We are IntechOpen, the world's leading publisher of Open Access books Built by scientists, for scientists

5,800
Open access books available

142,000
International authors and editors

180M
Downloads

154
Countries delivered to

Our authors are among the

TOP 1%
most cited scientists

12.2%
Contributors from top 500 universities

BOOK CITATION INDEX
CLARIVATE ANALYTICS
INDEXED

WEB OF SCIENCE™

Selection of our books indexed in the Book Citation Index
in Web of Science™ Core Collection (BKCI)

Interested in publishing with us?
Contact book.department@intechopen.com

Numbers displayed above are based on latest data collected.
For more information visit www.intechopen.com

Utilization of Fintech Applications during the Covid-19 Pandemic

Özlem Olgu Akdeniz

Abstract

At the beginning of 2020, a new disease (Covid-19) has emerged and expanded swiftly all around the world. Currently, we are still living in unprecedented times in which we should have social distance from one another and mostly work from home to diminish the spreading speed of the Covid-19. While we are experiencing these limitations, businesses and organizations are expected to work without having any disruptions. At this point, entering new technologies into our lives was inevitable and in fact, these new technologies have helped us to eliminate the challenges caused by the precautions with fewer flaws. Even though Fintech applications have numerous advantages, nothing comes without its drawbacks. The empirical analysis in this chapter aims to evaluate selection of best Fintech-based investments in the Turkish banking sector with an application of a hybrid DANP-fuzzy TOPSIS technique. Empirical findings of the analysis indicate that Strategy 2 has the best rank among the alternatives, followed by Strategy 1 and Strategy 3, whilst Strategy 4 has the weakest importance among the strategy preferences. Our findings suggest that policy makers/bank managers should focus more to direct Fintech investments firstly to lending services followed by payment systems.

Keywords: Fintech, Covid-19, financial institutions, pandemic, Turkish banking

1. Introduction

"Ignoring technological change in a financial system based upon technology, is like a mouse starving to death because someone moved their cheese."

Chris Skinne

At the beginning of 2020, a new disease (Covid-19) has emerged and expanded swiftly all around the world. As the global spread got out of control, World Health Organization (WHO) announced the situation as a pandemic. Followingly, governments took numerous precautions such as closing boarders, banns on international transportation, restrictions on social distancing, mandatory face masks, and flexible working conditions such as working from home/online meetings. Although, these precautions were taken against the virus, it affected almost all industries. The use of technology and innovation has increased more to eliminate the challenges caused by the precautions. At this point, Fintech applications have stepped forwards to catalyze business and individual processes.

'FinTech' is a compound word of Fin(ancial) and Tech(nology). It is a general name to refer to new disruptive, revolutionary technological developments that are

redefining the financial markets and changing the rules. Even though, the term has gained popularity in public not long ago, it has become one of the most researched topics as it has managed to influence almost every subsector ([1], p. 235). Fintech helps companies and consumers to operate their financial assets and processes in better conditions via using specialized software and algorithms by solely accessing through computers and smartphones. Alongside strengthening business and processing big data to meaningful data, Fintech is universal, cheaper, and more secure compared to conventional methods [2]. In addition, Fintech eliminates traditional intermediaries while offering financial services [3].

FinTech has many new and complex underlying technologies like blockchain, artificial intelligence, big data, and machine learning. With the new dynamics that these techs bring, FinTech offers various advantages that traditional institutions cannot compete with. Some of the most important advantages are the ability that Fintech start-ups can avoid intermediation costs and acquire minimum capital requirements usually associated with traditional banking services. On the other hand, big data analytics and data science transformed how data are captured, processed, and analyzed, which results in significant cost reduction [4]. Traditional ways of finance are being challenged continuously and long-established institutions should decide if they will embrace or fight it.

Artificial intelligence, machine learning, big data, data analytics, robotic process automation, and blockchain technologies have played and still are playing important roles in the creation of today's successful Fintech applications. These technologies have comprised the base for many Fintech applications, where they have enabled the creation of crowdfunding platforms, mobile payment systems, robo-advisors, insurance applications, budgeting applications, and Regulatory Technology (RegTech). As a result, financial markets, financial transactions, simpler money trade-offs, anything which can be thought on financial activities have become more convenient by the Fintech applications. Higher rates of convenience have brought also a higher number of new users and efficiency. Fintech applications also provide personalized services for people who require and want data and services. Indeed, personalization plays a subsidiary role for the enhancements of those Fintech applications; because via personalized services, the owners of the applications can learn what do their customers need. Those needs, afterwards, can be met by the new updates of the applications. Via the products of the new tech, the time it takes to make each of the transactions has lowered, encouraging people to be involved in more financial activities. Financial markets may benefit from new and more involved players.

According to Moden and Neufeld [5] the usage of Fintech applications increased by 72% in Europe since the first lockdown due to the Covid-19 pandemic. Fintech is one of the hottest topics in current finance and is thought to be the power that will shape the future. This chapter aims to investigate the utilization of Fintech applications during the COVID-19 pandemic, analyze the Fintech phenomenon, and show some of its main applications in financial markets such as cryptocurrency, crowdfunding, and mobile payments. Moreover, this chapter evaluates Fintech-based investments in Turkish banking with an application of the ANP and TOPSIS models. We aim to contribute to the existing literature by identifying the most important Fintech-based investment alternatives and to providing suggestions for policy makers to achieve higher financial performance in the Turkish banking sector. Our empirical findings illustrate that "payment" and "lending" systems are the most important Fintech-based investment alternatives. We recommend that Turkish banks should mainly focus on directing investments to Fintech applications on payment and lending services to attract more customers, decrease operational costs and achieve higher levels of customer satisfaction.

The rest of the chapter is organized as follows. Section 2 introduces a summary of the evolution of Fintech applications. Section 3 provides a literature review, followed by methodology and empirical findings. Lastly, Section 5 concludes the chapter.

2. Evolution of Fintech applications

The origins of Fintech go back to the mid-19th century. Although, it was initially designed for back-end systems of financial institutions, it has moved towards consumer-oriented services over time [6]. The development between finance and technology has always been hand to hand in history. A need, a deficiency in finance would provoke the technology to come up with a solution and the result would benefit both. Arner et al. [7] list the co-existence of financial services and technology in three eras as: Fintech 1, Fintech 2, and Fintech 3. The first period (Fintech 1) is between 1866 and 1967, which represents the period of transition from analog to digital applications. During this period, the foundations were laid for financial connections that would enable the rapid realization of financial information, transactions, and payments by means of telegraph, railways, canals, and transatlantic telegraph cables. In fact, laying of the transatlantic telegraph cable formed the infrastructure of the financial globalization process. Moreover, credit card applications started during this era and formed the basis for the next stage of Fintech development (Fintech 2).

The digitalization of technologies used in communication and commercial transactions triggered the Fintech 2 era, which refers to the 1967–2008 period. Products and services offered in the financial services sector started to be digitalized and internet banking applications (Wells Fargo-USA and ING Bank-Europe) and ATMs (1967-Barclays UK) were introduced over this period. The emergence of ATMs is accepted as the most important development revealing the relationship between finance and technology and as the first step towards digitalization of the financial services sector [8]. In addition, technology companies such as IBM emerged during this period [7]. Chronologically, over the following years, NASDAQ was established (1971), SWIFT application was commissioned (1973), Bloomberg was established (1981), the first mobile phones emerged (1983), and online banking applications started (1985). By 2001, the number of customers consuming these technologies reached to one million. In 2005, the first physically branchless banks such as ING Direct and HSBC Direct emerged in the UK. At the beginning of the 21st century, banks' internal processes, external systems, and interactions with their customers were completely digitalized [7].

Lastly, Fintech 3 era covers 2008 and beyond, which has the trigger point as the global economic crisis in 2008. Global economic crises caused distrust in financial markets and expanded the importance of Fintech applications. The public's anger with the banking system has created an excellent area of development for financial innovation. Taking advantage of the opportunity created by the crisis environment, Fintech providers offered services to their customers with low-cost, more transparent, and easier to use interfaces through well-designed platforms and mobile applications [9]. Although, Fintech 3 has emerged as a response to the financial crises in the West, similar Fintech developments were observed in Asia and Africa a bit later. The period in these two regions is described as Fintech 3.5 [7]. The elements that support the Fintech 3.5 era in these regions can be listed as high penetration of mobile devices among young and technology-savvy individuals, the growth of the middle class, unused market opportunities, lack of physical banking infrastructure, and low competition [7].

Fintech technologies are used in areas such as payments, digital currencies, insurance, investment management, credit, deposit, and lending. The cost of the services provided by this technology to the customer is low and easy to access. Fintech companies focus on the customer and take their actions in line with customer needs. According to a survey of BCBS, most Fintech services are in the category of payment, clearing and settlement; then, it was concluded that the activities of market support services and credit, deposit, capital-raising services respectively were high [10]. While Fintech companies operating on payment provide convenience to their customers in terms of payment, Fintech companies operating in the field of market support services are companies that provide financial support as the name suggests.

People who need a loan often go to banks; however, getting a loan is not that easy. Banks classify individuals according to their ability to pay, suspecting whether they can receive a refund. They expose individuals applying for loans to many questions such as income level, age, wealth status, illness status, credit rating, education level, and it becomes difficult to get a loan for someone with any disadvantage. However, for those who lost their jobs and lost their home; or for people who want to start a new venture but do not have capital, the situation is not very heartwarming. Besides, even if a loan will be given to the person applying for the loan, there may be a high-interest payment system. The Fintech industry has launched many technology applications and financial support services to create a new lending market, which will address all difficulties, support and meet most of the consumers' needs. To find solutions to such problems, Fintech developed its applications with its technological infrastructure and established its credit system, and even started to give loans to people deemed defective by banks. Unlike banks, some Fintech companies kept the interest on repayment low, did not ask long and detailed questions like banks. Instead, thanks to the algorithms developed, they started to use all the data that could be used, from the games played by the individuals who want to get a loan to the lifestyle they live, to get a preview.

Peer to Peer Lending, one of the models of these applications, served as a link between lenders and borrowers thanks to its highly developed technological infrastructure; In a way, it has undertaken the duties of other financial companies. Venmo app is a smartphone app used to make digital payments. Venmo, which was designed by targeting the Peer-to-Peer system, after some personal information is verified, personal bank accounts are connected to the application and allows individuals to easily transfer money among themselves. Another example of using Peer-to-Peer Lending systems is Sofi and Earnest. These two applications, help students to find individuals who give student loans.

Thanks to the technological applications developed by Fintech companies, making payments has now been transferred to the digital environment and requires easier and shorter transactions, which do not require physical transactions. People can now send money to another individual at the touch of a button, at any time and at any distance. For example, it used to be more difficult to send money to individuals living abroad. People who must go to the bank, answer a lot of questions, wait long lines, and deal with a lot of paperwork can now handle this issue much more comfortably. Mobile wallets are considered an Online Payment system. This system, which replaces the normal wallet, allows the use of most bank cards virtually with the technology it contains; It is designed for users to use comfortably and to save time, to avoid worries such as forgetting a wallet or shortage of cash. For this, the user only needs to download the application. There are mobile wallet applications such as Google Wallet, Square Cash, Paypal, and it allows individuals to carry a virtual wallet. Also, Apple released Apple Pay using its technology and moved users' purchases and billing transactions to digital using only Touch ID (Truong, p. 20).

In addition, cryptocurrency is introduced as a virtual currency, which has no physical appearance, and allows customers to transfer money digitally. Cryptocurrencies are tools for investing, like gold or dollar, you can trade and sell it through various apps and websites. The high demand and big expectations helped these currencies to reach all-time highs and they are still rising. Furthermore, they are parts of major investment banks' portfolios even though some of the banks still question their future. JP Morgan had announced that it had made a 50-million-dollar investment in Bitcoin and explained that they believe it is an important asset. As if that was not enough, JP Morgan went a step further and explained it will release its cryptocurrency for payments, JPM Coin. Before JP Morgan, platforms such as Amazon, Craigslist, and eBay had already realized the advantage of cryptocurrency payments [11]. In addition to incredibly fast payments, they allowed it to reduce their costs in labor and documentation and eliminate intermediary fees. They use these savings to improve their services for the customers. Also, blockchain technology allowed companies to set "smart contracts" which are codes with conditions that are executed when certain conditions are met [11]. These helped companies to avoid mistakes, save time and overcome trust issues. For example, in trade finance parties can guarantee that they will get their payment as soon as the shipment has arrived at the buyer. With smart contracts, there is no need for confirmation calls or emails.

The first and most popular type of cryptocurrency is Bitcoin. Bitcoin is a virtual currency where people are traded among themselves, and it is tracked through online platform sites, whilst without any regulation. It is now in such a position in the lives of individuals that it can be received as Bitcoin payment in some businesses. To create a digital platform for Bitcoin transactions, Blockchain technology is introduced, which enables data to be organized in blocks and protects the data it collects. In simplest terms, blockchain is a decentralized and secure electronic ledger. This ledger is public and built around a P2P system where participants are anonymous and do not have to reveal any information. Each transaction is linked to the previous one like a chain and because entries are linked, tracking and verifying them become significantly easier. But, before transactions become a "block" of the chain, they must be confirmed. The striking point is the participants are the ones who confirm them instead of a central power who charges fees and has the power to call off a transaction. Blockchain aims to replace authorities by creating a safe environment that is based upon the secure nature of cryptography and the trust participants have for each other. So, the transactions will be cheaper and irreversible.

Especially, the Crowdfunding system which combines individuals who are looking for capital for a project or a start-up but who have difficulty in finding them with their future investors, is a tool to find the desired financial support using P2P, and no fees are required to use this system. Thus, individuals or small companies in need of financing save time and could find an investment that they normally cannot find. At the same time, it enables the investor to receive commission after a certain period. In addition, Fintech application such as Virtual Saving Jars belonging to the investment area enable people to make savings by transferring their budget, expenses, and income to digital. This development, made especially by focusing on the young audience, is perfect for those who cannot save. Another application type made by Fintech companies is portfolio management. These applications such as Acorns and Betterment measure the risk level using the investor's data and match the suitability against which assets. In creating a portfolio, Robot-Advisor can be used which uses the investor's data and tells the investor how to make a portfolio. The system uses questions that are designed to get to know the investor, then it recognizes the investor and offers suitable portfolio options through its algorithms.

Fintech companies also help personal finance transactions to be carried out more efficiently. Despite each company's own technological infrastructure, customers who are suspected of being defrauded feel compelled to check many websites at the same time. For this purpose, websites such as Mint.com and CreditKarma were enabled to see individual transactions and to reach different banks with free of charge from a single platform. Thus, customers were able to manage their finances and have access to transaction, banking and credit activities much more easily. In this respect, LearnVest is an online platform that supports its users to manage their finance and investment.

Likewise, Asset and Wealth Management (AWM) is another financial service that is expected to be revolutionized by Fintech. Since 2008, there has been a constant rise in the number of AWM start-ups, which aim to stand out from the traditional advisors by incorporating artificial intelligence and new data analytic techniques in the game. Lopez et al. [12] list the major innovations that are making a difference as:

1. 'Well-designed platforms focused on simplicity, speed, and intuitive work-flows through digital and mobile offerings',

2. 'Compelling editorial content and financial education distributed openly online with focus on human connection, constant feedback on client's financial health',

3. 'Average fees between 25 and 50 basis points; free tools to analyze fees across accounts while offering cost-saving alternatives'.

One of the most important inventions in the process of automatizing and digitalizing investment management is robo-advisory. 'Robo-Advisors are digital platforms comprising interactive and intelligent user assistance components that use information technology to guide customers through an automated advisory process' ([13], p. 1). The new alternatives that were born with this technology can be divided into two branches as: (i) Fully-Automated and (ii) Advisor-Assisted ([12], p. 4). Betterment and Wealthfront are two of the Fully-Automated management firms where there is zero human elements. On the other hand, firms like Personal Capital—an important Advisor-Assisted system—a more comprehensive analysis of assets, and more detailed tracking and advisory on investments are offered with real human advisors who are evaluating and reporting the process. Eliminating the extra employee-based costs such as food, transportation and monthly salaries allow robo-advisory start-ups to accept customers without minimum investment limit. That's why especially the fully-automated firms have gained traction with millennials, which have an average account size of $20,000–$100,000 [12].

Small and Medium Enterprises (SMEs) and business ventures used to get financial support from banks. However, with the beginning of the 2008 financial crisis, banks decreased loan amounts and frequencies in order not to take risks in a non-growing economic condition. This becomes the revolutionary standpoint for crowdfunding [14]. Loans taken from banks are no longer being used, instead crowdfunding is used with the help of financial technologies for loan practices. Crowdfunding practices are fulfilled via internet crowdfunding websites and social media. These platforms ease lending transactions by eliminating difficult negotiations and time-consuming paperwork. Since crowdfunding platforms are easily usable and accessible, crowdfunding continues to develop.

Last but not the least, the mobile payment system is a monetary payment made through an electronic environment. This environment is mostly a smart device

like a phone, tablet, laptop, etc. In the traditional payment model, there is a direct link with financial institutions; however, with FinTech, payments are connected to financial institutions via Information Technologies (IT) companies. Even if IT is also used in traditional services, it is not easily adaptable to FinTech payment services [15]. For each financial institution, different payment methods should be used because traditional payment services were not developed as user-specific. Several companies give mobile payment services. Apple, Samsung, and Google developed mobile applications named respectively as Apple pay, Samsung pay, and Google pay. These applications are implemented to ease payment procedures and enable instantaneous purchasing by using barcodes. Another well-known platform is PayPal, which is mostly used by small stores instead of traditional equipment such as barcode readers and Point of Sales Terminal (POS). Mobile payment enables easy purchasing for stores that are not able to use traditional equipment and provides paying options other than cash [15].

3. Literature review

When the literature about Fintech applications in the finance industry is investigated it has been identified that studies were completed by countries, and mainly focused on (i) how consumers can react to Fintech applications, (ii) what are the challenges and barriers of Fintech applications for a specific country, and (iii) how Fintech applications can be popularized in the target country.

Starting with the challenges faced by countries on Fintech applications, Narayanasamy et al. [16] explored factors affecting the adoption of Fintech applications with a dataset of 100 participants who use Fintech applications. They identified that security, income, and cost are the main concepts that affect the adaptation of Fintech. Saksonova and Kuzmina-Merlino [17] studied the usage level of Fintech applications in Latvia compared to Europe and offered several recommendations to managers of Fintech enterprises. The study revealed that people in Latvia are not very aware of the applications. Furthermore, they made several suggestions to populate Fintech applications in Latvia such as forming impressive marketing campaigns to enhance the public's awareness, offering tax initiatives to attach investment to the sector, training human resources to specialize in Fintech applications, and further informing the population. Moreover, Harrison and Jürjens [18] examined the factors which affect the expectations of both users and organizations to adopt Fintech. Their study showed that data security, customer trust, and user design interface have an impact on adopting Fintech applications and can be a challenge.

Fintech applications provide cost-effective and more efficient transactions and have a crucial role in the banking industry since it is beneficial for customers [19]. Rizvi et al. [20] studied factors that enable penetration and growth of Fintech applications in Pakistan. Prominent suggestions to popularize the Fintech applications in the banking industry are promoting the Fintech applications, establishing an ecosystem where Fintech providers and consumers trust each other and the government's support. In another study, Nguyen et al. [21] investigated Fintech applications' development in the Vietnamese banking industry alongside identifying challenges to promote Fintech applications in the banking and finance systems in Vietnam. Legal corridor, infrastructure, Fintech companies, customers, and human resources are the main barriers that the Vietnamese banking industry deals with. Main solutions to overcome these problems are finalizing the regulatory framework, encouraging the research and implementation of block-chain technology, training human resources for gaining Fintech application specialty, and constant promotion about Fintech applications.

Ratten [22] investigated the factors determining the intention of users to adopt Fintech applications. The research focused on the effects of users' entrepreneurship and learning disposition on marketing and information related to mobile banking. The results obtained are aimed to reduce the risks faced by users of financial institutions in e-finance applications.

Another popular subject on Fintech is money laundering, which is a global problem that authorities have been desperately trying to prevent but still fail. Banks must follow protocols such as "Know-your-Customer," "Anti-Money Laundering," and "Combatting the Financing of Terrorism" [23]. So, the fact that participants of a blockchain are anonymous, drew criticism from all over the world as money laundering could get much easier. While it is true that following someone on the blockchain is impossible, blockchain can help fighting frauds as you must justify the source and destination of each transaction, and all transactions can be followed publicly. HSBC, OCBC Bank, IMDA and Mitsubishi Financial Groups are working on a pilot blockchain system to reduce duplication and increase transparency [23].

From the robo-advisory function of Fintech services, the operations are based on calculations and algorithms which minimize error and risk. First, you must fill out a form and survey for the system, so that your investor profile can be figured out. Then, a recommended portfolio is created according to your profile, which consists of different asset classes in risk and liquidity. There exist many different approaches for determining the portfolio weights, but most robo-advisors use modern portfolio theory [24]. Following the investment, algorithmic rebalancing provides stability of the portfolio weights and therefore the risk-level by shifting investments among asset classes to revert towards its predefined risk long-term equilibrium, when the weights of the portfolio change [24]. The speed and precision of artificial intelligence (AI) is incomparably higher than a human's capability and there is no emotional decision-making involved. Based on the advantages it creates, AI and Fintech applications have been the focus of financial institutions. For instance, banking is one of the leading sectors that digitalization is applied for saving time, diminishing operational costs, increasing profitability and simplifying transactions for customers [25]. Therefore, it usually requires renovation of financial structure (Yoo et al., 2010). The main aim is to extend customer satisfaction and outline future customer needs [26].

Digitalization in banking is also used to improve service quality and introduce new financial products. To catch up with this global trend is crucial for banks as new market participants like Fintechs are a great threat to their effectiveness. Fintech applications in the banking sector are applied in various fields such as payment and collections systems, money transferring, savings, budgeting and borrowing. Loebbecke and Picot [27] stated that the first Fintech applications were designed for payment services such as Paypal. However, introducing Fintech applications on lending services provided a competitive advantage for conventional banks. With new technologies, customer expectations of the banking system have changed. Thus, banks face the challenge of improving their efficiency with the boosted competition. Philippon [28] illustrated that Fintech applications increased productivity in financial services (outputs) and lowered operating costs (inputs).

In a recent study, Kou et al. [29] analyzed Fintech investments in European banking with an application of interval type-2 fuzzy DEMATEL and interval type-2 fuzzy TOPSIS models. Empirical findings illustrate that 'payment and money transferring systems' are the most important Fintech-based investment alternatives. It is suggested that the European banks should mainly direct their investments into these channels for higher customer satisfaction and improved profitability.

According to Fu and Mishra [30], the number of mobile app downloads across major categories has increased and finance applications download rates increased

both in the first and second lockdowns during the Covid-19 pandemic. This might be expected as, during the first lockdown in Europe, people were discouraged to use banknotes and were encouraged to contactless payment methods [31]. In addition, people were also encouraged to stay at home, therefore they were motivated to complete their financial transactions via financial applications. Saraogi [32] listed countries that were most affected by Covid-19 as Belgium, Brazil, China, France, Germany, Italy, Netherland, Spain, Switzerland, Turkey, the United Kingdom, and the United States. Considering the implemented social distancing and other precautions against the Covid-19, it was expected to see the number of downloads of Fintech applications to increase. Recent research conducted by MasterCard revealed that 79% of people worldwide and 91% in the Asia Pacific prefer to use tap-and-go payments due to safety and cleanliness reasons [32].

To sum up, Fintech applications make a significant contribution to the financial system by reducing costs, providing higher quality services and increasing customer satisfaction. Since the beginning of the pandemic, the speed of applications has boosted significantly. However, due to the short time span on the availability of detailed data in numerous industries and countries, new studies play an essential role to identify the needs of individual sectors and improve Fintech investments.

4. Empirical analysis

The aim of the analysis in this chapter is to evaluate the selection of best Fintech-based investments in the Turkish banking sector with an application of a hybrid DANP-fuzzy TOPSIS (Technique for Ordering Preference by Similarity to Ideal Solution) technique. DANP determines the weights of the SWOT factors and the fuzzy TOPSIS selects the best strategy for the Turkish banking sector. We identified the best strategies for decision-makers using an integrated model of the fuzzy TOPSIS technique with SWOT and DANP. To achieve a competitive advantage with growing Fintech applications, banks should identify targeted financial activities for prioritized Fintech investments. **Table 1** presents the proposed strategies based on feedback from the experts in the banking industry and academia.

4.1 Hybrid model construction

The integrated model has been built to select the best Fintech investment strategies for the Turkish banking sector by using the DANP (a combination of Decision-Making Trial and Evaluation Laboratory (DEMATEL) method and Analytical Network Process (ANP) method) technique to determine the weights of the SWOT factors followed by the fuzzy-TOPSIS (Technique for Order of Preference by Similarity to Ideal Solution) technique to select the best strategy. In determining the criteria for strategy

Proposed strategies	Explanation
Strategy 1	Directing investments to Fintech applications in payment systems
Strategy 2	Directing investments to Fintech applications in lending services
Strategy 3	Directing investments to Fintech applications in collection services
Strategy 4	Directing investments to Fintech applications in asset and wealth (investment) management
Source: Authors' own table.	

Table 1.
Formulating strategies.

formulation in this study, four banking experts with 15–20 years of experience cooperated to design a set of strategies. Then, three academics constructed the problems and modified strategies based on the expert scales and linguistic variables to evaluate the relative importance of the criteria and to select the strategies. First step of the analysis begins with the DANP technique to create the averaged initial direct relationship matrix with results presented in **Table 2**. The relationship among the SWOT factors is based on experts scales evaluated by the decision-makers.

Strengths are identified as increased service speed, improved customer satisfaction and cost reduction while weaknesses are customer adoption to no human transactions, physiological factors such as trust, technological capacity of customers. On the other hand, opportunities cover speedy international transactions, being part of Open Banking which may help in credit scores and providing alternative instruments/services. And finally, threats are identified as high initial investment costs, security and coping with foreign bank competition.

The second step is the application of the fuzzy TOPSIS technique to rank the proposed strategies. After constructing the fuzzy decision matrix, we normalized and weighted the matrix with DANP. **Table 3** introduces the findings in ranking the proposed strategies. $Di+$, $Di-$ and CCi are the values indicating distances of each strategy alternative from the positive and negative ideal solution.

Empirical findings of the analysis indicate that Strategy 2 has the best rank among the alternatives, followed by Strategy 1 and Strategy 3, whilst Strategy 4 has the weakest importance among the strategy preferences. Our findings suggest that policy makers/bank managers should focus more to direct Fintech investments firstly to lending services followed by payment systems.

4.2 Empirical findings

We applied a hybrid DANP-fuzzy TOPSIS technique to evaluate the selection of best Fintech-based investments in the Turkish banking sector. Ranking of the strategies helps us to identify the importance/priority of the proposed strategies on directing Fintech investments to various activities of Turkish banks. Empirical

	ri	yi	$(ri + yi)$	$(ri - yi)$
S (strengths)	6.37	5.36	11.73	0.94
W (weaknesses)	5.01	5.78	10.81	−0.77
O (opportunities)	5.92	5.51	11.43	−0.31
T (threats)	5.43	5.91	11.34	−0.48

Source: Authors' own table.

Table 2.
Impact-relationship degrees of dimension.

Strategies	$Di+$	$Di-$	CCi	Ranking
Strategy 1	9.585	1.531	0.132	2
Strategy 2	9.443	1.583	0.156	1
Strategy 3	9.649	1.449	0.112	3
Strategy 4	9.896	1.216	0.108	4

Source: Authors' own table.

Table 3.
Selection of the best Fintech investment strategy.

findings illustrate that among the financial activities of Turkish banks, lending services are identified to signal the highest need for Fintech investments. Payment services also show a priority in attracting Fintech investments being ranked as the second strategy. Receivable collection services and investment management services are not categorized as prioritized as others. These results should be interpreted carefully as customer satisfaction and expectations may differ from one country to another based on cultural and economic differences as well as the level of education and access to technology. To sum up, empirical analysis in this chapter suggests that policy makers/bank managers should focus more on direct Fintech investments firstly to lending services followed by payment systems.

5. Conclusions

Life has started to flow very quickly with the advancement of technology and the financial sector has also followed these developments with Fintech applications. Financial activities can be done faster and more effectively than traditional methods. With the Fintech applications, operations can be handled at the desired place and time because smart devices and online platforms eliminate the need of going to a bank. With the decrease of trust in traditional order due to the unethical attitudes displayed by traditional intermediaries, the Fintech sector has gained quick popularity in our lives [33].

Besides its advantages, there are also several disadvantages of Fintech applications. The Fintech industry is still developing faster than expected and there is no distinct transition to Fintech industries from traditional intermediaries. Therefore; the governmental regulations are tailored according to traditional companies [33]. As a result, Fintech companies may act through their desires and consider the requests of customers freely since some Fintech companies did not become legalized. The replacement of humans by artificial intelligence has negative effects on people's attitudes. In some circumstances, personal interaction becomes a need for customers. Researches show that only 11% of persons trust on robo-advisors and 49% of people do not prefer to use robo-advisory without getting consultancy from a real person [24].

Every invention brings along questions about the future and Fintech is no exception. Small ventures and entrepreneurs have concerns because they may lose their brand value, popularity, and the likelihood of the company in the future when they prefer crowdfunding instead of traditional banks to obtain capital. Since the crowdfunding process requires an online platform, all the investors and by extension the public may get quick notifications about the companies' failures and successes. Thus, even if the project has a future, if there is less demand or interest to project for a little time, investors who are expected to continue to invest may reduce their support or even cut their support completely.

Currently, we are living in unprecedented times in which we should have social distance from one another and stay at home. While these are happening, still businesses and organizations are expected to work without having any disruptions. At this point, entering new technologies into our lives was inevitable and in fact, these new technologies have helped us to get over this process with fewer flaws. One of these technologies was Fintech applications. Although, we used these technologies beforehand, with the Covid-19 precautions, the frequency and intensity of the usage of Fintech applications increased enormously. A recent study conducted in Singapore revealed that 80% of the consumers will probably continue to use Fintech applications even after the pandemic [34]. As one of the most affected countries from Covid-19, Turkey follows a similar trend for the utilization of Fintech applications.

Considering the challenges that other countries are dealing with while adopting Fintech applications, they are solutions to their problem. For instance, Saksonova and Kuzmina-Merlino [17] identified that during the utilization of Fintech applications, tax-related issues can appear. Therefore, governments should form related laws and regulations to regulate Fintech applications. Furthermore, Harrison and Jürjens [18] revealed that security is another important issue during the adoption of Fintech applications. Thus, awareness about security must be improved by both governments and businesses, which use Fintech applications. Finally, Nguyen et al. [21] illustrated that both employees and consumers might not understand the Fintech applications fully. Thus, training can be offered to them to explain the abilities of the Fintech applications.

Author details

Özlem Olgu Akdeniz
College of Administrative Sciences and Economics, Koç University,
Istanbul, Turkey

*Address all correspondence to: oolgu@ku.edu.tr

IntechOpen

References

[1] Alt R, Beck R, Smits MT. FinTech and the transformation of the financial industry. Electronic Markets. 2018;**28**:235-243. DOI: 10.1007/s12525-018-0310-9

[2] Lee I, Shin YJ. Fintech: Ecosystem, business models, investment decisions, and challenges. Business Horizons. 2018;**61**:35-46

[3] Thakor AV. Fintech and banking: What do we know? Journal of Financial Intermediation. 2020;**41**:100833

[4] Iman N, Tan AWK. The rise and rise of financial technology: The good, the bad, and the verdict. Cogent Business & Management. 2020;**7**:1. DOI: 10.1080/23311975.2020.1725309

[5] Moden N, Neufeld P. How Covid-19 has sped up digitalization for the banking sector. 2020. Available from: https://www.ey.com/en_gl/financial-services-emeia/how-covid-19-has-sped-up-digitization-for-the-banking-sector

[6] Kagan J. Financial technology—Fintech. 2020. Available from: https://www.investopedia.com/terms/f/Fintech.asp#:~:text=%E2%80%8B%E2%80%8B%E2%80%8BAt%20its,combination%20of%20%22financial%20technology%22

[7] Arner D, Barberris J, Buckley R. The evolution of Fintech: A new post-crisis paradigm? University of Hong Kong Faculty of Law. Research Paper No. 2015/047. 2015

[8] Nicoletti B. The Future of Fintech: Integrating Finance and Technology in Financial Services. Cham: Palgrave Macmillan; 2017

[9] Menat R. Why we're so excited about Fintech. In: Chishti S, Barberris J, editors. The Fintech Book. London: John Wiley and Sons; 2016. pp. 46-51

[10] Bank of International Settlements. Promoting Global Monetary and Financial Stability. Annual Economic Report; 2018

[11] Ertz M, Boily E. The rise of the digital economy: Thoughts on blockchain technology and cryptocurrencies for the collaborative economy. International Journal of Innovation Studies. 2020;**3**:84-93. DOI: 10.1016/j.ijis.2019.12.002

[12] Lopez JC, Babcic S, De La Ossa A. Advice goes virtual: How new digital investment services are changing the wealth management landscape. 2017. Retrieved from: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3084057

[13] Jung D, Dorner V, Glaser F, Morana S. Robo-Advisory: Digitalization and Automation of Financial Advisory. Business and Information Systems Engineering. 2018;**60**(1):81-86. DOI: 10.1007/s12599-018-0521-9

[14] Fenwick M, McCahery J, Vermeulen E. Fintech and the financing of entrepreneurs: From crowdfunding to marketplace lending. 2017

[15] Kang J. Mobile payment in Fintech environment: Trends, security challenges, and services. Human-centric Computing and Information Sciences. 2018;**8**:32. DOI: 10.1186/s13673-018-0155-4

[16] Narayanasamy K, Rasiah D, Tan TM. The adoption and concerns of e-finance in Malaysia. Electronic Commerce Research. 2011;**11**(4):383

[17] Saksonova S, Kuzmina-Merlino I. Fintech as financial innovation—The possibilities and problems of implementation. European Research Studies Journal. 2017;**20**(3A):961-973

[18] Harrison S, Jürjens J. Data security and consumer trust in Fintech in

innovation in Germany. Information and Computer Security. 2018;**26**(1):109-128

[19] Cheng MA, Wu Q, Yang B. How valuable is FinTech innovation? The Review of Financial Studies. 2019;**32**(5):2062-2106

[20] Rizvi SKA, Naqvi B, Tanveer F. Is Pakistan ready to embrace Fintech innovation? The Lahore Journal of Economics. 2018;**23**(2):151-182

[21] Nguyen DD, Dinh HC, Nguyen DV. Promotion of Fintech application for the modernization of banking-finance system in Vietnam. Journal of Asian Finance, Economics and Business. 2020;**7**(6):127-131

[22] Ratten V. Entrepreneurship, e-finance and mobile banking. International Journal of Electronic Finance. 2012;**6**(1):1-12

[23] Suominen K, Chatzky A, Reinsch W, Robison J. (Rep.). Center for Strategic and International Studies (CSIS). 2018. DOI:10.2307/resrep22491

[24] Jung D, Glaser F, Köpplin W. Robo-advisory: Opportunities and risks for the future of financial advisory: Recent findings and practical cases. 2019. DOI: 10.1007/978-3-319-95999-3_20

[25] Bhutani S, Paliwal Y. Digitalization: A step from sustainable development. OIDA International Journal of Sustainable Development. 2015;**8**(12):11-24

[26] Valenduc G, Vendramin P. Digitalisation, between disruption and evolution. European Review of Labour and Reserach. 2017;**23**(2):121-134

[27] Loebbecke C, Picot A. Reflections on societal and business model transformation arising from digitization and big data analytics: A research agenda. Journal of Strategic Information Systems; 2015

[28] Philippon T. The Fintech Opportunity. BIS Working Paper No. 655. 2017

[29] Kou G, Akdeniz OO, Dincer H, Yuksel S. FinTech investments in European banks: A hybrid IT2 fuzzy multidimensional decision-making approach. Financial Innovation. 2021;**7**:39

[30] Fu J, Mishra M. Fintech in the time of Covid-19: Trust and technological adoption during crises. Swiss Finance Institute Research Paper No. 20-38. 2020. Available from: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3588453

[31] Cocheo S. More consumers prefer contactless payments for pandemic purchases. 2020. Available from: https://thefinancialbrand.com/101415/payment-contactless-card-mobile-wallet-digital-coronavirus-covid-19-pandemic-trend/

[32] Saraogi V. Contactless payments will be the new normal for shoppers in the post Covid-19 world. 2020. Available from: https://newsroom.mastercard.com/asia-pacific/2020/05/20/contactless-payments-will-be-the-new-normal-for-shoppers-in-the-post-covid-19-world/

[33] Pejkovska M. Potential negative effects of Fintech on the financial services sector examples from the European Union, India and the United States of America. 2018. Retrieved from: https://www.theseus.fi/bitstream/handle/10024/148416/Maja_Pejkovska_Theseus.pdf?sequence=1andisAllowed=y

[34] Gene NK. 8 in 10 will continue banking online after pandemic: Survey. 2020. Available from: https://www.straitstimes.com/singapore/8-in-10-will-continue-banking-online-after-pandemic-survey