



DOI: <https://doi.org/10.58423/2786-6742/2022-2-163-171>
UDC 336.71

Judit SZEMÁN

PhD, associate professor, University of Miskolc,
Miskolc, Hungary
ORCID ID: 0000-0002-0594-9034
Scopus Author ID: 57210115305

Sándor BOZSIK

PhD, associate professor, University of Miskolc,
Miskolc, Hungary
Scopus Author ID: 6504488875

Gábor SÜVEGES

PhD, assistant professor, University of Miskolc,
Miskolc, Hungary

DIGITALIZATION OF THE BANKING SECTOR IN HUNGARY

Анотація. У період пандемії значна увага приділялася цифровим фінансовим онлайн-сервісам. Відчутні послуги приносять відчутну користь як національній економіці, так і громадянам. Легкодоступні та популярні варіанти сприяють зменшенню використання готівки, розширенню електронної комерції та адміністрування, а також підвищенню фінансової обізнаності, а також створенню стійкої фінансової системи. Широке використання цифрових послуг забезпечує зв'язок із глобальним світом, більш ефективне використання можливостей і, отже, успіх як окремої особи, як компанії чи як державного суб'єкта. Появі додатків FinTech також сприяв той факт, що в той час як діяльність фінансових установ суворо регулюється та контролюється владою, діяльність технологічних компаній у цій сфері пов'язана з набагато меншою кількістю обов'язкових норм. Важливо зазначити, що залишається ще багато питань, які потрібно вирішити, одним із яких є питання рівного регулювання фінтех-компаній і традиційних банків. Метою дослідження є оцінка поточного стану цифрового банкінгу в Угорщині у сфері житлово-комунальних послуг та визначення шляхів подальшого розвитку. Основні твердження статті такі: Загалом рівень цифровізації банківської системи Угорщини можна вважати середнім. У зв'язку з епідемією COVID-19 цифровізація зв'язків із клієнтами та продуктів вийшла на перший план у секторі. Серед кредитних продуктів найвищими є овердрафт для фізичних осіб та ступінь цифровізації кредитів для фізичних осіб. На корпоративному рівні онлайн-заявки на позику розглядаються ще гірше, головним чином через оцінку складних вимог до застави та низьку поширеність цифрових рішень для укладання контрактів і підписання. Ця стаття пропонує більш складні правила, оскільки регуляторні питання в цифрових фінансових інноваціях створюють проблеми для регуляторів. Основним завданням має бути створення умов для конкурентоспроможності та безпечного функціонування системи фінансового посередництва в епоху цифрових технологій, тому цифрові інтерфейси та комунікаційні платформи мають бути стандартизовані. З огляду на чинне законодавство ЄС, необхідно посилити елементи безпеки системи цифрових платежів.

Ключові слова: цифровізація, банківський сектор Угорщини, цифрові послуги, FinTech.

JEL Classification: G21, C89

Absztrakt. A járvány idején jelentős figyelem irányult az online digitális pénzügyi szolgáltatásokra. A megragadható szolgáltatások kézzelfogható előnyökkel járnak mind a

nemzetgazdaság, mind az állampolgárok számára. A könnyen elérhető és népszerű digitális fizetési rendszerek hozzájárulnak a készpénzhasználat visszaszorításához, az e-kereskedelem és ügyintézés bővítéséhez, valamint a pénzügyi tudatosság növeléséhez, valamint a fenntartható pénzügyi rendszer kialakításához. A digitális szolgáltatások széleskörű elterjedése biztosítja a globális világhoz való kapcsolódást, a lehetőségek hatékonyabb kihasználását, ezáltal a sikert akár magánszemélyként, akár vállalként, akár kormányzati szereplőként. A FinTech alkalmazások megjelenését az is segítette, hogy míg a pénzügyi intézetek működését szigorúan szabályozzák és ellenőrzik a hatóságok, addig a technológiai cégek működése ezen a területen jóval kevesebb kötelező előíráshoz van kötve. Fontos megjegyezni, hogy számos kérdés vár még megoldásra, ezek közül az egyik a FinTech cégek és a hagyományos bankok egyenlő szabályozásának kérdése. A tanulmány célja, hogy értékelje a magyarországi digitális banki tevékenység jelenlegi helyzetét a lakossági szolgáltatások területén, és rávilágítson a további fejlődés útjaira. A dolgozat főbb megállapításai a következők: Összességében a magyar bankrendszer digitalizáltsága közepesnek mondható. A COVID-19 járvány kapcsán az ágazatban előtérbe került az ügyfélkapcsolatok és a termékek digitalizálása. A hiteltermékek közül a magánszemélyek folyószámlahitele és a személyi kölcsönök digitalizáltsága a legmagasabb. Vállalati szinten még kevésbé oldódnak meg az online hiteligenlések, nagyrészt a komplex fedezeti követelmények kiértékelése és felmérése, valamint a szerződésalkötési és aláírási digitális megoldások alacsony elterjedtsége miatt. Ez a cikk kifinomultabb szabályozást javasol, mivel a digitális pénzügyi innováció szabályozási kérdései kihívások elé állítják a szabályozókat. A fő feladat a pénzügyi közvetítő rendszer versenyképességének és biztonságos működésének feltételeinek megteremtése a digitális korban, így a digitális interfészek és kommunikációs platformok egységesítése. A hatályos uniós szabályozáshoz képest a digitális fizetési rendszer biztonsági elemeit meg kell erősíteni.

Kulcsszó: digitalizáció, magyarországi bankszektor, digitális szolgáltatások, FinTech.

Abstract. During the pandemic period, considerable attention was paid to the online digital financial services. Tangible services provide tangible benefits to both the national economy and citizens. Easily accessible and popular options contribute to reducing the use of cash, expanding e-commerce and administration, and raising financial awareness, as well as creating a sustainable financial system. The widespread use of digital services ensures connection to the global world, more effective use of opportunities, and thus success either as an individual, as a company, or as a government actor. The emergence of FinTech applications has also been helped by the fact that while the operation of financial institutions is strictly regulated and controlled by the authorities, the operation of technology companies in this field is tied to far fewer mandatory regulations. It is important to note that there are still many issues to be resolved, one of which is the issue of equal regulation of FinTech companies and traditional banks. The purpose of the study is to evaluate the current state of digital banking in Hungary in the field of residential services and highlight the paths for further development. The main statements of the paper are the following: Overall, the level of digitization of the Hungarian banking system can be considered medium. In connection with the COVID-19 epidemic, the digitization of customer relations and products has come to the fore in the sector. Among the loan products, the overdraft facility for individuals and the degree of digitization of personal loans are the highest. At the corporate level, online loan applications are even less resolved, largely due to the evaluation and assessment of complex collateral requirements and the low prevalence of digital solutions for contracting and signing. This article proposes more sophisticated regulations, since the regulatory issues in digital financial innovation pose challenges for regulators. The main task should be to create the conditions for the competitiveness and safe operation of the financial intermediation system in the digital age, so the digital interfaces and communication platforms should be standardized. Regarding the current EU regulation, the security elements of the digital payment system should be strengthened.

Key word: digitalization, banking sector of Hungary, digital services, FinTech.

Introduction. Technology plays a very important role in today's world. Each industry uses different methods to create value in this digital world. The two



determinants of the last 40 years, the issue of digitalization and environmental sustainability, will be decisive in the coming decades and will significantly shape the future of humanity [1]. In this paper, we examine the issue of digitization for the banking sector. The banking sector is currently going through a technological revolution that has accelerated particularly during the pandemic era. This period has brought a drastic change in the world. However, in addition to losses, the epidemic has opened new opportunities for development, including in the banking sector. The coronavirus epidemic has repeatedly highlighted the potential for digitization in the financial system and highlighted the importance of reliable electronic payment options [2-3].

During this period, the banking sector has played an effective role in providing its customers with adequate services in the digital space. Most consumers have learned, accepted, and loved digital banking services. In this current era, the use of digital banking services has flourished, helping many customers access a variety of payment and other services. Artificial intelligence is the future of banking as it delivers data to reduce fraudulent transactions and improve security in this area. The FinTech revolution is rapidly transforming the financial sector. The use of digital technologies is becoming commonplace. This, together with regulatory and market changes, is creating a complete transformation in financial services. The development of accounting regulations adapted to the changing world is essential [4-5].

Purpose of the study. The purpose of the study is to evaluate the current state of digital banking in Hungary in the field of residential services and highlight the paths for further development.

Results and discussion. The pandemic has had a positive impact on international digitization processes, favoring actors who have been able to diversify their activities. It is now clear that, like other industries, the success of the banking sector is fundamentally determined by its responses to the challenges of digitalization. The period ahead will also be about improving the digital switchover process in banking services. An efficient banking system is also essential from the point of view of the national economy, so it is important that the digitalization efforts of the sector are realized as quickly and efficiently as possible [6]. Financial technology (FinTech) is a product or service created by innovative companies in a digital environment or operated on digital devices that competes with traditional financial methods and institutions in the financial sector (banking, investment, insurance). At the same time, FinTech is the name of a new industry that uses innovative technology to improve its financial activities. FinTech companies can be startups or financial and technology companies that have been on the market for several years seeking to replace or expand the financial services provided by existing financial institutions. We consider FinTech to be players that are classical financial institutions, credit institutions, insurers, brokers, and so on develop FinTech applications for or to provide a stand-alone service to or from them. In the latter case, they build their own customer base, competing with traditional players. FinTech's development over the past decade has also been fueled by the fact that, following the financial crisis that began in 2008, financial institutions have focused first on survival and then on consolidating their capital positions, leaving them with little money and energy for years of real financial innovation. At the same time, central banks around the world have made financial resources cheap and

plentiful worldwide to accelerate their recovery from the economic crisis. And this abundance of money, in search of the best return, has massively found an investment target in newly established technology companies that take advantage of the temporary paralysis of banks.

Total global investment activity in fintech between 2018-2021 is presented in Fig.1.



Figure 1. Total global investment activity in fintech between 2018-2021 (venture capital, private equity, and acquisitions)

Source: KPMG Pulse of FinTech H2'21 2022 January.

In addition to the record high investment in 2021, KPMG analyzes those large investments in Fintech are expected in 2022 and are expected to be active in the most developed markets in Africa, Southeast Asia, and Latin America [7].

These businesses were able to respond quickly and efficiently to the needs of the new generation of consumers: bringing novelty, convenience, simplicity, and a community experience to everyday life. Thus, many hundreds of cheap or free mobile applications around the world that simplify everyday finances have spread, mainly for reviewing accounts, convenient and cost-effective execution of payment services (in-store or online shopping, transfer), investment choice and investment management. The emergence of FinTech applications has also been helped by the fact that while the operation of financial institutions is strictly regulated and controlled by the authorities, the operation of technology companies in this field is tied to far fewer mandatory regulations. In addition to the narrowly defined banking and insurance services, an attempt was made to digitize the money itself as a means of payment, based on the blockchain technology developed about ten years ago. In addition to finance and insurance, there is a growing interest in blockchain technology in other areas. However, they also have a common set, so there are many FinTech, insurance tech applications that are built from elements of blockchain technology. In response to the emergence of FinTech companies, traditional credit institutions have also initiated innovative developments or formed various types of partnerships with companies in this field, or simply acquired new solutions together with FinTech startups and integrated them into their own operations. From the initial confrontation, the



relationship between the long-established classic financial and the new FinTech companies has now become a collaboration. Credit institutions and insurance companies have the necessary capital and a wide range of clients in classical institutions, and FinTech companies have the knowledge and flexibility to develop innovative solutions. By integrating them, not only can customers enjoy better services, but cooperating companies can also operate more profitably. However, collaboration with some technology giants (e.g., Google, Facebook, Amazon, Alibaba, etc.) is not necessary; the old rules of the game - even across borders. If the economic ecosystem and market of a given state are unprepared for the arrival of international technological giants, the returns of their activities and market-stimulating effects will be taken out of the country to a large extent due to their vulnerability. The fast-paced catch-up based on Hungary's innovation culture and high value-added intellectual resources is also an opportunity to jump out in the FinTech field, as all countries are on the same level to start in this competition.

The introduction of immediate payment under the direction of the Magyar Nemzeti Bank (Hungarian National Bank, MNB) is a major step in this direction. A comprehensive change in the payment culture and dissemination of knowledge is needed in the coming years to bring innovations into everyday life [8].

According to a comprehensive digitalization survey of the banking system prepared by the MNB, the level of digitization of the domestic banking system is medium [9]. However, significant catching-up was observed for several actors.

The digitization of institutions in the Hungarian banking system showed significant development in 2020. In the MNB's questionnaire survey, commercial banks [10] were asked about the degree of digitization in seven segments. The seven segments are as follows: workforce; process; system; product; customer; partner; leadership.

The responses received were compared with the results of a survey conducted in 2019. Thus, it can be stated that the digital development was spectacular primarily in the previously strongly underdeveloped segments, on the one hand the digitalization of customer relations and on the other hand the online availability of products and services. At the same time, it is worth noting that the development of the digitalization of relations with customers (external stakeholders) was also urged by the COVID-19 epidemic in 2020.

Banks have further expanded the range of products that can be fully used digitally, covering less prominent areas so far. The most common end-to-end digitally available products continue to be current account opening and personal loan application (current account opening is 70%, personal loan application is 60% based on digital market penetration in proportion to the balance sheet total) [10]). At the institutional level, these online products are gradually becoming more and more dominant: in 2020, retail current accounts opened online with banks that opened online accounts for 5% of all annual retail current account openings [10]. There is considerable room for improvement in the digitization of services for companies. Online loan applications are even less resolved at the corporate level, largely due to the assessment and adjudication of complex collateral requirements and the low prevalence of digital solutions for contracting and signing. At the sector level, almost one in two retail customers is now considered digitally active. With the development of banking, the

possibilities of administration on the net banking and mobile banking interfaces are becoming wider and easier to use. At the same time, digital channels and online interfaces for individual bank account operations and administrations are becoming more and more important on the customer side, which has also been strengthened by the epidemic situation. Accordingly, the proportion of digitally used accounts among the population is gradually expanding, with almost every second account being considered digitally active. Although the corporate clientele is slightly ahead with a digitally active account ratio of around 60 percent, there is still room for improvement in international comparisons for both clienteles. Regarding the use of digitally active accounts, it was generally observed that while this jumped markedly after the introduction of the restrictions, a certain degree of reorganization was observed with the easing of the restrictions. In addition to increasing the digitization of customer relations and products, fewer resources were allocated to developing the digitization of internal operations [10]. At the same time, there are areas of internal operation where significant progress can be made due to remote work due to the pandemic. Thus, the sector has significantly improved the automation of internal communication related to basic banking processes. Most institutions already use digitized managerial approvals and signatures, thanks in part to remote work. In addition, progress has been made in the automation of data transfer to the general ledger or analytics, and the efficiency of the flow of information between areas has increased [10]. However, in addition to automation, paper-based documentation and document management remained significant. Furthermore, the development and optimization of the process structure may be hampered by the lack of significant progress in several relevant areas (eg conscious use of data assets, complaint reporting processes, frequent use of paper-based information channels).

From this, it is likely that the next step in the banking system will be the digital development of internal operations (systems, processes). With the strengthening of digitalization, it is necessary to establish and develop stronger protection mechanisms for cyber incidents on the part of banks as well. In line with the cyber-attack trends of previous years, phishing activities still occupy a prominent place today. In the financial sector, nearly 70 percent of the incidents handled by the National Cyber Defense Institute of the National Security Service (NBSZ NKI) were phishing reports from customers through unsolicited mail in 2020, an increase of more than 10 percentage points by 2019. compared [10]. Although most incidents target customers directly, the “development” of attacks can also lead to operational problems on the part of banks (e.g., an overload attack), which are of paramount importance to deal with and prevent. In connection with the implementation of a comprehensive digital development covering all sub-areas, the MNB issued a recommendation to the actors of the banking sector, in which it provides guidelines for the implementation of tasks (Recommendation N 4/2021 (III.30) of the Magyar Nemzeti Bank on the digitization of credit institutions). The digitization recommendation has three major focus areas:

- Digitization of products and services;
- A corporate culture that supports digitization;
- Digitization-driven increase in internal efficiency.

The recommendation expects credit institutions to develop a comprehensive digital transformation strategy and timetable and to send it to the central bank.



Regulatory issues in digital financial innovation pose challenges for regulators. The task is to create the conditions for the competitiveness and safe operation of the financial intermediation system in the digital age. Effective regulation has a dual role to play competitiveness requires the smooth running of digital development, while the functioning of the financial intermediation system must not be undermined by the more favorable operating conditions for digital financial innovation. The principle of equal regulation of the same activities must be enforced. Regulation needs to strike a balance between these two interests, the lack of which results in regulatory arbitrage and asymmetry. Technological innovations serving artificial payment services, the regulation of artificial intelligence and data protection need to be monitored [11]. Digital innovations that have fundamentally reformed the banking sector have emerged since the middle of the last decade. Representing digital innovations, FinTech solutions have exploded into the traditional banking market and spread very quickly. Traditional banks needed staff with new skills and knowledge, while they had to get rid of many of the staff who used to run the bank. The FinTech competition has therefore forced them not only to develop technology and innovation, but also to provide new types of human resources. In addition to the many benefits of digital development, the issues that need to be addressed by regulators for the stability of the financial system have been revealed. It has also become clear to international financial institutions that the benefits of payment services pose risks to operational, data protection capabilities and the protection of customers' investments. All of this can lead to the impact of digital exclusion [12]. Asymmetries in the operating conditions of the two groups were observed in the early stages of the operation of traditional banks and digital financial service providers. While traditional banks operated under a strict regulatory regime, the FinTech startups entering the market essentially “mobilized” customer deposits placed at banks and customer money using innovative digital technologies, primarily providing payment services. Their costs and service fees were extremely low, while the traditional banks bore the costs of safely handling the deposits and current account money placed with them, and paid interest on the deposits. These resources are available to FinTech companies at no cost or fee [13]. It should be mentioned that these enterprises are primarily service providers active in the field of payment, and therefore fall under a different regulatory classification and type of activity from their credit institutions. Recognizing this regulatory dilemma, the European Union has reaffirmed the pre-existing principle, adopted by most Member States, that the same activities should be subject to the same rules. It has also become known from the outset that digital financial services providers operate cross-border, essentially unregulated, although there is no doubt that some of them have sought permission to do so when registering their activities. The European Central Bank (ECB) has indicated that international cooperation and regulation would be needed to manage the process, but this condition has not been feasible to date. It has therefore been decided that most of the regulation of innovative digital services should remain a national competence. However, it should also be noted that there is a layered regulatory environment in Europe that manages the regulatory framework in a uniform way, with room for maneuver in some cases or supervisory roles at national level, and in many cases regulations (directives) at European level.

The attitudes of each country towards FinTech innovations are very different and typically depend on the economic-political perception of the country. The United States, traditionally a believer in free trade and free competition, has already developed rules (Open banking) that have led many private companies, including the largest technology giants, to enter the FinTech market. In the Southeast Asian region, China and India are enabling some designated companies to develop applications that serve the masses through central programs, with stronger control over market players. However, the development is financially profitable for FinTech companies, because they can quickly reach a huge circle of users [11].

In the EU, central regulation and national autonomy prevail at the same time; Thus, certain frameworks and strategy documents have been adopted, such as the PSD2 Directive and the EU FinTech Action Plan issued in March 2018 [14]. However, these general rules also need to be transposed into national regulations in the individual Member States, which is a time-consuming process. In addition, the size of each market and the different economic policy approaches to competition and technological innovation contribute to a rather heterogeneous picture across the EU. Leading countries in the FinTech field (e.g., Sweden, Estonia) also have an independent FinTech strategy, while lagging countries (e.g., Romania or Bulgaria) have not yet taken any concrete steps to disseminate FinTech innovations.

The main messages of the European Commission's FinTech Action Plan (2018) [14] are:

- 1) Single Market Access and Authorization Regulatory Framework;
- 2) technology-neutral regulation;
- 3) accessibility of cloud services;
- 4) regulatory and supervisory cooperation - uniform interpretation of legislation.

Conclusions and prospects for further research. This article proposes more sophisticated regulations, since the regulatory issues in digital financial innovation pose challenges for regulators. The main task should be to create the conditions for the competitiveness and safe operation of the financial intermediation system in the digital age, so the digital interfaces and communication platforms should be standardized. Regarding to the current EU regulation, the security elements of the digital payment system should be strengthened.

Digital transformation is considered one of the main strategic goals of the entire banking sector. In terms of preparedness, a positive picture of the sector emerged even before the coronavirus epidemic. However, in the context of the pandemic, it has become even more important for banks to meet digital targets. Overall, the level of digitization of the Hungarian banking system can be considered medium. In connection with the COVID-19 epidemic, the digitization of customer relations and products has come to the fore in the sector. Among the loan products, the overdraft facility for individuals and the degree of digitization of personal loans are the highest. At the corporate level, online loan applications are even less resolved, largely due to the evaluation and assessment of complex collateral requirements and the low prevalence of digital solutions for contracting and signing. Regulatory issues in digital financial innovation pose challenges for regulators. The task is to create the conditions for the competitiveness and safe operation of the financial intermediation system in the digital age. Effective regulation has a dual role to play competitiveness requires the



smooth running of digital development, while the functioning of the financial intermediation system must not be undermined by the more favorable operating conditions for digital financial innovation. The principle of equal regulation of the same activities must be enforced. This principle is not currently in force, regulation is underway.

Regarding to the current EU regulation, the security elements of the digital payment system should be strengthened. The comparison of the regulatory policies of European countries in field of digital payment system focusing on the security elements are in focus of our future research work.

References

1. Murányi Klaudia (2018). Insight into the legal situation of virtual money in Hungary Insight into the legal situation of virtual money in Hungary In: Kékesi, Tamás (szerk.) Multiscience XXXII. MicroCAD International Multidisciplinary Scientific Conference Miskolc-Egyetemváros, Magyarország : Miskolci Egyetem (2018) pp. 1-8. , 8 p.
2. Pál, Zs. (2020). The Significance of financial literacy. *Economy and Finance*. Vol. 7. Iss. 1, pp. 141-142., 2 p., DOI: 10.33908/EF.2020.1.7
3. Kovács Levente, Nagy Ernő (2022). A hazai pénzügyi kultúra fejlesztésének aktuális feladatai. *GAZDASÁG ÉS PÉNZÜGY* 9. : 1. pp. 2-19, 18 p. Available from: <https://bankszovetseg.hu/Public/gep/002-019%20Kovacs%20Nagy.pdf> (accessed: 25.05.2022).
4. Judit Füredi-Fülöp, Béla Kántor, Juhász Mária Várkonyiné (2014). Számviteli szabályzatok. *SZÁMVITELI TANÁCSADÓ* 6 : 6 pp. 2-14, 13 p. Available from: <https://issuu.com/jegybank/docs/FinTech-e-s-digitaliza-cio-s-jelente-s-2021/1?ff> (accessed: 20.05.2022).
5. Pál Tibor, Várkonyiné Juhász Mária, Füredi-Fülöp Judit (2015). A könyvvizsgáló és a vállalati működés. *CONTROLLER INFO* 3 : 4, pp. 15-20.
6. Becsei András, Bogyó Attila, Csányi Péter (2019). A jövő bankja, a bankok jövője – A Magyar Bankszövetség digitalizációs javaslatai. *GAZDASÁG ÉS PÉNZÜGY* 6 : 3, pp. 299-310, 12 p. Available from: <https://www.bankszovetseg.hu/Public/gep/2019/299-310%20BecsBodCsaKo.pdf> (accessed: 22.05.2022).
7. KPMG Pulse of FinTech H2'21 (January 2). Available from: <https://assets.kpmg/content/dam/kpmg/xx/pdf/2022/02/pulse-of-fintech-h2-21.pdf022> (accessed: 21.03.2022).
8. Digitális Jólét (2019). Nonprofit Kft. Magyarország FinTech Stratégiája. A hazai pénzügyi szektor digitalizációja 2019–2022. Digitális Jólét Nonprofit Kft. Hillbrown Consulting Kft. Available from: <http://digitalisjoletprogram.hu/api/v1/companies/15/files/120886/download> (accessed: 23.05.2022).
9. Magyar Nemzeti Bank 4/2021.(III.30.) számú ajánlása a hitelintézetek digitalizációs transzformációjáról <https://www.mnb.hu/letoltes/4-2021-dig-transzformacio.pdf>
10. MNB, Digitalizációs Jelentés, 2021 május 40. old. Available from: <https://www.mnb.hu/kiadvanyok/jelentesek/fintech-es-digitalizacios-jelentes/fintech-es-digitalizacios-jelentes-2021-majus> (accessed: 21.03.2022).
11. Müller János, Kerényi Ádám (2021). Kiütkezés a digitális pénzügyi innovációk labirintusában – A digitális pénzügyi rendszer szabályozási kihívásainak csapdája. *Hitelintézeti Szemle* 20. évf. 1. szám, 2021. március 103-126. Available from: <https://hitelintezetiszemle.mnb.hu/letoltes/hsz-20-1-t4-muller-kerenyi.pdf> (accessed: 15.05.2022).
12. BIS (2020): Payment aspects of financial inclusion in the fintech era. Committee on Payments and Market Infrastructures – World Bank Group (CPMI-WBG), Bank for International Settlements, April. Available from: <https://www.bis.org/cpmi/publ/d191.pdf> (accessed: 15.05.2022).
13. Kerényi Ádám – Müller János: Szép új digitális világ? – A pénzügyi technológia és az információ hatalma. *Hitelintézeti Szemle*, 2019/1. Available from: <https://hitelintezetiszemle.mnb.hu/letoltes/hsz-18-1.pdf> (accessed: 15.05.2022).
14. FinTech Action Plan: For a more competitive and innovative European Financial Sector European Commission 2018 (March 8, 2018). Available from: https://ec.europa.eu/info/publications/180308-action-plan-FinTech_en (accessed: 25.05.2022).