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Fintech Growth during COVID-19 in MENA Region: Current Challenges and Future prospects

Farah Naz[1] · Sitara Karim[2] · Asma Houcine[3,4] · Muhammad Abubakr Naeem[5,6]

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Abstract
In the wake of ongoing challenges faced by the disruption of COVID-19, the current study attempts to investigate fintech growth during COVID-19 in the Middle East and North African (MENA) region. The study applies descriptive analysis, content analysis, and keyword selection criteria to segregate current challenges and future prospects of fintech growth in the MENA region. Our study comprises 250 research articles, web reports, news articles, opinion papers, and commentaries. The study reported privacy issues, cybercrimes, financial disruption and instability, exploitation of social norms and values, rising inequalities, and non-compliance of regulatory authorities as major challenges posed by fintech startups in the MENA region. On the contrary, the future prospects of FinTech growth in the MENA region are employment opportunities, decentralization, cost-effectiveness, financial outreach, networking, and breaking traditional financial biases. The study recommended multiple implications for policymakers, regulation bodies, countries in the MENA region, and fintech developers.

Keywords COVID-19 · FinTech Challenges · FinTech Growth · FinTech Future prospects · MENA Region

1 Introduction

Digital evolution is changing the competition around the world which makes difference in the market and provide innovation to the businesses in order to gain competitive advantage in the market. The technological innovation and digital finance have been reshaping in the financial service industry which leads to the increase in the productivity of services and changing the people's life by meeting their expectations (Triki and Faye, 2013). These technological innovations create the financial

Extended author information available on the last page of the article

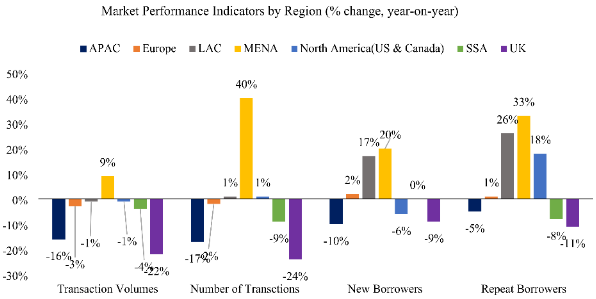


Fig. 1 Market Performance Indicators by Region. (Source: Ziegler et al., 2020)

innovation which changes the financial system. The developments in the financial innovation which normally taken as the Financial Technology i.e. Fintech enables the restructuring of the finance with the technological advancement to attract the nonfinancial customers into the financial sector (Beck, 2020; Philippon, 2019). Thus, increases the market return and economic progress of a country. Another dimension that helped the market is the financial inclusion which is basically providing the access to the formal financial services to the individuals and the enterprises enhanced the traditional model of using the services through branches to advanced model of financial inclusion (Emara and Mohieldin, 2020).

Fintech has raised the level of companies by increasing the development and entrepreneurial businesses in order to gain the advantage of the technological advancement and providing the accessible and affordable financial services (Abu Amuna et al., 2019). Though, Fintech has faced many obstacles due to asymmetries in the market created the losses to the entrepreneurs and the financial sector and impacted the society as a whole but have a significant impact on the market by the time with the knowledge to the non-participants created the more investments into the market.

The rising pace of Fintech adoption across the globe shows customer attraction towards financial technology where China and India has the highest rate of 87% amongst the 64 per cent global consumers (Young, 2019). Even during pandemic, the global fintech industry extended its growth with 3/5th of the firms through the launch of a new product or refurbishing the prevailing product. Although the progress is very much unsteady throughout the geographic regions, nationwide and across business models but fintech's are even than flourishing considerably well in its functioning and financing (Ziegler et al., 2020). In contrast to fintech hubs like Europe, Asia, and North Africa the banking Industry in MENA have also embraced financial technology which is delayed earlier. As a result of overhauling modernization and development of complex capital market structures, the fintech companies are surging new prospects in MENA region. The KSA and UAE are holding top lead in the region, while Egypt and Jordan are forthcoming.

As a consequence of increasing urbanization and use of smart technologies, people are more informed and have a better knowledge of FinTech. That is why it is one of the most commonly predicted and rapidly endorsed field of financial services.

A recent survey study by (Ziegler et al., 2020) showed the most signified segments of Fintech in MENA were Digital Payments accompanied by Digital Lending and Digital Banking. Almost all FinTech market performance indicators from MENA indicated the highest average growth, as compared to other regions. On the whole firms reported increments in average growth in all regions, although firms in the MENA regions could be distinguished on the basis of substantially greater year-on-year variation.

Basically, the structure of fintech companies is characterized by high- tech startup firms and the already established financial institutions. Fintech firms follows the idea of diverse unconventional business models to satisfy their customers. Subsequently, the number of startups is rising gradually overtime (Haddad & Hornuf, 2019). The role of fintech firms is crucial in bridging the gap between service providers and the users, to achieve the objective of financial inclusion. Fintech firms uses the advance technologies like Data analytics, Artificial Intelligence (AI), Robotic Process Automation (RPA), Blockchain, Machine Learning (ML), Internet of Things (IoT), Cloud computing (CC) to improve and accelerate the products and services offered to the clients. Since, the fintech enterprises has innovated and rescaled the traditional business processes which captivated customers attention. Now, a large number of countries are steadily upgrading their infrastructure by integrating and embedding these technological advances (Laahanen, Yrjänä, Martikainen, & Mlehner, 2019). According to the Financial Sector Deepening Africa (FSDA), the economic output that is related to the Fintech industry is expected to be increased by US$ 40 billion annually to US$ 150 billion by 2022. It is determined that there are almost three million people that are involved in the Fintech industry either directly or indirectly which ultimately give them the profit in working Fintech industry.

The transformation of finance with the reshaping of digital technologies enhanced the lending, payment, wealth management and health insurance during the COVID-19 pandemic which increased the usage of dynamic models into the market (Feyen et al., 2021). However, the financial system has faced many challenges in the COVID-19 pandemic that complicated the digital financial services (DFS) and the functions of the financial technology market. Hence, the social, economic shocks during the global pandemic have affected the Fintech sector which might have created the opportunities for some and losses for others (Rowan et al., 2020). Though, the pandemic has adversely affected initially but the economies tried to arrange the substitute in order to regulate the economy which ultimately increased the usage of financial technology and became a growth indicator for the Fintech industry (Nacera, 2021).

The spread of Fintech has been taken over all around the world which created the rapid growth into the Fintech industry. The Middle East and North Africa (MENA) region is one of the entrants into the Fintech industry in the new era of growth. There is an expectation that this region captures the 8% of the revenue from the financial services by the year 2022 with the demand from the better experience of the customers (Skan et al., 2014). With the time period, the Fintech companies have been increased in MENA region where it is anticipated that the MENA Fintech market will have annual growth of US$125 million till the year 2022 (Partners, 2022). Among the MENA countries, United Arab Emirates (UAE) has shown the upward trend for the adoption of the technology in the financial service industry in order to support the development of the Fintech (Mueller and Piwowar, 2019; Zarrouk et al., 2021). Nowadays, it is important for the countries to support the advancement in technology by flourishing the Fintech industry in order to widen the spread of financial services which helps in reducing the transaction costs, enhance the competition and ensures

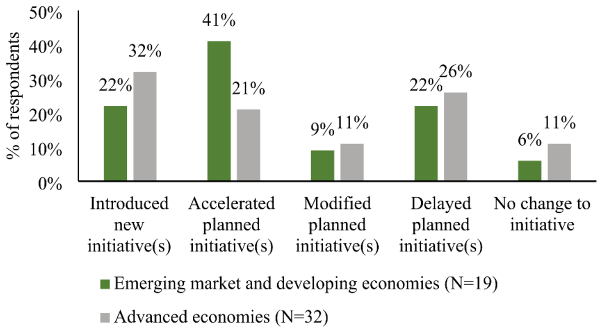


Fig. 1A The impact of Covid-19 on RegTech/SupTech initiatives - Emerging market and developing economies versus Advanced economies (N=51). (Source: CCAF, 2021)

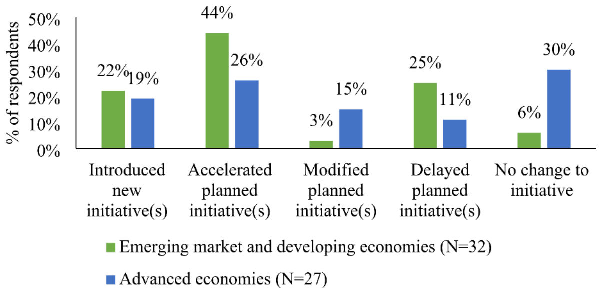


Fig. 1B The impact of Covid-19 on innovation offices - Emerging market and developing economies versus Advanced economies (N=59). (Source: CCAF, 2021)

the stability for the financial services. Fadhul and Hamdan (2020) have investigated the importance of the Fintech in Bahrain that it should focus in collaborating with the UK, China, US to gain advancement in the technology.

Rowan et al., (2020) evaluated the FinTech performance in MENA region that responded to the Global COVID-19 FinTech Market Rapid Assessment Study to analyze the growth all over the regions globally. Regulators are using smart data collection tools to collect rapid response of firms in perspective of the firms explicit undertaking to determine the emphasis on targeted markets and portfolios. To get a better insight of the COVID-19 impact on financial position of the firms, external resources has been employed by the regulators. Figure 1 exhibited that during COVID-19 emerging market and developing economies expedited RegTech/SupTech initiatives to 41% whereas the corresponding figure for advanced economies is almost one half (i.e., 21%). This could be an indication of higher comprehended perspective for RegTech/SupTech initiatives in EMDEs emerging market and developing economies.

Similarly, the acceleration of planned initiatives showed the highest percentage (i.e.44%) between the regulators in emerging market and developing economies (i.e. 26%). Also, innovation in terms of new initiatives specified 22% of respondents in EMDEs which is 2% higher than the advanced economies.

The COVID-19 crisis increased the chance of expansion of the Fintech role in the economies with the help of financial inclusion services to achieve the sustainable development by extending the financial services into those communities that are not much established. The MENA region had faced serious socioeconomic challenges even before the COVID-19 crisis but during the COVID period, it has recorded the low annual growth. The COVID-19 pandemic has not been the first crisis in the region that affected but it is the fourth crisis that affected the MENA region in the past decade (Hoogeveen and Lopez-Acevedo, 2021). However, the development in the Fintech have been increased after the initial impact during the time period of COVID-19 which provided the access to the online platforms and financial services in achieving the significant role of the Fintech. Also, provides the valuable and innovative financial solutions to lower-income groups to supports them in their investments. This significant role is ensured with the policies that leads to effective and efficient participation into the financial services. This research aims to explore the Fintech growth in MENA countries during the period of COVID-19 by analyzing the current challenges and future prospects of the region. Since, the number of Fintech companies have been increasing in the MENA region and generates the profits which improves the performance of the new market despite the existence of the obstacles to the economic and financial performance in the MENA zone through the innovations in the advanced technology using the Fintech. This study is conducted in order to evaluate the role of Fintech in establishing the markets of the MENA region into the world which would help to create the economic rise and financial boost in the countries.

In the light of above entitlements, the current study contributes to the current body of knowledge in several ways. First, this is one of the unique studies which investigates FinTech growth in the Middle East/North Africa region during COVID-19. Second, the study applied qualitative approach for the collected sample studies by conducting descriptive, content analysis using keyword selection criteria. Third, the study aspires to achieve research objectives by isolating current challenges and future prospects of FinTech growth in the MENA region particularly during COVID-19. Fourth, the study filtered 325 studies and obtained final dataset of 250 studies that comprises research articles, book chapters, news, OECD reports, and commentaries/personal opinions. Finally, we devised useful policy implications of FinTech growth in the MENA region in particular, and for the global world in general. Results of our content analysis highlighted parallel current challenges and future prospects implying every technology brings some benefits along with some costs to fetch the attention of the policymakers, regulators, and governments.

The rest of the study unveils as follows: Sect. 2 reviews the prior studies and literature, Sect. 3 presents materials and methods involved, Sect. 4 highlight current challenges and future prospects of FinTech in the MENA region. Finally, Sect. 5 concludes the study along with policy implications.

2 Literature Review

2.1 Role of Fintech in Global Financial Markets

Financial technology has provided platforms to the individuals that used in insurance, banking, trading and management of risk (Aldridge and Krawciw, 2017). Fintech provided the major field to the individuals by giving opportunities to invest and providing the platforms such as crowdfunding in order to finance their capital by analyzing the risks and trading options. Over the past years, the Fintech industry revolutionized around the globe in order to provide the diverse packages of financial services which mainly involves the wealth management of the clients and dilute the traditional way of financial services into the advanced models by adopting the technology to improve the competitiveness and increase the reliance on the technology which advances day by day. Globally, the investments in the Fintech has improved the volume of the global investment with an increase of 120% in 2018 that reached the $112 billion investments (Alkhazaleh, 2021). The investments are increasing gradually because of the need of Fintech in an economy which appraises the value of investment with the help of improved ways of financing the resources.

With the rapid growth in Fintech industry, it can be said that the investments in the Fintech startups are expected to increase by the time around the world that places the greater burden on Fintech industry with the high investments (Chinnasamy et al., 2021). The effectiveness of the Fintech should be acknowledged and updated with the time in order to provide the effective opportunities to the customers for their startups in Fintech industry. It is sometimes argued that these opportunities can be developed in the Fintech startups when the economies are well-developed but this should not be the case every time because the economic and technological developments can help the entrepreneurs to establish venture capitalist firms to make level high for the Fintech industry (Haddad and Hornuf, 2019). The investments in the Fintech technology internationally have increased in the consecutive years with having North America on the top of the list after followed by Europe, then comes Asia, Latin America in the bottom of ranking. Since, the importance of the Fintech has created the transformation of the financial sector and even in the COVID-19 crisis the Fintech adoption has been widely created in order to overcome the impact of the crisis that affected the businesses to be operated physically (Fu and Mishra, 2022; Ziegler et al., 2020).

2.2 Role of Fintech in MENA Region

The Fintech ecosystem has been started in 2010 in the MENA region where almost more than half of the Fintech startups in the region founded after 2012 (Feller et al., 2017). Initially, the financial system of MENA was mainly based on banks that played in the economy but the governments had the prominent place in the economy. This created the low access to the banks and finance in order to attain the retained earnings from their savings that are being invested because of the major government interventions (Allen, 2021). However, the Fintech has a valuable role in the Middle East, North Africa, Afghanistan and Pakistan (MENAP) and Central Asia (CCA) region because of the potential benefits and need for the Fintech in the regions that are aligned with the policy restrictions (Lukonga, 2018). Though, Fintech has the slow pace at the start even the mobile financial services was slow no matter global investments. The banks and businesses used the basic technologies such as ATMs, credit card, mobile financial services (Bolze and Beshara, 2017). The paths are being created by the governments and the businesses because in future the technology will have a major role regardless of the traditional ways of businesses in short, the future businesses will ultimately in need of financial technology to attain the effective and efficient ways of businesses and financial services in order to promote their services and satisfy their clients.

The breakthrough of the COVID-19 pandemic has affected many countries around the globe but it showed rise in the digital transformation by adopting the Fintech in the financial sector. The COVID-19 crisis has enabled the digital transformation at progressive stage in the North African region by providing the microfinance opportunities and digital banking accessibility to the poor in order to promote the self-employment structure (Tidjani, 2021). This self-employment structure can create the economic growth by more investment by the people to achieve the basic lifestyle and helps the economy to develop more prospects for others. However, many people around the globe could not accept the technological advancement due to lack of knowledge intentions of the individuals, this argument leads to the Technology Acceptance model (TAM). This model hypothesizes that the acceptance of the technology can be illustrated with the help of the people's intentions whether they have intention to use the technology or being rigid not to use technology hence leads to the perception of individual to its usefulness. The behaviors can be improved when they perceived the usefulness and ease of the technology (M. U. Hassan et al., 2018; Yousafzai et al., 2010). However, the COVID-19 has improved the digital payment acceptance system of Fintech in the emerging and developing countries with the strict measures of lockdowns during the pandemic (Tut, 2020).

By the time, the Fintech technology is being recognized by the countries because it creates effective opportunities for all regardless the level of finance but the COVID-19 crisis created the downturns in many economies which affected all sectors in the industry. The fluctuations created in the industry affected the returns of the markets but Fintech played a vital role to provide platforms to individuals in order to overcome the increased rate of poverty in the time of pandemic. The African region has recorded fluctuations in the countries during the pandemic which declined the Fintech sector due to regulatory and infrastructure issues. A key theory that can be observed here is the Information Technology (IT) research that helped users in understanding the factors to determine the value in order to better utilize IT resource. Agur et al. (2020) argued that the sudden shift to digital financial services could worsen the income group and gender disparity which leads to the impact on the regulatory framework for Fintech investment, hence affected the privacy and data access disclosure, cyber threats, operational threats. There are certain areas and markets which are not much established in MENA region creating the major challenges to the Fintech industry for the region.

2.3 Technology Adoption Models

When people have no control on their intensions limiting the controls on the behaviors they perceived and the normative influence impacts the actual behavior leads to the behavioral Theory of Planned Behavior (TPB) (Ajzen, 1991; M. U. Hassan et al., 2018). This theory predicts the behaviors which leads people to belief that same outcomes will come no matter their expectations. This can relate to the challenge of consumer trust on government because the expectations they have are not fulfilled impacting the low investments in the market. Hawkins et al. (2017) has investigated the attitude of Jordan economy towards DFS showed the negative perception of the financial products used by the institutions for the financial services due to the lack of government support. Some empirical studies investigated that the technology use has negative effect as compare to inflation on the economy (Ben Romdhane Loukil et al., 2021). Though, the inflation affects the living style of the people but the economies that are not developed might have fear of technology because not all the time technology can create positive affect to the economy.

Half of the population in the MENA region are "unbanked" with having no secure means to their savings (Demirgüç-Kunt et al., 2020; Feller et al., 2017). Moreover, North African region have been affected with the major challenges including the lack of confidence, too tight to laws or obsolete rules, reluctance to change which causes the infrastructure and regulatory gaps, serious barriers in term of lack of trust limiting the digital transformation and financial access. These challenges change the behavior of the people to invest in the businesses and creates gap between the individual and the financial sector. Most of the behaviors of the people around the globe are socially relevant that are predictable from the intentions this creates the relation to the Theory of Reasoned Action (TRA) (Fishbein and Ajzen, 1980; Mishra et al., 2014). The behavioral intentions of the people limit to fill the gap between the gender disparities which individual perceived at the low level of deliberate control. The gap between men and women in the financial inclusion by 7% globally but MENA region shows more disparity (Demirgüç-Kunt et al., 2020). This challenge created due to the social behavior and backward concepts of the people which affected the contribution of both genders into the market.

One of the major challenge for the Fintech in the region is that 86% adults do not have the bank account (Anwar and Salama, 2021). Fintech is in emerging phase in the MENA region, the lack of finance is the issue for the individuals and low talented employees in the Fintech firms creating the challenge for the Fintech industry. The firms having Fintech requires skill of the employees for the effective and efficient management of the business but if a country do not have skilled labor than it creates major issues for the technological business as a whole. More than two third of the new mobile internet users nearly 350 million people in MENA region are unable to connect the internet due to the digital gap which is being highlighted with the impact of pandemic (GSMA, 2020). Hence, the individuals having low knowledge levels about the mobile money restrict to the digital gap in the region. The financial structure which includes banks in the MENA region are engaged in the exploratory projects in order to gain the strategic partnership but only 5% of the banks win the exploratory projects (Netzer, 2021). The strategic partnerships are limited in the region which can develop the opportunities for the region affects the matter of Fintech industry.

For technological firms, the data security is still a concern for MENA region because every startup need to ensure the effective cyber-security measures hence causes the low entrepreneurship groups with another challenge of gender disparity creates the low participation of the women in the entrepreneurial activities (O'Sullivan et al., 2011). The lack of entrepreneurial activities ultimately affects the new startup businesses in the economy impacts the economic performance and create more risks for the investments. Moreover, the risk averse option is being used for Fintech in many countries. For example, in Morocco, the crowdfunding is still not licensed. The virtual currencies such as cryptocurrencies are still not traded and restricted in many countries due to high risk except for the Abu Dhabi that actively encouraged the operation of cryptocurrencies through ADGM Free Zone.

The development in the Fintech companies of MENA region has increased with the faster rate compare to the other segments with the help of major organizations such as World Bank, IMF, OECD that created the path for the region with the help of awareness in the world through conferences. This establishment creates more awareness to the people of the region helped in the development of Fintech industry with more startup Fintech businesses. The growing technology provided financial solutions to Bahrain, Egypt and the Kingdom of Saudi Arabia with the involvement of private and government sector to endorse the region. Since October 2019, the technology in startups showed increment by 330 startups in 22 countries in the Arab region. Moreover, the Gulf countries have come upfront by boasting the Emirates with more than 60 solutions. The Sub-Saharan Africa (SSA) has showed an improved rate of 21% of the adult population with the mobile accounts in contrast to the MENA region that are still low in rate of mobile accounts and transactions (Appiah et al., 2022). The digital investments in North Africa have recorded with the lowest rate of 25% in the number of deals and the investment values by the individuals in the MENA region. Where, the Egypt showed highest investment in the North African region (Yehia, 2018; Alawi et al., 2022). The North African region is not as much matured as the SSA region but three countries are showing leveraging to Fintech industry that are Egypt, Morocco and Tunisia. A research by CGAP (2020) has recognized 349 active Fintech firms in the Arab region in which North African region represents 35% of the firms.

The Fintech industry has been advanced during the pandemic forcing the development in the Fintech technology due to the lockdowns and precautionary measures because of the spread. However, the Fintech technology is capable in reducing the costs, security and transparency, providing financial services to the individuals particularly during the COVID period. Innovations in payments can be created in order to give access of financial services to the unbanked communities which leads the Fintech future prospects in the region that should be supported by the government to make trust-based economy and protect the customers from fraud (Farrell et al., 2021).

3 Materials and methods

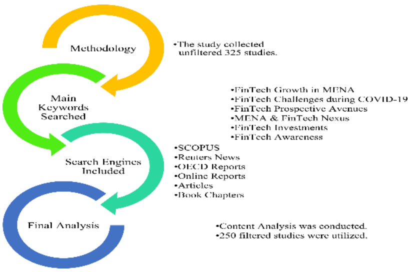
The prime objective of the current study is to investigate fintech growth during COVID-19 in the MENA region. The study employed descriptive analysis, content analysis, and keyword analysis for differentiating the current challenges and future prospects of FinTech growth in the MENA region particularly during COVID-19. At first, the study collected unfiltered 325 studies using keywords of FinTech growth in MENA, FinTech challenges during COVID-19, FinTech prospective avenues during COVID-19, MENA and FinTech nexus, MENA region during COVID-19, cost benefit analysis of FinTech, FinTech investments in MENA, awareness of FinTech in MENA, barriers to FinTech in MENA, and risks involved in FinTech as presented in Table 1. The databases accessed for achieving research objectives include SCOPUS

Table 1 Final Sample for Content Analysis

No.	Keywords	Unfiltered Studies	Filtered Studies
1.	FinTech growth in MENA	40	34
2.	FinTech challenges during COVID-19	55	51
3.	FinTech prospective avenues during COVID-19	46	39
4.	MENA and FinTech nexus	20	14
5.	MENA region during COVID-19	15	10
6.	Cost benefit analysis of FinTech	16	05
7.	FinTech investments in MENA	42	34
8.	Awareness of FinTech in MENA	26	12
9.	Barriers to FinTech in MENA	20	15
10.	Risks involved in FinTech	45	36
Total		**325**	**250**

Source: Author(s) own compilation.

Fig. 2A Stepwise Methodology of the current study



Database, Google Search Engine, Reuters News, OECD website, and online reports by various regulation authorities. After carrying out initial scrutiny of collected studies, final research sample of 250 studies, book chapters, reports, news, and commentaries from experts was achieved. In this way, our formal content analysis is based on 250 studies to identify current challenges and future prospects of Fintech growth in the MENA region during COVID-19.

Content analysis is a widely accepted technique to identify certain words, trends, themes, ideas, and concepts given in particular qualitative data or text. Using this technique, studies can segregate the desired results based on the research objectives. Thus, content analysis helps in evaluating various relationships, underlying meaning of the text, making inferences, and presenting the results with concrete research directions (Hsieh & Shannon, 2005; Karim et al., 2022e). Since FinTech startups and FinTech developments are still in their natal stage in the MENA region, therefore the current study is conducted in a qualitative manner to observe FinTech growth during COVID-19 in the MENA region. Figure 2 A presents diagram of methodological approach employed in the study.

4 Current Challenges and future prospects of FinTech in the MENA Region

This section identifies current challenges and future prospects of FinTech in the MENA region during COVID-19. Challenges and opportunities are assessed based on the keyword selection criterion and specific thematic approaches. Details of each challenge and future prospects are explained in the following sub-sections.

4.1 Current Challenges

FinTech growth is experiencing several challenges due to its inherent nature, regulatory concerns, its explicit use in terrorism and war crimes. Due to these problems, FinTech growth is considered as a major hurdle toward financial instability and a greater cause of exploiting social values which ultimately raises inequalities and discrimination. Adrian and Mancini-Griffoli (2019) note that Fintech can become a potential cause toward financial instability, financial misconduct, risk to monetary policy, and can raise new competition standards. The list below is exhaustive which encompasses a few challenges of FinTech in the MENA region. Moreover, to conserve the space, the study emphasizes only six challenges and six relevant future prospects of FinTech growth in the MENA region.

4.1.1 Privacy issues

One of the biggest concerns of FinTech is its violation of data protection act and misusing the data of consumers to fulfill business objectives and earning profits. The renowned scandal of Facebook and Cambridge Analytic Scandal (FCAS) in 2015 has remained at the center of attention for public, institutes, and higher data controlling authorities (Davies, 2015). The breach of data protection by the Facebook and resultant FCAS have influenced approximately 87 million individuals attracting the attention of general public which raised serious discourse questions on appropriate protection, use and access of the consumers' data (Internet Society, 2019). Business Insider in its relevant report showcased that Facebook has illegally harvested the electronic mail addresses of 1.5 million user accounts without their personal consent, information, and knowledge (Doffman, 2019). In addition, scandals of giant companies for tax evasion are also remarkable where big companies tend to avoid taxes by manipulating their sales statistics. For example, OECD has launched a plan where multinational firms like Apple, Facebook, and Amazon cannot evade taxes (Tankersley, 2019). The basic purpose of this plan is to avoid economic imbalances and retain the financial stability. The other remarkable role is performed by legislative authorities to protect the consumers' data from being misused. With its full effect, European Union's General Data Protection Regulation (GDPR) has taken several serious steps to ensure data privacy of the consumers. In another news by the Internet Society (2019), Irish Data Protection Authority has fined Facebook of about USD 1.6 billion for manipulating the data of over 50 million users.

4.1.2 Cybercrimes

Due to its huge reliance on algorithms, artificial intelligence tools, and coded language, FinTech is facing extreme challenges through its use in illicit activities such as terrorism, human trafficking, cybercrimes, and data insecurity. The United Nation reiterates this fact by stressing that tech-firms are highly engaged in the algorithmic configurations and the use of artificial intelligence to remove the content related to cybercrimes and terrorism which creates serious accountability and transparency oversights for the common individuals (CTED, 2018). In a similar vein, the use of various blockchain based currencies is also figured out as a common trend to support the terroristic and human trafficking activities at both national and international levels (Karim et al., 2022a). While considering the cybercrimes during COVID-19, MENA region, particularly UAE experienced a sharp increase in the cybercrimes which is often termed as "cyber pandemic" in consonant with COVID-19 pandemic (Karim et al., 2022c; Pham et al., 2022; Naeem et al., 2022; Shahzad et al., 2022). Meanwhile, there was about 250% escalation in the cyberattacks during 2020 with suspicious activities of hackers and malicious actors taking the advantages of health pandemic[1]. As a legislative move, the National Cyber Security Council of UAE banned services of various social media platforms to avoid cyberattacks. At the same time, the legislative framework of UAE supersedes other states of MENA region in terms of providing effective cybercrime laws and remarkable technological advancements.

4.1.3 Financial disruption and instability

COVID-19 pandemic has brought financial disruption and instability to the overall economic and financial systems where financial institutions, firms, organizations, and businesses underwent serious repercussions of the epidemic. Similarly, in the MENA region, COVID-19 pandemic infuriated the development challenges addressing poverty, public finances, debt regulations, and financial erosion concerns. As part of technological innovations, some regulation bodies and economic institutions have pointed out various factors that impact the financial stability following the FinTech discoveries (Karim et al., 2022d). Studies and reports document that technological innovations facilitated positive impact when competition among firms is higher. However, at the same time, these innovations can cause a serious harm to the financial stability (Financial Stability Board, 2019). The Financial Stability Board (2019) also shed light on the similar note by emphasizing the promising aspects of FinTech on the overall financial system but carries a greater risk of financial stability.

4.1.4 Exploitation of Social norms and values

FinTech, due to its controversial state, has attracted much attention from policymakers, regulatory bodies, governments, and financial analysts. The social aspects of FinTech adoption are creating alarming signals for the society by huge involvement

[1] Please see: https://www.cnbc.com/2020/12/06/middle-east-facing-cyber-pandemic-amid-covid-19-uae-official-says.html.

in social hubs and online platforms that encompass financial fraud and criminal acts posing serious threats to the social norms and values. In the MENA region, particularly in the UAE, hackers during COVID-19 have messed up the user experiences of social applications such as WhatsApp and Facebook. The malicious hacking tactics of these individuals not only created a privacy problem rather an attention call to the regulators to control financial crimes (Younies & Al-Tawil, 2020). Studies also report that the use of data per person during the pandemic and adoption of several apps have widely increased introducing various market and financial disequilibrium (Fu & Mishra, 2022). The indulgence of FinTech and technological advancements in the use of human trafficking, terrorism, and money laundering points toward the exploitation of social norms and values and exposure of MENA region to these illicit practices contend that FinTech growth in the MENA region possesses several human as well as financial challenges.

4.1.5 Raising inequalities and discrimination

Inequalities and discrimination are vital issues of the contemporary world. A classic example of income inequalities can be sourced from Oxfam (2019) who reported that the wealth of world's billionaires is increasing at an exponential rate which is approximated at USD 2.5 billion a day. The FinTech challenges, as suggested through the sample studies, have been spurred due to these income mismatches that ultimately gives rise to inequality and discrimination creating income parities. The technological innovations have invoked these social concerns manifold. In the MENA region, where individuals are specifically belonging to resource rich countries, the adoption toward FinTech is itself a greater challenge. Following this, firms that are continuously excelling in their business operations with the use of FinTech, are enjoying the first mover advantages. However, the real value on the economy by the FinTech firms in the MENA region has yet to be determined. A study by Dabla-Norris et al., (2015) has provided rigorous assessment by arguing that technology played a key role in the U.S. wage structure whereas real value of minimum wages contributed to it slightly. In this way, income inequalities and discrimination are major obstacles and challenges toward FinTech growth in the MENA region.

4.1.6 Non-compliance of Regulatory Authorities

FinTech growth is facing a greater challenge in terms of regulatory constraints. Most of the financial institutions are regulated by the central banks of a specific territory with appropriate risk measures controlling for the aspects of liquidity and credit default. Since financial technology mainly works on decentralized structure without involvement of intermediaries, the strong reliance on encrypted technology have created a disturbing situation for the overall financial system, financial institutions, and its affiliated constituents. Corbet et al., (2019) and Naeem and Karim (2021) termed this factor as trilemma of blockchain technology where regulatory concerns, privacy issues, and cybercrimes are exacerbating the use of FinTech. As a legislative framework, UAE has developed concrete measures to prevent destructive effects of FinTech on the economic growth where formal institutions are continuously monitoring the FinTech landscape. Thus, the decentralized nature of FinTech is not only a positive aspect rather it bears some severe challenges as well.

Overall, we argue that FinTech growth in the MENA region is hampered by multifarious factors. The raising war crimes, terroristic activities, nuclear tussles, human trafficking, anonymity of the users, money laundering etc., all are the miracles of technological innovations where digital currencies and blockchain technologies take the lead. In this manner, to reap the benefits of the FinTech, it is necessary to control and monitor the FinTech ecosystem in the MENA to avoid social, financial, and economic losses.

4.2 Future prospects

This sub-section highlights future prospects of FinTech growth in the MENA region. The content analysis revealed that employment opportunities, decentralization, cost effectiveness, financial outreach, networking and breaking traditional financial biases are the major prospects of FinTech growth in the MENA region. Each of the future prospect is being explained in detail below.

4.2.1 Employment Opportunities

The last decade has experienced a rapid growth in the FinTech startups with digital transformation involving global financial services for instance, digital lending and payments, insurance, wealth management in the capital markets etc. As defined by the Financial Stability Board (FSB, 2017), financial technology is the technology enabled business model, application, and process that has direct influence on the economic outcome. The COVID-19 pandemic has embraced the attention of several technology enablers particularly in the MENA region who created unique startups amidst the destructing features of the epidemic. A closer look at GCC countries and their heavy investing in the FinTech startups have resulted in several employment opportunities and job creation for unemployed individuals. The efforts of Saudi Arabia's Financial Sector Development Program (FSDP) are aligned with their vision 2030 to accelerate FinTech growth in the region[2]. Thus, as a prospective future trend, FinTech has the ability to circulate several employment opportunities for technology enthusiasts to make them self-sufficient and backing their states in the economic stability.

4.2.2 Decentralization

In the wake of FinTech revolution, decentralization is one of the key factors to assess the development of FinTech ecosystem. The whole process of FinTech revolution is based on artificial intelligence (AI), machine and deep learning, and big data analytics (Panetta, 2018). Blockchain technology, among these, is considered as a most sophisticated technology that operates on decentralization mechanism. Referring to

[2] Please see: https://www.pwc.com/m1/en/publications/local-fintech-opportunity-post-covid-19-world.html.

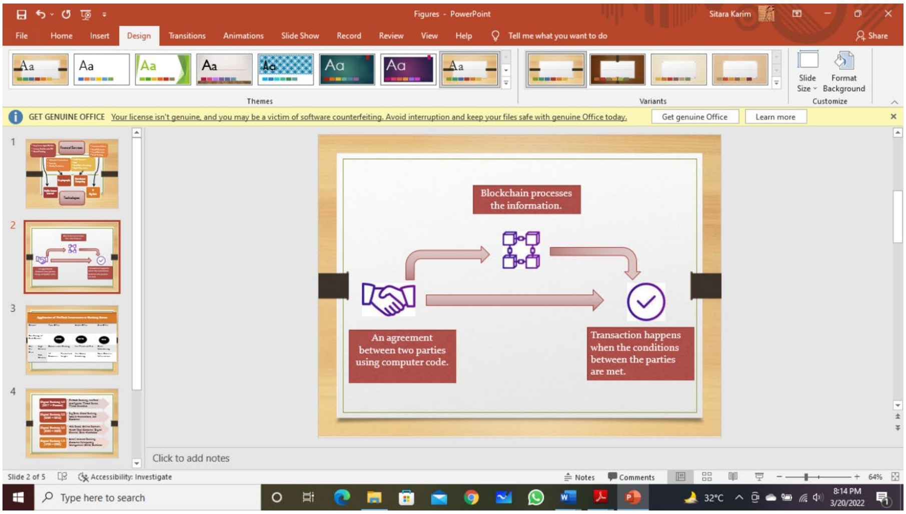


Fig. 2 Mechanism of Blockchain Technology

Fig. 2, blockchain technology works on an agreement between the two said parties using a computer-generated code which is further processed by the blockchain. Finally, transaction happens when the terms and conditions are met between the two parties. As indicated in the Figure, there is no intermediary involved in the whole process and no monitoring and regulatory mechanism is provided (Karim et al., 2022b). Blockchain technology facilitates such kind of online financial transactions with complete empowerment (Dillon, 2017). In the MENA region, with the progress of FinTech revolutions and investments in the FinTech startups, the decentralization of the FinTech solutions offer varied opportunities to the individuals.

4.2.3 Cost effectiveness

Many studies report that FinTech growth is backed by profitable business solutions with maximum efficiency and flexibility in the processes (Leong & Sung, 2018). Moreover, with the greater pace of FinTech growth in the MENA region, it has also provided financial services faster, persistent, and reliable. Meanwhile, FinTech innovations offer cost effective solutions. Figure 3 presents the application of FinTech innovations in banking industry which are mainly provided by the Business Insider report on artificial intelligence. The major findings of the report state that the cumulative cost saving for banks by the use of AI applications is approximately $447 billion by 2023 and the application of AI is not limited to retail banking only i.e., they can benefit from back office and middle office of investment as well as all sort of financial services. In particular, the unit of analysis for this report was banks (conventional) using the AI practices into their business operations. The three main categories where financial sector can benefit from artificial intelligence and technological innovations are conversational (face-to-face) banking termed as front office; secondly there is middle office where application of AI is based on fraud detection

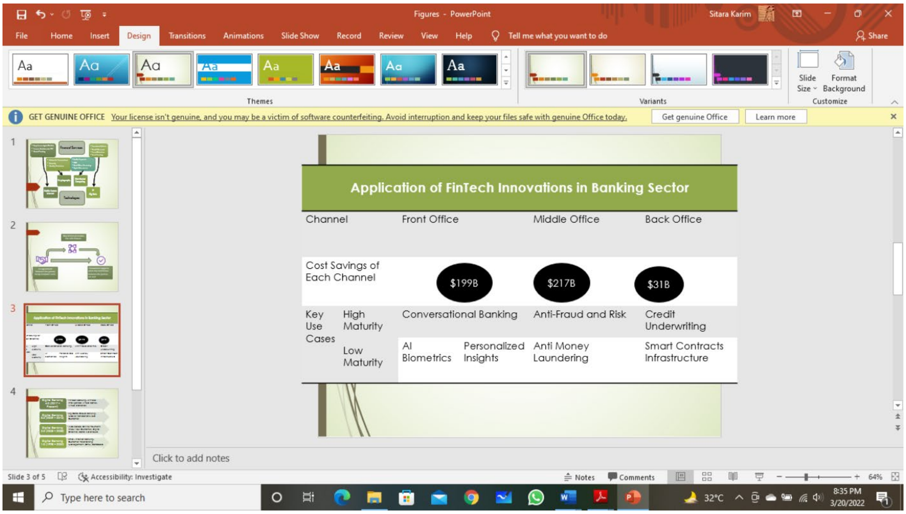


Fig. 3 Cost Effectiveness of FinTech Solutions. (Source: Business Insider)

and risk management practices such as cyber-security, mobile hacks, and other malpractices. Additionally, there is back office in the financial industry which uses the AI into its processes for underwriting the risks associated with financial activity. This report concludes that major applications of AI in financial sector are related to front and middle offices which mainly involve implementation of financial technologies (FinTech), applying the AI strategies in the core business processes and providing recommendations to the industry how they can adopt AI-enabled approach to overcome the challenges associated with risk exposures and financial crisis. The major banks of this report constitute Capital One, CitiBank, HSBC, JPMorgan Chase, Personetics, Quantexa, and U.S. Bank.

4.2.4 Financial Outreach

\FinTech growth by obtaining support from the blockchain technology welcomes the financial system by introducing unique user-friendly processes. A number of factors are responsible for financial outreach using the FinTech solutions and its growth in the MENA region. As mentioned earlier, FinTech innovations are cost effective, cheaper, and faster than traditional financial processes, thus, blockchain technology offers dual efficiency by tackling transactions at a lower cost and at a faster pace (Zulkhibri, 2016). If we take the example of international payments, there are several intermediaries involved to process one transaction. However, with the miracles of FinTech, its outreach is remarkable following the last decade. Figure 4 compares the mode of international payments with (without) FinTech and blockchain technology explaining the faster (slower) pace of international funds transfer. Thus, FinTech innovations have integrated the financial system by offering extra efficiency and financial inclusion.

Fig. 4 Mechanism of International Payments – A comparison

4.2.5 Networking

Cattelan (2019) quotes in a study that crowd connection brings magic to unveil the power of networking and connecting the masses. The network economics entails a positive influence of network for producing effective work to showcase value generation and performance output. For FinTech growth and development in the MENA region, one of the key future prospects is to engage with the partner firms and make allies with them to reap the fruits of networking. In the FinTech ecosystem particularly in the MENA region, networking and connections are playing a vital role to accelerate FinTech growth (Tongia and Wilson, 2019). In this manner, networking is considered as a key prospective element to obtain FinTech growth in the region within minimum timeframe.

4.2.6 Breaking Traditional Financial Biases

The final prospective aspect of FinTech growth in the MENA region is breaking the bias of traditional financial processes and procedures to initiate FinTech innovations with their original spirit. As part of the regulatory concerns in the FinTech (Karim & Naeem, 2021, 2022, Corbet et al., 2019), FinTech growth is experiencing obstacles to be completely introduced in the MENA region (Younies and Al-Tawil, 2020). However, breaking the traditional biases in the financial system is reported as the vital factor to attain FinTech growth. Following this stream, online mobile banking, paying bills, money transfer through a click and sending funds to abroad family all are miracles of FinTech and blockchain technology where intermediary bank or financial institution is not necessarily involved. Chhabra and Das (2019) termed this factor as a game-changing move for the low-income class of individuals as FinTech is easy and cheaper.

In summary, the future prospects of FinTech growth in the MENA region stress decentralization, mobile or user-friendly experience, financial outreach, quick access to resources, and networking. All these factors are contributing to expand FinTech growth in the MENA region which implies several benefits to the policymakers, governments, and practitioners.

5 Conclusion and recommendations

The current study endeavored to throw light on the FinTech growth during COVID-19 in the MENA region. For attaining this research objective, the study carried out content analysis of filtered studies with selected keywords. We identified current challenges posed with FinTech growth in the MENA regions which encapsulate privacy issues, cybercrimes, financial disruption and instability, exploitation of social norms and values, raising inequalities, and non-compliance of regulatory authorities. Meanwhile, future prospects of FinTech growth in the MENA region involve employment opportunities, decentralization, cost effectiveness, financial outreach, networking, and breaking traditional financial biases. Following this, we stipulate policy implications of FinTech growth in the MENA region in particular and for the global world in general.

Innovations in the technology create the advanced economy and reduce the gap between the digital platforms and the individuals. Therefore, the regulators of the MENA region need to prioritize focus on limiting the gap of digital infrastructure and cyber security. Moreover, the cross sector as well as cross border collaborations need to be extended in order to flourish the Fintech industry. Among the financial technology, the blockchain innovations in UAE starting to prevail in the region with having 50% of the federal government transactions. Other Fintech products such as Interactive Voice Response (IVR) portal have been initiated in the Kuwait International Bank (KIB) creating the more paths towards the successful economy (Anwar and Salama, 2021). The consumer trust on the government, financial institutions and banks is a primary reason for the low demand of the digital money in the MENA region. With the low opportunities and lack of government support led the people have low trust on government because they do not provide necessities to the consumer of the economy. Besides, people have low awareness about the financial services in MENA region become the challenge to the Fintech industry and therefore required education regarding the financial services in awareness for the benefit of the digital accounts in money management (Riley, 2020).

The current research possesses some limitations as it only covers the MENA region. However, future studies can be initiated by employing the similar technique in different regions of the world, for instance, European region, Gulf Cooperation Countries, and American regions. In this way, the current study can help the upcoming scholars and practitioners to utilize it as a cornerstone for their research endeavors to accomplish their research objectives.

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Data Availability The datasets generated during and/or analysed during the current study are available from the corresponding author on reasonable request.

Declarations

Conflict of interest The authors declare no conflict of interest.

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Authors and Affiliations

Farah Naz[1] · **Sitara Karim**[2] · **Asma Houcine**[3,4] · **Muhammad Abubakr Naeem**[5,6]

✉ Muhammad Abubakr Naeem
m.ab.naeem@gmail.com; muhammad.naeem@uaeu.ac.ae

Farah Naz
farah.naz@kinnaird.edu.pk

Sitara Karim
sitarakarim.malik@gmail.com

Asma Houcine
asma.houcine@gmail.com

1 Department of Accounting and Finance, Kinnaird College for Women, Lahore, Pakistan

2 Nottingham University Business School, University of Nottingham, Malaysia Campus, Semenyih, Malaysia

3 GEF2A-Lab, Higher Institute of Management of Tunis (ISGT), University of Tunis, Tunis, Tunisia

4 Dubai Business School (DBS), University of Dubai, Dubai, United Arab Emirates

5 Accounting and Finance Department, United Arab Emirates University, P.O. Box 15551, Al-Ain, United Arab Emirates

6 South Ural State University, Lenin Prospect 76, 454080 Chelyabinsk, Russian Federation