Fintech Applications in the Financial System: Risks and Opportunities[1]

Finans Sisteminde Fintek Uygulamaları: Risk ve Fırsatlar

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Ö Z E T

Dünya ve Türkiye ekonomisinde son dönemde finans piyasalarında yaşanan teknolojik yenilikler her geçen gün gerek bireysel gerek kurumsal ekonomik kararlarda belirleyici gücünü arttırmıştır. Gerek iç piyasada gerek uluslararası piyasalarda finansal teknolojilerde yaşanan hızlı dönüşümler firmalar arası rekabette önemli bir belirleyici haline gelmiştir. Finansal teknolojik yeniliklere ayak uydurabilen piyasa ekonomilerinde finansman çeşitliliğinin arttığı ve finansal kaynaklara ulaşmanın önündeki engellerin azaldığı görülmektedir. Artan finansal derinlik ve uluslararası rekabet finansal teknolojilerin önemini daha da arttırmakta ve Fintek'lerin ekonomik belileyici rolü her geçen gün daha da önem kazanmaktadır. Bu kapsamda çalışmada son dönemde özellikle finansal teknolojiler (FİNTEK)'de yaşanan dönüşümler, finansal teknolojik yenilikler ve araçlar araştırılmış ve ilgili araçlarda yaşanan gelişmelerin ekonomik aktörlere sunduğu fırsatlar ve riskler tartışılmıştır.

A B S T R A C T

Recent technological innovations in the financial markets in the world and Turkish economy have increased the determining power in both individual and corporate economic decisions. Rapid transformations in financial technologies in both domestic and international markets have become an important determinant in competition among firms. In market economies that can keep pace with financial technological innovations, financing diversity has increased and the barriers to accessing financial resources have decreased. Increasing financial depth and international competition further increase the importance of financial technologies and the economic determinant role of Fintechs is becoming more important day by day. In this context, this study analyses the recent transformations in financial technologies (Fintech), financial technological innovations and instruments, and discusses the opportunities and risks offered to economic actors by the developments in the related instruments.

INTRODUCTION

The diversity of this technology began to gain momentum as contactless and electronic payment needs became more evident due to social distance intervals and closure payment interruptions during the pandemic. Technology and innovations are applied rapidly in financial systems where competition is quite high. Cloud Information, Artificial Intelligence, Machinery Learning, Deep Learning, Block Chain, Mobile and Digital Payment Technology, Smart Conventions, Banks and financial institutions using these new technological tools such as reduced transaction procedures aim to provide low cost and cost services.

The failure of the operation of the current financial system has become visible with the 2008 global crisis. Trust in traditional banks has started to decrease considerably and therefore the new order for the financial system has become essential. Thanks to the block chain technology, it has been on the attention of having an intermediary, easy and cheap system, while it provides prevention of these crises. Financial Technologies (Fintech) support the banking sector with many products. Increased mobile devices and computers have accelerated financial services. When supported by legal regulations, Fintech initiatives will develop and increase. Organizations organized by the state give confidence to customers and reduce risks.
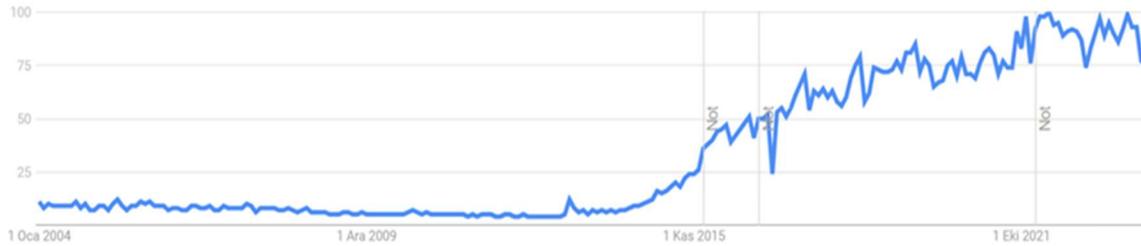
Unlike the traditional system, financial technologies are technologies that make the service to be offered to customers easier and more accessible. From electronic commerce to cryptocurrencies and smart contracts, rapidly advancing technological developments have a positive impact on the economies of countries. Block chain technology, which enables data transfer between machines that communicate with peer-to-peer connection network, has opened the door for many innovations. In this context, in the study, the course and economic effects of digital transformation in Türkiye's economy, which gained momentum in the 2000s, will be analysed.

1. THE CONCEPT OF FİNTECH, HİSTORİCAL DEVELOPMENT AND TECHNOLOGİCAL MODELİNG APPLİED İN THE FİELD OF BANKİNG

The concept of Fintech is defined as organizations or products that offer innovative, complementary and accelerating business models and numerical technologies. Future finance businesses with hardware, software, mobile applications and technologies that improve and accelerate. It is a product that offers more easy and faster service to its customers with a more affordable cost and provides services to large audiences (Ernst & Young, 2018). Fintech technology has included the system at a low cost for those who cannot benefit from the system (Arner, Barberis, Buckley, 2016). It enables individuals and companies to manage their financial transactions quickly and efficiently by using private investments and algorithms. Mobile, insurance, crypto, virtual reality products such as Fintech is a rapidly growing application.

Since classical financial systems are based on a human-oriented working system, they may not be able to reach the high speed and ease that is required by the age. The delay in payment and financial transactions can cause serious problems in the business world. Fintech, which fulfills the financial needs of individuals and businesses with artificial intelligence-based applications, makes the world of finance unlimited and expands its possibilities.Financial institutions and banks aim to reduce process procedures, reduce costs and increase security with high technological arguments such as block chain, cloud computing, artificial intelligence, scattered notebook technology, machine learning (Demirdöğen, 2019). Financial Technologies, which were based on the 1990s, was influenced by the development of innovative formations in the functioning of global finance due to important events such as global finance and Covid-19 epidemic 2008 and contributed to the development of the concept of Fintech. In the relevant literature, it is seen that the interest in Fintechs is increasing day by day and financial technologies are replacing many traditional transactions.

Figure 1. Number of Scanning the word "Fintech" on the Internet

Source: Google Trend (30/11/2023)

As seen in Chart 1, interest in financial technologies has increased after 2015 and economic actors are making more searches for financial technology and related technological products in search engines. Also the interest in financial technologies is

increasing every day and to be able to respond to the expectations and needs of economic actors on behalf of Fintech it is observed that experienced a rapid transformation.

1.1. Fintech 1.0

It is the period between 1866 and 1967, when financial applications were made manually and included the transition to digital applications. This period is the first period for transition from manual to digital. After World War I, the establishment of communication with the use of technological infrastructure and payment systems has become widespread rapidly. During this period, developed countries began to computerize and establish the necessary infrastructure. These developments have revealed the need for connection and digitalization (Erden, Topal, 2021).

1.2. Fintech 2.0

It is the period covering the 1967 and 2008 years when the technologies used for products and services, communication and commercial transactions offered in the financial sector started to digitize. With the digitalization of technologies in the field of commercial transactions and communication, it has started to digitize in financial services and products in the field. In addition to the use of credit cards and ATMs, which are the most important products of the relationship between finance and technology, internet banking applications are the first step towards digitalization. ATM and Credit Card are prominent products of digitalization in the financial field. Massively usage of Internet paved the way for the spread of financial digitalization (Arner, Barberis, Buckly, 2016).

1.3. Fintech 3.0

The process since 2008 is called Fintech 3.0. Fintech began to form and mature in response to the global crisis in 2008, in line with the need to reduce costs, provide transparency, and access industry intermediaries and financial wisdom. Developing technology makes the information used more efficiently and helps to create many progressive financial products. Fintechs has produced many new models and services created in digital environment with new applications for businesses (Leong&Sung, 2018). Increased financial product type and the number of participants and the growth of the market have brought various risks. The transition from bank -based financial system to market -based system has caused a structural change.

The financial fluctuation in the USA in 2007 caused great problems in the banking sector. False calculations and incomplete inspections in the risk calculations of derivative products have become a global liquidity crisis and the crisis in 2008 resulted in the bankruptcy of many large banks. In order to compensate for the insecurity environment in the financial system, restructuring steps have begun to be taken (Pollari, 2016).

Fintech has put the opportunity to the customers with a lower cost -effective, transparent platforms with a good designed interface applications for well -designed interfaces (Menat, 2016). Digital, interactive and personalized products and services, especially preferred by new generation customers, have been developed (Temelkov, 2018). Traditional banks have changed their old systems with technologies such as artificial intelligence and cloud information and became big Fintech companies. Despite its many disadvantages such as lack of personnel and insufficient infrastructure, Türkiye is more developed and adapted in the use of Fintech compared to other developed countries (Genç & Küçükçolak, 2020).

2. FINTECH MODELING APPLIED IN FINANCIAL MARKETS

2.1. Smart Contract Technology and Banking

Smart contracts implement transactions that are not directly related to legal contracts, but agreed upon by the parties, with programmed commands. Smart contracts with addresses created via the blockchain cannot be modified after they are included in the blockchain (Buterin, 2014). It would be more appropriate to use for short -term transactions since there is no different structure on smart contracts and the processing of processing cannot be stopped (O'hara, 2017).

Smart contracts are fast and low-cost computer programs that carry out the agreements and transactions of the parties consistently and reliably, do not require a legal system and a central authority that cannot be changed retrospectively. The parties' agreements are prepared and cryptographically uploaded to the blockchain. The uploaded contract works by interacting with the blockchain and other combinations, starting the transaction, delivering and sending information (Yıldız, 2019).

The reason why smart contracts are high safety is due to the encryption of the software algorithm and kept in scattered notebooks. Smart contracts is buried in block chains and the intervention of third parties is prevented (Tevetoğlu, 2021). This increases security further. Users make specially created cryptographic codes that support open key cryptography. Its decentralized database and automation ensure the security of the parties. Block chain technology is very effective in crypto currencies as well as many areas such as electronic commerce. Smart contracts developed on Ethereum have enabled blockchain technology to be reconsidered and advanced. There is no need for a relationship of trust when making a contract and there is

no uncertainty in the parties' performance of their actions. When the conditions of the contract are met, the action is expressed automatically (Tevetoğlu, 2021).

In order to prevent loans from becoming problematic, banks use artificial intelligence-based applications, examine the customer's basic financial statements, detect the problem the customer will experience in advance, and take precautions is of great importance in credit management (Ceran, 2019).

2.2. Deep Learning Models and Banking

The subset of machine learning (ML) in which algorithms (artificial neural networks) modeled after the human brain learn from a large number of data is called deep learning. Deep learning consisting of a series of algorithms that try to learn at many levels is the sub class of machinery and artificial intelligence (Deng, Yu, 2014). By configuring the neurons in the neural networks, learning is performed with a large number of data. Learned new data are processed with deep learning model. Deep learning models analyze the information they receive from many data sources in real time without human intervention. As the number of layers increases in the deep learning model, the depth of the model increases. Because the deep concept is measured by consecutive layers (Altunbaş, 2021).

The secret layer is located between the input layer and the output layer, and contrary to the basic nervous network of one or two layers, hundreds of hidden layers can be found in the deep learning network. Although it requires more calculation and parameters, the accuracy of the network increases in direct proportion to the increase in the number of layers and nodes. As the number of hidden layers increases, it performs more complex data classification. The more data are trained with deep learning algorithms, the more accurate information is obtained. The size of the data given to the input layer in the created network model is very important for the success of the network. Very large data will lead to complex processing power and memory needs. If One wants to create a fast and successful model, the calculation cost and model success should be used for success (Özkan, İlker, 2017)

In deep learning, which is the most appropriate and good for education models, graphic processing units process multiple calculations at the same time. In this respect, it directs artificial intelligence (AI) technology. It has a huge place in our daily lives, such as the internet environment, the use of mobile phones, application software, facial recognition applications, and speech recognition on smart speakers. The deep learning method, which is composed of many layers of processing, which is a sequential representation system and based on machine learning, is used in areas that produce too much data. The use of deep learning method in areas such as language education, biomedical, autonomous systems, image and sound transfer and transportation is very common (Lecun, 2015). The deep learning algorithm, which has achieved as much success as humans in the field of facial recognition, has proven its importance in extracting high-level visual features (Sun, 2014).

The areas where the deep learning model is widely used in the finance and banking sector (Olorunnimbe &Viktor, 2023);

- • The trade strategy applied for purchase and sale of a stock traded on the stock exchange,
- • Selection and managing the portfolio of a group of financial assets for long-term income,
- • The fact that market data remains under market scenarios creates market simulation,
- • Evaluating and managing risks in investor purchase and sale transactions that want to increase their earnings
- • Minimizing the risk by using the risk protection strategy by taking the opposite position in different assets.

2.3. Mobile Payment Apps and Digital Wallet

The digital wallet, which is kept in the safe storage areas of the bank and credit cards, is a tool of online payment through the application without entering card information to pay and physically carrying the card. For payment made with a digital wallet, details are transferred from your bank to the seller via software. It has high security applications such as advanced encryption techniques, two-factor authentication, one-time PIN code and fingerprint usage.

Digital wallets can be kept in the wallet in important documents as well as being a payment tool. This provides regular, fast and easily accessible opportunity for the customer. Many products such as boarding cards, reservations, concert tickets, gift cards, loyalty awards, credit and debit cards can be stored in the digital wallet (Yapıkredi, 2022).

The contributions of the digital wallet to the sector (İşbank, 2020):

- It offers the opportunity to shop safely with high security structure.
- It can keep its budget and expenditures under control with a digital wallet.
- It can pay quickly, easily and practically with the card it selected from the cards in the wallet.
- It can also store various documents .
- It is used to reduce costs in small valuable transactions and has eliminated the necessity of face-to -face payment (Kirmaban, 2005).
- It saves a large number of cards and money to customers from the obligation to carry.

Usage of the close area communication technology that emerged in 1990 was presented to use in Türkiye in 2011 (Baydur, 2011). While mobile devices have served as wallets for consumers, they have served as cash registers and card readers for merchants (Fortune, 2012). Unstoppable electronicization is seen as an opportunity for payment systems and should be evaluated in the best way (Zengin & Güngürdü, 2013).

2.4. Digital Money and Banking

Internet-based currency that does not physically exist is called digital money (technological money). In addition to its unique features, digital money used in the virtual environment also has features of traditional money such as value, acceptability, trade, accumulation and lending (İşbankası, 2023).

- Digital money, which uses computer files instead of paper money. Virtual money, which is very difficult to copy and steal due to its encrypted structure, is very safe.
- Digital money used on the internet provides fast and convenient payment.
- Transactions such as shopping, bill payment and money transfer can be carried out with digital money, which is the most important example of money in bank deposits.
- A real user ID is needed to transact with digital money.
- Digital currencies have a central structure and digital currencies are official currencies.
- Like gold and silver, its value does not change when melted, it does not carry its value, nor is it a document held in trust in exchange for a precious metal.

The first payment transaction on the network created in the first phase of the Digital Turkish Money Project, led by the Central Bank of the Republic of Türkiye, was successful (CBRT, 2022). Central banks of many countries have also started initiatives for digital money. The currencies that are used for physical gold are used as the '' price 'unit over time and receive their power from the confidence given to authorities such as central banks by their users (Turpin, 2014). Fast-advancing technology and new business models have created many new payment products that reduce the use of cash, especially in retail. Innovations create great potential for changes that may occur in the payment system (Fung, Halaburda, 2016).

Banking is one of the sectors most affected in the rapidly digitalizing world order. Customer demands and expectations also change with changing and developing technology. Digital Transformation has reduced costs, improved customer experiences, increased productivity. Financial technology companies that provide customer -oriented products and services have increased competition in technological transformation in the banking sector (Akın, 2020).

Accurate definition of the requirements by which digital money will gain functionality and strengthen by being integrated into the system is the basis for achieving the goal. It is aimed to increase efficiency in the procurement process.By integrating the Digital Turkish Lira with existing and new financial technology, the growth of the financial technologies ecosystem increases the efficiency in the sector, contributes to potential growth, strengthens the competition to become a global financial technologies center, and makes decision making by contributing to data analysis with data-oriented cryptology, artificial intelligence and machine learning, where personal data is protected. In addition, with the smart payment system, money transfer and payments will be made more effective and practical with tools such as the economy of objects and invisible economies, while making your transactions less costly and safer. It will be possible to make payments in the digital money programmability layer with contract templates containing payment interfaces and smart payments feature. While the central bank issues the money, financial intermediaries distribute it, showing the two-layered structure of digital money. While the use of the abstraction layer makes the Digital Turkish Lira Project modular, it also reduces the cost of easy replacement of parts that work independently of each other (CBRT, 2023).

2.5. Electronic Banking

In the process that started with the development of telephone banking and ATM transactions and continued with the development of the Internet, banks and customers have gained great advantages (Ojeka&Ikpefan, 2011). Many transactions such as mutual funds, foreign exchange, stocks, account management, financial services, lending, deposit collection, electronic bill payment, repo, bonds and bills, gold, VOB are carried out through internet banking (BAT, 2012).

Electronic banking, which improves the market for banks' activities such as deposit collection and lending, and strengthens competition to promote existing and new products and services, offers these opportunities at lower costs (Committee, 1988). Banks should adopt the efficient technology possibilities they use to the customer and include the customer in this technological development, otherwise the success of the banks does not seem possible.(Quren&Singer, 1998).

Technological developments have had a significant impact on both the number of bank employees and their qualifications. New branch openings are decreasing and the qualifications of employees are changing. Open banking, mobile banking, internet banking, ATM and Kiosk devices are all kinds of electronic distribution channels through which remote banking transactions can be performed. Benefits of electronic banking to the system (BAT, 2003):

- Productivity potential exists
- Increases economic prosperity
- Makes banking easier and more efficient
- It includes those who do not have access to the financial system.

2.6 Internet Banking

In 1962, Licklider at the Massachusetts Institute of Tecnology, one of the biggest universities in the USA, introduced the concept of "internet" for sharing programs and data on a global scale. One of the important products provided by information technologies in banking activities is internet banking (Singer, 1996). In internet banking, the target group of customers who benefit from retail and corporate banking services receive many services in addition to banking transactions. Customers can perform many transactions such as credit card statements, electronic fund transfers, bill payments, time and demand account transactions from their location (Ertürk, 1999). In 1998, Egg Bank in the UK provided services only over the Internet (Korkmaz & Gövdeli, 2005). In Türkiye, the first İşbank provided Internet banking services in 1997.

The benefits of internet banking: (Coşkun, 2012)
- It realizes banking transactions without going to the bank, without waiting in line, with no cost, cheap and fast.
- Access to detailed information and reports.
- Since no one, including bank staff, can see it, it can make more confidential and secure transactions.

Many transactions such as mutual funds, foreign exchange, stocks, repo, bonds and bills, gold, and VOB can be made through internet banking (BAT, 2012).

2.7. Cryptocurrency, Blockchain Technology and Banking

As a virtual currency that does not physically exist, cryptocurrencies are similar to digital currencies in this respect. The most important feature of cryptocurrencies, which are highly secure encrypted cryptocurrencies, is that they are not subject to a centralized structure and are not subject to any government regulation.

To summarize in this context, cryptocurrencies (Kuveyttürk, 2022);
- Transactions made with cryptocurrency are tracked and recorded.
- Unlike digital currency, cyryprocurrency does not need a real ID in order to make a transaction.It even keeps the IDs anonymous
- Cryptocurrencies have a stronger security system against cyber-attacks, thieves and copying with blockchain technology.
- What cryptocurrencies can do and their validity depends on the innovations that will take place

Cryptocurrency, which emerged in opposition to traditional money, which is centrally coordinated and less transparent, has a structure that is decentralized, has transparency and operational security, has information systems such as cryptographic algorithms, and is far from the infrastructures of the traditional financial system (JAKUB, 2015).

On the other hand, the financial sector, which is the sector that has received the fastest share of digital transformation, is experiencing the most important transformation in digitalization and blockchain technologies (Palabıyık, Başol, 2020). Blockchain, a decentralized ledger of data that is securely shared, can aggregate, integrate and share transaction data from a cloud service. A blockchain is a distributed ledger with a number of blocks of information that are securely chained together. It consists of four factors: block, peer-to-peer network, distributed ledger technology and consensus mechanism (Karaköse, 2017)

- Layer block: a structure where data is stored, arranged in a linear chain as data is added.
- Layer peer-to-peer network: this is the layer that makes the blockchain secure and funtion stable. Each user is equal and used as a peer. Users can benefit from the resource while providing resources on the one hand (Durukal&Öztürk, 2019).
- Layer Distributed ledger technology: there is no need for intermediary organizations and devices to provide the desired trust environment. Copies of information are stored on devices that are registered in the system.
- Layer consensus structure: the rules that the elements within the system are obliged to follow and their functioning processes (Durbilmez&Türkmen, 2018).

2.8. Machine Learning and Banking

Arthur Samuel, a pioneer of artificial intelligence and computer games, introduced the concept of machine learning in 1956 (Samuel, 1956). The performance measure of a computer program is symbolized as "P", the task class as "T" and the experience as "E". When the performance in the task class "T" is improved with the experience "E" as a result of measuring "P", it shows that the experience "E" has been learned (Mitchell, 1997). It has two main purposes: to classify data according to the models that develop it and to make predictions for future outcomes with these models.

Machine learning, a subset of artificial intelligence, aims to improve the computer through experience rather than programming it to learn and teach from data. In machine learning, algorithms are trained to make decisions by making the best prediction in

analyzing correlations and patterns of clusters of large sets of data. Increasing the amount of data accessed in the machine learning model increases accuracy and provides improvement by applying it. Machine learning algorithms do not process data but start to use it to learn and own it without any support or intervention. Machine learning aims to give computers the ability to make rational decisions based on data by detecting complex patterns. Machine learning algorithms enable computers whose tasks are not clearly defined to fulfill them by learning from the data provided (Alpaydın, 2020). It includes computers with the ability to acquire their own knowledge by extracting patterns from data using algorithms.

Machine learning model is argued to be successful in predicting corporate bankruptcy (Barboza, 2017). With this model, banks will be able to predict the default of the institutions to which they extend loans. Credit scoring, which makes an important contribution to credit risk analysis, provides the fastest service to the customer by categorizing whether the customer applying for a loan is good or bad and minimizing the cost (Chen, 2019). There are two types of scorecard models: statistical and machine learning methods. Machine learning algorithms are more preferred than statistical models (Wang, 2011).

Machine learning applications are being used in areas such as the impact of central bank announcements on the market, predicting bankruptcy risk and failure, determining bank risk culture, identifying the determinants of debt financing in businesses, predicting stock returns, and preventing money laundering and terrorist financing (Marne, 2021).

2.9. IoT Technology and Banking

In 1999, Ashton first mentioned the concept of the Internet of Things (Ashton, 2009). The Internet of Things, which has a very broad meaning, is the transformation of objects with all kinds of sensors, monitoring devices, access devices into smart objects that can be controlled from anywhere in the world.

The condition of singularity of objects is provided by the transformation of objects into unique entities with the use of "IPv6" (IPv6, 2021)

The Internet of Things, one of the pioneers of next-generation technologies that enable devices to operate robotically and consciously, automates and smartens objects and enables them to be controlled and supervised remotely via the Internet (KuveytTürk, 2023). Benefits of the Internet of Things (İşbankası,2020):

- The overall workflow can be closely monitored,
- It saves time and costs and increases revenue,
- Increasing the productivity of employees
- It creates the opportunity to improve customer experiences,
- It gives the opportunity to take precautions by anticipating problems and errors.
- It is an opportunity to re-evaluate methods and develop new strategies,
- Every stage of the supply chain can be observed and controlled in the most detailed way.

It is the ability of objects that can be connected to the Internet to communicate with each other. The main factor in the internet of things is the internet. Devices equipped with sensors that have the ability to collect, communicate and process data can exchange data and interact over the internet (Erturan&Ergin, 2017):

- Queueing: the mobile app and sensor on the smart device will recognize when the customer enters the bank branch and immediately queue and notify the customer.
- Personalized campaigns: customers who are detected by sensors to be at certain campaign points or bank branches will receive a campaign notification.
- Smart ATM: At the ATM equipped with the Internet of Things, which aims to provide easy and fast service to users, they can use unencrypted cards, withdraw and deposit money from the mobile wallet via smartphones.
- Wearable devices such as rings, bracelets and watches equipped with IoT technology can make fast and secure cardless payments with NFC technology (Ener, 2015)
- Smart wallet: It shows financial status, manages budgets, pays bills automatically, and can make payments with NFC and QR code technologies.
- Data analytics and fraud prevention: sensors that track customer habits, spending and behavior can be used to detect fraud incidents, providing customers with a safer experience (Hussein, Bayati, 2016)
- ATM and branch management: ATM status maintenance needs, cash levels, customer density, etc. can be monitored with sensors to increase service efficiency.

3. CONCLUSION

The recently accelerated technological transformation has also affected the financial markets and offered new opportunities to economic actors in valuing their savings. However, financial technological transformation brings some opportunities as well as some risks. In developing countries such as Türkiye, the level of financial literacy is not at expected levels. The fact that the level of financial literacy of economic actors is below the expected level brings some risks to the expected level of income from the current fintech transformations.

Fintech transformations can positively/negatively affect individual savings as well as the macroeconomic performance of countries

In the study, Kaya (2019) investigated the effect of fintechs and thus artificial intelligence applications in EU member countries on banking return on assets of artificial intelligence patents with panel regression analysis in the period between 2010-2015. Return on assets (ROA) of the banking sector of each country is selected as the dependent variable of the model. In the study, macro factors such as GDP growth and inflation affect bank profitability with a ratio of 2/3, while Cost/Revenue, Equity/Assets and Non-Performing Loans explain ROA change by 0%, 0% and 30%, respectively. In addition, it is concluded that artificial intelligence patents statistically positively affect ROA and explain the change by 7%. The high-capacity, fast data collection and fast computing patents of artificial intelligence have effects far beyond artificial intelligence. In the study, it was concluded that artificial intelligence applications have a positive effect on increasing bank profitability by using it more strongly in certain fields and information technologies.

Ceran and Ergün (2019) made financial failure prediction in banks with the artificial intelligence neural network model in their study, linked the problematic loans to the financial failure of the enterprises to which loans were extended, and ratios such as balance sheet and income statement, which are financial data for this determination, were included in the analysis. Modelling with artificial intelligence neural networks has been more successful in predicting financial failures compared to other analysis methods. They concluded that the credit method will be more effective by detecting financial failures in advance and increasing the measures to be taken before the loans become problematic.

Taştan and Oralcan (2019) analysed the technological and economic determinants that cause fintech initiatives in the world. They concluded that the fintech ecosystem is stronger in countries such as the USA and the UK than in other countries. They also concluded that increases in unemployment rate, number of ATMs, number of scientific and technical journal articles, bank cost income ratio, innovation, financial depth and labour market efficiency positively affect fintech initiatives.

Aksoy and Boztosun (2020) established a model with 25 independent variables consisting of financial ratios (liquidity ratios, leverage ratios, efficiency ratios, stability ratios) and 4 variables not based on financial statements, totalling 29 independent variables in order to predict the financial success and failure of 126 enterprises operating in the BIST manufacturing industry sector. The relevant variables were predicted by ANN (NN), C5.0 classification algorithm, classification and regression trees (CART) analysis for predicting the financial success and failure of 126 enterprises operating in the BIST manufacturing industry sector, and as a result of the analysis, it was concluded that the CART model was the model with the most successful classification accuracy in predicting the financial success/failure 1,2,3 years in advance.

Karaçayır and Afşar (2021) analysed the number of bank branches, GDP, number of account holders, number of mobile banking customers, inflation, unemployment rate, number of ATMs, individual internet usage variables on the basis of panel data model to investigate the technological and economic factors affecting fintech investments between 2006 and 2019 in a total of 30 countries including EU member states and Türkiye. According to the findings obtained from the study; there is a negative and statistically significant relationship between the number of bank branches and fintech investments. There is a positive and statistically significant relationship between the number of account holders and GDP and fintech investment amount. It has been determined that there is no effect between inflation and unemployment rate and fintech investments. Fintech, which has 2 branches as finance and technology, has many areas such as artificial intelligence, data, analysis, cloud computing, machine learning and cyber security in the technology part. Since the technical details are within the scope of engineering, only financial aspects are considered in the study. A high correlation was found between internet usage and account holder variables. No correlation was found between the number of ATMs and fintech investments.

The relevant literature and analyses show that Fintechs are effective in both individual and corporate investment decisions, that the developments in fintechs offer opportunities to economic actors in investment decisions on the one hand, while bringing along some systematic risks on the other hand, and that they have noticeable effects on increasing the economic performance of both institutions and countries. In addition, it has been observed that the decisive role of artificial intelligence-based applications in decision-making processes in the measurement of market and firm failures is increasing day by day. In this context, policy makers' pioneering the firms in both fintechs and artificial intelligence-based technologies that form the infrastructure of fintechs and gradually increasing the incentives for related technologies will play a decisive role in the capture of the financial transformation era.

AUTHOR DECLARATIONS

Declarations of Research and Publication Ethics: This study has been prepared in accordance with scientific research and publication ethics.

Ethics Committee Approval: Since this research does not include analyzes that require ethics committee approval, it does not require ethics committee approval.

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