Chapter 2
Fintech Ecosystem in Turkey: An Evaluation in Terms of Financial Markets and Financial Stability

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Abstract FinTech is an innovation that integrates technology into financial services. FinTech contributes to the economy by increasing financial access and new products and services, therefore it has an important role in shaping the future of the financial system. FinTech market has been rapidly growing worldwide, and awareness of financial market users of FinTech has been increasing. This rapid growth in FinTech market makes evaluating status of FinTechs significant. This paper aims to evaluate the economic significance, benefits, and solutions of FinTech, status of FinTech markets worldwide and in Europe, and impact of FinTech on banking market structure. This paper evaluates the FinTech ecosystem in Turkey and effects of FinTech on financial stability and financial markets with a SWOT analysis and makes proposals for Turkey.

Keywords FinTech · Banking · Financial stability

2.1 Introduction

Globalization has transformed the financial markets and this transformation has accelerated with the technology. Technological transformation makes it easy to access financial services, increases diversity and quality of the financial products and services, and reduces costs. The impact of FinTech has been felt in the world and in Turkey also.

FinTech has no common accepted definition. The Financial Stability Board (FSB) defines FinTech as technologically enabled innovation in financial services that could result in new business models, applications, processes, or products with an associated

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S. Bozkuş Kahyaoğlu (ed.), *The Impact of Artificial Intelligence on Governance, Economics and Finance, Volume I*, Accounting, Finance, Sustainability, Governance & Fraud: Theory and Application, https://doi.org/10.1007/978-981-33-6811-8_2

significant effect on financial markets and institutions and the provision of financial services (FSB 2019).

FinTech is an important opportunity to shape the future of the financial system due to its contribution to the economy and increasing financial access and new products and services. The demand for digital financial services has increased due to changing consumer expectations, and the progress in the information technology (IT) sector and changes in financial regulations have contributed to the acceleration of FinTech's progress and expansion in recent years. It is expected that the development of FinTechs will have more impact on the banking sector activities and riskiness in the future and the financial regulations for the sector are expected to be reviewed and changed accordingly. The heightened competition of FinTechs is expected to have an impact on financial stability and requires an evaluation of the FinTech ecosystem in terms of financial stability.

The main factors that make FinTech popular are technological developments, changing customer demands, and macroeconomic conditions. The strong banking system, the expansion of card payment systems, and an intensive use of mobile technology provide important opportunities to FinTech start-ups in Turkey. This situation shows Turkey will have an important role in FinTech ecosystem in the long run. The FinTech ecosystem has been growing with new start-ups and investors with banking system and financial markets' support. FinTech start-ups come into focus in Turkey as well as all over the world.

This paper aims to evaluate the economic significance, benefits, and solutions of FinTech, status of FinTech markets worldwide and Europe, and impact of FinTech on banking market structure. This paper evaluates the FinTech ecosystem in Turkey and effects of FinTech on financial stability and financial markets with a SWOT (Strengths, Weaknesses, Opportunities, Threats) analysis and makes proposals for Turkey because FinTech has become a rising star in the world and shaped the financial system. This paper intends to contribute to literature on conceptual FinTech evaluation.

The rest of the study is organized as follows. The following section overviews the economic significance of FinTech, world and European FinTech markets, benefits of FinTech industry and solutions for capital markets, and the impact of FinTech on the structure of the banking industry. The third section evaluates the relation between FinTech and financial stability. The fourth section is about the FinTech ecosystem and its impacts on financial markets in Turkey. A SWOT analysis of Turkey's FinTech market is figured in the fourth section. The last section concludes the paper.

2.2 The Overview of Fintech Market

The Economic Significance of FinTech

The evolution of FinTech has occurred in three periods. The financial services industry largely remained an analog industry for the public while the industry was intensively interconnected with technology from 1866 to 1987, a period that we label FinTech 1.0. The period between 1987 and 2008 is called as FinTech 2.0. In this period, financial services had become highly globalized and digital in developed countries. FinTech was dominated primarily by the traditional regulated financial services industry which used technology to deliver financial products and services in FinTech 2.0. The period after 2008 is FinTech 3.0, and new start-ups and existing technology companies have begun to provide financial products and services besides the traditional regulated financial services companies in FinTech 3.0 (Arner et al. 2015). The FinTech sector has grown significantly over the last decade with the invention of cloud computing, smartphones, and high-speed internet (Arner et al. 2018). According to GSMA (2019) report, the number of mobile internet users is expected to reach 5 billion by 2025. This increase reported by GSMA reveals that the world's ongoing appetite for the internet may be a signal for the future of FinTech sector that has the power to change all financial systems worldwide. After 2008, almost all financial institutions were affected by FinTech, in parallel with regulatory and structural changes (Bayón and Vega 2018). Fintech companies are trying to receive a part of the profitable business of the banking industry (Varga 2017). FinTech activities include a number of alternative financial services such as peer-to-peer, alternative lending and crowdfunding, payments, clearing and settlement, personal finance like robo-advising, investment management, market support, and insurance (Demertzis et al. 2017; FSB 2017) that banking sector provides also. These services that FinTech provides disrupt financial intermediation by changing the structure of the financial system at various levels demonstrated in Fig. 2.1.

The rise of Fintech has quickly shifted from being a threat to being an opportunity for traditional players. All players have started to develop strategies to benefit from the development of new, technology driven, financial products and services (Deloitte 2016).

Digitally active customers are using several FinTech services. 50% of customers are using money transfer and payments, 24% insurance, 20% savings and investments, 10% borrowing, and 10% financial planning (EY 2017). The usage of technologically enabled financial services reveals the significance of FinTech sector.

Financial behaviors have been changing due to enhanced and easy-access technology. According to a survey by Goldman Sachs (2015), 33% of Millennial believe that they will not require a bank in 5 years, 14% of Millennial small business owners use alternative (nonbank) finance, less than half have a credit card and only half expect to use cash on a weekly basis by 2020.

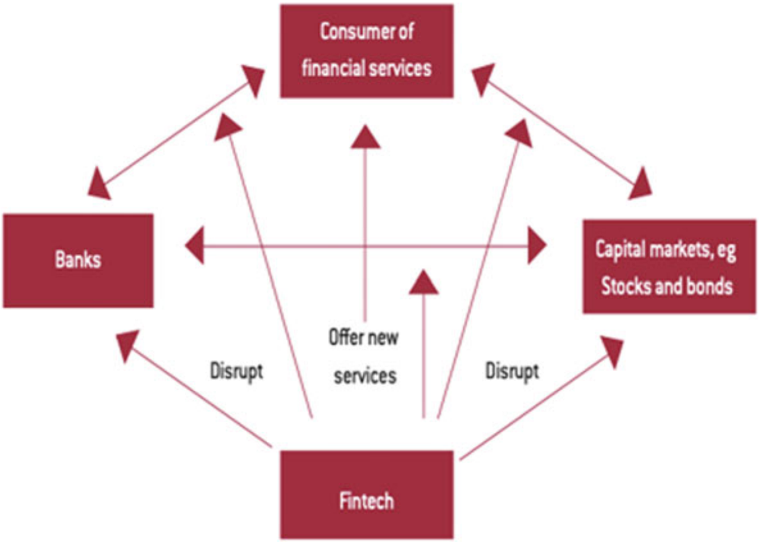

Fig. 2.1 The effect of Fintech on financial intermediation (*Source* "Capital Markets Union and the FinTech Opportunity" Demertzis et al. 2017: 24)

The Worldwide FinTech Market

FinTech market has been rapidly growing worldwide, and financial market users' awareness of FinTech has been increasing. EY, one of Big Four accounting firms, has been publishing FinTech Adoption Index since 2015. According to EY reports global consumer adoption of FinTech services increased from 16% in 2015 to 33% in 2017, to 64% in 2019. Worldwide, 96% of consumers know that at least one alternative FinTech solution is available to help them to transfer money and make payments. Small and medium sized enterprises (SMEs) are also using FinTech and EY report says that global SMEs adoption rate is 25% (EY 2019). Adoption of insurance (insurtech) has seen a significant growth from 8% in 2015 to nearly 50% in 2019 (Statista 2019).

More than 50 billion devices will be connected to the Internet by 2020. 50% of global payments predicted to be made through FinTech channels by 2022 due to increasing access to the Internet. $200 million of investments poured into RegTech companies since 2017. 80% of large banks have been set to support the development of FinTech application through open banking (SEON 2019).

The total value of FinTech deals globally declined 29% from the first half of 2018 (US$31.2 billion) to the same period of 2019 (US$22 billion) due to the lack of a giant deal like Ant Financial's record US$14 billion fundraising in May 2018. Excluding that transaction, global FinTech investments would have increased 28% in the first half of 2019 over the same period of 2018 (Accenture 2019). The global

FinTech market worth would increase to $309.98 billion until 2022 from $127.66 billion in 2018 (Ketabchi 2019).

Figure 2.2 demonstrates the value of investment in FinTech sector worldwide between 2011 and 2018. Investment in FinTech sector has increased from $2,5 billion to $54,4 billion dollars between 2011 and 2018.

According to the Crunchbase database, there are now 13.221 FinTech start-ups worldwide. Figure 2.3 demonstrates the number of Fintech start-ups worldwide as of February 2020, by region. There were 8,775 Fintech start-ups in Americans, 7,385 start-ups in Europe, the Middle East, and Africa, and 4,765 start-ups in Asia and the Pacific region. The Americans had the most Fintech start-ups globally.

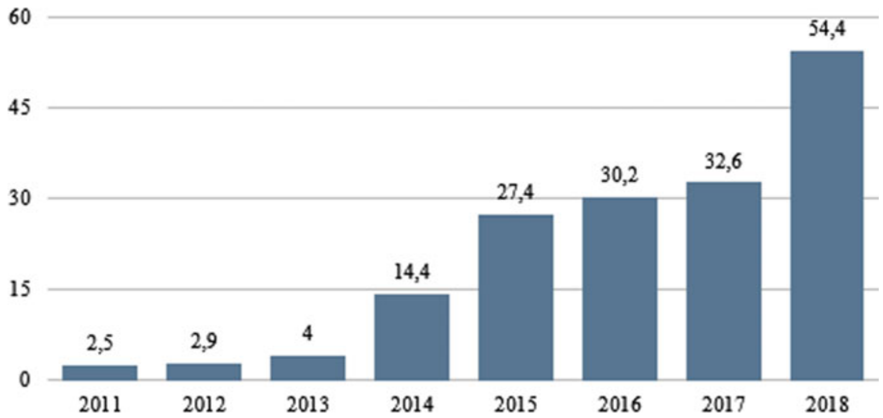

Fig. 2.2 Value of investment in FinTech Sector Worldwide (billion $) (*Source* Statista [2018, October] https://www.statista.com/statistics/557237/value-of-fintech-financing, accessed 02.01.2020)

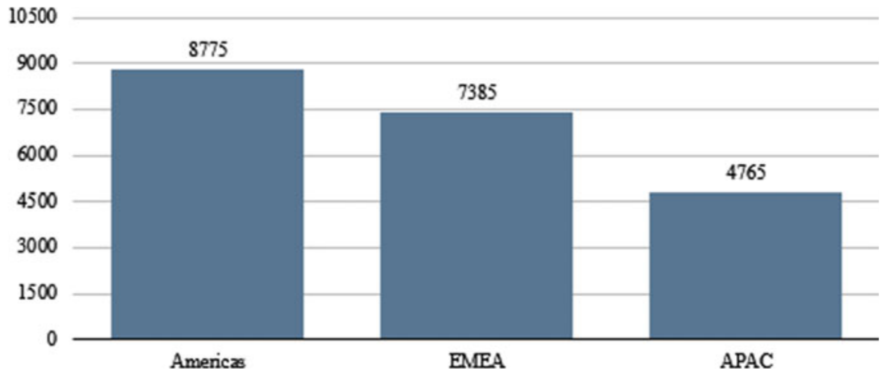

Fig. 2.3 Number of FinTech start-ups worldwide (2020, February) (*Source* Statista [2020] https://www.statista.com/statistics/893954/number-fintech-startups-by-region, accessed 16.03.2020)

Global Fintech Rank	Change from Startup Rank	Country	Total Score
1	► ±0	United States	31.789
2	► ±0	United Kingdom	23.262
3	▲ +18	Singapore	19.176
4	▲ +14	Lithuania	17.343
5	▲ +3	Switzerland	16.018
6	► ±0	The Netherlands	14.464
7	► ±0	Sweden	14.272
8	▼ -3	Australia	13.555
9	▼ -6	Canada	13.322
10	▲ +3	Estonia	13.303
11	▼ -2	Germany	12.787
12	▼ -8	Israel	12.771
13	▼ -3	Spain	12.372
14	▼ -2	Finland	12.110
15	▲ +2	India	12.024
16	▼ -5	France	11.803
17	▼ -3	Ireland	11.754
18	▲ +1	South Korea	11.543
19	▲ +18	Brazil	11.456
20	▼ -4	Denmark	11.368
21	▲ +6	China	11.143
22	▲ +1	Japan	11.114
23	▲ +30	Luxembourg	11.088
24	▲ +1	Italy	10.772
25	▲ +3	Austria	10.660
26	▼ -2	Belgium	10.586
27	▲ +19	Norway	10.497
28	▲ +1	Portugal	10.394
29	▼ -9	Poland	10.364
30	▲ +2	Mexico	10.294
31	▼ -9	Czechia	10.188
32	▼ -17	Russia	10.052
33	▲ +56	Malta	9.983
34	▲ +6	United Arab Emirates	9.928
35	▼ -5	Chile	9.746
36	▲ +11	Malaysia	9.692
37	▲ +14	South Africa	9.614
38	▲ +6	Argentina	9.425
39	▼ -6	Thailand	9.415
40	▼ -6	Colombia	9.289
41	▲ +1	Greece	9.210
42	▲ +10	Kenya	9.039
43	▼ -12	Ukraine	8.969
44	▼ -1	Turkey	8.937
45	▼ -19	New Zealand	8.893
46	▲ +8	Philippines	8.831
47	▼ -6	Indonesia	8.658
48	▲ +20	Cyprus	8.380
49	▼ -4	Latvia	8.329
50	new	Taiwan	8.321
51	▲ +21	Vietnam	8.118
52	▲ +4	Nigeria	7.918
53	▼ -14	Hungary	7.742
54	▼ -6	Slovenia	7.607
55	▲ +2	Peru	7.575
56	▼ -21	Bulgaria	7.542
57	▼ -19	Romania	7.447
58	▲ +17	Ghana	6.632
59	▼ -4	Belarus	5.986
60	► ±0	Egypt	5.676
61	▲ +26	Bangladesh	5.073
62	▼ -1	Pakistan	4.675
63	▲ +8	Uruguay	4.562
64	▲ +17	Uganda	4.037
65	▲ +17	Lebanon	3.941

Fig. 2.4 Global FinTech rankings of countries (*Source* Findexable [2020])

Global FinTech rankings of countries are demonstrated in Fig. 2.4. USA has the highest FinTech score and UK follows the USA. Fintech's top 10 countries are USA, UK, Singapore, Lithuania, Switzerland, Netherlands, Sweden, Australia, Canada, and Estonia (Findexable 2020).

Share of Fintech in total VC investment per region (2017–2019 YTD) is stated in Fig. 2.5. Share of Fintech in total VC investment in Europe is 20%, higher than the USA and Asia.

2.3 The European FinTech Market

There are 3.044 FinTech companies in Europe currently according to the Crunchbase database. Most EU Fintech companies operate in the areas of payment and alternative finance, and there are five Fintech unicorns (Adyen, Funding Circle, Klarna, Revolut, and Transferwise) in Europe, each of them with a value of $1 billion or more. FinTech is Europe's largest venture capital investment category with 20%, and the sector is more active in Europe than in Asia and the USA as demonstrated in Fig. 2.5 (Finch Capital and dealroom.co 2019).

The size of FinTech industry is smaller than the size of capital markets, and FinTech industry falls behind in Europe. EU countries have no significant development of FinTech applications as much as the UK has (Vives 2017: 97–98). Fintech investment in the UK is approximately $2.6 billion, and the number of deals reached

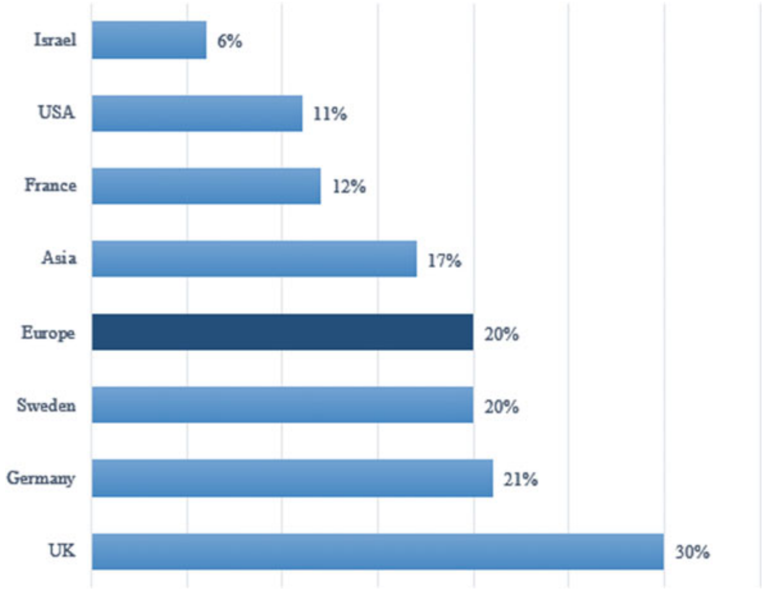

Fig. 2.5 Share of FinTech in total VC investment per region (2017–2019 YTD) (*Source* [Finch Capital and dealroom.co 2019])

263 increasing by 25% (Accenture 2019). The UK and Spain have the highest share of FinTech users in Europe, with 41% and 37%, respectively. The share of FinTech users in Germany is 35%. Germany is the third European country with 35% and above the global average (Carmona et al. 2018).

Cross-border activity can be measured in terms of funds inflow or funds outflow. Almost 50% of surveyed platforms had no inflow of funds from other countries, and 76% of FinTech start-ups reported no outflow of funds in 2015. This data reveals that FinTech activities tend to be based in Europe on a domestic basis and has very limited cross-border flows (Demertzis et al. 2017).

Other European markets also improved greatly with more than doubling investments in FinTechs in Germany in the first half of 2019, from $406 million to $829 million in the same period of last year. Fundraising in Sweden more than quadrupled, to $573 million, while French FinTechs raised $423 million in the first half of 2019, 48% more than the previous year (Accenture 2019).

2.4 Benefits of FinTech Industry and Solutions for Capital Markets

Fintech provides different products and consumer experiences, thus FinTech can extremely change financial intermediation. The availability of financial products through user-friendly mobile applications can change the way consumers and especially households use financial products (Demertzis et al. 2017).

Fintech can enhance the financial services industry in many ways, from providing a better client experience to reduce friction, strengthening critical infrastructure components, realizing efficiencies, and reducing costs for market participants and investing public (DTCC 2017). FinTech can also help businesses through improved payments systems, and invoicing and collections and customer relationship management. FinTech solutions include supply chain finance and e-invoice management portals. FinTech's innovative solutions include marketplace lending, ecommerce and merchant finance, invoice finance, online supply chain finance, and online trade finance for small businesses and providing them with increased access to more diversified financing options (AGT 2016). FinTech sector may help to reduce the cost of financial intermediation by improving access to finance (Demertzis et al. 2017) increasing financial inclusion, assessing the creditworthiness of loan applicants, improving the interface between financial clients and financial service providers (Vives 2017).

Due to having a potential to overcome information asymmetries that are related with the banking sector, FinTech market is efficient. FinTech companies also have no legacy technologies to handle and a culture of efficient operational design. This provides them to have a larger innovating capacity than traditional institutions (Vives 2017). FinTech services have several benefits for consumers, such as greater transparency and easy-access and affordable financial services to large masses of the population and SMEs, particularly in the area of credits and payments (Carmona et al. 2018).

FinTech companies offer disruptive innovations for the provision of specific services. FinTech start-ups are not held back by existing systems and are willing to make risky choices. In banking, for instance, successive mergers have left many large banks with layers of legacy technologies that are at best partly integrated. On the other hand, FinTech start-ups have the opportunity to build the right systems from the start. Moreover, FinTech start-ups share a culture of efficient operational design that many incumbents do not have. FinTech may show how far technology can go in providing low-leverage solutions. FinTech companies are funded with much more equity than existing firms (Philippon 2016).

FinTech improves efficiency and the customer experience and enables individuals to conduct transactions via their mobile phone and tablets, therefore FinTech reduces compliance costs for businesses through synchronization of financial data from several sources and integrate bank accounts from different financial institutions by data aggregators. FinTech intermediaries enable retail investors to participate more in the market by reducing information asymmetry in the market and matching investors, lenders, and borrowers well, thus FinTech intermediaries provide additional liquidity to the market (AGT 2016). FinTech provides a variety of possibilities for the financial services industry. B2B FinTech companies create real opportunities for incumbents to improve their traditional offerings. For example, white label robo-advisors provide software that helps clients to better investment management, so customer experience of an independent financial advisor may be improved.

Incumbent businesses could be more efficient thanks to partnerships with FinTech companies. A telematics technology provider in the insurance industry can help insurers to monitor their risks and driving habits. According to PwC Global FinTech Survey in 2016, cost reduction is the main opportunity of the rise of FinTech with the ratings of 73% of respondents. Incumbents could simplify and rationalize their core processes, services, and products, and therefore reduce operating inefficiencies in this regard. But FinTechs do not have the only advantage of cutting costs. Working together with FinTech companies could provide a differentiated offering, improve retention of customers, and generate additional revenues for incumbents. In this regard, 74% of fund transfer and payment institutions consider generating additional revenues as an opportunity of FinTechs. That FinTech generates additional revenues through faster and easier payments and digital wallet transactions is already true in the payments industry (PWC 2016).

2.5 The Impact of FinTech on Banking Market Structure

Due to their innovative solutions, FinTech start-ups are slowly getting a share of the banks (Belli 2016). Fintech institutions are putting pressure on the conventional banks' business model. Two competitive advantages of retail banks which may be undermined by the new entrants are that borrowing cheaply with their access to cheap deposits and explicit or implicit insurance by the government, and privileged access to a stable customer base that can be sold a range of products (Vives 2017).

The role of traditional bank deposits faces a challenge of the usage of digital currencies. Digital central bank money could pose a question fractional reserve banking and shift the financial system toward narrow banking (Demetrtzis et al. 2017).

Figure 2.6 shows the impact of alternative financial companies that nonbank institutions on several banking products and services according to opinions of senior banking executives worldwide in 2018. Alternative financial companies were having a large impact on wallets and mobile payments globally according to 66.7% of senior banking executives.

There are several risks and opportunities emanating from FinTechs on banks and the banking system. FinTech includes strategic and profitability risk, cyber-risk, operational risk, compliance risk with regard to data privacy, liquidity risk, and volatility of funding sources for banks. Opportunities of FinTech for banks are improved and more efficient banking processes, positive impact on financial stability due to increased competition (FORFIRM 2019).

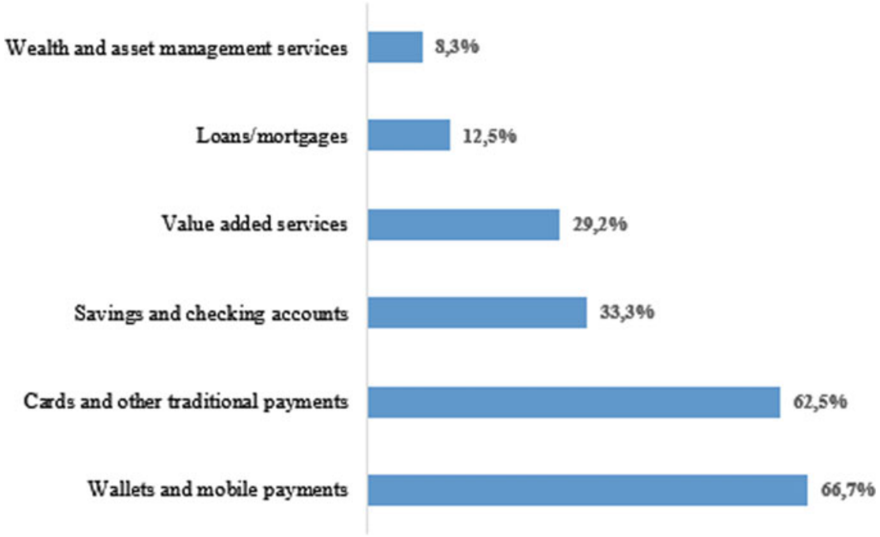

Fig. 2.6 Impact of alternative financial companies on several banking products and services according to senior banking executives worldwide in 2018 (*Source* Statista [2018, September])

There are over 30 fields such as next-generation personal financial management, new digital lending, peer-to-peer lending and investment, mobile payments, aggregator comparison engine, mobile point-of-sale devices, international remittances, other payment processing, social integration IoT and connected devices, telematics, next-generation trade finance, prevention, next-generation collateral management, trading, trade analytics, peer-to-peer corporate lending and investment, one-stop shop for businesses, digital cash management, next-generation lending to SMEs, robo-advisory, crowdfunding, social investing, blockchain, investment across regions engine, payment infrastructure, big data base risk assessment, application programming interface ecosystem, anti-money laundering and know your customer, cybersecurity, artificial intelligence, and machine learning emerging as new norms in global banking and FinTechs provide services in these areas (BKM 2016). That FinTech finance is a substitute for bank finance can be thought because of providing services in the same fields by banks and FinTechs, but Cole et al. (2019) state that bank finance is a complement to, and not a substitute for, crowdfunding that is a form of FinTech.

2.6 Fintech and Financial Stability Relationship

FinTech is worth looking at from a financial stability perspective. Fintech can improve the financial services industry by providing a better client experience to reducing friction, increasing access to the financial system, strengthening critical infrastructure components, reducing costs, and realizing efficiencies for market participants and the investing public. Besides these benefits, FinTech may also pose negative consequences, such as exacerbating cybersecurity threats or increasing third-party risks (DTCC 2017), systemic problems arising out of operational risk and risk of developing a new shadow banking system that increases systemic risk due working with less leverage than traditional banks (Vives 2017). These risks and benefits of FinTech affect financial stability.

The core banking function of credit, liquidity, and maturity transformation provided by FinTech companies may affect financial stability in a positive way by diversifying credit and liquidity risk within the financial system, and in a negative way by creating systemic vulnerabilities due lack of banking experience. The level of competition or cooperation between FinTech start-ups and traditional financial institutions may affect financial stability. The cooperation between FinTech companies and incumbents promotes financial stability because the competition forces banks to pursue riskier strategies and endangers financial stability (DTCC 2017).

FSB (2017) stated potential benefits of FinTech for financial stability as decentralization and diversification, efficiency, and access to financial services. FinTech may lead to greater decentralization and diversification in lending. Technological developments such as big data processing and automation of loan originations, have reduced barriers to entry. Robo-advice, RegTech, or applications of technology could strengthen efficiency of business models of incumbent financial institutions. Greater efficiency could reduce risks by decreasing settlement time. FinTech implications such as payment, lending, robo-advisory, InsurTech services have a significant role in increasing access to financial services.

FSB (2017) stated potential micro- and macro-financial risks of FinTech on financial stability. Micro-financial risks include financial risk and operational risk. Financial risks are maturity mismatch, liquidity mismatch, and leverage. Maturity mismatch of FinTech lending may cost to the economy and affect financial stability in a negative way. FinTech credit platforms do not perform liquidity transformation, because FinTech operations do not involve the holding of client monies. FinTech activities are not generally associated with leverage. Only a small part of FinTech credit platforms become involved in leverage when they use their own balance sheet to provide fund for loans. Operational risks include cyber risks, third-party reliance, and regulatory risk. Cyber-attacks pose a growing threat to the entire financial system. Disruptions to third-party services like cloud-based financial services are more likely to pose systemic risks. Existing legislation, legal, and regulatory frameworks do not cover FinTech activities. Macro-financial risks are contagion, procyclicality, and excess volatility. Significant and unexpected losses incurred on a single FinTech lending platform could be viewed as a signal of potential losses across the sector because of contagion effect. Interaction between investors and borrowers on FinTech lending platforms could potentially display larger fluctuation in sentiment than traditional fund intermediation. Because of the fast nature of FinTech activities asset prices volatility can increase and financial system is more sensitive to news.

FinTech-related developments which are new providers of bank-like services competing or cooperating with established financial services providers, provision of financial services by large technology companies, and reliance on third-party providers for cloud services have the potential to alter the current structure of the financial system, and may affect financial stability implications (FSB 2019).

Financial stability implications of FinTech have generally been considered as small due to their small size. Deeper involvement of large technology providers alter this consideration (FSB 2019). There is no more available official and privately disclosed data in the FinTech area, therefore there is a challenge on assessment of the implications of FinTech for financial stability. While there is currently limited evidence about risks emanating from advances in FinTech to financial stability, change is occurring rapidly and decisions taken in this early period may set significant precedents. Policymakers should continue to evaluate the adequacy of regulatory frameworks in an environment of rising adoption of FinTech, with the objective of harnessing the benefits while alleviating potential financial stability risks (FSB 2017).

Fintech has a welfare-enhancing capability but regulation should be adopted so that the new technology provides several benefits without endangering financial stability (Vives 2017).

2.7 Fintech Ecosystem, Impacts on Financial Markets in Turkey, and a Swot Analysis

High-growth technology investments supplant the investments in traditional industries, so that FinTech needs attention among the competitive strategies of countries to attract more foreign direct investments (Yazıcı 2019).

The Turkish industry has great potential and strong infrastructure; however comparingly to the major hubs in the world, such as London or San Francisco, that the Turkish industry is only at the beginning of a race is clear. This lagging of Turkey in FinTech is related with the late start in the game and thus time is required to adapt to the new tools of FinTech. Nevertheless, it has provided the industry with fast-paced adaptation skills, and the companies advantages of forecasting risks and opportunities (StantonChase 2014).

FinTech investments in Turkey decreased from $12,2 million to $8,4 million from 2018 to 2019. Although there was a decrease in FinTech investments, the number of ventures had increased from 14 to 17 (FinTech İstanbul 2019).

Istanbul is a very important city for FinTechs in Turkey. Istanbul has several strengths such as having a young talent pool both, having cheaper labor costs, and increasing brand value (Belli 2016). The government plans to make Istanbul a regional center of finance within the next 10 years. Banking sector is so strong in Turkey. Digitisation and skillful workforce within the banking sector is creating several opportunities for talented individuals to explore new innovative ideas in FinTech (Global FinTech Hubs Federation and Deloitte 2017). Companies in FinTech ecosystem of Turkey are banks and payment services companies and e-money institutions established in accordance with the amendments introduced by Law No. 6493 (EY 2018). Representative FinTech companies in Turkey are IyziCo and Papara.

Well-developed securities market and mature in attracting foreign capital are the advantages for FinTech in Turkey (Global Fintech Hub Report 2018).

According to FinTech country rankings that is demonstrated in "The Worldwide FinTech market" section in Table 2.1, global FinTech ranking of Turkey is 44 with the score of 8.937. Regional ranking of İstanbul, the emerging hub in Europe, between European FinTech cities is 21 with the score of 9.303 and global ranking of İstanbul is 56 (Findexable 2020).

There are more than 300 start-ups operating in 13 different verticals that include payments, banking, finance, asset management, corporate finance, personal finance management, insurance, crowdfunding, investment, big data, hubs, crypto coins, and blockchain in the field of FinTech in Turkey in 2019 according to the Startups.Watch statistics as seen in Fig. 2.7.

According to Cantürk who is a Financial Services Sector Director of Turkey in KPMG which is an international tax, audit, and consultancy firm, FinTech sector will develop by consolidation, agreements, global growth, open banking, blockchain, insurtech, RegTech, collaboration between banks and start-up companies in Asia and digital banking. Higher consolidation is expected in payment, credits and blockchain and start-up companies grow in international areas. Investors focus on FinTech companies as a result of agreements in FinTech sector. Banks also will continue to grow with increasing services and global growth will be realized. Open banking regulations will enhance the increasing role of start-up companies in financial sector.

FinTech investments are growing rapidly in Turkey due to the sound structure of financial institutions, particularly in the banking sector (Söylemez 2020). Investment into FinTech looks likely to continue and private equity investment is seen as being the largest source of finance to fund FinTech's future growth in Turkey (The City UK 2018).

Stakeholders of FinTech ecosystem in Turkey are entrepreneurs, universities, technology firms, traditional financial institutions, consumers, regulatory and supervisory authorities, government, investors of public offerings, venture firms, and angel investors. FinTech ecosystem in Turkey may be expressed with four main topics affecting FinTech ecosystem and factors of these topics demonstrated in Table 2.1.

Capital markets, asset management, mobile banking, payment methods, and digital currencies attract investors' interest in Turkey. FinTech players in Turkey are active in wallet applications, payment tracking, offline payment, pre-accounting, cash register, VPOS, credit scoring, and banking software (Deloitte 2017). Turkish banks demand Google Glass, wallet, beacon, and ATM projects from the FinTech companies in addition to mobile banking solutions. The m-commerce supplanted ecommerce currently in Turkey which makes P2P money transfer more vital. P2P money transfer innovations, like paying through mobiles, watches, and Google Glass arouse the interest of Turkish consumers. Some of the Turkish payment companies work very closely with the technology vendors and entrepreneurs within the ecosystem. These companies are open to work with anyone willing to introduce a new solution and to support them with their experience and know-how. This cooperative environment is very significant for companies because that may contribute to their businesses (Belli 2016).

Table 2.1 Main topics of the fintech ecosystem and the impacting factors

Topic	Factor	Explanation
Demand	Market Structure in the Country	The structure of the current financial services sector and the place of FinTechs
	Competition	The competition within the FinTech market, and between FinTechs and other financial institutions
	Consumer Behavior	The consumers' perspective to the FinTech industry
	Customer Experience	FinTechs' contribution and advantages for customer experience
	Opportunities and Threats	Opportunities and threats that FinTechs face in their fields of activity
	New Markets	New markets that may occur in the financial services sector
Regulation	Trust and Security	The public trust in the services provided by the FinTechs in terms of data security and finance
	New Regulations	Design and implementation of new regulations that will regulate the financial markets, and affect the FinTechs
	Operating Permits	Operating permits especially in the fields of payment and ecurrency
	Constraints and Obstacles	Constraints and obstacles faced by FinTechs when providing certain services
Capital	Public Funds and Government Assistance	Public aids and incentives to be provided for FinTechs
	Banks	The investments and financial support of banks in FinTechs
	Investors	The factors that have an impact on the angel investors, VCs, and public offering investors who invest in FinTechs
	Business Model	The new and creative business models of FinTechs to attract new investment
Human Resources	Quality, Quantity, and Cost	The quality and quantity of the current human resources in the sector, and the costs of hiring or training new human resources

(continued)

Table 2.1 (continued)

Topic	Factor	Explanation
	The Role of Financial Institutions	The role of the financial services institutions in training human resources
	The Role of Universities	Universities and other educational institutions' ability in training the human resources working in the FinTech sector
	Entrepreneurship within the Company	The approach of the institutions toward the entrepreneurial ideas

Source EY (2018)

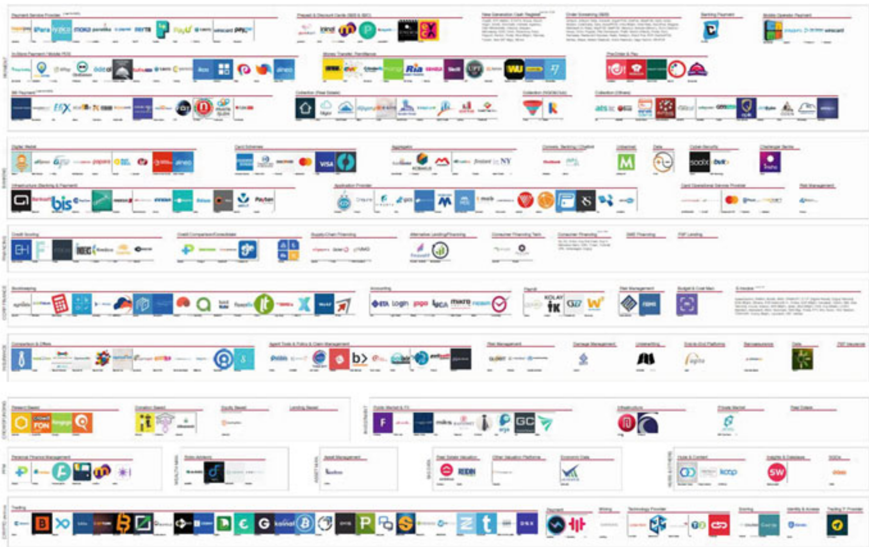

Fig. 2.7 Turkish FinTech ecosystem map (2019, May)

FinTech start-ups and banks were thought to be competitors in the beginning in Turkey. FinTech start-ups were trying to enter the market with their customer-oriented and innovative approaches although banks did not want to give their shares to FinTechs. The relation of FinTech start-ups and banks in Turkey can be dated back to 2013. At first, big banks provided superiority in the sector with their technology companies and the digital channels they developed. FinTech start-ups have entered the fields of the online payment systems and virtual POS areas that banks cannot realize, cannot enter, or are not willing to enter. There is currently lower cooperation between banks and FinTech start-ups in Turkey. TUBITAK and EU funds become prominent as government and publicly funded support for FinTechs, however, FinTechs in Turkey do not have confidence about these funds and are directed toward angel investors, venture capital, and bank incentives (Yazıcı 2019).

The quality of the FinTech infrastructure and the FinTech ecosystem determines the speed at which implementation of FinTech in a country. From the FinTech infrastructure and ecosystem perspectives Turkey is labeled as easy implementers that means good infrastructure and a supportive business environment. When FinTech demand and supply evaluated in Turkey, it has seen that lower FinTech need meets supportive FinTech environment (ING 2016).

A SWOT analysis should be performed to understand what Turkey needs to do for developing FinTech ecosystem. The SWOT analysis is demonstrated in Fig. 2.8.

Developments in FinTech field were on the agenda of Turkey and therefore FinTech-related articles were included in the 11th Development Plan. FinTech-related articles in 11th Development Plan are listed below Fintechtime (2019):

- Creation of a secure FinTech ecosystem that provides equal opportunity to companies through international good practices will be supported.
- A roadmap for the development of the Fintech ecosystem in Turkey will be provided and only a public institution will be authorized to implement the roadmap.
- A regulation experiment area and industry experiment area will be established.
- The Union of Payment Services and E-money Institutions will be established.
- Istanbul Finance and Technology Base will be established.
- The harmonization of regulations with the EU Payment Services Directive 2 will be ensured in order to strengthen the legal infrastructure of open banking.
- Access to financial services, financial awareness, and investor base will be increased.
- Financial literacy education to students in the primary, secondary, and higher education institutions and to adults will be provided.
- The Financial Advisory System in which the needs of financial consumers are determined correctly, their rights are protected against financial institutions and intermediary services are provided between both parties will be developed.

The awareness of financial consumers and their knowledge about managing financial transactions, and collaboration of FinTech companies and other financial institutions will have an increasing effect on the demands of individuals on the usage of financial products and services. The usage of FinTech products and services, which will increase financial inclusion, and the transition to cashless society should be encouraged. FinTech companies and existing financial institutions should establish common infrastructures that allow consumers to securely share financial transaction information, and common feedback mechanisms to inform consumers about transactions carried out on their data. Access to corporate data should be gained to local and foreign investors to invest in FinTech sector in Turkey (EY 2018).

Fig. 2.8 SWOT analysis of the FinTech sector in Turkey (*Source* Belli [2016])

2.8 Discussion

Financial markets have been changing at a rapid scale due to globalization. The technology has accelerated this transformation process of financial markets. The use of technology in financial markets is defined as FinTech, and the impact of FinTech has been felt worldwide and in Turkey also. Technological transformation makes it easy to access financial services, increases diversity and quality of the financial products and services, and reduces costs.

This paper aims to evaluate the economic significance, benefits, and solutions of FinTech, status of FinTech markets worldwide and Europe, and impact of FinTech on banking market structure. This paper evaluates also the FinTech ecosystem in Turkey and effects of FinTech on financial stability and financial markets with a SWOT analysis and makes proposals for Turkey because of FinTech is significant in shaping the financial system. This paper intends to contribute to literature on conceptual FinTech evaluation.

Investment in FinTech sector has increased from 2,5 billion dollars in 2011 to 54,4 billion dollars in 2018. There are now 13.221 FinTech companies worldwide while there are 3.044 FinTech companies in Europe. Fintech companies try to obtain a slice of the banking industry's profitable business and disrupt the financial intermediary. Because of that, FinTech may have positive/negative impacts on financial stability. Fintech can provide a better client experience to reducing friction, increasing access to the financial system, strengthening critical infrastructure components, reducing costs, and realizing efficiencies for market participants and the investing public. FinTech companies may diversify credit and liquidity risk in the financial system. However, FinTech has also negative consequences, such as exacerbating cybersecurity threats or increasing third-party risks, systemic problems arising out of operational risk, and risk of developing a new shadow banking system that increases systemic risk due to working with less leverage than traditional banks. FinTech companies may create systemic vulnerabilities due to lack of banking experience. The degree of competition or cooperation between FinTech firms and traditional financial service providers may affect financial stability. The cooperation between them promotes financial stability because the competition forces banks to pursue riskier strategies and endangers financial stability.

Investment in FinTech market of Turkey increased from 4,6 million dollars to 29 million dollars from 2012 to 2016, and more than 300 start-ups are operating in the field of FinTech in Turkey as of December 2019. Stakeholders of FinTech ecosystem in Turkey are entrepreneurs, universities, technology firms, traditional financial institutions, consumers, regulatory and supervisory authorities, government, investors of public offerings, venture firms and angel investors. Mobile banking, payment methods, asset management, capital markets, and digital currencies arouse interest and investments in Turkey. FinTech players in Turkey are active in wallet applications, offline payment, pre-accounting, payment tracking, VPOS (Virtual Point of Sale), banking software, credit scoring, and cash register areas.

Turkey has a good infrastructure and a supportive business environment in FinTech ecosystem. Lower FinTech need meets supportive FinTech environment in Turkey. Some of the strengths of Turkish FinTech sector are strongly structured and highly regulated banking sector since 2001, central location between Europe and the Middle East, high mobile phone and smartphone penetration rate, tech-savvy young population, and the increase in the number of entrepreneurship centers. Developing an infrastructure to foster innovation, making Istanbul a global financial center, partnerships and collaborations with foreign FinTech companies, locationally potential to become a regional FinTech hub, increasing mentorships provided by banks to FinTech start-ups are several opportunities of Turkish FinTech sector in Istanbul. Weaknesses of the Turkish FinTech sector include the requirement for establishing infrastructure, lack of experts in financial services sector to support the sector, highly regulated banking sector, poor communication, and collaboration between banks and technology companies. Historically high inflationary economy, low ability to attract talented and multilingual workforce, and security concerns of businesses and individuals about FinTech solutions are several threats for Turkish FinTech sector.

FinTech has been brought to the agenda of Turkey. There are planned implications for developing FinTech sector in 11th Development Plan of Turkey. That means FinTech may have a bright future in Turkey with the increased financial literacy and financial awareness, though local and foreign investment in FinTech will be increased in Turkey.

References

Accenture (2019) Global Fintech Fundraising Fell in First Half of 2019, with Decline in China Offsetting Gains in the US and Europe, Accenture Analysis Finds. https://newsroom.accenture.com/news/global-fintech-fundraising-fell-in-first-half-of-2019-with-decline-in-china-offsetting-gains-in-the-us-and-europe-accenture-analysis-finds.htm (accessed 16.03.2020).

AGT (2016) Economic Benefits of FinTech. https://treasury.gov.au/publication/backing-australian-fintech/economic-benefits-of-fintech (accessed 5.03.2020).

Arner DW, Barberis J, Buckley RP (2015) The Evolution of FinTech: A New Post-Crisis Paradim? http://hdl.handle.net/10722/221450. The University of Hong Kong (accessed 7.05.2020).

Arner DW, Buckley RP, Zetzsche DA (2018) FinTech for Financial Inclusion: A Framework for Digital Financial Transformation-A Report to the Alliance for Financial Inclusion. https://www.afi-global.org/sites/default/files/publications/2018-09/AFI_FinTech_Special%20Report_AW_digital.pdf (accessed 4.07.2020).

Bayón PS, Vega LG (2018) An Outlook on the Role of Finance Regulation Under the Fourth Industrial Revolution. Archives of Business Research, 6(10), 423–434 (accessed 15.07.2020).

Belli M (2016) Banking and FinTech Developing a FinTech Ecosystem in Istanbul Learning Lessons from London. Bankalar Arası Kart Merkezi. https://bkm.com.tr/wp-content/uploads/2016/02/Banking-and-FinTech.pdf (accessed 4.07.2020).

BKM (2016) The Turkish FinTech Ecosystem Progress Report. https://fintechistanbul.org/wp-content/uploads/2019/04/FinTech-Progress-Report.pdf (accessed 25.06.2020).

Carmona AF, Lombardo G, Pastor RR, Quirós CT, García JPV, Muñoz DR, Martín LC (2018) Competition Issues in the Area of Financial Technology (FinTech). European Parliament Study. https://www.europarl.europa.eu/RegData/etudes/STUD/2018/619027/IPOL_STU(2018)619027_EN.pdf (accessed 25.06.2020).

Cole RA, Cumming DJ, Taylor JR (2019) Does FinTech Compete with or Complement Bank Finance? Available at SSRN. https://ssrn.com/abstract=3302975 (accessed 17.08.2020).

Deloitte (2016) Overview of the FinTech Sector: Challenges for the European Players and Possible Policy Measures at EU Level, Publications Office of the European Union, 2018. https://doi.org/10.2759/507164 (accessed 25.06.2020).

Deloitte (2017) FinTech Ecosystem in Turkey Report. https://www2.deloitte.com/tr/en/pages/finance/articles/fintech-ecosystem-in-turkey.html (accessed 17.08.2020).

Demertzis M, Merler S, Wolff GB (2017) Capital Markets Union and the FinTech Opportunity. Bruegel Policy Contribution Issue, 22, 1–17.

DTCC (2017) FinTech And Financial Stability Exploring How Technological Innovations Could Impact The Safety & Security of Global Markets, Fintech and Financial Stability—DTCCwww.dtcc.com › Files › PDFs (accessed 17.08.2020).
EY (2017) EY FinTech Adoption Index 2017: The Rapid Emergence of FinTech. Available at: http://www.ey.com/gl/en/industries/financial-services/ey-fintech-adoption-index (accessed 25.04.2020).
EY (2018) Twenty-three Suggestions for the Sustainable Improvement of the Turkey FinTech Ecosystem Report. https://bkm.com.tr/wp-content/uploads/2018/11/EY_Fintech_ENG.pdf (accessed 7.07.2020).
EY (2019) Global FinTech Adoption Index Report. https://www.ey.com/en_gl/ey-global-fintech-adoption-index (accessed 25.06.2020).
Finch Capital & dealroom.co (2019) The State of European FinTech. https://blog.dealroom.co/wp-content/uploads/2019/10/The-State-of-European-Fintech-2019.pdf?_ga=2.34433569.1466205195.1571827244-2104247381.1571407367 (accessed 16.03.2020) and (accessed 3.03.2020).
Findexable (2020) The Global Fintech Index City Rankings Report. https://findexable.com/wp-content/uploads/2019/12/Findexable_Global-Fintech-Rankings-2020exSFA.pdf (accessed 16.03.2020).
FinTechtime (2019) On Birinci Kalkınma Planı Fintech'ler için Ne Vadediyor? http://fintechtime.com/tr/2019/07/on-birinci-kalkinma-plani-fintechler-icin-ne-vadediyor/.
FinTech İstanbul (2019) Türkiye'de ve Dünyada FinTech 2019 Raporu. https://bkm.com.tr/wp-content/uploads/2015/06/Turkiyede_ve_Dunyada_Fintech_2019-1.pdf (accessed 16.03.2020)
FORFIRM (2019) https://www.forfirm.com/banking-system-fintech (accessed 02.01.2020).
FSB (2017) Financial Stability Implications from FinTech Supervisory and Regulatory Issues that Merit Authorities' Attention. https://www.fsb.org/wp-content/uploads/R270617.pdf (accessed 28.03.2020).
FSB (2019) FinTech and Market Structure in Financial Services: Market Developments and Potential Financial Stability Implications. https://www.fsb.org/2019/02/fintech-and-market-structure-in-financial-services-market-developments-and-potential-financial-stability-implications/ (accessed 17.08.2020).
Global FinTech Hub Report (2018) The Future of Finance is Emerging: New Hubs, New Landscapes. https://www.jbs.cam.ac.uk/fileadmin/user_upload/research/centres/alternative-finance/downloads/2018-ccaf-global-fintech-hub-report-eng.pdf (accessed 15.07.2020).
Global FinTech Hubs Federation and Deloitte (2017) A Tale of 44 Cities Connecting Global FinTech: Interim Hub Review 2017. https://www2.deloitte.com/content/dam/Deloitte/uk/Documents/Innovation/deloitte-uk-connecting-global-fintech-hub-federation-innotribe-innovate-finance.pdf (accessed 16.03.2020).
Goldman Sachs (2015) The Future of Finance-The Socialization of Finance. https://www.planet-fintech.com/downloads/The-future-of-Finance-the-Socialization-of-Finance-Golman-Sachs-march-2015_t18796.html (accessed 28.03.2020).
GSMA Intellgence (2019) The Mobile Economy. https://www.gsma.com/mobileeconomy/.
ING (2016) The FinTech Index. https://www.ing.nl/media/ING_EBZ_fintech-index-report_tcm162-116078.pdf (accessed 6.04.2020).
Ketabchi N (2019) State of the FinTech Industry. https://www.toptal.com/finance/market-research-analysts/fintech-landscape (accessed 18.05.2020).
Philippon T (2016) The FinTech Opportunity NBER Working Paper Series Working Paper 22476. http://www.nber.org/papers/w22476 (accessed 27.05.2020).
PWC (2016) Global FinTech Report, Blurred lines: How FinTech Is Shaping Financial Services. https://www.pwc.com/il/en/home/assets/pwc_fintech_global_report.pdf (accessed 16.03.2020).
SEON (2019) The State of FinTech and Fraud in 2019, https://seon.io/resources/ebook/the-state-of-fintech-and-fraud-in-2019/ (accessed 28.03.2020).
Söylemez Y (2020) FinTech Ecosystem and Banking: The Case of Turkey. In Handbook of Research on Strategic Fit and Design in Business Ecosystems (pp. 332–353). IGI Global.

StantonChase (2014) FinTech Turkey: A New Vision. https://www.stantonchase.com/wp-content/uploads/2014/10/Stanton-Chase-Turkey-FinTech-Research.pdf (accessed 02.01.2020)

Statista (2018, October), Value of investment in Fintech sector worldwide from 2011 to 2019. https://www.statista.com/statistics/557237/value-of-fintech-financing (accessed 02.01.2020) and (accessed 27.03.2020)

Statista (2018, September) Impact of Non-Traditional Financial Firms on Selected Banking Products and Services According to Senior Banking Executives Worldwide in 2018. https://www.statista.com/statistics/946886/impact-fintech-banking-products-services-globally (accessed 26.05.2020).

Statista (2019) Consumer Fintech Adoption Rates Globally from 2015 to 2019, by Category. https://www.statista.com/statistics/1055356/fintech-adoption-rates-globally-selected-countries-by-category/ (accessed 02.01.2020).

Statista (2020) Number of Fintech Startups Worldwide from 2018 to 2020, by Region. https://www.statista.com/statistics/893954/number-fintech-startups-by-region (accessed 16.03.2020).

The City UK (2018) Finance for FinTech Report. https://www.thecityuk.com/assets/2018/Reports-PDF/c439a47ef2/LSE-report-Finance-for-FinTech-TCUK-cobranded.pdf (accessed 5.06.2020).

Varga D (2017) FinTech, The New Era of Financial Services. Budapest Management Review, 48(11), 22-32.

Vives X (2017) The Impact of FinTech on Banking. European Economy, 2, 97–105.

Yazıcı S (2019) The Analysis of FinTech Ecosystem in Turkey. Journal of Business Economics and Finance, 8(4), 188–197. http://fintechtime.com/tr/2019/07/on-birinci-kalkinma-plani-fintechler-icin-ne-vadediyor (accessed 02.01.2020).

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