The Role of Blockchain in Innovative Fintech Services

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Abstract—Most financial institutions have started applying Blockchain technology in the financial market with the aim of reducing transaction costs and increasing operational efficiency. As part of open banking, this technology is designed to improve financial services for its users. For customers, this technology will mean better ways to spend, borrow and invest. Clients will be able to get financial products better adapted to their needs, which would lead to a reduction in costs. In this paper, modern trends in the application of Blockchain technology in the field of banking and financial services are followed. Based on the reviewed literature, an analysis of the application of blockchain technologies in financial services was made, taking into account the advantages and disadvantages of this technology. Numerous studies conducted on the application of Blockchain technology in the financial market have shown that this technology can be applied to financial fields and financial products and that it can protect data security, especially in the data trading aspect. Today, large IT firms and companies invest large financial resources for the implementation and development of this technology.

Keywords - financial technologies, blockchain technologies, financial services, open banking

I. INTRODUCTION

Financial technologies ("fintech") have a very important place in financial markets around the world today. In fact, these are information technologies that serve the financial sector. Their role is to enable the improvement of the already existing way of financial business. A developed information environment is necessary for the successful implementation and application of these technologies. The rapid development of information technology, internet connectivity and smartphones has an impact on the banking and financial services sector. The combination of financial technology (fintech) and blockchain affects the modernization and transformation of services in digital banking and financial services [1]. Financial technologies in the banking sector are not new. Banks as participants and bearers of the permanent development of the modern financial market must accept the fact that financial technologies are by no means a competition, but a great help in stimulating the development of timely solutions in order to overcome the difficulties that already exist but also those that will certainly arise during the development of technology. According to Tadić Živković [2], the Balkan countries have slow economic development, where the dominance of banks within the financial system is pronounced. For these reasons, the financial systems of these countries are suitable for the development and implementation of new financial technologies. Given that the spectrum of application of new technologies in these developing countries is much wider, financial institutions have a unique opportunity to take the initiative in their development and to secure a stable position for themselves in the future. There is no single definition of financial technologies because they can be intended for end users or companies themselves. According to German authors from 2017, financial technologies describe companies or company representatives that complement the provision of financial services with modern innovative technologies [3]. In the financial market, the banking sector as it existed until now is beginning to disappear because an increasing number of financial services find their way to end users without the mediation of banks, so banks should recognize their opportunity in time. There may be a chance for banks to implement new technologies in small innovative companies that would contribute to preserving market share and improving bank operations. Available data from the last report of four large auditing institutions indicate that banks are more afraid of losing market share than of uncollectible claims. In order to survive, banks need to notice changes on a global level in time and adjust their operations to new trends, in order to preserve their position on the financial market [2]. For the reconstruction of the banking and financial sector, it is necessary to interconnect financial technology (FinTech) and blockchain technology [4]. FinTech is considered one of the most significant revolutions in the financial industry. It has progressed very quickly, thanks in part to the sharing economy, favorable legislation and advances in information technology [5]. Finance and technology are involved in a long-term FinTech development process based on new technologies [6]. Mobile and digital payment systems are key to the further development of FinTech. FinTech companies are rapidly gaining ground around the world. They offer service options in a number of areas such as payment systems, asset management, credit solutions and insurance services. This technology is well designed to support businesses to efficiently and resourcefully adapt to the needs and conditions of the financial market [7].

II. LITERATURE REVIEW

We can distinguish financial technologies according to their application to different business segments. Those segments are [3]:

- *financing* (financial technologies provide the opportunity for funds to be equally available to individuals and the economy);

- *asset management* (the concept is more recent and represents the possibility of an individual who is not ready to take risks to freely access information about trading on the stock market and freely download the trading patterns of existing brokers from the stock market [8];

- *payment systems* (Alternative forms of payment are increasingly end-user focus primarily due to the speed of the transaction. A typical such example is the peer-to-peer (P2P) money transfer. This method of money transfer does not exclude banking institutions, but in the future it could seriously threaten the banking industry in combination with blockchain technologies and cryptocurrencies. Money transfer is fast and funds are available immediately. The recipient has the option to decide whether to leave the received money undistributed or to pay it into his bank account. Banks in Serbia accepted this challenge and responded to it, so in 2019 they implemented an instant payment system. Funds are transferred from account to account in just a few seconds, 365 days a year. One of the ways of instant payment for goods and services in shops is to scan a QR code, which is a two-dimensional graphic symbol on a mobile phone, by scanning which payment is made to the seller or even to the manufacturer. China is the world's largest user of payments made by mobile phones and even street vendors. At the markets, by scanning the code, payment is made directly to the producer's account, whereby the buyer or seller settles later. Blockchain technologies and crypto-currencies describe financial technologies that offer virtual currencies as an alternative to existing money [3]. This technology represents a much broader concept than cryptocurrencies. It can be used in other systems and not only in the financial market [2];

- *other financial technologies* (applied in the field of insurance, search and comparative analysis with the help of internet search engines, development of new technologies, IT solutions and infrastructure). Research has shown that banks and financial institutions are undergoing a major transformation in order to keep up with modern and digital technological changes. Numerous studies have forced the conclusion that FinTech, supported by blockchain technology, will lead to major changes in investment standards that offer useful information about clients. Blockchain in FinTech is based on capital and decentralization and as such can provide a much more efficient banking alternative than the current alternative [1]. Research shows that most banks are currently focused on blockchain technology to accelerate the promotion of economic growth and the development of green technologies. The results indicate that by overcoming the shortcomings in the Bitcoin system and blockchain technology, financial processes can be managed in a more efficient way than in the already existing system. Blockchain technology has the potential to optimize the global financial infrastructure, improving the efficiency of existing financial systems [9]. Blockchain technology, as a new technique that has appeared in recent years, is widespread in all sectors of society, especially in financial institutions [10]. Blockchain technology was first invented by Nakamoto in 2008 (Satoshi Nakamoto in 2008). Years. He tried to design a decentralized system of electronic cash transactions in order to solve the double payment problem and to improve the security of information verification [11]. This is the reason why blockchain technology quickly found its place in the financial sector. The advantage of blockchain technology such as decentralization, openness, autonomy, information resistant to unauthorized use and anonymity is that it can reduce the operating costs of a commercial bank and somewhat improve the efficiency of capital utilization [12]. Blockchain systems possess a number of attractive attributes for the banking and financial services markets. These systems are resilient and can operate as decentralized networks that do not require an operating system and have no single point of failure. Because they work using open source distributed protocols, they have integrity and do not need to trust a third party to execute transactions. Public blockchain systems are transparent, as all changes are visible to all parties [13]. Blockchain based on five principles: computational logic, peer-to-peer transmission, record irreversibility, distributed database and pseudonymous transparency, has enormous potential to significantly influence the transformation of the financial services industry. With the increasing operations of decentralized banking, insurance, trade finance, financial markets and cryptocurrency markets based on blockchain, the impact of blockchain on the entire business sector is increasingly attracting the attention of scholars from around the world [14]. With the reduction in complexity and costs of implementation and the increasing number of pilot projects, Blockchain is becoming a technology that is increasingly acceptable. Perceptive executives and managers should see how technology fits into their business and how it can improve their business and create an edge over competitors. [15, 16, 17, 18]. In the banking and financial services sector, blockchain technology can streamline business processes while creating secure, reliable records of contracts and transactions [13]. Blockchain technology will certainly influence the transformation of the banking and financial sector to a large extent, given that information technology enables equal P2P communication, as well as communication with mass media. Blockchain allows the public to send and receive money instantly, securely and with a low transfer fee for fast transactions without third-party intervention, which reduces or eliminates the chances of hacking. The digitization of banking and financial services is incomplete without all the components of the fourth industrial revolution: blockchain networks and the comprehensive preparation of financial technology companies for the digital platform and other services. Digitized banking services strongly challenge old business models and tradition-based

processes with faster response times and skills in offering secure and simple payment transactions [19]. The banking and financial services industry has noticed the many benefits of blockchain technology.

III. ANALYSIS OF BLOCKCHAIN APPLICATION IN FINTECH

Financial technology (fintech) refers to financial innovations that create new business models, applications, processes, or products through technology. These innovations can have a significant impact on financial markets, financial institutions, or financial service [20]. Modern fintech deal with the creation of tools for tracking cash flows, accounts, advances in the insurance industry, and provide analytical and infrastructure tools for financial institutions. Blockchain technology can speed up the process and make it more secure. Using blockchain technology, both parties can see and track all document changes online during the lending process. Moreover - the distributed blockchain guarantees the complete integrity of the process. As a result, it offers customers a safer, cheaper and more efficient way to borrow funds. The development of blockchain solutions for financial services can lead to several benefits for the industry. Blockchain in financial services has also led to the introduction of decentralized finance, better known as DeFi (Decentralized Finance). DeFi is a form of finance powered by blockchain technology that aims to remove third party from financial services through the use of smart contracts. Blockchain technology brings new solutions and advantages in financial technologies, taking into account that blockchain finds application in [21], [22].

Security and Transparency- With blockchain in financial services, transparency and security can be ensured simultaneously. Blockchain has the property of immutability, which means that data cannot be changed. Ensures that all data is secure, authentic and accurate. Several blockchain networks support Zero-Knowledge Proof technology as a privacy solution for their blockchains. It enables the verification of financial data without disclosure.

Blockchain technology helps ensure the integrity of a distributed system, but at the same time provides real-time transparency and cost savings through the use of a consensus algorithm [23]. Blockchain technology is a decentralized, coded security system that enables the development of new digital platforms and services using this development technology. Most research studies have shown that security is the most significant barrier to the adoption of blockchain technology. Since the digital world is full of known and unknown cyber threats, critical data must be protected immediately [24]. According to Yaqoob, et.al, the security threat is 51% [25]. For these reasons, all State Governments and relevant departments should develop and implement laws that will allow people to profit from Blockchain, but strictly prohibit the use of Blockchain for criminal purposes such as capital control, terrorist financing and money laundering [24].

Reduced Cost- With blockchain in finance, many costs can be reduced. Blockchain technology is a form of DLT (Distributed ledger technology), which can help increase transparency and reduce costs while ensuring security. Financial service providers such as banks can also implement smart contracts into their systems to reduce costs.

Collaboration- Removes the third party from the transaction. By providing a ledger that no one manages, blockchain would have the ability to provide specific financial services. One of these services is payment or securitization, without the need for a bank. Blockchain enables the use of tools such as "smart contracts", self-executing contracts based on the blockchain [26].

Effectively Control Risks-By applying blockchain, each stakeholder is treated as a node. Hence: peer-to-peer (P2P) transactions can be enabled, eliminating the need for third parties. Fund management and credit risks are reduced as all transactions are recorded online. Smart contracts help transactions settle quickly, and data immutability improves reliability. The application of blockchain makes it easier for financial service providers to deal with all risks.

Blockchain creates new risks, but also helps mitigate existing risks by promoting accountability, maintaining record integrity, and providing an irrefutable record [27]. Based on analyzes of the impact of the implementation of blockchain technology (BCT) on the accuracy, reliability, visibility, incorruptibility and timeliness of processes and transactions in the supply chain, it can be said that it is suitable for improving robustness, transparency, accountability and decision-making in risk management [28].

Instant Settlments- In the current financial system, some payments can take up to a week to clear. The reason for this is mainly the presence of third parties in the system. By applying blockchain, peer-to-peer (P2P) transactions are possible. This implies the elimination of third parties as smart contracts will be able to successfully manage transactions. As the "layers" of the system will be reduced, transactions will be faster and easier.

Instant payments have the potential to become widely used in the euro zone. The extent to which this will be achieved depends on the environment in which we live and on the speed at which the transformation will take place, which depends from country to country. [29].

Better Auditting- With the implementation of blockchain, the audit process can be simplified. Blockchain records are immutable, so auditors can check them to make sure compliances are being met correctly and what exactly is going on in that financial organization. Transparency will be maintained with the help of blockchain. Any suspicious transaction can be easily traced.

Blockchains can definitely be a huge help to the audit system, in terms of increasing efficiency and improving auditor procedures. Auditors are provided with a better insight into the state of the client they audit during the entire

financial year. Despite technological advances in the form of blockchain, auditors still have reason to investigate in order to detect corruption of management personnel and verify the verifiability of accounts [30].

In recent years, many companies are trying to find the way how to use blockchain to create better financial services or improve existing ones. There are many applications of blockchain in finance, including [22]:

RTP solutions- Sending money will only take a matter of minutes. Implementing RTP has been risky with the traditional banking process, but Blockchain accelerates the implementation process. As a result, irrespective of any app used for money transfer, transactions will happen securely.

Cross-border Payments- While setting up to collect or fund transfer across other countries, the limitations make the process slow, tiresome and challenging. With Blockchain, the restrictions can be melted. In addition, it is an entirely internet-based operation which removes the need for an additional setup cost.

Smart Contracts & Recurring Payments- For SaaS (Software as a service) & B2B industries, smart contracts will help secure credible transactions that can be released based on a completed action, event, or conditions. It is useful when the goods are delivered, and the funds are released in the logistics.

Lending platforms- Fintech blockchain solutions make loans more accessible to both lenders and borrowers. However, with blockchain in finance, borrowers can directly deal with lenders about the interest rate, installments and duration of the transaction with the help of immutable smart contracts. Borrowers and lenders can negotiate terms on smart contracts.

Invoice Management and Billing Solution- A significant number of companies are adopting electronic invoicing, but they lack the standards needed to execute invoice financing in a simplified manner. With blockchain in finance, companies can upload invoices to the blockchain via smart contracts.

Fund Investment- Currently investing in funds is very time-consuming and expensive. The current procedure involves manual processes that use multiple databases. With blockchain, providers can store users' legal, personal and public information on the blockchain. This could: reduce the possibility of errors and fraud, introduce transparency and thus facilitate access to data.

Financial Record Keeping- Companies plan to use blockchain to store immutable records of financial-related information such as: financial history, profits earned, distribution of dividends. Smart contracts allow different stakeholders to gain access to relevant information. Therefore, blockchain helps companies bring transparency to financial systems.

Keeping accurate and up-to-date records is vital to business success. Good records help to reduce losses, manage cash, fulfill all legal, regulatory and tax obligations and improve financial analysis [31].

IV. OPEN BANKING

A. Concept of open banking

Behr analyzes the importance of information exchange between lenders. Information from the public credit register of the central Albanian bank, related to access to credit, cost of credit and credit performance. The results of the analysis indicate that the sharing of information through the central registry does not affect the access or cost of loans, but contributes to the improvement of loan performance. Loans approved after the introduction of the credit register have a 3% lower chance of becoming problematic. The effect of information exchange is more pronounced among borrowers who reuse loans and in areas where banking market competition is less, which indicates that information exchange between lenders improves loan performance mainly by disciplining borrowers to repay the loan due to their concern about access to loans in the future [32]. Behr and Sonnekalb find that the effect of information sharing is more pronounced among repeat borrowers and conclude that the disciplinary effect of information sharing is stronger for clients who have already secured a relationship with the lender [33].

Based on the research results of many authors, it can be said that credit information sharing improves bank loans ([34, 35, 36] and credit quality [34, 33]. The degree of banking market concentration reduces the effect of credit information sharing on bank loans. The results are robust to control possible interactions between credit information sharing and management [36].

Fosu et al. during the study of the impact of the exchange of credit information on the rate of loan defaults in banks based in developing countries came to the conclusion that the sharing of credit information reduces the rate of loan defaults, that the relationship between the sharing of credit information and the rate of loan defaults is conditioned by the concentration of the banking market and that the quality of management at the country level, it does not have a strong role in moderating the impact of credit information sharing on the loan default rate[37] .

Banks and lenders are required to share information about consumers as part of open banking, enabling them to provide customers with specialized services tailored to their requirements and financial situation. This can be done while maintaining privacy, integrity and security using blockchain technology. Open banking refers to the use of APIs to share financial data and services with third parties. Third parties typically provide technology, a service or an app to the bank’s customers that makes use of the shared financial data and services. The shared financial data comprises e.g. the statements and transaction records belonging to the banks customers. This data cannot be made

openly available, but it is only shared at explicit request of the customer. Open banking provides the technological infrastructure and the legal frameworks to make such consent-driven sharing happen. Every financial institution currently has its own internal system in which information about consumers is stored. Since open banking requires opening APIs for other financial institutions to consult information about that customer, it is necessary for them to be on a decentralized and shared platform. Each authorized financial institution must develop an API that allows other financial institutions to access customer information when requested. This will result in costly and time-consuming processes for participants. Fig. 1. provides a current view of how open banking works. [38]

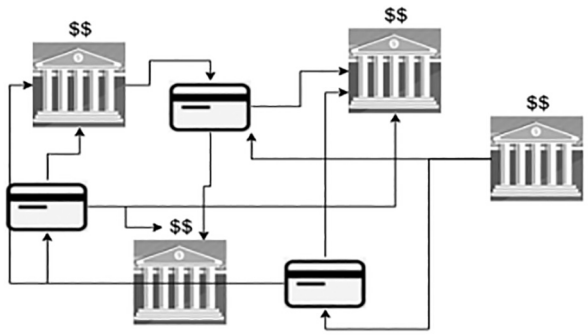

Fig. 1. Current overview of the functioning of open banking

The second scenario shows how open banking could work, minimizing operational costs for all participants by improving control and regulation of central banks, as well as more efficient updating when needed. This scenario refers to open banking using blockchain technology whose platform is decentralized and whose APIs are universal. The central bank will be able to supervise financial institutions in accordance with their regulatory means. Smart contracts will guarantee that the protocol is followed. The client will also benefit from controlling their own data and authorizing the sharing of information that requires access for personalized and better services. In this model, the user has full control over all their data in an efficient manner, having the ability to grant and revoke access at any time. Fig. 2. provides a current view of how open banking could work using blockchain technology [39].

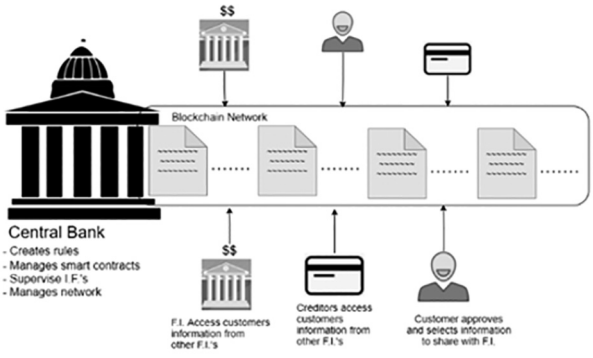

Fig. 2. An illustration of how open banking could work using blockchain technology

B. Advantages of open banking

Secure Payments- Data security is vital, so it is understandable that consumers may believe their data is not safe if it is now available to third parties and companies. However, this is not the case – Open Banking actually has security at its core. Not only has consumer identity significantly been approved in recent years, but all the data is also encrypted and stored securely.

Better Customer Experience- One of the main goals of open banking is to improve financial services for consumers, and one way it achieves this is by creating a better customer experience. Less time-consuming form-filling means making payments and managing personal finances has never been easier

Centralised Information- The 2018 changes in Open Banking mean consumers can now get more services in one place as their information, previously only available to banks, is now kept in a central location for others to access if/ when is necessary.

Instant Payments- Funds travel quickly with Open Banking, meaning you will receive the money instantly rather than taking a while to process. Not only is this great for a business' cash flow, but it also reduces the risk of failed transactions which can be costly.

C. Disadvantages of open banking

Relatively new- While APIs have been around for some time, open banking is a relatively new concept. This means a lot of trial and error situations are yet to come.

Lack Of Consumer Trust- Some people are not great at dealing with change, especially when it comes to technology. As open banking is still relatively new, it will take a while for some consumers and businesses to come around to the idea of it.

Safety Concern- Whilst open banking is secure, it is understandable that some people will be skeptical, especially as it involves personal financial data. The key is to highlight the secure nature of this system, emphasizing that their data is safe. It is however imperative that consumers know the importance of checking the authenticity of any open banking software they use before they start [39].

V. CONCLUSION

By reviewing the relevant available literature, it can be said that the financial market has recognized the importance of the development and implementation of financial technologies that will enable the development of many innovative individuals to find their place in the financial sector and to realize themselves in the financial market, given that the opportunities for the application of financial technologies are great. Through the application of fintech, there are great opportunities for business improvement

through getting closer to the end users, which requires adequate legal regulations.

Then financial institutions would become safe havens for users. The financial services industry is traditionally known for its legacy systems. There are banks whose systems are 30-40 years old and which are outdated, so their obsolescence is precisely the reason for them to innovate and improve their systems by accepting blockchain, which would allow them to save considerable funds. By implementing and applying new financial technologies, banks would not only become more efficient, but would also be given the opportunity to trade faster and cheaper on the financial market.

Research shows that Blockchain technology will have a wide application in financial fields in the future, considering that Blockchain technologies enable decentralization, openness, autonomy, information resistant to unauthorized use and anonymity, which can reduce the cost of doing business for a commercial bank and somewhat improve the efficiency of using financial capital. At present, blockchain technology has been widely applied in the financial market, especially as a financial record, cross-border payment and asset-backed securitization, as a technology that has great advantage in the information transaction sector. Research shows that this technology is revolutionary and that as such in the future it should be widely used in the financial sector as well as in all segments of life.

Following the trends of Blockchain application and taking into account the advantages and disadvantages of this technology, it can be said that Blockchain has all the prerequisites to make its full contribution to changing the banking system, both in the world and in Serbia. The conclusion is that all research activities are aimed at the maximum use of all the available potential of Blockchain, which is a good support for financial systems in the future. The implementation of Blockchain in financial infrastructure can solve some financial issues much more efficiently than existing financial systems.

Research shows that the comprehensive transformation of the financial industry brings with it major changes in the regulatory sense, which requires the development of comprehensive and precisely defined legal regulations, especially in the open banking sector, given that digitization and the widespread use of information technologies bring numerous risks related mainly to Internet security. Special attention should be paid to the security of the entire system, especially in the segment of protection against hacking. The challenge of creating effective protection has yet to be faced and adequate solutions have to be sought.

Blockchain technology still faces various challenges and shortcomings today, but it is still the most promising technology in the banking and financial sector with the tendency to become the leading technology in the banking sector.

So the future of blockchain technology can only be brighter [1].

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