The Future of Banking in FinTech Era: Decentralized and Embedded Finance

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Abstract The main goal of this paper is to analyze the impact of FinTech innovations on financial services industry in South-East Europe. The paper summarizes existing knowledge of banking services in the FinTech era and pays special attention to decentralized and embedded finance. Qualitative exploratory research was conducted using in-depth semi-structured interviews. Participants were bankers selected based on their experiences in the banking sector. In this study, we identified the most important factors driving the success of FinTech innovations in the banking sector: legal framework, impact of FinTech innovations on financial market and regulators, protection of personal and institutional data, major changes that happened with the use of FinTech innovations, advantages and disadvantages of FinTech innovations, competition in terms of embedded finance, and decentralized finance. According to the study results, it is not clear whether the FinTech innovations will disrupt traditional ways of working in the banking sector or lead to improved modern ecosystems of financial services. The FinTech industry is attractive and promising, and financial sector will experience great changes in the future. Additionally, most of the participants think that banks and FinTech should cooperate and find solutions together—expertise in banks is enormous, and FinTech brings agility and flexibility.

Keywords Banking · Digital transformation · FinTech · Decentralized finance (DEFI) · Embedded finance

1 Introduction

Historically, organizations are driven by innovations. In this era, we are witnessing the highest level of innovations mankind is faced so far. Continuous innovation is of ultimate importance, but those innovations must be customer oriented, and should

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create value both for the customer and for the business itself (Aslam et al. 2020). Any innovation is driven by the technology underneath and banking industry is one of the most innovative ones in the world (Zaleska and Kondraciuk 2019).

One of the most prominent innovative technologies is digital technologies. The use of those technologies led to digitalization and change in business models in all industries. Digitalization has been seen as the new, fourth industrial revolution. Digital technology has been changing social, economic, and financial perspectives in numerous ways. Brennen and Kreiss (2014) have explained digitalization as "the adoption or increase in use of digital or computer technology by an organization, industry, country, etc."

Milošević et al. (2018) have analyzed the literature on digitalization and found out that there are two main streams in research—one is focused on the usage of digital technologies on macro and micro levels, and the second one is covering a digital gap, focusing on the differences in the development of digital technologies.

Numerous studies have been conducted to reveal the impact that digital technologies have on economic and social development and growth. For instance, Evangelista et al. (2014) point out that digitalization may drive productivity and employment growth. Authors Heredia et al. (2022) have explored and proposed the role of leadership management in improving firm performance through digital capabilities and found out that digital capabilities are sufficient but not a necessary condition for firm's performance improving. Milošević et al. (2019) recommended a mechanism for top management involvement and knowledge sharing to enhance project performance in the banking sector.

Additionally, it has been shown that digital technologies influence all kinds of businesses. Financial services are in the epicenter of those changes and one of the business areas that are affected by those changes, however, they are also active participants that are pushing digitalization forward.

As other businesses, financial services industry is immersing into the field of digitalization. Digital transformation in the financial services industry, and specifically in banking, has been seen both as an outcome of customers' demand from one side and as the initiation from a bank itself as a perceived necessity due to heavy competition in the field.

Analyzing innovation in the banking sector Milosevic et al. (2021) concluded that better performance results are achieved with innovation agility and readiness than quality of innovation. This means that the influence of innovation speed is more effective for performance success than the effect of innovation quality.

In their research OECD (2020) conclude that banks will create customer-centric business models as a reaction to digital disruption in financial services generally.

According to Statista (2022) and their research performed among managers in global financial services institutions, two main challenges facing digital banking worldwide in 2021, were ensuring data security and ensuring cybersecurity across the network and infrastructure.

Industry of financial services belongs to one of the most dynamic and innovation-driven industries. This industry is considered to be an active innovator and creator of new technologies, especially continuous development and improvement of financial

technologies (FinTech). On the other hand, banking industry is facing huge competition from non-financial players. Financial technologies and their applications are significantly disrupting financial services arena. FinTech is not a new term in the industry of financial services, but in the last decade, it brought immense changes to the field of financial services.

The main goal of this paper is to analyze the impact of FinTech innovations on financial services industry in South-East Europe. More precisely, the paper will summarize existing knowledge of banking services in the FinTech era, especially having in focus on decentralized and embedded finance. Additionally, the paper will reveal the current level of FinTech development in financial services, especially banking services, and propose a future progress of FinTech innovations in banking services in the countries from South-East Europe. Those countries are bank oriented, and it is challenging to analyze the implications of FinTech on financial services, especially banks, in those countries. The research will rely on 12 elements that the International Monetary Fund (IMF) and World Bank have prepared in the document called "Bali FinTech Agenda paper" from 2018. The purpose of the agenda is to give a framework for FinTech issues that countries should consider in their financial technologies' development and growth (International Monetary Fund; The World Bank 2018).

Attractiveness of FinTech leads to the most important factors driving the success of FinTech innovations in banking sector, particularly in emerging economies. In this study, we identified nine factors such as legal framework, impact of FinTech innovations on financial market and regulators, protection of personal and institutional data, major changes that happened with the use of FinTech innovations, advantages and disadvantages of FinTech innovations, competition in terms of embedded finance, and decentralized finance. The study used qualitative exploratory research. More precisely, 16 participants gave their opinion on FinTech innovations in banking sector through semi-structure interviews. Our results confirm that the FinTech industry is attractive and promising and that financial sector will experience great changes in future.

Paper structure comprises several parts: after the introduction, literature review has been presented with financial technologies innovations in financial services, especially banking, then special focus has been on decentralized financial DEFI and its influence on banking sector, and finally basics of embedded finance are presented. Next section includes research methodology and the description of the data obtained from the research. Results section presents findings from the undertaken research, and finally in the conclusion part authors summarize obtained findings, analyze implications and provide directions for the future study of the subject. Paper closes with a list of applied references.

2 Literature Review

2.1 Banking Industry and FinTech

Traditional financial services have been changed significantly and credits go to financial technologies. Involving digital technologies in financial services has created enhanced business opportunities. Possibilities and chances from FinTech are enormous. FinTech suggests entirely new ways of offering financial services and benefits go to consumers, financial services institutions, regulators, and governments. Altogether, in shortest, FinTech changed financial services helping them be less costly and much faster.

Financial industry has ever been an early adopter and intensive user of information and communication technologies, nevertheless FinTech, with new business models and new players, has created dramatical changes in this sector (Gomber et al. 2017).

In the past, information and communication technologies supported but also changed the financial industry. FinTech—financial technologies are one of the prominent areas of digital technologies and transformation. Financial technologies, as the name implies, relate to the usage of technologies to create new and upgraded financial services (Thakor 2019). FinTech has transformed financial services—created a new landscape and introduce new players who offer new, innovative services and products.

Authors Boot et al. (2021) have conducted research on two important dimensions of financial innovations—information and communications, both are being influenced by technological changes. This conclusion disturbed traditional banks in a sense that allowed new financial players to entry arena and offer new services much easier, without accessing balance sheet, for example, for payments or wealth management services.

Being a very broad term—FinTech covers various aspects from almost all areas of finance like payments, lending, investment, wealth management, personal finance, cryptocurrencies, and stock market. FinTech uses blockchain technologies, artificial intelligence (AI), and data science, to transform traditional financial services. FinTech makes access to financial services easier and encourages competition introducing new players into the financial services arena. New players are mainly FinTech start-ups, which act alone or allied with traditional financial institutions, but also non-financial tech and big data companies. Main threats for FinTech are dealing with potential financial risks and security issues for all participants, as well as regulatory concerns considering digital transformation of financial services.

Chen et al. (2019) proposed a very interesting, extensive typology of FinTech encompassing seven categories: cybersecurity, mobile transactions, data analytics, blockchain, peer-to-peer (P2P), robo-advising, and IoT. For every category, they gave a short explanation and main technologies it uses, as well as real-case examples.

Banking, as one of the important segments of financial service industry, is facing huge impact of FinTech. There is scientific research that have analyzed the evolution of relationships between banks and FinTech of Carbó-Valverde et al. (2021).

In their research, Bofondi and Gobbi (2017) discuss that FinTech stands as a serious challenge for traditional banking institutions.

Further, considering the competition between FinTech lending and incumbent banking services, authors Bejar et al. (2022) found out that FinTech impact is associated with lower net interest margins and defensive responses of banks regarding FinTech adoption, lowering of fees, and expansions into new markets, all of which are beneficial to customers.

Elsaid (2021) finds out that although FinTech companies have been taking some market share from banks, it is hard to believe that banks would be substituted by FinTech companies. It is more likely, as for now, that there will be strategic partnerships between banks and FinTech companies. That would bring advantages to both parties, banks will offer new services, or they will present new business models, and FinTech companies will enter the market and get a broader customer base. In Murinde et al. (2022) it has been confirmed that "it is unlikely that FinTech lenders will replace banks, perhaps because banks are developing their own FinTech platforms or working with FinTech start-ups." Navaretti et al. (2018) state that, to survive, banks will have to react, face rising competitive pressure, and adopt new strategies.

If we look at developed European markets such as German financial market, then from the research of Dorfleitner et al. (2017) we could see that "87% of the surveyed banks either currently cooperate with a FinTech business or are pursuing a partnership or cooperation with FinTech businesses in the future." However, even though banks are aware that cooperation with FinTech would speed up their innovative business models, they still hesitate and resist facing challenges of this cooperation (Drasch et al. 2018).

Open question is to grasp the level of impact FinTech has on incumbent financial institutions, predominantly banks. Siek and Sutanto (2019) have done research on this topic, particularly focusing on whether peer-to-peer (P2P) lending platforms, have disrupted banking services. They found out that considering P2P payments, FinTech start-ups significantly affected banks in the early period of adoption of FinTech. Nevertheless, according to their research (research done before COVID-19, prim. authors) it is not as emphasized as it used to be, since bank customers value safety reasons.

Several research analyzed the influence that COVID-19 had on FinTech usage and adoption, and that research found out positive influence FinTech innovations had on financial services and peoples' lives (Liu et al. 2020; Xu et al. 2021).

Questions regarding the cost efficiency of FinTech innovations have been posted in scientific research. Lee et al. (2021) have done research analyzing whether FinTech innovations have improved bank efficiency. They found twofold benefits of FinTech innovation for banks: the first one relates to improved cost efficiency and the second one implies improved technology used by banks.

Research by Chen et al. (2019) have just covered the technologies that are being leveraged in FinTech innovations and what benefits pertained technologies give to the innovators. They concluded that blockchain technology has been particularly valuable as an underlining technology.

Both FinTech firms and banks have advantages one over the other, banks have the advantage of large established consumer bases, more experience in dealing with regulators, and a broader set of product offerings. FinTech firms for their part, have the advantage of being less regulated, they are much flexible and not burdened with legacy IT systems (Stulz 2019).

Wonglimpiyarat (2017) has tried to develop a systematic innovation business model for the banks that can be used as a dynamic tool to track the progress and pattern of technology development and diffusion in the banking industry.

Authors Li et al. (2022) have researched the impact of FinTech innovations in banking and their risk-taking levels. They have concluded that if a bank improves the level of its FinTech innovations, then it, generally, reduces the level of risks it takes.

Authors Lien et al. (2020) considered that customers' intention to use FinTech services will influence banks' improvement in the quality of their FinTech services. Through their research authors suggested that banks should primarily focus on improving the usefulness of FinTech services to meet demand of all customer segments.

Hu et al. (2019) have suggested an improved technology acceptance model (TAM) that incorporates user innovativeness, government support, brand image, and perceived risk as determinants of trust to investigate how users adopt Fintech services. According to this research, to accept new technology, customers first start using it, under the influence of government, brand image and user characteristics, and then rate benefits and potential risks.

Ryu (2018) in his research has analyzed the potential benefits and risks of FinTech use, and for a better understanding of FinTech behavior, has divided users into two groups of early and late adopters. Study revealed that both benefits and risks significantly influence further continued use of FinTech services, but perceived benefits had a much stronger impact on FinTech usage decisions than the perceived risks. Considering two groups of users, study showed that early adopters mainly focus on the efficiency of financial transactions, while the late adopters request more financial gains through FinTech usage.

Once again, as with financial services industry generally, with a new, innovative FinTech landscape, regulators face challenges of setting the right level or balance of regulation—the one that will encourage innovations and preserve financial stability and protect consumers (Vives 2019).

FinTech has reshaped financial services industry and banking itself. Having in mind all the characteristics and benefits financial technology innovation has brought to financial services industry, both customers and financial institutions now expect adaptability and expeditious processes.

2.2 *Decentralized Finance: DEFI and Embedded Finance*

As mentioned before, financial industry has a long relationship with information, communication, and now digital technologies. Further improvements in those technologies, especially in the domain of digital technologies, have remodeled traditional financial services, markets, and regulations. Today, we can talk about DeFi—decentralized finance, because of the FinTech influence on the financial system. Basically, DeFi relates to blockchain technologies, and represents digital financial infrastructure that does not need any central regulator that approves financial transactions.

Decentralized financial services could have existed in merit to blockchain technology. A blockchain is basically a digital ledger of transactions that is duplicated and distributed across the entire network of computer systems on the blockchain (Euromoney 2022). System of recording transactions in a blockchain is very difficult or probably impossible to alter or misapply. Blockchain technology, as peer-to-peer network, allows participants to confirm transaction without a need for a central clearing authority (PWC 2022).

Banking sector gained several benefits from the revolutionary technology such as blockchain technology (Ramchandra et al. 2022).

Martino (2021) emphasizes that blockchain's distributed ledger technology (i.e., second-generation blockchain) provides an opportunity for the banking industry because it can enhance efficiency of the banking processes and enrich services that banks offer to their customers. All have a positive impact on banks' profitability. According to the same author, main banking areas that could benefit from adopting blockchain technology are lending, payment systems, trade finance, and capital markets.

Blockchain impact on financial services can be huge, as Fanning and Centers (2016) concluded, financial institutions could save costs of at least 20 billion US dollars annually in settlement, regulatory, and cross border payments.

Blockchain technologies, as mentioned before, enable decentralized finance to be applied. Grassi et al. (2022) stated that DeFi does not "eliminate financial intermediation, but enables it to be performed in new ways, where decentralization means that no single entity can hold too much power or monopoly." Same authors state that DeFi is an alternative financial system where anyone can access financial services like lending, investing, or insurance from any place.

With this model of financial services, question of regulations comes across. In that sense, authors Zetzsche et al. (2020) point out that DeFi needs regulation in order to achieve the objective of decentralization itself. Those authors think that DeFi offers an opportunity for the regulatory approach to be built into DeFi design and to decentralize both finance and its regulation.

DeFi has developed significantly in recent years, and consequently its growth brought some new risks. Authors Werner et al. (2021) emphasis that decentralised nature allows that any participant can create unaudited and maybe malicious smart contracts within DeFi system.

Although DeFi constructs financial intermediation as being more decentralized, innovative, and transparent, it still has to overcome numerous issues in order to reach its full potential (Chen and Bellavitis 2020). However, DeFi will mark future of financial innovation in financial services industry, and the main question is in what form and when it will lead to financial disintermediation.

Another challenge that banking institutions are facing due to digitalization of financial services is incorporated in embedded finance. This term refers to non-bank providers offering banking services like payments, lending, and deposits. Being very beneficial for both the customers and companies, it can be noticed that there is a switch from all types of companies, like telecommunications, retailers, big techs and software companies, car manufacturers, insurance providers, and logistics firms to launch embedded financial services (McKinsey 2021). For the consumers, this means that they receive financial services when they need them, without going to financial service institutions.

For the banks, this means they are going to stay aside, and lose profits, or they can actively participate in this process. Hensen and Kötting (2022) state that banks could "adopt this approach by embedding financial services into the products of non-bank companies, thus offering seamless processes and an increased level of convenience to their clients."

3 Methodology

In this study qualitative exploratory research was conducted using in-depth semi-structured interviews. A convenience sampling method was used to analyze the perceived future of banking services in the FinTech era. Therefore, participants were bankers selected based on their experiences in the banking sector. Sixteen participants were chosen aged between 30 and 55 years. The numbers of male and female participants were balanced to avoid gender bias.

The primary data collection process ended after data saturation was reached. Data saturation was reached when additional sampling was unnecessary because no new information related to the research question was obtained after the additional interviews. Open and manual coding is feasible for the code with a few interviews (Basit 2003), and this study has 16 interviewees. Data were analyzed using open and manual coding to ensure comprehensive analysis and interpretation (Saldana 2009).

The nine factors identified during the interviews were: legal framework, impact of FinTech innovations on financial market and regulators, protection of personal and institutional data, major changes that happened with the use of FinTech innovations, advantages and disadvantages of FinTech innovations, competition in terms of embedded finance, and decentralized finance.

Legal framework refers to the level of legal clarity and certainty regarding FinTech innovations. It is essential for trustful and long-term relationships between financial intermediaries and clients. Clear and predictable legal rules are important

for technological change and they became one of the top priorities for FinTech innovations, especially in developing countries.

In order to reach social and economic *impact* it is necessary to build robust financial and data infrastructure.

Protection refers to the goal to safeguard the integrity of financial system through identifying, understanding, and mitigating all potential risks in terms of personal and institutional data (Murinde et al. 2022).

Major changes require strong institutional capacity and involvement of relevant ministries and agencies which lead to economic and financial development (Romānova and Kudinska 2016).

The main *advantages* of decentralization and disintermediation are open financial systems, reduction of transactional costs, and direct connection through peer-to-peer network (Navaretti et al. 2018; Chen et al. 2019).

Disadvantages are described as the main obstacles to successful adoption of FinTech innovations and main problems in terms of effectiveness and efficiency of regulation.

Competition between banks and other players in the market should be balanced and based on knowledge sharing and openness about different experiences and best practices. In this research competition refers to non-bank providers offering banking services like payments, lending, and deposits (Wullweber 2020).

DeFi—decentralized finance—relates to blockchain technologies, and represents a digital financial infrastructure that does not need any central regulator that approves financial transactions (Chen et al. 2019). DeFi creates new opportunities, encourages permissionless innovation, and facilitates open access (Chen et al. 2019). For the purpose of this research participants were asked about their expectations in terms of DeFi.

4 Results

This research aims to fill the gap in literature by uncovering empirical insights into FinTech innovations in banking sector. In terms of legal framework, people generally think that there is room for improvement. Participants point out that the main problem refers to legal frameworks which do not come as a necessity, but as an order. Law is too rigidly implemented, i.e., it is not always adapted to local specificities. Moreover, participants argue that it is often too late with adoption and implementation in the field.

Majority of participants think that it is not clear whether the FinTech innovations will disrupt traditional ways of working in the banking sector or lead to improved modern ecosystems of financial services. Nevertheless, it can be safely considered that FinTech will leave a big impact on the entire financial market.

Fintech innovations increase the need for strong frameworks to protect individual and institutional data. Three participants stated that the most important part of the bank–client relationship is trust in data protection. However, they point out that there

is a long way to go until the standards of developed countries are reached in terms of data protection.

In terms of major changes that happened with the use of FinTech innovations, participants argue that innovative solutions will enable us to have available information in the so-called immediate response, which is the basis of any communication or business, especially for the young generations.

Additionally, participants point out that FinTech offers numerous benefits such as expanding access, reducing costs, and increasing transaction convenience. Moreover, FinTech innovations promote new business models and develop financial markets. However, being in line with market changes and developments may be challenging for regulatory authorities. Participants argue that inconsistent legal framework is not stimulating FinTech innovations in South-East Europe.

Only one participant thinks that banks should compete with other players in financial markets, especially in terms of talented, experienced employees that create new solutions. The participant thinks that banks very often lose hard-working employees because they do not support them and recognize the need for change and innovation. Others think that there is a space for synergy between banks and FinTech, and that they should cooperate and find solutions together—expertise in banks is enormous, and FinTech brings agility and flexibility.

Decentralized finance is still a fairly new term in the cryptocurrency and blockchain world. Participants believe that decentralized finance is the future, but they do not expect major changes in the next 10 years. They perceive financial markets as underdeveloped and unprepared for so many changes. However, having in mind that banks are large and not so agile systems where changes happen slowly, it is important to be focused on innovations and ensure a timely response. The interview results from open coding are shown in Table 1.

5 Conclusion

The main goal of this paper is to analyze the impact of FinTech innovations on financial services industry in South-East Europe. More precisely, the paper summarizes existing knowledge of banking services in the FinTech era, especially having in focus on decentralized and embedded finance.

The gap in the literature regarding FinTech innovations in the banking sector led us to apply a qualitative method to gather information from bankers. The nine factors identified during the interviews and perceived as important by bankers were: legal framework, impact of FinTech innovations on financial market and regulators, protection of personal and institutional data, major changes that happened with the use of FinTech innovations, advantages and disadvantages of FinTech innovations, competition in terms of embedded finance, and decentralized finance. In this study, we used in-depth semi-structured interviews. Participants were selected based on their experiences in the banking sector. Sixteen participants were chosen aged between 30 and 55 years.

Table 1 Interview results

Code	Description	Sample quotations
Legal framework	Legal framework refers to the level of legal clarity and certainty regarding FinTech innovations.	"I believe that the FinTech sector should have equal or stronger legal norms in relation to other parts of the financial system." "The legal framework is very rigid and only fully licensed banks can offer a complete set of financial services." "The problem is that legal frameworks do not come as a necessity, but as an order. Law is too rigidly implemented, i.e., it is not always adapted to local specificities; it is often too late with adoption and implementation in the field."
Impact	This variable refers to social and economic impact.	"It is very important to coordinate the regulator and 'practice' in order to avoid the complexity of the regulatory framework, which can significantly slow down business, or even devalue 'innovations'." "FinTech innovations have a positive effect on financial market since they initiate change and efficiency. They help traditional market participants to understand and accept trends, i.e., the need for business model changes. Moreover, FinTech innovation leads to the possibility of alternative investments." "The legal framework is being modernized and a better competitive atmosphere is being created. FinTech innovations lead to the development of the market."
Protection	Protection refers to the goal to safeguard the integrity of financial system through identifying, understanding and mitigating all potential risks in terms of personal and institutional data.	"Data protection is a big challenge even for large universal banks that can invest significant funds in this area, which implies that it is significantly more difficult for 'smaller entities' like FinTech companies." "It is necessary to implement the GDPR regulation, which enables the clear participation of data owners in the use of data."
Major changes	Major changes require strong institutional capacity and involvement of relevant ministries and agencies which lead to economic and financial development.	"FinTech should liberalize the financial sector and increase competition. Also, a very important role is education and greater orientation towards the client, greater transparency and

(continued)

Table 1 (continued)

Code	Description	Sample quotations
		better user experience." "FinTech innovations will change the structure of employees in the financial sector (more IT profile)."
Advantages	The main advantages of decentralization and disintermediation are open financial system, reduction of transactional costs, and direct connection through peer-to-peer network.	"Improving efficiency, availability of services, simple use of financial services, speeding up processes, getting to know clients and their financial habits and patterns of financial behavior; it is opportunity to optimize their processes and save time."
Disadvantages	Disadvantages are described as main obstacles to successful adoption of FinTech innovations and main problems in terms of effectiveness and efficiency of regulation.	"Slow implementation; still complicated customer identification system, limited customer support." "Possible loss of personal relationship with the client and lower level of loyalty." "Lack of understanding of complex banking processes, lack of recognition and trust."
DeFi	DeFi relates to blockchain technologies and represents digital financial infrastructure that does not need any central regulator that should approve financial transactions.	"With the development of technology, the process of decentralization will take place. I am not optimistic that something will significantly change in the next 10 years, but definitely the future is in decentralization and greater democratization of the financial sector." "I expect some 'upgrade' of the old model of the financial system."

The findings of this study are relevant to banking sector and FinTech firms that intend to innovate and ensure timely response to technological changes. Moreover, results are valuable for regulators in the financial market, especially for those who influence the development of legal framework.

However, our study has several limitations. The first limitation of this study is its methodology. Since interviews give us a unique chance to discuss and analyze the perception of bankers, their attitudes toward FinTech innovations and thoughts on embedded and decentralize finance, we started with qualitative research. In terms of future research, it would be interesting to test identified factors through international quantitative survey. Additionally, the study might be more captivating by using an experimental approach to collecting real-time data. Additionally, since this study is limited to examining the experiences of people who work in a banking sector, another possible area of future research is analyzing the perceptions of other players in the financial market. This would be very interesting, especially in terms of embedded and decentralized finance.

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