[14] See more in: P. Gałązka, "Fintech Regulatory Policy in the Legislative Agenda of the European Commission – European Approach Versus New Challenges and Opportunities," in *Public and Private Law and the Challenges of New Technologies and Digital Markets. Legal Aspects of FinTech (volume 2)*, edited by E. Bani, B. Pachuca-Smulska, E. Rutkowska-Tomaszewska (Warsaw: C.H. Beck, 2020), 53–66 and literature cited therein.

market participants alike. Another priority is to ensure operational resilience of the financial sector to digital change,[15] including effective supervision over key external suppliers of new technologies. They aim to create a single market for consumer financial services and a single digital market. Therefore, there are important interdependencies between the Digital Single Market strategy,[16] the cybersecurity strategy,[17] the eIDAS Regulation[18] and financial service initiatives such as "Consumer Financial Services Action Plan,"[19] "Capital Markets Union Action Plan,"[20] or "FinTech Action Plan: For a More Competitive and Innovative European Financial Sector."[21] FinTech solutions using digital identification, mobile applications, cloud computing, big data analytics, artificial intelligence, blockchain technology and distributed ledger technology are being implemented. New technologies are changing the financial sector and the way consumers and businesses access services. FinTech-based solutions are able to

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[15] European Commission, *Public Consultation on FinTech: A More Competitive and Innovative European Financial Sector*, summary of contributions available at https://ec.europa.eu/info/sites/info/files/2017-fintech-summary-of-responses_en.pdf (accessed 7 May 2020); European Commission, *Consultation on a New Digital Finance Strategy for Europe / FinTech Action Plan*, available at https://ec.europa.eu/info/consultations/finance-2020-digital-finance-strategy_en (accessed on 5 May 2020), 36.

[16] Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions, A Digital Single Market Strategy for Europe, Brussels, 6 May 2015, COM(2015) 192 final; Brussels, 6 June 2018 COM(2018) 434 final 2018/0227 (COD), Proposal for a Regulation of the European Parliament and of the Council Establishing the Digital Europe Programme for the period 2021–2027 {SEC(2018)289final} – {SWD(2018)305final} – {SWD(2018)306final}.

[17] JOIN(2017) 450 final – Resilience, Deterrence and Defence: Building Strong Cybersecurity for the EU.

[18] Regulation (EU) No. 910/2014 of the European Parliament and of the Council of 23 July 2014 on electronic identification and trust services for electronic transactions in the internal market and repealing Directive 1999/93/EC, OJ EU L No. 257 of 28 August 2014, 73–114.

[19] European Commission: Communication from the Commission to the European Parliament, the Council, the European Central Bank, the European Economic and Social Committee and the Committee of Regions: Consumer Financial Services Action Plan: Better Products, More Choice, 23 March 2017, Brussels, COM(2017) 139 final.

[20] COM(2017) 292 European Commission. "Staff Working Document Accompanying the Communication Mid-Term Review of the Capital Markets Union Action Plan," SWD(2017) 225 final; European Commission, "Capital Markets Union and Fintech: Commission Welcomes Political Agreement to Boost Crowdfunding in the EU," (19 December 2019), press-release, available at https://ec.europa.eu/commission/presscorner/detail/en/IP_19_6829.

[21] European Commission, Communication from the Commission to the European Parliament, the Council, the European Central Bank, the European Economic and Social Committee and the Committee of Regions „FinTech Action Plan: For More Competitive and Innovative European Financial Sector," Brussels, 8 March 2018, COM(2018) 109 final, available at https://ec.europa.eu/info/publications/180308-action-plan-fintech_en ( ).

provide digitally connected citizens with better access to finance and to increase their social inclusion in financial terms.

Measures are also being taken to address some of the specific threats related to virtual currencies,[22] money laundering and terrorist financing.[23] The ESAs have issued warnings on the speculative aspects of virtual currency markets and other risks related to crypto-assets.[24]

FinTech is also an area of interest for the regulator at international level, for example for the G20, where a regulatory and supervisory framework is being developed to take account of certain forms of FinTech innovations.[25] Outside Europe, regulatory authorities focus mainly on payment instruments and services and alternative forms of financing (crowdfunding and social lending). In order to increase interaction with FinTech technology and innovation developers, several supervisory bodies (e.g. from Australia, Canada, USA, Hong Kong, Singapore and Japan) have established FinTech centres. Several authorities have also developed an experimental framework for innovative companies – the so-called regulatory sandboxes (e.g. in Australia, Hong Kong, Singapore and Canada).[26]

The presence of new technologies in the financial market makes it necessary to solve many major problems concerning i.a. granting and taking loans without

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[22] See more in: G. L. Greco, "Virtual Currencies and Regulatory Issues," in *Public and Private Law and the Challenges of New Technologies and Digital Markets. Legal Aspects of FinTech (volume 2)*, edited by E. Bani, B. Pachuca-Smulska, E. Rutkowska-Tomaszewska (Warsaw: C.H. Beck, 2020), 211–235 and literature cited therein.

[23] Report from the Commission to the European Parliament and the Council on the Assessment of the Risks of Money Laundering and Terrorist Financing Affecting the Internal Market and Relating to Cross-border Activities. COM(2017) 340 final of 26 June 2017.

[24] Warning to Consumers on Virtual Currencies, EBA/WRG/2013/01, available at https://www.eba.europa.eu/documents/10180/598420/EBA_2013_01030000_PL_TRA.pdf; EBA Opinion on Virtual Currencies – EBA/Op/2014/08, available at https://www.eba.europa.eu/documents/10180/657547/EBA-Op-2014-08+Opinion+on+Virtual+Currencies.pdf; ESMA Alerts Investors to the High Risks of Initial Coin Offerings, ESMA50-157-829, available at https://www.esma.europa.eu/sites/default/files/library/esma50-157-829_ico_statement_investors.pdf; ESMA Alerts Firms Involved in Initial Coin Offerings (ICOs) to the Need to Meet Relevant Regulatory Requirements, ESMA50-157-828, available at https://www.esma.europa.eu/sites/default/files/library/esma50-157-828_ico_statement_firms.pdf; ESMA, EBA and EIOPA Warn Consumers on the Risks of Virtual Currencies, 12 February 2018, available at https://www.eba.europa.eu/documents/10180/2120596/Joint+ESAs+Warning+on+Virtual+Currencies.pdf

[25] European Commission, Communication from the Commission to the European Parliament, the Council, the European Central Bank, the European Economic and Social Committee and the Committee of Regions „FinTech Action Plan: For More Competitive and Innovative European Financial Sector," Brussels, 8 March 2018, COM(2018) 109 final, available at https://ec.europa.eu/info/publications/180308-action-plan-fintech_en ( ), 4.

[26] Ibid., 4; See more: I. Jenik, and K. Lauer, "Regulatory Sandboxes and Financial Inclusion," Working Paper, Washington D.C.: CGAP, 2017.

the participation of banks and other entities entitled to do so under separate regulations. This requires the creation of conditions for fair competition between new and old forms of money in order to better serve the needs of society, including crowdfunding of various projects without the need for lenders (including banks). It is also crucial to provide forms and ways for financial institutions to interact with providers of new technologies. Finally, it is essential to safeguard adequate protection against new risks associated with the presence of new technologies in the financial market, which may destabilise it or even the entire financial system.

2. The concept, essence and areas of the FinTech sector

In recent years, the term “FinTech” has become an extremely popular concept and a subject of great interest in practice and theory of legal, technical and economic sciences. Although it has already established itself in market practice, there is still considerable controversy as to its scope and meaning, due to the lack of a legal definition. The term is used to cover different conceptual ranges as regards the activity types or group of entities involved (different – more or less capacious – coverage and substance). Regardless of that, it is undoubtedly synonymous with modernity, innovation and technological advancement, which is why even large financial institutions with an established market position are willing to be regarded as operating in the FinTech sector.

Apart from the term “FinTech,” there are many other terms that are more or less correctly associated with it, such as i.a.: “InsurTech,” “RegTech,” “artificial intelligence,” “robo-advisor,” “Big Data,” “cloud computing,” “blockchain,” “crowdfunding,” “peer-to-peer finance,” “cryptocurrency.”[27] Regardless of the different terms used, it is applied to describe innovations in technology-based financial services that can lead to new business models, applications, processes and products that have a significant impact on financial markets and institutions and on the way financial services are delivered.[28]

It seems that the FinTech sector should be understood as entities using modern technology to create new services, processes, applications that have a bearing on the provision of financial services. Typically, they are using instruments based on big data analysis, machine learning or customer profiling

[27] K. Jajuga, “Fintech – znaczenie dla rynku finansowego,” *Biuletyn IDM* 2018, No. 15: 5–7.

[28] See http://www.fsb.org/what-we-do/policy-development/additional-policy-areas/monitoring-of-FinTech/, and “Creating a More Competitive and Innovative Financial Market,” available at https://ec.europa.eu/info/sites/info/files/180308-action-plan-fintech-factsheet_en.pdf.

to adapt to the preferences and expectations of the "one-click oriented" customers and to offer them services tailored to their needs.

The problem with precise clarification of this notion results i.a. from the difficulty to indicate the timeframe for the beginning of FinTech development, as well as the proportion of financial services and technologies necessary to define the company as FinTech. In general, a service-based criterion is used whereby any business activity based on the sale of financial products over the Internet is considered to be FinTech.[29] Both financial institutions with an established market position and start-ups are willing to identify themselves with this concept.[30]

The term FinTech is often used as a synonym for start-ups – companies in the first phase of development, under organisation, creating a product or sales channel and most often seeking financing. However, not every start-up is a FinTech and vice versa. An entity cannot be described as FinTech when none of its core functions are based on the use of finance and technology. On the other hand, a large bank operating in the market for several dozen years cannot be described as a start-up, but if it is a producer of financial and technological services (e.g. it has developed a new payment model) and supplies them to other entities, it may be a FinTech.

FinTech is also defined as those entities which, although they are not financial service providers themselves, focus their activities on offering services or technological solutions to mediate or assist their providers in delivering them. The term refers to the integration of technology into the offers of companies rendering financial services to improve their use and delivery to consumers; the sector operates by singling out such companies' offers and creating new markets for them. In this context, FinTech can even be considered as a pro-consumer phenomenon, as it facilitates access to financial services and means speed.

It is also believed that FinTech companies are a new type of shadow banking, the activity of which is based on the use of modern computer and network technologies not only to enhance provision of the existing financial services, but also to design and create new ones.[31]

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[29] Ł. Piechowiak, "Definicja FinTech – co to jest FinTech. Czym jest firma Fintech?," available at https://fintek.pl/definicja-fintech-fintech/ (accessed on 4 May 2020).

[30] A. Wachnicka, "Rozwój rynku FinTech a problematyka ochrony konsumentów," in *Ochrona konsumenta na polskim i międzynarodowym rynku finansowym*, edited by J. Monikiewicz, E. Rutkowska--Tomaszewska (Warsaw: Wolters Kluwer, 2019), 325.

[31] W. Szpringer, *Nowe technologie a sektor finansowy. FinTech jako szansa i zagrożenie* (Warsaw: Wydawnictwo Poltext, 2017), 9.

The financial technology sector is entering various areas of the financial market[32]: online payments, retail and mobile banking, financial and investment advice, personal finance management, insurance market, trading in financial instruments, currency exchange, cryptocurrencies (Bitcoin is the digital currency), crowdfunding – social funding, peer-to-peer lending – social loans, consumer finance – financial instruments for financing the needs of individual clients. FinTech companies therefore offer almost all types of financial services (banking, insurance, investment or payment) that are not provided by traditional, licensed service providers. The term is also used to denote the entities that offer innovative solutions for financial services and products, financial instruments and services for the financial sector – for financial market entities authorised under separate regulations (the so-called sectoral regulations[33]) to provide particular types of financial services. This concerns in particular the following sectoral packages: banking sector – CRD IV/CRR,[34] insurance sector – Solvency II and IDD,[35] capital market – MiFID II/MiFIR, EMIR,[36] complex financial products market – PRIIPs,[37] payment services market.[38]

[32] J. Harasim, K. Mitręga-Niestrój, "Fintech – dylematy definicyjne i determinanty rozwoju," *Prace Naukowe Uniwersytetu Ekonomicznego we Wrocławiu* 2018, No. 531: 169–179 and 170–173; H. Gimpel, D. Rau, M. Röglinger, "Understanding FinTech Start-ups – A Taxonomy of Consumer-oriented Service Offerings," *Electronic Markets* 2018, No. 28: 245–264, available at https://doi.org/10.1007/s12525-017-0275-0.

[33] These are the directives that regulate the conduct of business by particular types of financial institutions and define the permitted and assigned catalogue of financial services – see E. Rutkowska-Tomaszewska, "Financial Services in the Light of the Act on Consumer Rights," in *Consumer Protection Law in Poland from the Perspective of EU Law*, edited by B. Pachuca-Smulska (Warsaw: C.H.Beck, 2017), 107–136.

[34] Directive 2013/36/EU of the European Parliament and of the Council of 26 June 2013 on the conditions of admission to the activity of credit institutions and the prudential supervision of credit institutions and investment firms, OJ EU L 176 of 27 June 2013 and Regulation (EU) No. 575/2013 of the European Parliament and of the Council of 26 June 2013 on prudential requirements for credit institutions and investment firms and amending Regulation (EU) No. 648/2012.

[35] Directive 2009/138/EC of the European Parliament and of the Council of 25 November 2009 on the taking-up and pursuit of the business of Insurance and Reinsurance (Solvency II) (OJ EU L 335 of 17 December 2009, p. 1) and Directive (EU) 2016/97 of the European Parliament and of the Council of 20 January 2016 on insurance distribution (OJ EU L 26 of 2 February 2016, p. 19).

[36] Directive 2014/65/EU of the European Parliament and of the Council of 15 May 2014 on the markets in financial instruments and amending Directive 2002/92/EC and Directive 2011/61/EU (recast), OJ EU L 173 of 12 June 2014, p. 349–496; Regulation (EU) No. 600/2014 of the European Parliament and of the Council of 15 May 2014 on markets in financial instruments and amending Regulation (EU) No. 648/2012; Regulation (EU) No. 648/2012 of the European Parliament and of the Council of 4 July 2012 on OTC derivatives, central counterparties and trade repositories, OJ L 201 of 27 July 2012.

[37] Regulation (EU) No. 1286/2014 of the European Parliament and of the Council of 26 November 2014 on key information documents for packaged retail and insurance-based investment products.

[38] Directive (EU) 2015/2366 of the European Parliament and of the Council of 25 November 2015 on payment services in the internal market, amending Directives 2002/65/EC, 2009/110/EC

Thus, FinTech means the sector of the economy comprising companies operating in the financial and technological industry in the financial market, which provide financial services via the Internet, using the most modern solutions.

However, regardless of the different ways of defining FinTech, at least two basic understandings can be distinguished. The first, narrower means "a new segment of the financial sector that uses technology to enhance financial processes," where it is an entity which usually does not originate from the financial sector but offers technological applications in the financial market[39] in the scope of the services provided. It may also be that the FinTech sector will include entities that use this term to refer to themselves, using the common meaning of the word, and do not offer innovative (at a given moment) solutions, but may only try to reproduce solutions proposed by innovators. In terms of substance and coverage, "FinTech" should be understood as "innovative technological solutions that improve financial processes," where innovation is crucial, and not the entity which proposes a specific solution. Thus, FinTech could include both traditional entities of the financial sector (financial institutions), using a specific innovative solution, but also e.g. online banking or any other solution based on new technologies.

The name itself suggests that FinTech should be defined as an entity performing the activity of offering financial services using innovative technological solutions. However, practice shows that this category generally includes entities that do not provide financial services themselves, but only implement them or provide technological solutions to mediate or assist their providers (e.g. providers of mobile applications for non-cash payments, non-cash payment aggregators, etc.).

Undoubtedly, the entire new FinTech sector is emerging, which includes both innovative supervised entities (e.g. banks, payment institutions, insurance companies, investment companies) and unsupervised entities (often start-ups just starting their activity). This will include banks that enable their clients to benefit from a wide range of online banking functionalities and mobile applications, online lending companies or investment companies that offer the possibility of investing funds on the so-called Forex platforms, as well as those that do not render these services but only provide new technologies. Finally,

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and 2013/36/EU and Regulation (EU) No. 1093/2010, and repealing Directive 2007/64/EC (OJ EU L 337 of 23 December 2015, p. 35–127) – PSD2 and Directive 2009/110/EC of the European Parliament and of the Council of 16 September 2009 on the taking up, pursuit and prudential supervision of the business of electronic money institutions amending Directives 2005/60/EC and 2006/48/EC and repealing Directive 2000/46/EC (OJ EU L 267 of 10 October 2009, p. 7).

[39] Cf. K. Jajuga, "Fintech – znaczenie dla rynku finansowego," 5–7.

FinTech may mean software and other technologies that support or enable the provision of financial services,[40] any technological innovation in the financial sector,[41] or any activity that aims to provide financial services using modern technologies.[42] The Financial Stability Board (FSB) adopted a similar definition according to which FinTech means a technologically conditioned financial innovation that may result in a new business model, applications, processes or services with a real impact on financial institutions and markets and the provision of financial services.[43]

Although the definition and classification of FinTech is not easy, two useful criteria can be identified (area of application and tools). As far as the first criterion is concerned, 8 areas of application shall be distinguished:[44] payment systems, digital banking, insurance (InsurTech), loans, investment management, crowdfunding, financial market infrastructure, segment of financial regulation (RegTech). The classification within the other criterion, i.e. that of tools, is difficult due to the huge number of technological innovations that have been or will be applied in the broadly understood financial services sector. Nevertheless, two very general types of technological innovations can be identified: "hard type" innovations (hardware)[45] and "soft type"

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[40] According to Oxford English Dictionary, see https://en.oxforddictionaries.com/definition/fintech (accessed on 7 May 2020).

[41] Available at https://www.investopedia.com/terms/f/fintech.asp (accessed on 7 May 2020).

[42] *Fintech Weekly*, available at https://www.fintechweekly.com/fintech-definition (accessed on 4 July 2019).

[43] "Financial Stability Implications from FinTech. Supervisory and Regulatory Issues that Merit Authorities' Attention," available at http: http://www.fsb.org/wp-content/uploads/R270617.pdf (accessed on 7 May 2020); Financial Stability Board, "Monitoring of FinTech," available at http://www.fsb.org/what-we-do/policy-development/additional-policy-areas/monitoring-of-FinTech/ (accessed on 4 June 2019).

[44] This has been based on K. Jajuga, "Fintech – znaczenie dla rynku finansowego," *Biuletyn IDM* 2018, No. 15: 5–7; and Report "Beyond Fintech: A Pragmatic Assessment Of Disruptive Potential In Financial Services," available at https://www.weforum.org/reports/beyond-fintech-a-pragmatic-assessment-of-disruptive-potential-in-financial-services (accessed on 26 May 2020); *The Future of Financial Services. How Disruptive Innovations are Reshaping the Way Financial Services are Structured, Provisioned and Consumed. An Industry Project of the Financial Services Community. Prepared in Collaboration with Deloitte*, Final Report, June 2015, available at http://www3.weforum.org/docs/WEF_The_future__of_financial_services.pdf; Deloitte / World Economic Forum Report, Disruptive Innovation in Financial Services. The Future of Financial Infrastructure, published on 12 August 2016, available at https://www.weforum.org/reports/the-future-of-financial-infrastructure-an-ambitious-look-at-how-blockchain-can-reshape-financial-services/.

[45] They concern IT and information exchange tools, where the main criterion for development is speed, as can be seen in algorithmic trading on various platforms (including exchanges), where the time from sending the information to the market participant to receiving a trade order by that participant amounts to microseconds.

innovations[46] (software). In turn, the coverage of the FinTech sector's activities includes all areas of financial services, from retail to wholesale, from deposit and loan services through payment and investment services to the automation of internal processes.[47]

The Bank for International Settlements, in its report on the implications of the FinTech sector for the banking sector and banking supervisors,[48] indicates that no legal definition of the concept of FinTech has been introduced in most countries. It might be premature, due to the still dynamically developing financial market and technological innovation.[49] As a result, the concept may continue to evolve and cover further types of services or specific technological developments.

An overview of the various approaches to defining FinTech (although not exhaustive and incomplete), as well as the indicated definitions of this phenomenon in the financial market allows to conclude that it is difficult to clearly define and classify FinTech solutions, due to their continuous and dynamic development.

3. Benefits, threats and risks of new technologies in the financial market

The traditional financial services sector and the FinTech sector intertwine to form a network of links that is exposed to a range of risks and threats related to cyberspace, protection of data, consumers and investors and financial market integrity. Irregularities associated with offering financial services using new technologies concern digital security and awareness, identity theft, leakage and misuse of personal data, cross-border provision of services and consumer protection in the financial market.

In turn, the potential benefits of using FinTech in the EU are often described as "better performance." It is expressed in enabling market participants to

[46] They concern all kinds of tools for providing and processing information, i.a. algorithms for analysis of large (but not only large) data sets (Big Data); tools for data processing implementation based on common use of IT services, such as cloud computing; the concept of reporting financial phenomena in a decentralised database – blockchain technology.

[47] Cf. J. Harasim, K. Mitręga-Niestrój, "Fintech – dylematy definicyjne i determinanty rozwoju," 174.

[48] *Implications of FinTech Developments for Banks and Bank Supervisors*, Bank for International Settlements 2018, available at https://www.bis.org/bcbs/publ/d431.pdf (accessed on 7 May 2020).

[49] *Implications of FinTech Developments for Banks and Bank Supervisors*, Bank for International Settlements 2018, available at https://www.bis.org/bcbs/publ/d431.pdf (accessed on 7 May 2020).

provide financial services at a lower cost; a wider range of products and services, and selection of consumers and businesses; and providing better financing opportunities (social funding, P2P loans) to excluded entities for which they have not been available so far.

While the presence of new technologies in the financial services market is inevitable and may benefit many of its participants, including consumers, the risks associated with it must not be forgotten. FinTech can, and should, also be viewed in the context of the interpenetration of the financial and non-financial sectors and the phenomenon of financial innovation "circumventing" the regulations[50] on taking up and pursuing activities in the financial market by different types of financial service providers, including those involving new technologies.

The online channel is the most exposed to the risk of abuse, followed by the mobile one, while the abuse itself mainly concerns credit and loan fraud – also as a result of unauthorised use of the consumer's personal data (data theft) by third parties (so-called fraud), cyber-attacks and unauthorised payment transactions most often carried out as a result of hacking customer accounts. The pro-consumer quality of FinTech, expressed in the simplicity and speed of access to a financial service, can therefore become – unknowingly or intentionally – an element of unsolicited activities, generating risks that customers are not aware of, and, consequently, real losses for them. FinTech may become a source of increased financial risk in various market areas related to credit activity, trading, liquidity, operability and reputation, or even systemically.

Cybercrime related to the collection of personal data remains an issue of serious concern. The digital world is conducive to anonymity and assuming other people's identities. With the use of another person's personal data, criminals open a bank account, which is then used to perform verification transfers when taking out loans with credit institutions, and the funds transferred to the bank account used for verification are then forwarded to other bank accounts. The consumer learns about this transaction with delay. It is also difficult to determine whether there have been no other attempts of credit fraud using one's personal data; thus the consumer cannot take action to protect their rights. In addition, scamming also represents a serious risk and loss for lenders.

Cybercrime is the fastest growing risk for entities[51] that do not use the services of cybersecurity professionals and have not implemented operational

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[50] Cf. W. Szpringer, *Nowe technologie a sektor finansowy* (Warsaw: Wydawnictwo Poltext, 2017).

[51] EY report, *Shifting into High Gear: Mitigating Risks and Demonstrating Returns. Global Forensic Data Analytics Survey*, available at https://www.ey.com/gl/en/services/assurance/fraud-investigation--dispute-services/ey-shifting-into-high-gear-mitigating-risks-and-demonstrating-returns (accessed on 4 February 2020).

procedures to respond to incidents,[52] which affects digital security. The FinTech sector offers services similar to those provided by traditional financial institutions and can generate reputation risk for the financial institutions and the financial market by undermining confidence in it. Cybercrime in financial services usually involves the use of highly sophisticated methods, such as the use of malicious software to access bank accounts. Cyberattacks are organised in such a way that clients of banks and other financial institutions are not aware that they are victims of criminals, but have the impression that the pattern imposed by criminals is the standard procedure followed by the entity.[53] Digital risk is constantly growing and affects all players in the financial services market, as evidenced by the increasing activity of cybercriminals, targeted both at various types of financial institutions[54] and service users. The range and intensity of cybercriminals' activity is also related to the level of digital culture of clients, employees of financial market entities, regulatory and supervisory institutions. Organisational culture is of key significance here, as poor management in this area is a major barrier to reaping the benefits of the digital economy[55] in the financial market. A large number of entities do not use the services of cybersecurity professionals and have not implemented operational procedures to respond to incidents, which results in incurring financial losses due to attacks and functional disruptions.[56]

Operational risk and cyber risk pose an increasing threat to financial market stability and undermine confidence in it, which is essential for its efficient

[52] PwC report, *Cyber-ruletka po polsku. Dlaczego firmy w walce z cyberprzestępcami liczą na szczęście*, available at https://www.pwc.pl/pl/pdf/publikacje/2018/cyber-ruletka-po-polsku-raport-pwc-gsiss-2018.pdf (accessed on 7 February 2020).

[53] See more in: A. Wachnicka, *Consumer Finance in the Digital World – Selected Issues* in *Public and Private Law and the Challenges of New Technologies and Digital Markets. Legal Aspects of FinTech Volume 2*, edited by E. Bani, B. Pachuca-Smulska, E. Rutkowska-Tomaszewska (Warsaw: C.H.Beck, 2020), 33–51.

[54] See more in: A. Krawczyk-Jezierska, "Development of New Technologies and Their Impact on the Financial Sector in the Context of Cyber Threats" in *Public and Private Law and the Challenges of New Technologies and Digital Markets. Legal Aspects of FinTech, Volume 2*, edited by E. Bani, B. Pachuca--Smulska, E. Rutkowska-Tomaszewska (Warsaw: C.H.Beck, 2020), 99–114 and literature cited therein, and M. Rojszczak, "The Evolution of the EU Cybersecurity Model: Current State and Future Prospects," in *Public and Private Law and the Challenges of New Technologies and Digital Markets. New Technologies and Digital Markets in the Light of Current Regulatory Challenges*, *Volume 1*, edited by E. Bani, B. Pachuca-Smulska and E. Rutkowska-Tomaszewska (Warsaw: C.H.Beck, 2020).

[55] J. Goran, L. LaBerge, R. Srrinivasan, "Culture for Digital Age," *McKinsey Quarterly*, July 2017: 295–312.

[56] *Cyber-ruletka po polsku. Dlaczego firmy w walce z cyberprzestępcami liczą na szczęście, PwC report,* available at https://www.pwc.pl/pl/pdf/publikacje/2018/cyber-ruletka-po-polsku-raport-pwc-gsiss-2018.pdf (accessed on 7 May 2020).