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The Effect of The Digitalization Process on The Banking Sector

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The Effect of The Digitalization Process on The Banking Sector*

Yusuf Tuna
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Abstract

With the rapid progress of technology day by day, especially the banking sector within the financial sector follows these developments very closely and has entered the process of continuous development and transformation by making use of the technological infrastructure and opportunities at the highest level. The concept of fintech, which came out as a result of the combination of the financial services sector and technology, has taken banking out of the traditional structure. With the emergence of the concept of open banking, giving the control of customer data to customers again came with competition, digitalization and transparency in the sector. In the study, an assessment on the impact of the pandemic on the digitalization of the banking sector and the future of banking was held by including the effects of digital technologies on the banking sector, fintech concept and open banking issues.

Keywords: Open banking, API, PSD2, FINTECH

Jel Code: G290

Dijitalleşme Sürecinin Bankacılık Sektörüne Etkisi

Öz

Teknolojinin her geçen gün hızla ilerlemesi ile birlikte finansal sektör içerisinde özellikle bankacılık sektörü bu gelişmeleri çok yakın takip etmekte ve teknolojik

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altyapı ve imkanlardan en ileri seviyede faydalanarak sürekli gelişim ve dönüşüm sürecine girmiştir. Finansal hizmetler sektörü ile teknolojinin bir araya gelmesi sonucu ortaya çıkan fintek kavramı bankacılığı geleneksel yapının dışına çıkarmıştır. Açık bankacılık kavramının ortaya çıkmasıyla beraber müşteri verilerinin kontrolü yine müşterilerin kendisine verilmesi sektörde rekabeti, dijitalleşmeyi ve şeffaflığı beraberinde getirmiştir. Çalışmada dijital teknolojilerin bankacılık sektörüne etkileri, fintek kavramı ve açık bankacılık konularına yer verilerek pandeminin bankacılık sektörünün dijitalleşmesine etkisi ile bankacılığın geleceği hakkında değerlendirme yapılmıştır.

Anahtar Kelimeler: Açık bankacılık, API, PSD2, FINTECH

Jel Kodu: G290

1. Introduction

The banking and finance sector is always one of the leading sectors in the use of technology. With digitalization, ensuring the rapid access to information, the increase in the use of smart phones, and the spread of mobile applications, products and services in the banking sector have been constantly diversified and access to services has become easier. With the increasing competition in the market, industry players are competing to not lag behind their competitors by closely following the technology and producing quality products and services with digitalization. It has become a financial burden for banks to change their infrastructure in accordance with the ever-changing technology. At this very point, Fintechs aim to provide banks with fast and effective solutions in the areas they need. The products and services developed as a result of Fintech activities have started to drive payment services, especially traditional bank customer relations, to an irreversible change. Open banking applications have led to the transfer of traditional banking activities to platforms by accelerating the emergence of personalized products and services. In the study, artificial intelligence, cloud computing, big data, robo-advisers, internet of things and blockchain technologies, which are closely related to the banking sector, were evaluated by being associated with the banking sector. The effects of Fintechs and open banking applications on the banking sector are explained. Finally, the effects of the pandemic on digitalization in the banking sector were discussed.

2. Aims

The aim of the study is to evaluate artificial intelligence, cloud computing, big data, robo consultants, internet of things and blockchain technologies, which are closely related to the banking sector, and to explain the effects of fintechs and open banking applications on the banking sector.

3. Conceptual and Theoretical Framework/Literature

Effects of the Digitalization Process on the Banking Sector

The first debit card used in the banking sector was introduced in 1946 by Flatbush National Bank under the name Charge-It developed by John Biggins (Paytry, 2020). Cash Dispenser, the first known application of digitalization, was launched by Barclays Bank in England in 1967. The Cash Dispenser system has emerged as a system that allows cash to come into the customer's account without going to the bank and allows the use of a punch card, unlike today's applications (Korkmaz and Bodily, 2005). This system is also accepted as the first application of ATM devices that have been used since 1983 (Yurttadur and Süzen, 2016). With the spread of the internet worldwide since 1995, telephone banking applications have been replaced by internet banking. The first use of internet banking in Turkey was introduced in 1997 by İşbank. Due to the rapid adoption of this system by customers, Garanti Bank also introduced the application in the same year. With the invention of smartphones, in 2007, the first mobile banking application was launched by İşbank (Beybur. 2021).

Today, however going to the bank to carry out banking transactions is not preferred by most people. The ease of access to the internet by people, money transfers, payments, account monitoring, etc. enabled many transactions to be made via internet banking and mobile banking (PWC, 2020). With the digitalization process in the banking sector; open banking, digital bank and blockchain concepts have become spoken following credit card, telephone banking, internet banking, mobile banking, fintech (Beybur, 2021).

The importance of increasing customer experience in the banking sector, the ability to make transactions easily and quickly with mobile applications and global digital banking systems with credibility continue to grow and develop. The global digital banking platform market is projected to reach 9

billion US dollars by 2026. According to Research and Markets' Global Digital Banking Platform report published in 2020, the market is expanding with a compound annual growth rate of 16% (Participation Banks Association of Türkiye, 2021).

Digitalization has advantages for banks such as efficiency, cost advantage, presence, competition and agility (Sharma, 2017). Conducting traditional banking transactions face-to-face causes transactions to be both slower and more costly. For example, with the FAST (Instant and Continuous Transfer of Funds) system, which began to be used in 2020, fund transfers are enabled to be made at any time during the day. Customers can make their payments quickly, contactless and practically via FAST by scanning the QR code offered by the workplace with their mobile phones (TKBB, 2021).

It attracts attention with its features that banks can log in faster, easier and more securely without using a password with eye scanning technology via smartphones. In addition, they are trying to satisfy their customers with features such as fast withdrawal from ATM with QR code and direct connection to the call center. While banks offer smart solutions, their needs-oriented analysis also comes to the fore. Responding to customers' demands becomes easier with analysis. Thanks to artificial intelligence, chatbots and voice recognition technologies are being reformatted to respond to customers much faster (Garanti BBVA, 2019

4. Research Scope

Issues That Have Become Important in the Banking Sector with Digitalization

Artificial Intelligence

Artificial intelligence is performing the abilities such as thinking, comprehending, analyzing, coming to conclusions and making decisions and etc., unique features of humans, through machines. With artificial intelligence, the actions that people can do with thinking have been tried to be imitated by machines. It is expected that machines can react in the same way as people react to the events and situations they encounter in their lives (Ercan, 2021). It is the English mathematician, computer scientist and

cryptologist Alan Mathison Turing (Turing, 1948), who came up with the idea about artificial intelligence by asking the question "Can machines think?" for the first time.

Machines' learning, neural network, natural language processing, fuzzy logic, deep learning evolutionary computation and hybrid artificial intelligence technologies are introduced in practice with increasing types of unmanned aerial vehicles, facial recognition technologies, text editors, search and advice robots, self-driving cars or systems such as patient diagnosis, treatment method, chatbots, digital assistants, etc. (Pannu et al. 2015). The introduction of similar suggestions to an item of interest on the internet that we have previously looked at with our mobile phone, diagnosing a disease based on a patient's data, determining a treatment method, learning the routines of people living in smart homes and automatically making compatible commands to them on their own (Ercan, 2021).

The main articial intelligence techniques are applications such as expert systems, natural language processing, image processing, sound processing, vision, comprehension, artificial neural networks, robotic and emotional systems and etc. Expert systems are a constantly evolving and rapidly spreading technology that has a very important effect in every aspect of our lives. With machine learning, neural network, natural language processing, fuzzy logic, deep learning, evolutionary computation and hybrid artificial intelligence technologies in application of unmanned aerial vehicles, face recognition technologies, text editors, search and recommendation robots, self-driving cars or patient diagnosis, treatment method, chatbots, digital assistants and related systems appear in increasing varieties (Pannu vd., 2015). Some examples can be given as; making suggestions similar to an item we previously looked at with our mobile phone and interested in on the internet, diagnosing a disease based on a patient's data, determining a treatment method, the devices in smart homes learning the routines of people living at home and automatically making commands compatible with them (Ercan, 2021).

According to the "Banking Technolog Vision 2017" report prepared by Accentura research firm with the participation of 30 countries and 589 bank

executives, it is referred that artificial intelligence is not a new concept in the banking sector and that banks use artificial intelligence for efficiency, accuracy and cost advantage. In the study, 67% of bankers consider the reason for investing in artificial intelligence as a cost advantage. Banks think that articial intelligence investments will give them the opportunity to earn higher incomes (Banking Technolog Vision, 2017). By using these technologies, banks can identify risky customers, take investment opportunities and detect fraud transactions with cyber monitoring technology (Candemir, 2020).

Giving an example of artificial intelligence application from the banking sector; Turkey's first voice assistant UGİ, which Garanti BBVA launched in 2016, has been renewed and has now started to provide support in banking transactions by correspondence with UGİ 2.0. People carry out banking transactions by corresponding with UGİ 2.0 where they do not want to receive service by talking. This renewed system can rightly guide people by better understanding them. The application was used 53 million times by 4.6 million customers from 2016 to the end of 2020. UGİ 2.0, which is increasing in use every year, has more than 400 thousand individual users on a monthly basis (Garanti BBVA).

Artificial intelligence today is one of the most important issues which big companies allocate high budgets for by investing in. In addition, scientists write articles about artificial intelligence, conduct continuous research and develop various projects. Although large-scale work has been done with artificial intelligence to date, it is thought that much more can be done in the future due to the unabated progress of technology (Ercan, 2021).

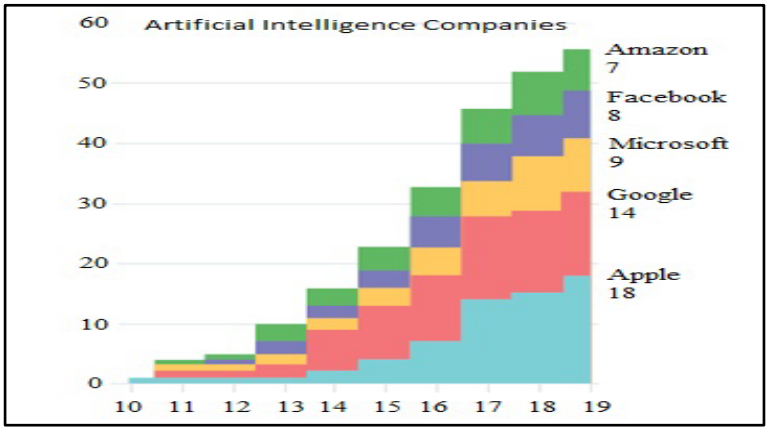

Figure 1. Companies That Have Purchased Articial Intelligence Initiative since 2010

Source: Softtech Inc. 2020 Technology Report

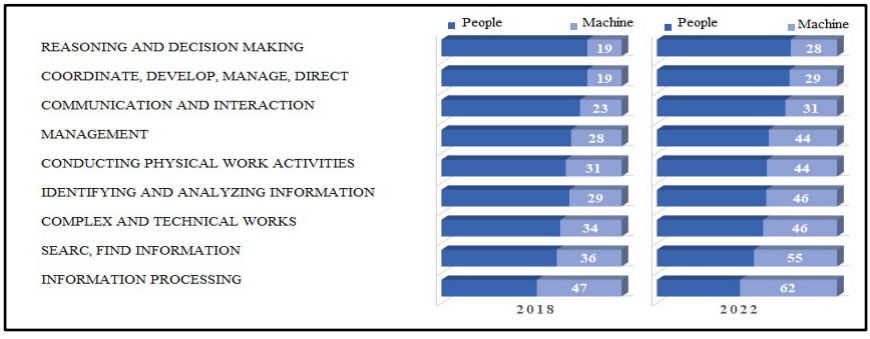

Figure 2. Division of Labor with Machinery

Source: World Economic Forum Future of Jobs Survey, 201

The pandemic process and the Fourth Industrial Revolution we are in are changing business processes, techniques and labor demand in all sectors, creating new sectors and fields of activity. In the "Future of Jobs" survey of the World Economic Forum, the change between machinery and humans in 2018 and 2022 is clearly seen on the above table.

With the development of artificial intelligence technology; in the field of "Information Processing", while almost half of the work was done by machines in 2018, 62% of it is done by machines by 2022. Today, it is envisaged that many professions will change due to artificial intelligence technology, and some professions will be done entirely by machines. The pandemic has accelerated this process of change. Although this table does not mean that all the work that humans will do is done by machines, it shows that many new jobs and sectors will emerge. While technology is advancing at such a rapid pace, it is important for people, institutions, organizations and countries to keep up with this change (Softtech Inc., 2022).

Robo-advisers

The concept of virtual assistant is closely related to the concept of artificial intelligence. Virtual assistants are systems that use artificial intelligence to understand users' demands and search for answers to questions. Virtual assistants are used in many areas such as health, education and facilitating daily life. The advancement of technology and consequent development of artificial intelligence have also led to an increase in the number of virtual assistants (Engin, 2021).

The most well known virtual assistants are Siri, Cortona, Alexsa and Google Now. Those who use virtual assistants can plan their lives by performing time management. Virtual assistants can create a personalized agenda for their users with the natural language structure they use. Thus, a virtual personality is also formed. With this virtual personality, tasks such as sending messages, taking notes, phone calls, internet calls, and calendar events can be carried out. Foreign language education is also provided (Göksel, Canbek and Mutlu, 2016).

Robo-advisers are virtual financial advisers who provide virtual services developed with artificial intelligence technology. The importance of robo-advisers is that with remote access, transactions can be done easily without the need for physical advisers. Undoubtedly, the most important benefit of robo-advisers is that their costs are quite low as they make transactions by replacing physical advisers. It is also preferred by customers due to its ability to be reached at any time of the day.

According to worldwide research, the number of users of digital assistants from 2015 to 2021 is shown as follows.

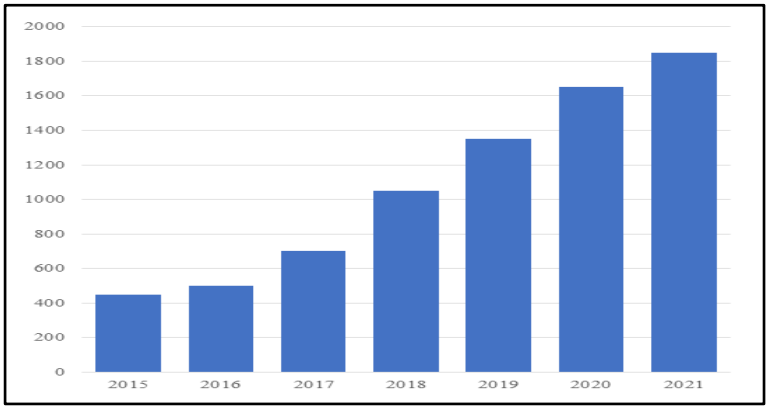

Figure 3. Estimated Number of Users of Digital Assistants Worldwide (million)

Source: Statista, "Digital Asistants – Always At Your Service"

Selim, known as the digital assistant of Kuwait Turk (bank), answered a total of 9,231,992 questions in 3,521,904 communications via website, internet, mobile branch and whatsapp between April 1, 2021 and October 1, 2021. According to the data dated September 30, 2021, Selim achieved approximately 98% success in word recognition (TKBB, 2021).

Internet of Things

The Internet of Things (IoT), which first came out in a speech by Peter T. Lewis in 1985, is that the machines, mobile phones, computers and other objects around us connect to a network over the Internet and exchange data (Sharma, 2016). However, Kevin Ashton was the first to use the concept of the Internet of Things in 1999. Ashton standardly defined the concept of the Internet of Things as "a worldwide wide-ranging network of uniquely addressable objects and the interaction of objects on this network with a specific protocol" (Kaplanseren, 2019).

The development of technology and the continuous expansion of wireless

internet infrastructure make it easier for people to access the internet. Although the concept of the Internet of Things is a concept that is emphasized a lot today, it causes the emergence of technologies that will make people's lives easier by connecting objects with each other. The Internet of Things is encountered in school, hospital, agriculture, home, finance sector, offices and almost everywhere we spend our lives (Ercan, 2021). Along with electronic devices, hospitals, cities, cars and homes are now included in this ecosystem. It is expected that one of the markets that will develop and grow the most will undoubtedly be the Internet of Things (IoT) (GTECH). Today, more than 5 billion consumers interact with data every day. It is projected that this number will reach at about 6 billion (75% of the world's population) by 2025. The reason for these interactions is known to be caused by billions of internet of things devices (Reinsel et al, 2018).

In parallel with this communication network, the sensor market is also developing. It is estimated that approximately 1 trillion sensors will join the network each year in the next 10 years, and approximately 45 trillion sensors will be connected to the network within 20 years (Softtech Inc., 2019).

In the banking sector; it is considered that high-tech products will dominate in the future. BLE (Bluetooth Low Energy) technology, which aims to reduce energy consumption, is used in many devices and there are many new technologies used with this technology. One of them is Baecon technology (Candemir, 2020), which provides location information data using BLE technology. Created in the form of designing Bluetooth technology with sensors, Beacons are one of the most up-to-date products in the field of digital banking. When the Beacon device is associated with an ATM, it is ensured that users are able to recognize them thanks to their smart devices. Likewise, when associated with POS devices, mobile payments are realized. This technology is used in Citibank ATM machines around the world so that customers can log into the system through their smart devices without using their debit cards. Thanks to this technology, Barclays identifies the disabled customers who come to their branches and forwards them to the branch employees and ensures that these customers receive special attention and service. Thanks to the Beacon devices installed in its branches operating in Sydney, St. George Bank has the opportunity to promote special offers and

products to customers visiting its branches (Hürriyet, 2016).

One of the priority issues among the strategic plans of the European Union has been the issue of digitalization. Although the existing band infrastructure seems sufficient, the European Union is creating action plans for increasing internet speed and expanding band infrastructure. Between 2015 and 2020, the European Union is known to have invested €500 million in internet of things research alone. In Turkey, 33% of the total population currently has a basic level of digital skills. When the share of the workforce with digital skills is examined in Turkey, it is known that the rate remains below 50%. Turkey currently has a basic level of digital skills in 33% of the total population. When the share of the workforce with digital skills is examined in Turkey, it is known that the rate remains below 50%. These rates appear to be lower in Turkey compared to the economically developed EU, which incorporates digital growth into its strategic goals and actions. These rates appear to be lower in Turkey than in the economically developed EU, which Although 88% of Turkish households have internet access, according to Ookla's statistics, Turkey ranks 98th out of 177 countries with an average internet speed of 34 Mbps. Although 88% of Turkish households have internet access, according to statistics published by Ookla, Turkey ranks 98th out of 177 countries with an average internet speed of 34 Mbps. In order for IoT and its connectivity to become more widespread in Turkey, new investments are required (Klynveld Peat Mearwick Goerdeler, 2021).

Cloud Computing

Cloud computing can be defined as a system that is ready to be used at any time and provides a network connection to a pool where computer data can be shared instantly (Ebem, 2013). The concept of cloud computing can also be expressed as online information distribution. Basically, it is a service that provides easy access to all information, applications and programs stored in the cloud and owned via the internet. This service, called cloud computing or cloud technology, refers to both the applications provided over the internet and the hardware and software systems that provide these services (Armbrust et al., 2010).

Cloud computing allows a large number of people to work on files and

documents simultaneously. For example, the Google Drive application used by many people provides great convenience and benefit in working life. Since storage operations in Cloud Computing technology are not on the computer, it provides ease of accessing these documents from anywhere at any time over the internet (Sarıtaş and Üner, 2013).

Cloud computing provides advantages to institutions and organizations in many respects. These can be listed as: Cloud computing provides institutions with a system where they can only pay for what they use instead of investing in technologies such as data centers and servers. It helps companies devote more time to their own business rather than dealing with infrastructure, storage, and servers. While new IT resources are made ready for use after weeks of work under normal conditions, this time is reduced to minutes thanks to cloud computing. Applications can be deployed to various parts of the world with a few clicks, providing a better experience for customers at minimum cost (Sofftech Inc., 2019).

Traditional banks, especially the ones that provide 24/7 services with neo-banks through their mobile applications, need to store their data securely. This security requirement has made the cloud computing system the most beneficial and used system of the banking sector. These solutions provide banks and financial institutions with the opportunity to design new service models, make business processes efficient and take advantage of cost (TKBB, 2021).

Cloud computing offers a solution to such organizations which provides ready-made access to the resources they may need and significantly eliminates problems with capacity, procurement, and maintenance of IT infrastructure or data processing centers. Because of the capabilities it provides, many organizations benefit from cloud services and are known to continue to do so in the future. The general cloud services market in the world is expected to exceed approximately 362.3 billion US dollars in revenue in 2022 (KPMG, 2021).

Blockchain

Blockchain can be defined as a distributed database system that provides data management in an encrypted manner. In this database, data is

distributed, encrypted and blocked in different locations (Softtech Inc., 2020).

Blockchain technology, which was brought to the agenda by the person nicknamed Satoshi Nakamoto in 2008 and proposed for the problems that the traditional database structure could not offer a solution, basically consists of two elements. These are blocks and transaction records within blocks (Candemir, 2020).

Blockchain technology can also be considered as a ledger that keeps track of transactions. Each group of transactions made on a blockchain can be referred to as a block. Each block is then merged chronologically to form a chain. Each block in the chain contains an encrypted hash value, timestamp, and batches of the previous block. The cryptographic hash included in a block strengthens the integrity of the previous block, making the blockchain architecture highly secure (Softtech Inc., 2020).

Banks follow blockchain technology closely. SWIFT costs are reduced in international money transfers thanks to blockchain technology (Erkan, 2019). In addition, researches continue in order to to make use of this technology in various areas where banks operate, such as the preparation of letters of guarantee, approval of loan contracts, deposit service contracts (Skinner, 2016). Apart from the banking sector, blockchain technology can be used in many different sectors and areas, such as smart contracts, voting, digital identity, national and international logistics transactions, transport contracts, notary attestations and certifications, monitoring of goods, services and payments in imports and exports, and all kinds of insurance, deed and equity transactions (Yilmaz, 2020). Researchers predict that by 2025, blockchain technology will be widely used by financial services institutions and consumers in international transfers by 2025 (Carlozo 2017).

Open Banking

Open Banking is basically an application that allows banks to share their financial data with third-party organizations with users' permission through APIs and enable these institutions to develop new customer-oriented financial services using the data. This application means "democratization of data" for the banking sector.

The first country to switch to the Open Banking model was the England. The

PSD (Payment Services Directive) introduced by the European Union to increase competition and reliability has a very important place. With PSD2, which is a continuation of PSD regulation and was published in 2016, open banking has become a necessity rather than an initiative for banks. In 2016, 9 private large banks in the UK came together within the Open Banking Implementation Entity (OBIE) and formed the open banking model. In our country, PSD was adapted with law no. 6493, which came into force in 2013 after almost four years. The legal infrastructure of the concept of open banking was established in 2020 with the "Regulation on Banks' Information Systems and Electronic Banking Services" published by the Banking Regulation and Supervision Agency. (Akbank, 2021).

In today's world where data is very important, open banking emerges as the driving force of reliability and innovation. However, in this system where data sharing takes place only with user permission, any data you do not want is not shared with any other organization by your bank. With this feature, your privacy rights are also protected (Garanti BBVA).

Today, all our financial information is recorded and processed by the banks we trade with. All information such as our automatic payment orders, credit card expenses, grocery purchases and borrowings and etc. are kept by our bank. The Open Banking application, on the other hand, aims to give the control of the data held by the banks back to our control. The method of this will be provided when our bank will allow access to our data stored for us, independent mobile applications and internet services. Thus, we will be able to take control of our data with the channels and applications we wish. If we have permission on a subject, our bank is obliged to disclose our financial data to the institution you request. This application and related regulations are shorthly called Open Banking (Alkan, 2018).

Neobanking

In essence, neobanking can be defined as the next generation of banking, which allows all transactions in the banking sector to be done digitally.

Neo-banks are new generation banks that operate only on digital platforms and do not have any physical branches (TKKB, 2021). Banks that do not have branches and use new generation technologies are defined as “neobank” or

"challenger bank" in the literature. The term "Challenger Bank" is mostly used for banks that compete with big banks (Wiki-Turk, 2019). Neobanks are banks that have emerged as alternatives to traditional banks and aim to provide banking services to their customers through mobile applications and that do not have branches (Watson, 2020). In essence, neobanking can be defined as the new generation banking that enables all transactions in the banking sector to be carried out in a digital environment.

The founding of Bank Simple by the Australian John Reich in 2009 can be considered a milestone for neobanks and the open banking system. In 2014, Bank Simple was purchased by BBVA (Banco Bilbao Vizcaya Argentaria). Shorthly after Simple, another Australian, Brett King, started Moven, followed by the American Chime and Varo Money (Wiki-Turk, 2019). The concept of Neobank came to the fore in 2017, especially when players such as Monzo and Atom Bank in England took part in the system. Their aim is to reduce costs and deliver banking services to large masses (Bagri, 2019).

Looking from a global perspective, the history of the concept of Digital Bank can be considered as about ten years. The first examples of Digital Banks are Simple and Moven, which were established in the USA. Although this trend started in the USA, more important initiatives and investments, specific to the Digital Bank, emerged in other countries in the following period (Canko, 2022).

In Europe, there are transitions from traditional banks with physical branches to neo-banks. Since 2017, there has been a market boom with accelerating new acquisitions in neo-banks. This situation accelerates by the fact that digital banks such as N26 and Revolut operate by entering various countries and current accounts, credit cards, mobile banking applications shift to neo-banks (TKBB, 2021).

One of the main strategies of neo-banks is to reach adequate number of customers in the target markets. In this context, neo-banks, which are making investments to maximize customer acquisition processes, give priority to the younger generations and SMEs, especially as the target audience (TKBB, 2021). For example; founded in France, Qonto Bank is a neo-bank for SMEs. Operating entirely in a digital environment, the neo-bank provides many services to facilitate the daily activities of companies

(TKKB, 2021). The regulation necessary for us to see digital, that is, branchless banks, which we see examples of in Europe, in our country, "Regulation on the Operating Principles of Digital Banks and Service Model Banking" prepared by the "Banking Regulation and Supervision Agency" came into force on January 1, 2022. It is seen that digital banks, which will become the new player of the financial sector with the regulation, will cause a change and transformation in the sector in our country as well in terms of digitalization of banking services and competition between banks. It is possible to say that banks will soon experience competition in the field of digital banking as well (Canko, 2022).

Fintech Concept

Fintech companies are technology companies that aim to provide innovative services at affordable costs through well-designed platforms and mobile applications. It has led to the emergence of different practices than traditional methods in matters such as payment, sending money, lending, borrowing and investing, and led to make the financial services sector smarter and more dynamic (TKKB, 2021).

In general, the term Fintech, which is formed by the combination of finance and technology words, has been defined more than once in the literature. The dictionary definition reveals the software used to provide banking and financial services and related technologies (Oxford Learner's Dictionaries).

The feature that distinguishes FinTechs from other actors in the financial services sector is their speed and agility. Thanks to this feature, they can quickly keep up with the changes in the sector. While this agility also enables FinTechs to quickly establish partnerships with other companies, at the same time it increases participation in the financial system by contributing to the development and growth of the financial services sector by merging different FinTech companies or supporting banks with innovative technological solutions. Thanks to these business partnerships, customers can be offered services that are more comprehensive and that can meet all their needs when necessary. With the increase in the participation of banks in this collaborative structure, both FinTechs and banks will be able to benefit seriously (The Interbank Card Center).

Outlook on Fintech in the World and Turkey

The global technology transformation, which became stronger during the pandemic period, has become the determinant of the future of many sectors. Despite its short history, the fintech industry, which can offer security, simplicity and speed in financial services, continues to grow and contribute to the sectors every year. It is observed that start-ups established outside the financial sector appear to stand out in competition in the services offered by banks. Most services previously performed by banks are now on the radar of fintech companies. Fintech companies have become able to offer services with alternative products such as funding, payment systems, electronic wallets, electronic commerce, electronic insurance and, perhaps most of all, cryptocurrencies (KMPG, 2021).

According to the results of research conducted by Startup Genome in 2020, the global fintech ecosystem has five main centers: Silicon Valley and New York in the USA, London in Europe, Singapore and Beijing in Asia. Apart from these five; Shanghai, Boston, Hong-Kong, Paris, Chicago, Los Angeles and Toronto are also considered to be among the important centers (KMPG, 2021).

In the 2021 annual global FinTech report, FinTech investment activities carried out in 2020 are discussed. According to the report, in 2021, FinTech startups raised a total of 115 billion dollars in investments with 3,604 agreements. In 2020, 1757 agreements and 32 billion dollars of investments were raised. It is seen that total investments increased by 262 percent and the number of transactions increased by 105 percent compared to the previous year. When the investments were examined, it was identified that the prominent trends were payments, financing, cryptocurrencies, blockchain, banking and insurance. The most invested countries are the USA, UK and India, respectively. It is observed that a parallel trend with the global trend is experienced in the name of the fintech sector in our country during the pandemic period. Turkey became the 46th most invested country in 2021 with 64 million 937 thousand dollars in terms of agreement size. However, the amount of investment has increased more than three times compared to the previous year. It ranked 20th globally in the number of agreements (Startups.Watch,2021).

Our country ranked 18th on the European continent after Poland with 139 million funding in 2020. In the ranking, the first three of the list are the United Kingdom with 13.6 billion USD, France with 5.3 billion USD and Germany with 5.1 billion USD. When only the Middle East countries are considered in this ranking, it is seen that our country ranks 3rd (KMPG, 2021).

One of the most dynamic sectors in Turkey is the financial technology sector. As of December 23, 2021, there are 520 active fintech companies in Turkey. Given the changes in the banking sector with the development of technology, new opportunities are constantly emerging for fintech companies. For example, after the issuance of payment and electronic money licenses in 2013, 56 fintech institutions obtained licenses, and a total of more than 100 payment and electronic money companies were established with the companies waiting in line (Finance Office of the Presidency of the Republic of Türkiye).

With the developments and expectations in the fintech ecosystem related to open banking and PSD2, over 30 fintechs have been established in this field in the last three years. It is estimated that close to 100 fintechs will be established in this area upon completion of the regulations.

Looking at the fintech fields of activity, there are 216 fintechs in payments, 70 fintechs in banking, 64 fintechs in blockchain and fintech assets areas in Turkey (Fintech Snapshot for Turkey v0.5). Given the publication of new crowdfunding arrangements in 2021, it is also estimated that there will be a large number of new crowdfunding initiatives in the coming period. The highest level of interest of banks and investors in fintech sector has made this sector one of the most popular sectors in Turkey (Finance Office of the Presidency of the Republic of Türkiye).

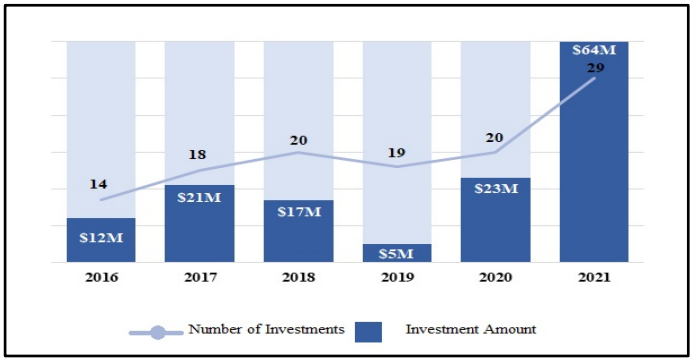

Figure 4. Findek Investments (Angel Investor & VC)

Source: Startups.watch

When Fintech investments are examined, 2021 has been the most invested year in both quantity and quantity with an investment of 64 million dollars in 29 investment rounds (Fintech Snapshot for Turkey, 2021). The reason for the investments to increase this much in 2021 was the rapid growth of e-commerce and the corresponding increase in the need for payment systems. It is considered that the quality and diversity of service will increase in the coming years as increased investments in fintechs will create a more competitive fintech ecosystem. The development of the Fintech ecosystem will benefit many sectors, especially e-commerce (Finance Office of the Presidency of the Republic of Türkiye).

The Impact of Pandemic Process on Digitalization in Banking Sector

The pandemic, which has affected the whole world and our country since 2020, has shown its effect in every aspect of our lives. The Covid 19 pandemic has also caused a rapid change in the way of doing business. The financial sector had to adapt to this change more and more each day and quickly adapted its business processes to the pandemic conditions.

Although the banking sector is a constantly digitalizing sector that follows technological innovations, this process has become even faster with the

effect of the pandemic (Akca & Tepe Küçükoğlu, 2020). The banking sector has taken a series of measures to minimize the effects of the pandemic. Free usage of common ATMs, increasing contactless payment limits, increasing digital credit limits and related measures can be cited as an example to these (Beybur, 2021).

In the financial services sector, remote working, access to financial opportunities, customer-oriented services, sustainability and technological developments have been among the priority issues. Banks had to regulate their business processes in a way that would minimize contact with customers and employees, but also ensures or even furthers the efficiency before the Covid-19 pandemic. With the transition of millions of people to remote working model, a new working ecosystem has been formed. According to the "State of Remote Work Report" of Global Workplace Analytics, 77% of employees stated that they would be happy to be able to work remotely in the post-Covid-19 pandemic period as well (Global Workplace Analytics, 2021). Banks in Turkey have taken swift action to provide uninterrupted service in the pandemic by quickly establishing the principles of remote working with the pandemic.

According to Paysafe's Consumer Payment Trends survey for 2021, 59% of customers responded they had tried at least one new online payment method in the past year. (Paysafe, 2021). The importance of access to financial facilities has become more prominent during the Covid-19 pandemic. In the EY article titled "Can Inclusive Banking Drive Economics Growth in Emerging Markets", it was noted that, as of 2018, approximately 1.6 billion people in the world did not benefit from any financial service (Mastercard). In the World Bank data for 2017, the proportion of people with bank accounts over the age of 15 in Turkey was recorded as 69% (World Bank Global Findex). This population, which is concentrated in underdeveloped or developing countries, has faced a difficult struggle in the Covid-19 pandemic due to weak financial opportunities, insufficient regulations and disruptions in health systems. At this point, giving importance to the efforts to ensure the accessibility of financial opportunities by all will enable the aforementioned population to overcome the epidemic process relatively more easily (TKKB, 2021).

According to the data received from the Banks Association of Türkiye (TBB) at the beginning of the pandemic, the data for the 4th quarter of 2019 and the 3rd quarter of 2020 are shown in the table below. According to these data, there has been an 8.69% increase in the use of online banking in the 2nd quarter, with the effect of restrictions since March 2020, when the pandemic started. With the easing of the restrictions, the rate of increase decreased, however the number of bank branches and the number of employees decreased regularly.

Table 1. Number of Bank Branches, Employees, and Online Customers

Digital Banking / Offline Banking	December 2019 (4th Quarter)	March 2020 (1st Quarter)	June 2020 (2nd Quarter)	September 2020 (3rd Quarter)
Number of Banks	47	48	48	48
Number of Branches	10.199	10.161	10.132	10.079
Number of Employees	188.837	188.164	187.490	186.654
Online Banking (Active Customer)				
Number of Individual Customers	51.014	53.981	59.076	60.038
Number of Corporate Customers	2.143	2.343	2.611	2.702
Total Number of Customers	53.157	56.324	61.687	62.741

5. Discussion and Suggestions

With the introduction of the first mobile applications in the 2000s, online shopping began and financial technologies showed themselves. The global financial crisis of 2008 affected all financial markets and systems. The crisis has undermined confidence in the financial system and banks.

With the effect of the crisis, financial technologies gained importance and the concept of Fintech emerged. Financial services has been one of the most important innovations emerging in the banking sector. By 2019, the emerging pandemic has accelerated the digitalization of the financial services sector. The pandemic has resulted in changes in social life and human habits. The Remote Customer Acquisition Law, which came into force in May 2021, opened the door to a new era in the banking sector by ensuring that consumers can access financial services regardless of location and place (The Banks Association of Türkiye, 2020).

When we look at the data of the Banks Association of Türkiye, it is seen that approximately 68 million people were digital banking customers in this period, and the number of active customers using internet banking was above 11 million. When non-bank customer acquisition channels are examined, it is seen that while there were 274 thousand users in May 2021, it increased to 382 thousand users in September 2021. When payment systems are examined, it reached approximately 263 billion dollars by August 2021, almost approaching the total figure of the previous year. This shows us how important payment systems have become in our lives. In this new era, digitalization has contributed to the increase of competition between banks, the growth of the sector and the banks' renewing themselves in terms of excellent customer experience. In this period when services for customer demands have become important, traditional banking methods such as increasing branch numbers and employment have lost their importance.

Digitalization brought up many new issues, such as cryptocurrency, digital banking, open banking and etc. Changing conditions and competitive environment are pushing banks to collaborate with fintechs, technology companies that produce financial services, by carrying them beyond just providing services through their own digital channels. The quote "Banking is necessary, but banks are not", which was said by Bill Gates in 1994, pointing

to the future of the banking sector, led to the birth of fintechs. Fintechs are companies that can create customized products tailored to customers and help banks constantly renew themselves with the technological progress. According to the Open Banking Expo survey conducted in 2020, 89% of financial institutions are willing to cooperate with fintechs. While a few years ago, banks saw fintech companies as their competitors, they have now started to see them as business partners.

While in traditional banking, face-to-face activities with the customers are carried out in physical bank branches, with the development of technology, customers can now perform many transactions without going to the branch. Moreover, thanks to artificial intelligence technology, many operations can be done through applications with the help of virtual assistants. According to the report on "An Outlook on Fintechs Sector from the KPMG Perspective", it has been stated that between 2015 and 2020, approximately 30 billion dollars are invested globally in the fintech field every year. In the coming period, it is considered that investments will increase exponentially. It is also estimated that robo-advisers will save banks 7.3 billion dollars by the end of 2023.

Through Open Banking, the digitalized banking sector is becoming more free and more democratic. In this process, while fintechs companies, e-money companies and payment institutions undertake a very important role as like the banks, customers gain the opportunity to access more advantageous and useful services. When evaluated in terms of the sector, it is projected that the increase in the the number of fintech companies in the market will increase competition.

With the effect of this change and transformation created by technology, the banking sector is moving away from the traditional banking system and becoming a digital platform. There is a transition towards a period when banking is not just about monetary issues, but data banking is gaining importance.

As a result; banks should not see transformation along with the digitalization process and cooperation with financial technology companies as a threat. They should consider this transformation and cooperation as an advantage in terms of improving the customer experience, providing new

products and services to customers, reducing operational costs, ensuring access to the financial system, reaching more customers, facilitating financial life and increasing financial inclusion. Banks need to collaborate with fintech companies for developing services for digital customer acquisition, building their open banking infrastructure qucikly, and providing customized products and services to customers. In the future, it is foreseen that banks will not need to increase the number of physical branches and bank branches will also change with the decrease in cash need in the society. In addition, instead of carrying out operational transactions, bank employees will be moved towards a system where they will be in dialogue with customers. It is considered that the competition in the sector will increasingly continue in the field of digitalization. In the future, the transformation process will continue with the concepts of fintech companies, open banking, open finance, decentralized finance, embedded banking concepts, instead of the traditional banking system with a headquarter and numerous physical branches

References

Accenture, (2017). Banking technology vision 2017. Retrieved December 15, 2021, from https://www.accenture.com/_acnmedia/pdf-47/accenture-banking-technology-vision-2017.pdf.

Aktan, E. (2018). Büyük veri: uygulama alanları, analitiği ve güvenlik boyutu. Ankara Üniversitesi Bilgi Yönetimi Dergisi, (1), 3.

Alkan, A. (23 Ocak 2018). Açık bankacılık hakkında sorular ve cevapları. 7 Kasım 2021. https://fintechistanbul.org/2018/01/23/acik-bankacilik-hakkinda-sorular-ve-cevaplari/

Akbank, (20 Ekim 2021). Nedir? açık bankacılık. 5 Ocak 2022. https://medium.com/akbank-sürdürülebilirlik/nedir-açık-bankacılık-eabd7ea1275a.

Armbrust, M., Fox, A., Griffith, R., Joseph, A. D., Katz, R., Konwinski, A. & Zaharia, M. (2010). A view of cloud computing. Retrieved February 2, 2021. Communications of the ACM, 52(4): 50-58.

Ayvaz, T. (b.t.). Endüstri 4.0 nedir? 5 Eylül 2021. https://www.mediaclick.com.tr/tr/blog/endustri-4-0-nedir.

Bagri, K. (2019). Neobanking: Is the future of banking here? Retrieved Agust 15, 2021. from https://medium.com/datadriveninvestor/neobanking-is-the-future-of-banking-here.

Bilir, H. (2020). Açık bankacılık finansal sistemin dönüşümü (1. Baskı). Ankara: Gazi Kitapevi.

Beybur, M. & Çetinkaya, M. (2020). Covid-19 pandemisinin Türkiye'de dijital bankacılık ürün ve hizmetlerinin kullanımı üzerindeki etkisi. USOBED Uluslararası Batı Karadeniz Sosyal ve Beşeri Bilimler Dergisi, 4(2), 148-163.

Candemir, G. (2020). Bankacılık sektöründe yeni trendler ve teknolojik gelişmeler: Fintek sektörü üzerine bir uygulama. Doktora tezi, Marmara Üniversitesi Bankacılık ve Sigortacılık Enstitüsü.

Carlozo, L. (July 1, 2017). What is blockchain? Retrieved May 10, 2021. from

Canko, S. (25 Ocak 2022). Dijital Banka. 15 Şubat 2022. https://fintechistanbul.org/2022/01/25/dijital-banka/

Ebem, Ş. (2013). Kamu bilişim sistemleri açısından bulut bilişimin teknik, yönetim ve hukuki boyutlarıyla incelenmesi: Bilgi teknolojileri ve iletişim kurumu için öneriler. Teknik Uzmanlık Tezi. Bilgi Teknolojileri ve İletişim Kurumu.

Ercan, S. (2021). Akıllı uygulamalar. İ. Tarakçı, B. Göktaş, (Ed.), Dijital gelecek dijital dönüşüm (7-31). İstanbul: Efe Akademi Yayınevi.

Engin, R. (2021). Dijital eğitim uygulamaları. İ. Tarakçı, B. Göktaş, (Ed.), Dijital gelecek dijital dönüşüm (119-138). İstanbul: Efe Akademi Yayınevi.

EY, (April 25, 2018). Can ınclusive banking drive economics growth in emerging markets. Retrieved May 20, 2021. from https://www.ey.com./en_gl/trust/can-inclusive-banking-drive-economic-growth-in-emerging-markets.

Fintech İstanbul, (2019). Dünyada ve Türkiye'de açık bankacılık: bankacılığın geleceği. 20 Nisan 2021.

Fucs, C. (2018). Industry 4.0: the digital German ideology. Retrieved July 19, 2021. Triplec: 16(1), 280-290. from https://www.triple-c.at/index.php/tripleC/article/view/1010.

Garanti BBVA, (2019). Açık bankacılık (open banking) nedir? 20 Kasım 2021. https://www.garantibbva.com.tr/tr/blog/acik-bankacilik.page.

Gartner Inc, (2021). Definition of digital transformation. Retrieved March 17, 2022. from https://www.gartner.com/en/information-technology/glossary/digital-transformation.

Göksel- Canbek, N. & Mutlu, M.E. (2016). Sayısal gelecekte yeni adım: akıllı kişisel yardımcılar. Açıköğretim Uygulamaları ve Araştırma Dergisi, 2(1), 114-129.

Güleryüz, D. (2021). Dijital dönüşümde büyük veri ve makine öğrenmesinin rolü. İ. Tarakçı, B. Göktaş, (Ed.), Dijital gelecek dijital dönüşüm (385-400). İstanbul: Efe Akademi Yayınevi.

Gtech, (2021). Nesnelerin interneti (ıot) nedir? 25 Nisan 2021. https://www.gtech.com.tr/nesnelerin-interneti-iot-nedir/

Hürriyet, (2016). Bankacılıkta beacon devrimi başlıyor. 27 Haziran 2021. https://www.hurriyet.com.tr/teknoloji/bankacilikta-beacon-devrimi-basliyor-40143465

Katz, R. L. (2017). Social and economic ımpact of dijital transformation. International Telecommunications Union.

Korkmaz, S., & Gövdeli, Y.E. (2005). Türk bankacılığında alternatif dağıtım kanalları ve ürünleri ile bunların gelişiminde ve pazarlamasında eğitimin önemi. Endüstriyel Sanatlar Eğitim Fakültesi Dergisi, 15(4).

KPMG, (2021). KPMG perspektifinden fintech sektörüne bakış 2021. 15 Şubat 2022. https://assets.kpmg/content/dam/kpmg/tr/pdf/2021/08/fintech-sektorel-bakis-2021.pdf

Kaplanseren, E. (2019). Nesnelerin interneti önümüzdeki 10 yılda neleri değiştirecek? 12 Aralık 2021. https://webrazzi.com/2019/10/24/nesnelerin-interneti-onumuzdeki-10-yilda-neleri-degistirecek

Lister, K. (2021). Work at home after covid 19 our forecast. Retrieved January 14, 2022. from https://globalworkplaceanalytics-com.translate.goog/work-at-home-after-covid-19-our-forecast?

Mrugalska, B. & Wyrwicka, M. K. (2017). Towards lean productionin ındustry 4.0, Procedia Engineering, 182, 466-473.

Naik, K. & Joshi, A. (2017). Çeşitli sektörlerde büyük verinin rolü. 10 Şubat 2022. 2017 Uluslararası I-SMAC Konferansı (IoT, Sosyal, Mobil, Analitik ve Bulutta) (I-SMAC), 117-122.

Oxford Learner's Dictionaries. May 1, 2022. https:www.oxfordlearnersdictionaries.com/definition/english/fintech?q=fintech.

Pannu, A. (2015). Artifical intelligence and its application in different areas. Retrieved December 15, 2021. International Journal of Engineering and Innovative Technology (IJEIT), 4(10), 79-84.

Paytry Blog, (20 Eylül 2020). İlk kredi kartı ne zaman kullanıldı? Kredi kartlarının tarihçesi. 15 Mart 2021. https://www.paytry.com/blog/kredi-kartlarinin-tarihcesi-286

Paysefe, (2021). Paysafe group sapio research lost in transaction consumer payment trends 2021. Retrieved February 10, 2022. https://www.paysefe.com/fileadmin/user_upload/Lost_in_Transaction_Consumer_Payment_trends_2021.pdf

PWC & GSG Hukuk, (2020). Açık bankacılık: dünya ve Türkiye. 14 Nisan 2021. https://www.gsghukuk.com/tr/yayinlar/kose-yazilari/acik-bankacilik-dünya-ve-turkiye.pdf

Reınsel, D. John, G. & John, R. (2018). The digitization of the World from edge to core. Retrieved April 20, 2021.

Research And Markets, (2020). Global big data Analytics Market 2020. Retrieved June 18, 2021. https://www.researchandmarkets.com/reports/5023344/global-big-data-analytics-market-2020

Sarıtaş, M., Üner, T. & Üner, N. (2013). Eğitimdeki yenilikçi teknolojiler: bulut teknolojisi. Eğitim ve Öğretim Araştırmaları Dergisi. 2(3), 192-201.

Sharma, C. (2016). Correcting the IO history. Retrieved July 20, 2021. www.chetansharma.com/correcting-the-iot-history/

Skinner, C. (2014). Dijital Bankacılık. N. Özata, İstanbul: Kapital Medya Hizmetleri A.Ş.

Skinner, C. (2016). Valueweb. A. Çelebi, N. Özata & T. Gezer, İstanbul: Kapital Medya Hizmetleri A.Ş.

Softtech A.Ş., (2019). Softtech 2019 teknoloji raporu. 25 Mayıs 2021. Türkiye İş Bankası Yayınları. https://softtech.com.tr/2019-teknoloji-raporu/

Softtech A.Ş., (2020). Softtech 2020 teknoloji raporu. 10 Haziran 2021. Türkiye İş Bankası Yayınları. https://softtech.com.tr/teknoloji-raporu-2020/

Softtech A.Ş., (2022). Softtech 2021 teknoloji raporu. 30 Nisan 2022. Türkiye

İş Bankası Yayınları. https://softtech.com.tr/2022-softtech-teknoloji-raporu/

TKBB, (2021). Katılım bankacılığı dijital araştırma raporu 2021. 10 Şubat 2022. https://www.tkbb.org.tr/Documents/Tkbbyayinlari/EY-TKBB-Dijital-Raporu.pdf

The World Bank, (2017). The global findex database 2017. Retrieved March 10, 2022. https://globalfindex.worldbank.org/

T.C. Cumhurbaşkanlığı Finans Ofisi, (2021). Türkiye fintek ekosistemi durum raporu 2021. 25 Nisan 2022. https://www.cbfo.gov.tr/sites/default/files/2021-12/turkiye-fintek-ekosistemi-durum-raporu-2021.pdf

Turing, A. (1948). Machine Intelligence, B. Jack Copeland (ed.), The Essential Turing: The ideas that gave birth to the computer age, Oxford University Press, p. 412

Uzkurt, C. (2017). Yenilik (inovasyon) yönetimi ve yenilikçi örgütü kültürü (s. 63). İstanbul: Beta Yayınevi.

Watson, T. (2020). Neobanks and digital banks licences explained. Retrieved February 22, 2021. https://mozo.com.au/neobanks/guides/neobanks-and-digital-banks-licences-explained

World Economic Forum, (2018). İşlerin geleceği raporu 2018. https://digitalage.com.tr/wp-content/uploads/2018/11/islerin-gelecegi-turkce.pdf

Wıkı-Turk, (2019). Yeni Nesil Banka (Neobank). Yeni Nesil Banka (Neobank) | Wiki-Turk

Yılmaz, E. (2020). Nakitsiz toplum sürecinde ticari müşterilerin, kart kullanım tercihlerinin belirlenmesi üzerine bir araştırma. Beykent Üniversitesi Lisansüstü Eğitim Enstitüsü.

Yurttadur, M., & Süzen, E. (2016). Türkiye'de Banka Müşterilerinin İnternet Bankacılığına Yaklaşımlarının İncelenmesi Üzerine Bir Uygulama. Tüketici ve Tüketim Araştırmaları Dergisi, 8(1), 93-120.