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Combination the financial system with digital technology

- evaluation of the Hungarian FinTech ecosystem –

Theses of doctoral dissertation

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Contents

1. Significance of the chosen topic

Digitalization is one of the most exciting phenomena in the world today, its pace is rapid and profound, and the related innovations are affecting all segments of society and the economy. The financial sector is also affected by this unstoppable revolutionary change. Technological innovations, solutions, and financial services that affect certain parts of the financial intermediation system are referred to as FinTech, a combination of the words finance and technology.

While FinTech companies have been fighting for more dominance, banks have started to work in partnership with them. In the coming years, banking will undergo a major change and there is a chance that the FinTech phenomenon will follow the pattern of shadow banking[1]. One possible development shortly is Amazonisation (digital financial marketplace, customer-centric interface), where citizens and corporate customers can find the products and services they need at favourable prices and conditions. Technology solutions open up new opportunities for sharing services.

A key element of the regulation is the way it assesses and treats traditional and challenger players. The authorities that formulate regulations and supervise the sector need to create the conditions to ensure that the playing field is as level as possible for traditional banks and FinTech firms.

There are several key players in the FinTech ecosystem (Glavanits, 2011): FinTech startups, financial institutions, government, technology developers and financial users (Lee - Shin, 2018), each of whom has some responsibilities. They involve entrepreneurs, organisations, institutions and processes that create dynamic local entrepreneurial processes through formal and informal collaborations. The actors in this ecosystem cover six domains:

- Businesses developing FinTech solutions, startups
- Financial Regulation (Government, Research, Central banks)
- Traditional Financial Institutions (Traditional banks, Insurance Companies)
- Financial Costumers (Individuals, Organizations)
- Investors (Bank investors, Angel investors)
- Technology Developers

1 provide services similar to traditional commercial banks but outside normal banking regulation

Looking at the economic geography of FinTech firms, the FinTech sector is stronger where there is more geographic decentralization, financial reallocation, and international financial centres (Hendrikse et al, 2020), governments of host countries actively support the operation of technology clusters (Lai – Sammers, 2021).

2. Research aim and research questions

The aim of the research is to explore the emergence and unfolding of the digitalisation process in the financial and banking sector based on Hungarian knowledge. The added value of my research is to compare and complement the results with my primary research, in particular my interviews and questionnaires, according to selected criteria. The focus of my research is Hungary. I will present and compare investments in FinTech companies in the US, Asia, European Union, discussing the delays in national developments compared to other countries and whether they have caught up. I will discuss the rise of the national FinTech sector, the business models, and the innovation capabilities of banks. My research also covers the competition, cooperation, and competitive cooperation between national banks and FinTech firms (Kerényi - Müller, 2019).

I will present how the processes of modernization in financial services in the era of Industry 4.0 are evolving with the spread of digitalization. I define FinTech concepts precisely, showing the dynamics between the participants in our FinTech ecosystem (commercial banks, regulators and supervisors, FinTech firms, business investors, consumers), and how they work. I examine how the regulators and supervisors influence the changes, whether they can ensure a level playing field between banks and FinTech firms, taking into account their specific situations.

My review of the international and Hungarian literature on the FinTech phenomenon and my own research focused on four aspects:

- FinTech innovations,
- FinTech ecosystem,
- FinTech-regulation,
- Competitiveness and Growth.

I have identified thematic questions in each of the four themes above.

1. FinTech innovation-focused research questions

The many benefits and positive effects of digital financial services are well known. You should be happy when a new product is better than the old one. Digital financial innovation has been described as the new normal. To examine this, I asked the following questions:

- Do FinTech products and services meet existing and new consumer expectations?
- Is the spread of the FinTech phenomenon characterized by a slower and gradual evolution or a revolutionary change?
- What are the benefits and harms of innovation?

How can the broad FinTech phenomenon be captured, how do innovations change financial services? Surely, in addition to the business/technological/user benefits, there are also adverse effects of change, and if so, what they are. How fast are the changes?
Do the turning points come suddenly, difficult to predict, as with revolutions; or are they more gradual and evolutionary, as in the case of evolution? Do digital financial changes always bring better outcomes, or is it the manipulative effect of revolutionary innovations, and with it the risk of these?
Are geographical borders important in the age of digitalisation or do they have a significant impact on the international spread of products and services.

2. FinTech ecosystem-focused research questions

The second research question is also descriptive, aiming to investigate the interactions of actors.

- Who are the dominant players in the FinTech phenomenon?
- How can the dynamics between actors be described?
- Are geographical borders a barrier to the spread of FinTech solutions?
- What is the typical business strategy of national FinTech companies?

The entry of FinTech startups has affected the financial services industry, were traditional banks hostile to these new participants or looking for cooperation? Will credit institutions be forced to adapt their previous strategies and build new ones? In the age of digitalisation, do geographical borders affect the international spread of products and services? I am very interested to see how banks and FinTech companies can benefit from working together.

3. Research questions focused on FinTech regulation

The role of regulators in the spread of this phenomenon is crucial.

- What are the characteristics of activity-based regulation for FinTech innovations?
- What are the characteristics of institution-based regulation, are there differences in the regulation of different participants in the FinTech ecosystem?
- Is there a change in regulation and, if so, in what direction?

From an activity regulation perspective, as the FinTech phenomenon spreads, can we keep up with the rapid developments and participants? Can institution-based regulators ensure a level playing field for banks and FinTech start-ups without relying on a precise FinTech definition?

Is it possible and to what extent to harmonise international and national rules with regard to cross-border services. Can innovative solutions also be applied to regulatory activities? How can the regulatory toolbox encourage win-win business outcomes and avoid large international frauds and bankruptcies?

4. Competition and growth-focused research questions

In the modern economy, technological innovation has an impact on economic growth.

- Can a competitive FinTech ecosystem contribute to economic growth?
- Can Hungary hope to become a regional FinTech hub in the future?
- Should startups and banks compete with BigTech companies rather than each other?

In the modern economy, technological and social innovations also have an impact on economic growth. The last set of questions looks at how much a country's FinTech sector can contribute to economic growth if it is competitive. The question to be examined here is: what are the trends in the FinTech industry?

3. Hypotheses

1. FinTech innovation-focused hypothesis

The supply-side reasons for the growth of FinTech solutions are technological advances, the internet, mobile phones, and digitalization, while the demand-side reasons are changing consumer expectations and habits, which have led to a significant transformation of financial services and products. The speed of spread of solutions has been evolutionary rather than revolutionary. FinTech solutions and participants cannot remain within national borders.

2. FinTech ecosystem-focused hypothesis

The FinTech phenomenon has spread to banks, which have created FinTech solutions both in-house and with external partners. The emergence of FinTech ecosystems is a global trend. My hypothesis is that collaboration is becoming more and more common among ecosystem participants, alongside rivalry. Both rivalry and cooperation can help the ecosystem to become more active. Along these lines, both FinTech companies and banks can contribute to the expansion and activation of the FinTech sector.

3. FinTech regulation-focused hypothesis

The spread of new FinTech solutions and the growth of FinTech participants has meant an increase in the risk associated with them, in line with which both have received increasing regulatory and supervisory attention. A key element of regulation in the direction and speed of the spread of the FinTech phenomenon, affecting both demand and supply. In the case of FinTech firms, overly permissive regulation should be avoided as much as over-strict regulation. The regulatory battlefield between countries is very intensive. The focus between institution-based and activity-based regulation is tending to shift towards the activity-based regulation. Regulatory asymmetry and regulatory arbitrage can be hybrid, using a mix of institution-based and activity-based solutions.

4. Competition and growth-focused hypothesis

I suppose that with the adequate stimulus, FinTech solutions can also contribute to the renewal of the Hungarian economy. The participants in the Hungarian FinTech ecosystem are already competitive with their regional rivals, but the chances of Hungary becoming a FinTech hub in the near future are not yet significant. However, both public and representative organisations are already working towards Budapest becoming a regional FinTech hub.

4. Structure of the dissertation

My dissertation consists of eight chapters. The first chapter of the thesis outlines the aim of the research, the main research questions and the four hypotheses. In addition to the qualitative and quantitative methods of the research, the methodological background of the semi-structured interviewing and the questionnaire research is presented in the second chapter. I describe the criteria used to select my interviewees and the methodological problems encountered during the empirical research. A comprehensive review of the literature on the FinTech phenomenon is presented in chapter three. Here I write about the history of the emergence of the FinTech phenomenon, covering consumer habits, technological developments and some revolutionary innovations. At the end of the chapter, I analyse the impact of banks' business models on their ability to innovate. I present the FinTech sub-areas and the different definitions of the FinTech concept.

The fourth chapter deals with the different situation of the FinTech phenomenon in different continents (Europe, America, Asia), the fifth chapter presents the model and actors of the FinTech ecosystem, and the sixth chapter focuses on the domestic penetration of FinTech solutions.

The seventh chapter presents the results of the research interviews and questionnaires, outlining the theses of the thesis on four topics: the impact of FinTech innovations, the participants in the FinTech ecosystem, FinTech regulation and competitiveness stimulation, and economic growth. I conclude this chapter by formulating and justifying four theses that elaborate on the findings of the disertation. In chapter eight, I summarise the main findings of my thesis, thus concluding my dissertation.

5. The research methods used

I explore the transformation process in the banking sector using the Schumpeterian innovation theory, which is an excellent way to explore the cause-and-effect relationship (Ridder, 2017). According to the Austrian economist J. A. Schumpeter, the basic nature of innovation is that it creates a favourable environment by aggressively removing the previous equilibrium. The three steps of Schumpeter's approach to innovation:

- invention - birth of a new idea,
- innovation - the materialization of the idea, and
- diffusion - the spread and uptake of a new product/service (Buenstorf, 2016).

I use a game theory model to illustrate how the FinTech ecosystem works. The idea is to create an equilibrium situation where each participant can develop his own optimal strategy. The Nash equilibrium, as a fundamental theorem of microeconomics, helps us to see situations where economic agents are aware that their simultaneous decisions affect the decisions of others. This equilibrium situation is achieved when there is an incentive to cooperate and when each actor has the trust of the others.

FinTech invention is triggered by the changing market environment, which makes entrepreneurial actors financially interested in changing the nature of their business. FinTech innovation is the data-driven and technology-driven evolution of the financial sector, affecting customer-facing and back-office activities (MNB, 2017, p. 9).

I study financial systems based on systems theory (Bertalanffy, 1968). The key concepts are taken from biology, from the world of communities and ecosystems, because the underlying structure, processes and logic of the phenomena are very similar, but the participants are different. The supporting environment of startups can be called FinTech ecosystems because their day-to-day functioning also has many similarities with biological communities.

The majority of systems found in nature are complex adaptive systems (CAS) based on self-organization and feedback processes. Financial systems can be identified as such systems (Beinhocker, 2006; Evans - Li, 2018; White, 2018). The two basic conditions for the sustainability of financial systems are the pursuit of efficiency and adaptability (Lietaer, 2010). The methodological basis of my research is the qualitative technique, the two research methods were interviewing analysis and a questionnaire. In the first part of my interviews, I used the narrative interview technique (Rosenthal, 2018), where the narration is the sharing of personal experiences.

I asked the respondents guided questions based on the interview technique methodology (Kvale, 2005; Gábriel, 2020). This way I achieved a different perspective on the questions that were relevant to their personal experiences. During the primary data collection, I used interviews to explore the common and different incentives of the actors in the domestic FinTech ecosystem, while semi-structured interviews helped to gather more in-depth information.

The semi-structured in-depth interviews were conducted with representatives of banks and FinTech companies, but I also interviewed other actors in the ecosystem. The main criterion for the selection of interviewees was that they should be active players in the conclusion of collaborations. I looked for interviewees who held a senior position in the company, ensuring that the person not only had an impact on the collaboration but also on the strategy and innovation efforts of the bank or FinTech company.

I also conducted a questionnaire survey to gain a more layered understanding of the topic. As the aim of the research was to explore incentives, I selected banks that actively collaborate with FinTech businesses.

6. History and periods of FinTech

The FinTech era boundaries can be defined based on that a given period in which types of innovations were developed (Horváth, 2020).

The FinTech 1.0 period (1866-1967) was about setting up a financial structure. The technological innovations of the time (telegraph, railways, steamships) increased the efficiency of business in the financial sector and allowed for cross-border financial connections. The use of encoding in World War II triggered the progressive development of communication and information technology (Arner et al, 2015).

The FinTech 2.0 period (1967-2008) began with the transition from the analogue to the digital era with electronic payment systems and the use of automated teller machines (ATMs). At the turn of the millennium, new payment systems were developed with well-established processes in the background, which were entrusted to trusted actors (Szota, 2019). Electronic payment systems such as NASDAQ (National Association of Securities Dealers Automated Quotations), which is an automated give-and-take system for securities transactions, and SWIFT (Society for Worldwide Interbank Financial Telecommunications), which is a secure messaging platform for international interbank info-communications across borders, were launched in banking operations. The FinTech era boundaries can be defined based on that in a given period

In the FinTech 3.0 era (from 2008) new consumer needs were served by digital financial solutions. The FinTech sector is becoming global: mass creation of new players and start-ups can be observed in both developed (US, UK) and dynamically developing markets (India, China). Financial institutions are supported by innovative developments and authorities are supporting prudential regulation and supervision of financial institutions (Arner et al. 2017).

This era has been more stimulating for financial and technological innovation. Alongside Artificial Intelligence (AI) came the emergence of massive databases (Big Data), distributed ledger technology (DLT), cryptography and widespread mobile internet access (Gąsiorkiewicz - Monkiewicz, 2019:97). These developments have enabled the emergence of new applications for various financial institutions (Schmaus et al. 2019).

“FinTech 3.0 emerged as a reaction to the financial crisis in the West, but in Asia and Africa, recent FinTech developments have been primarily prompted by the pursuit of economic development. We characterize the era in these two regions as FinTech 3.5” (Arner et al. 2015: p 21.).

Since the mid-2010s, BigTech companies have appeared, initially only offering payment services, but later also lending and other banking activities (Müller - Kerényi, 2021). Their importance is indicated by the fact that the era of FinTech 4.0 could even have started with their significant market participation (Horváth, 2020).

7. Defining FinTech

FinTech is an acronym (fin + tech; "financial" + "technology") for technological innovations affecting different parts of the financial system (Szota, 2019), whose precise meaning changes as technologies evolve (Kerényi - Müller, 2019).

There is still no single definition of the FinTech phenomenon in the literature, as digital financial technologies are evolving too fast for this (Kerényi - Müller, 2019). The definitions of the various researchers and stakeholders differ in terms of which of the factors they place the greatest emphasis on. One approach focuses on the content of FinTech, while another argues that the actors behind innovative financial solutions are more important (Horváth, 2020; Petze, 2005 23).

The Financial Stability Board (FSB) has a very broad definition of FinTech, which is the most widely used, and which is a generic term for both technology-driven innovation in financial services and new business models, applications, processes and products that have a significant impact on the delivery of financial services (FSB, 2017). The definition no longer identifies more precisely the content and scope of FinTech services, making it difficult to establish a legal framework that defines the boundaries of supervisory controls, as well as to ensure a level playing field between traditional banks and FinTech firms (Treu, 2022: p. 9).

Definitions are constantly changing and expanding. The latest definitions include digital ledger technology, robo-advisors, RegTech (regulation technology), regulatory solutions and virtual money.

8. FinTech sub-sectors

To characterise FinTech, three categories can be distinguished according to

- FinTech activities,
- enabling technologies,
- policy enablers (Ehrentraud et al, 2020).

The new participants in the digital ecosystem, FinTech companies, have succeeded in combining new financial (finance) products and services with the latest digital technology in a new model. This has led to a re-regulation of the way the financial sector operates. The emergence of the FinTech sector has been observed in both developed and developing markets (Kerényi – Molnár, 2017b). The new participants in the financial intermediation system initially offered the same products and services as banks had been offering until then.

After the emergence of FinTechs, the FinTech industry now covered more than 30 areas, including retail products, wealth management, servicing the SME sector, and banking activities related to insurance and investment (Dietz et al, 2016). FinTech companies have responded more quickly and strongly than banks to the needs of young customers in particular, worldwide. It is also worth taking stock of FinTech activities, also presented in my dissertation in the order of their formulation.

Changing consumer expectations and the need to attract new customers have led to the emergence of new FinTech services. Consumers have become more closely connected, leading to IT dependencies between banks, FinTech firms and other financial service providers. Popular peer-to-peer (P2P) services, online marketplace lending and crowdfunding bring together lenders and borrowers to choose the most advantageous services. Digital technology makes it cheap and easy for many people to access services (Kuti – Madarász, 2014).

9. Factors supporting the FinTech phenomenon

The findings of my thesis suggest that the spread of the FinTech phenomenon is driven by four groups of factors, which can be further broken down into (Table 1):

Table 1: Factors supporting the spread of the FinTech phenomenon

Changing consumer habits	•The emergence of new generations •Increased trust in banks
Technological developments	•The spread of mobile phones •Availability of the Internet •Cloud-based data storage •Artificial Intelligence (AI) • Big Data
Revolutionary innovation	•Distributed ledger technology (DLT)) •Crypto-devices
Macroeconomic environment	•Regulation •Financial stability

Source: Kerényi - Molnár, 2017a based on own editing

10. FinTech around the world

The volume of FinTech investment is difficult to quantify. Researchers and consultancies are trying to do this. Below I refer to a database based on Swedish research (Alekseeva et al, 2022). It shows that the largest amount of investment in the world has come from the US. America is home to nearly 3,000 FinTech companies, Europe to nearly 2,000 and Asia to 1,500. The difference in terms of invested capital is almost similar. Here, too, America leads with nearly $120 billion, representing 50%, but invested capital in Europe is only two-thirds of that in Asia ($55 billion compared to $82 billion). The researchers' data show that half of the investment up to 2022 was in FinTech companies in the US, a quarter in Europe and a quarter in other continents (Table 2).

Table 2: FinTech companies, investments (number, million USD and %)

	Number of FinTech-componies (pcs)	Total amount invested ($ million)	Number of FinTech-companies (%)	Amount of invested (%)
America	3 057	118 978	45,21%	45,59%
Europe	1 857	54 620	27,46%	20,93%
Asia	1 494	81 715	22,09%	31,31%
Africa	221	3 035	3,27%	1,16%
Australia	133	2 621	1,97%	1,00%
Total	**6 762**	**260 968**	**100%**	**100%**

Forrás: Alekseeva et al. (2022)

The United States received $100 billion, 40% of the world's investment, followed by Canada and Brazil. Interestingly for the continent, the Bahamas, which is tiny compared to its size, received nearly one and a half per cent of the capital invested. The UK is Europe's FinTech hub. It is home to 40% of companies and 53% of the capital invested.

In the years after the 2008 financial crisis, the EU developed a regulatory environment and institutional architecture that strengthens the safe functioning of the banking sector. The European Central Bank (ECB) has expanded and strengthened its powers, as have the European Banking Authority (EBA), the European Supervisory Authorities, the Single European Supervisory Mechanism, the European Resolution and Recovery Fund and Mechanism, and the European Deposit Guarantee Scheme. The Monetary Union, the Banking Union and the Capital Markets Union have been steadily built. Measures have been put in place to guarantee the functioning of national jurisdictions.

Asia has a much more even distribution than the US. China excels in terms of investment but is almost neck and neck with India in terms of the number of FinTech companies. If we add Singapore, Israel and Indonesia together, we get a similar distribution in terms of the number of firms (370 compared to 380 in India and 390 in China). Asia's Top 10 countries cover 90% of the total number of companies. This is because there are several countries with a large number of FinTech hubs (Saudi Arabia, Thailand, Vietnam.

Asian regional markets are less competitive than Western markets, as the market is dominated by a few highly regulated state-owned banks, with very high barriers to entry. State-owned banks have excluded new entrants to the market, with a persistently low quality of banking services and little innovation in the absence of real competition. The stagnation of the market was initially somewhat alleviated by the entry of foreign banks, but they were unable to compete with state banks.

Although the state supports the development of the financial services market in order to promote economic growth and the development of state banks, these state banks invest relatively little in IT (Galántai, 2021; Kapron, 2018).

11. The rise of FinTech in Hungary

At the time of my research, or after my interviews were conducted, there were many others like me who were conducting in-depth interviews with experts to investigate the spread of the FinTech phenomenon in Hungary. The MNB was the first to publish such research (MNB, 2017), and the list has been extended by others (Hillbrown, 2021; MNB, 2017; MNB, 2020; MNB, 2021; MNB, 2022).

Nearly two-thirds of domestic players continue to be made up of firms in financial software development and systems integration, payment services, and data analytics and business intelligence. Financial software development and systems integration firms accounted for more than a quarter of all firms in the sector in 2020. The domesticisation of international banking and FinTech collaborations is reflected in the continued growth in the number of players involved in the digitisation efforts of typically domestic incumbent institutions. In addition, there is a smaller but growing number of domestically-founded FinTech companies entering into collaborations with international incumbents.

Domestic incumbent institutions are showing strong interest in FinTech innovation. Many are designing or using innovative solutions related to mobile and digital payment solutions and payment initiation services (MNB, 2017).

12. Main results of the dissertation, presentation of thesis

Based on a review of the literature and a synthesis of the knowledge from my research, I have formulated the following theses by issue area.

Thesis 1 on FinTech innovations in Hungary

There are both supply and demand reasons for the growth of FinTech solutions in our country. Innovations in the local FinTech sector have responded to changing consumer needs. New and beneficial solutions have contributed to making financial services faster, more accessible and cost-effective. The growth in the number of internet and mobile phone users has created a market of sufficient size for FinTech companies, which, together with other institutions providing advanced financial services, have served the real economy well. For some financial services, there has been more of an evolutionary development, which cannot be considered a revolutionary innovation. Many of the local FinTech innovations, by their very nature, could not remain within the Hungarian borders and had to move out into the global space.

Justification:

The innovative financial services offered by Hungarian FinTech companies have been welcomed with confidence by consumers from the very beginning. On the demand side, the demographic composition of the customer base is changing, with FinTech solutions becoming more popular among young people, which can accelerate the spread of digitalisation. A quarter of the adult population in Hungary uses mobile payments, according to a representative survey conducted in autumn 2020.

The concrete steps taken by the Hungarian Banking Association will stimulate both the demand and the supply side. The interest in local FinTech solutions is demonstrated by the fact that these companies are profitable. According to the MNB's analysis, local FinTech companies are, uniquely, in many cases already profitable as micro-enterprises.

The radical nature of the FinTech phenomenon necessarily gives it an international framework and nuances. It is clear from interviews and questionnaires that, given the limited size of the Hungarian consumer market, companies need export revenues, so local banks and FinTech start-ups are also looking for foreign partners. Borders can also be crossed from the other direction, so opening up the Hungarian market to foreign firms may weaken local participants. The president of Hungarian FinTech Association mentioned the example of Wise, a company that employs 100 software engineers.

Interviews and questionnaires show that both banking and FinTech participants are aware of the risks, yet they are constantly looking to exploit the benefits, as shown by the growing number of local FinTech companies working on cybersecurity. In addition, the number of firms involved in financial software development and systems integration accounted for more than a quarter of the sector's companies in 2020.

Thesis 2 on the national FinTech ecosystem

The spread of the FinTech phenomenon has reached local banks, which have created FinTech solutions in-house and with external partners. Cooperation, rather than competition, is the dominant feature among the participants in the local FinTech ecosystem, so FinTech companies and banks can contribute to the spread and increased activity of the FinTech sector.

Justification:

Relationships between participants in the local FinTech ecosystem are expanding dynamically. Increasing the share of FinTech solutions is supported by several domestic banks with incubation programmes, creating and implementing market models. It is striking how different the role of achieving financial returns is between banks and FinTech responses, with banks only counting this as a motivating factor. According to the MNB survey, there are currently 146 FinTech companies operating in Hungary. The European Central Bank (ECB) and ESMA think that regulation should be based on the financial services activity of start-ups rather than on their business form, as this is where most FinTech companies are active in Hungary.

Cooperation between national banks and startups has become the new norm. National banks have recognised that they are better off cooperating rather than competing because of the start-ups' proficiency in new technologies. This makes sense, they have the necessary capital and a significant customer base of their own, while start-ups have the state-of-the-art knowledge and flexibility to create innovative solutions.

In Hungary, start-ups are primarily supplier partners, which is a win-win situation, but the real winners of their cooperation are Hungarian consumers. It is also clear from the interviews and the questionnaire responses that banks and FinTech companies are also early adopters of cooperation in digital financial services. Banks later realised that they could not be innovative and cost-effective in all areas because this is a capability that start-ups have: they have a wealth of knowledge about the product that banks have not had the opportunity to accumulate.

The success of the collaboration depends mainly on what the FinTech company wants to do on its own, and what value-added service it would provide. The strategic thinking of bank executives can be influenced by those who can share with them, on a workshop basis, the experience they have gained in the international environment and with other clients. Business consultants can show banks how to be more competitive, how to accelerate the implementation of their business plans, and how to offer new services to a new market segment. The Bank helps FinTech companies to test their services with a large customer base.

My research shows that local FinTech start-ups prefer the B2B business model to B2C, with banks as their suppliers. There is little knowledge sharing among the participants in the local ecosystem. Venture capitalists are needed to successfully launch local FinTech start-ups. Banks have set up incubator houses, accelerator organisations and mentoring programmes to boost innovation, which has become an integral part of the well-developed national FinTech ecosystem. FinTech professional communities and advocacy organisations strengthen the national FinTech community through their professional knowledge, training and advocacy.

The Hungarian Banking Association has formulated a package of digitalisation proposals, in which it seeks to work in partnership with the legislator and supervisory bodies to create a legislative environment that supports the digital switchover.

Thesis 3 on FinTech regulation in Hungary

New FinTech solutions have attracted increasing regulatory and supervisory attention, and our regulation is permissive rather than strict. We follow international regulatory developments closely, especially EU developments. In our country, too, the emphasis is shifting from institution-based to activity-based regulation. Regulatory asymmetry and regulatory arbitrage can be reduced by applying hybrid, mixed institution-based and activity-based solutions.

Justification:

EU and national regulation share the common goal of attracting new actors to foster innovation in digital financial services. National innovation has improved the resilience of the financial intermediation system to unexpected shocks. Better use of resources has improved cost efficiency and helped the economy grow faster. Regulatory objectives have created a more supportive environment for innovative financial market service providers.

When drafting the PSD2 regulation, policymakers did not think enough about its impact on the banking system because they were watching rather than cooperating. Once the regulation came into force, banks tried to profit from it. But the PSD2 and other national regulations did not stop anyone from expanding internationally.

The regulatory response needed for non-exclusive financial services may be based on a hybrid model of activity and institution: the home Member State's institution-based approach may be able to cover the cross-border, group-level activities of tech firms, while host supervisors may be able to address risks in the host state through activity-based regulation. Financial regulators and supervisors have been working on how to support competitive processes and how to adapt regulations to ensure the safety of the whole financial and banking system.

International financial organisations have unanimously called for harmonised international regulation of new financial services. They recognised the need to do so, but the principle of identical regulation of the same activities has not yet been achieved. There was a statement in one of the interviews linking the two research themes, i.e. regulation can increase innovation. In the case of the consistent responses from representative bodies, it is worth pointing out that three of the four respondents also mentioned FinTech under the heading "bypassing legal and regulatory barriers".

And in the question "meeting regulatory challenges", banks were identified as being better placed to do so. The MNB has launched two platforms (Regulatory Sandbox; Innovation Hub) to stimulate digital financial development, which have created a new and much more supportive environment for innovative financial market service providers. They are used and appreciated by the players in the ecosystem.

Steps have been taken to enforce competition rules at both international and national levels. To support the global expansion of domestic FinTech players, the MNB has joined the GFIN network, which will enable the international expansion of domestic players and the effective domestic roll-out of international innovations through information sharing and the operation of a global financial testing environment.

Thesis 4 Competition and growth-focus

In Hungary, it is recognised that appropriate stimulus is needed to enable FinTech solutions to contribute to economic growth. The participants in the FinTech ecosystem in Hungary are competitive with their regional peers, but the chances of Hungary becoming a FinTech leader are not significant. Among Hungarian public authorities, the central bank is the most supportive of the Hungarian FinTech ecosystem, but representative organisations (Hungarian Banking Association, FinTech Association) are also working towards Budapest becoming a regional FinTech hub.

Justification:

While the number of bank branches and banks is declining globally, new skills are increasingly needed to sustain economic growth. It would increase competitiveness to have more successful companies and services in the Hungarian FinTech ecosystem. The introduction of instant payments, led by the Magyar Nemzeti Bank, is a major step towards becoming one of the leading examples in the region, or even in the EU, of a virtually cashless payments economy.

It is in our national economic interest that our country should not be at a competitive disadvantage in the regulatory competition within the European Union compared to the Member States with more flexible regulations. Regulations that encourage the spread of innovation have made the domestic FinTech ecosystem strong and crisis-proof, and domestic FinTech firms have high added value and are capable of significant export activity, which is a key factor for growth. Their competitive technological solutions can improve their efficiency and integrate into the financial services value chain, thus strengthening the competitiveness of the entire domestic financial system (Fáykiss - Ónozó, 2020)

The entry of BigTech firms into the financial market represents a paradigm shift, which requires the development of a comprehensive regulatory framework. The Hungarian market is not able to provide a backdrop for a regional centre due to its size, and cross-border services are needed. The rise of BigTech is changing the FinTech ecosystem. By working together, banks and FinTech start-ups can better respond to the threat of BigTech giants, as FinTech brings flexibility, ideas and youthful impetus, and the bank provides the backing for development.

13. Thesis booklet references

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