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The adoption of fintech solutions in Saudi Arabia's e-commerce landscape: Impact on security, convenience, and financial inclusion

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Abstract

The MENA region, particularly in the Gulf area, has recently witnessed remarkable growth in the adoption of financial technology and e-commerce to build a new digital economy that enhances countries' capabilities. One of the most prominent models reflecting significant developments in digital economies is the Kingdom of Saudi Arabia, due to its Vision 2030 and the facilities it has provided to attract local and global investments. This is in line with its goals of increasing fintech startups, increasing the number of Saudi workers, and achieving an investment surplus.

This paper aims to explore the influence of fintech innovations on the growth of e-commerce in Saudi Arabia market. The intersection of financial technology and e-commerce has a clear effect on the KSA economic growth, especially in the past 10 years. By leveraging government-backed initiatives under Vision 2030 and a regulatory framework established by the Saudi Central Bank (SAMA), Fintech has enhanced consumer trust, access to financial services, and facilitated seamless online transactions. The findings underline the critical role of Fintech in shaping the future of e-commerce within the Kingdom of Saudi Arabia.

Keywords: Fintech; E-commerce; AI; Cybersecurity; Saudi Vision 2030

1. Introduction

Financial technology, or as it called (FinTech) is a new term refers to provide financial services by technological apps. These apps created by new entrants (startups) to compete in the market of traditional banking and financial (Anyfantaki, 2016). The word fintech is also denote to the evolution of Digital Financial Services (DFS) like mobile apps, web, application mobile interfaces, and digital ID. Overall, the revolution of digital technologies contribute to the reshaping the financial services such as payments, lending, insurance, etc., and create new innovations of fintech such as peer-to-peer lending, mobile wallet, insurance technology (InsurTech), and crypto-assets (Feyen, et al., 2021).

In its vision 2030, Saudi Arabia is working to increase competitiveness by strengthening the financial infrastructure. His Excellency Mr. Mohammed Bin Abdullah Al-Jadaan, the Minister of Finance, and Chairman of the Financial Sector Development Program, said “We are striving to achieve a sustainable and advanced economic future by linking the finance sector with new digital platforms and technologies to transform it into a resilient sector, utilizing artificial intelligence and big data.” (Financial Sector Development Program, 2023).

The World Economic Forum suggests that experts believe fintech will benefit emerging and developing markets, especially where innovation is needed most and where the major tech companies are unable to serve. In terms of e-commerce, fintech innovations have the potential to increase the range of financial services offered, with regards to payment options available, as well as increasing the rate of adoption and usage. Furthermore, it is expected that the

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security and convenience of these digital payment methods have increased as well. The increase in the range of available digital services is anticipated to have a positive effect on the e-commerce activities of the population, especially on financial inclusion and the potential for growth in the digital economy in Saudi Arabia.

The trust and awareness of Saudi citizens to use e-payments in their online shopping, is consider one of the main reasons of electronic commerce growth in KSA market. As it appears in Saudi report 2024 that 72.1% of people in Saudi Arabia made digital payments on e-commerce in the past year (2023), and their payment methods used for the online purchase were: 22% used the mobile wallets, 42% used debit or credit cards, and 16% used the online banking transfer. While, only 10% used the cash-on-delivery method (Kemp, 2024).

2. Research Methodology

Diffusion of Innovation theory (DoI) (Rogers, 2003). In spite of its old model, but it still one of the most technological theories applied in different technologies' fields. DoI theory which developed by the communication theorist Everett M. Rogers in 1962, discuss how a new idea, product, or service can gain spreads a specific population or social system over time. Rogers defined the diffusion as "the process of which an innovation is communicated through certain channels over time among social system's members". By this way, Rogers showed 4 main elements which based his theory to be:

- *Innovation*: for Rogers, "it's an idea, practice, or project, that is perceived as new by an individual or other unit of adoption". The innovation is considering an innovation for the people whom current use it as a new, even if it invented a long time ago. And their characteristics are related to one of the three steps of the innovation-decision process (knowledge, persuasion, and decision) (Shahin, 2006).
- *Communication Channels*: for Rogers, "it's "a process in which participants create and share information with one another in order to reach a mutual understanding".
- *Time*: Rogers confirms that including the time aspect in his theory DoI, illustrates one of its strengths, that because of most of the behavioral researches ignored the time dimensions (Shahin, 2006).
- and *Social System*: the element in Rogers' theory, and he defined it as "a set of interrelated units engaged in joint problem solving to accomplish a common goal".

On the other side, Rogers identified the attributes of innovation with five critical elements which are:

- *Relative Advantage*: for Rogers it's "the degree to which an innovation is perceived as being better than the idea it supersedes". Relative advantage's rate can be measured by means of economic indicators, and it given by the nature of the innovation itself (Drenta & Lobontio, 2016). In this paper the relative advantage is more likely to (security, and convenience).
- *Complexity*: defined as "the degree to which an innovation is perceived as relatively difficult to understand and use". Complexity isn't as important as relative advantage for more ideas, but for some new innovations it considers an important barrier against their adoption (Davis, 1989).
- *Trialability*: for the theorist, "it is the degree to which an innovation may be experimented with on a limited basis". In this attribution, Saudi government clearly contributed to the adoption of fintech, and setting its regulatory framework, as will be explained later.
- *Observability*: it defined as "the degree to which the results of an innovation are visible to others". When the result of innovation become clearer and more visible, it leads to its adoption from more of social systems (Drenta & Lobontio, 2016). In this paper, observability is more relevant to apply on financial inclusion.
- *Compatibility*: the last attribute which Roger stated it as "is the degree to which an innovation is perceived as consistent with the existing values, past experiences, and needs of potential adopters". And this one is a master characteristic to apply on the need of the KSA government and reflect on its vision 2030.

As an end result, Rogers found that people can adopt a new idea, or a new behavior, and the adoption's key is that the person should perceive this new idea as innovative.

The theory divided the populations to five established adoption categories according the time of adopting innovation, as it found that the person who adopt an innovation early has different characteristics than the person who adopt an innovation later. And so, the main categories of the populations are:

- *Innovators*: those people have characteristics of interesting in new ideas, and willing to take risks.
- *Early Adopters*: those are opinion leaders, aware of the need to change opportunities, and take the decision of changing after analyzing their needs.

- *Early Majority*: those people need to be convinced first by getting more information about the innovation and see success stories or experience of previous adopters.
- *Late Majority*: those population follow the Early Majority as part of their life style.
- *Laggards*: those people represent the traditional life, lack of accepting new ideas, and skeptical of change.

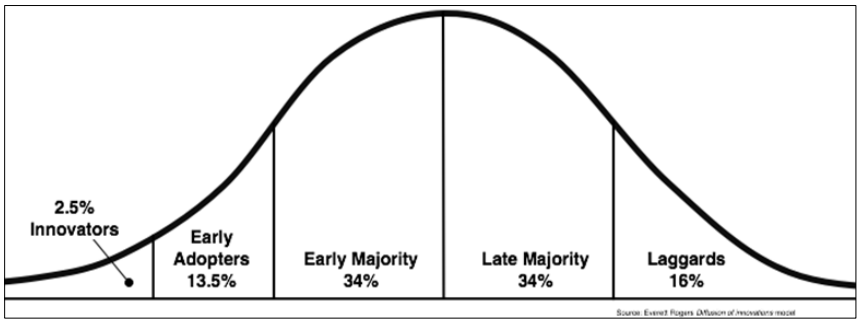

Figure 1 Diffusion of Innovation Model

This framework is easily can help to understand the behavior of different segments within the Saudi e-commerce landscape that are more or less likely to adopt the fintech solutions.

3. Fintech & E-Commerce: An Overview in Saudi Market

The rapid growth of e-commerce worldwide caused to create new opportunities for different business, whether it's B2B, B2C, P2P, or even government's business. This new opportunities by the way reflect on creating economic competition in quality, technology, and production. In addition, it refers to a commitment of business owners to have the ability to keep competing on a competition market (Sudiatmika & Purwanti, 2020). On the other side, the growing demand on cashless payments, contactless, and transactions, led to adopt fintech ecosystem which continues to evolve over time (Dabour & Alber, 2024).

In a previous look at electronic commerce, it showed that e-commerce was developed in the early 1970s with the EET innovation (Electronic Funds Transfer) which allowed funds routing between organizations (Nogoev, et al., 2011). And by its developing to include purchasing and selling physical goods, different services, and money transactions, it found that both of fintech solutions and e-commerce have the effectiveness for selling growth. On the other hand, e-payment has a direct impact on the e-commerce due to several reasons. First of all, because of its timeliness, payment process can be done anytime without adhering to official time of banks, organizations, or holidays, etc. In addition, electronic payment system includes different modes of payments like mobile banking, online bank system, mobile wallets, money transaction apps. Furthermore, the rapid changing growth of the internet activities which effect by the way the using of online payment. And so, the e-payment became a crucial component that contributed the e-commerce success, and the lack of payment methods on any electronic commerce's platforms may hinder the success rate of its development (M. Alzoubi, et al., 2022).

3.1. Scope of Fintech in KSA

H.E. Ayman Mohamed Alsayari, the governor of Saudi central bank, said that the council of ministers approved the National Fintech Strategy as a new pillar within the Financial Sector Development Program (FSDP) in May 2022, with a target goal to achieve globally competition through technological innovation. The fintech strategy works on enhancing the digital financial services ecosystem in collaboration with SAMA (Saudi Central Bank) to promote the ecosystem enablers to work optimally through four main finance sectors, which are Finance, Payments, Insurance, and Open Banking (Saudi Central Bank (SAMA), 2022).

The FSDP was launched in 2017 with three strategic pillars which serve the Saudi vision 2030. The first strategy is to enable financial institutions to support the growth of private sectors. The second one is to ensure the formation of advanced capital market. The last strategy is to enable financial planning. Fintech was a part of the first strategy before confirming the fintech strategy to be the fourth pillar of the FSDP.

The National Fintech Strategy is adopted 6 transformational drivers, and 11 initiatives to improve the fintech ecosystem. The transformational drivers defined in Positioning, Talent, Collaboration, Regulatory Frame Work, Market and Funding, and Technology. By positioning the initiatives with the transformational drivers, it showed as the follow:

- *Positioning* of KSA global fintech: work on marketing campaigns to build the branding and awareness of Saudi fintech market as a leader, and focus on the multi-year global positioning roadmap.
- *Talent*: Nurture fintech knowledge in the Kingdom: focus on building local workforce through internship programs and training, in addition upskill the existing workforce in the financial sectors and train regulators on the fintech.
- Orchestrate *Collaboration* locally and globally to lead with purpose: with strategic partnerships and fintech hubs, through "Ruwwad" program to meet the industry needs.
- *Regulatory Framework*, by enhancing fintech-related innovation within the central bank: it can develop and implement Suptech solutions to support its risk-based supervisory role.
- *Market and Funding*, by enabling fintech Saudi as a market driver: to develop and support fintech ecosystem in Saudi Arabia, enhance programs, and facilitate knowledge sharing with the fintech panel.
- *Technology*, by accelerating cloud of fintech: by expanding in developing technology platforms, and establishing incentives of providers.

In continue in initiatives, the fintech strategy focus on:

- Regulatory enablement for fintech in the central bank space.
- Determine financial support mechanisms for fintech in Saudi market.
- Develop emerging technology policies and accelerators.
- Regulatory enablement of fintech in the capital markets' space.
- Implement and activate the open banking practice in KSA.

The fintech strategy set 2030 goals to be include 525 fintech companies, and provide 18K fintech jobs, by achieving 20% foreign investment and SAR 12.2B cumulative VC investments for 10 years. And to achieve vision 2030 goals, the government set short term goals as a commitment to achieve by 2025 to be increasing fintech companies' players to 230 companies. In addition, increasing the digital transactions amongst individuals to 70%. Furthermore, enhancing local investments and attract foreign investments to raise the volume of investments in fintech companies to SAR 2.6B. And finally, raise the GDP to reach SAR 4.5B, and create avg. 6K fintech jobs by the end of 2025 (Saudi Central Bank (SAMA), 2022).

3.2. E-Commerce Landscape in Saudi Arabia

Electronic commerce is one of the most important pillars of Saudi vision 2030, to diversify and expand its non-oil economy. So, the kingdom government has launched initiatives' programs to support the growth of e-commerce in Saudi market such as providing e-commerce advanced courses in academic institutions, establishing guidelines of e-commerce cybersecurity, and building the capacity of local services' providers (Saudi General Authority of Foreign Trade, 2023).

Saudi Arabia established the E-Commerce Council in 2018 as a legal and institutional infrastructure, which consist of 16 government representatives' organizations and 3 private sectors. The council launched the "E-Commerce Stimulus Program" which aims to raise the growth of the e-commerce ecosystem, through this program the council works to enhance the economic growth and achieve leadership in e-commerce sector. Additionally, the government has worked on improving and innovating fintech sector, and improving e-commerce environment by establishing a program that facilitate payment stages of e-stores, such as e-wallets, payment gateways, etc. (Saudi General Authority of Foreign Trade, 2023).

The Saudi General Authority refers that the most important developments of this program are:

- E-commerce' venture capital grew up by 492%, reaching a value by this percentage of SAR 637.5M in 2021.
- E-commerce transaction through *Mada,* the national payment network established in 1990 by the Saudi Arabian Monitory Authority, reached to be SAR 111B in 2022.
- Launching new business models in payment technology, one of them is "buy now, pay later" services. This supported in licensing 12 technology companies in financial out of 32 companies in 2022. In addition, 14 licensed technology companies authorized in the regulatory sandbox.

All of these previous factors strengthened the base of e-commerce in KSA and expanded its market.

4. Security Concerns in Fintech and E-Commerce

Any digital technology is -however- vulnerable to security breaches and manipulation by hackers, which effect on its growth and user trusting. On the other side, this encourages technology companies to compete on developing a high secure, high-quality software. Based on IBM report 2024 about threat intelligence, it showed that the industry of Finance and Insurance is the second of the most cyber-criminal targeting since 2019 to 2023 by 18.2% (IBM, 2024).

Saudi Arabia is considered the highest country in the Middle East in number of cyberattacks, as it recorded over 160.000 daily hits (Fintech Saudi, 2021). The fintech apps and e-commerce platforms, both have a number of cyber threats:

- *IoT*: because of increasing the insecure devices on the internet network, that makes the businesses more vulnerable to cyber breaches and attacks. Moniak Maiti & Uttam Ghosh referred in their study that 55% of business professionals ranked security as the top priority for wide using of IoT in organizations' projects (Maiti & Ghosh, 2021).
- *Data Infrastructure*: the data storage is susceptible by cyberattacks either it stored physical on organization database devices, or on cloud. Data infrastructure could also damage by human mistake or technical error, and this phenomenon called Data Leak. Shannon's information theory goes to focus on the weakest links which are humans, to protect data damaging (Javaheri, et al., 2024).
- *Advanced Phishing*: AI and Machine Learning have increased the threats of malware and data attacks. In 2017, the financial sector absorbed about 19% of totally malware hacking, and lost about $18.3B (Javaheri, et al., 2024).

In their study, the researchers Mansour & Sara added additionally challenges of Fintech, which are the following (Albarrak & Alokley, 2021):

- *Regulation*: SAMA and CMA approved a little number of fintech issued cause of various reasons, such as the licenses should be obtained by the fintech companies, or the prolonged duration of conservative approaches.
- *Concentration*: most of fintech startups focus on investing in Peer-to-Peer lending, as a way of facilitate transaction for both businesses and individuals. The ease of use the P2P affect increasing the threat of data cyberattacks.
- *Human Capital*: duo to the limited training of fintech systems, or releasing the importance of its use. Human considers a great danger on fintech security.
- *International Competition*: because of the market need for fintech solutions. So, if the local startups not ready to cover the needed solutions, they'll struggle to compete.
- *Foreign Investors*: fintech investors have to work according KSA license and rules, to keep fintech security, and data saving.

4.1. Cybersecurity Solutions of Fintech in KSA

According to Fintech Saudi, financial firms are 300 times vulnerable to hacking than the other firms. While 95% of cybersecurity companies focus on providing the cyber services, or products, only 5% focus on developing the cybersecurity services/products to tackle the evolving of challenges that businesses in Saudi Arabia face (Fintech Saudi, 2021).

The Saudi government goes to create solutions for cyberattacks as a part of its vision to increase investment in Fintech market locally and globally, and its solutions depend on adopting AI technology. The artificial intelligence solutions are potential to offer number of benefits to companies to protect their cybersecurity, additionally the strategic benefits. First is to utilize AI to monitor transactions, and analyze it, to protect the sensitive data, on the other hand, it can predict the market changes by its deep analyzing. Secondly, using AI to secure the cloud systems against malware penetration. In addition, using AI and machine learning in monitoring and preventing cyberattacks to reduce costs, as it makes a real advices and suggestions of building decisions for both clients and organizations. Further, it has the ability to avoid mistakes and delaying processes by humans (Fintech Saudi, 2021) (Chikri & Kassou, 2024).

Fintech companies and apps have enhancing chatbots by a large scale of AI capabilities to be the virtual assistant for clients to answer their enquiries, and handle their issues. By empowering virtual assistants, AI can evaluate customers' information and provide a tailored product or service recommendation. This user experience can increase customer satisfaction, boost loyalty, and reduce cost of traditional customer service (Syed, 2024).

5. Convenience and User Experience in Fintech Solution

The adoption of fintech applications has its effect on additional user convenience experiences in online shopping. In capturing the full experience of digital financial payments, the payment system always optimized to be made full use of, where the buyer can pay his merchant digitally using his digital financial apps. The binding of Saudi payment services with popular social media, digital content, and the government awareness are going to provide an added incentive to adopt the e-commerce channels.

On its vision 2030, Saudi Arabia had a fintech strategic plan by 2023 to adopt 150 fintech companies, achieve SAR 742 million cumulative value of capital raised investment, and share the non-cash transaction to 63%. Due to the great opportunities of investment and the government facilities, the country could achieve growth in the planned numbers to has 216 fintechs, SAR 6.9B of cumulative value of capital raised investment, and 70% sharing of non-cash transactions (Fintech Saudi, 2024).

The users continue in using e-payment in Saudi Arabia goes to three main dimensions that influence user satisfaction, which are System Quality (SYSQ), Service Quality (SERQ), and Information Quality (INFQ). SYSQ meets the Saudi users' expectations of ease of use, info appearance, access speed, and security. SERQ meets users' personalization, responsiveness, and assurance. Finally, INFQ meets users' expectations of pay bills, buying, and easily access payment information anytime from anywhere (Ahmed Albliwi & Abdullah Alkharmani, 2020).

6. Financial Inclusion through Fintech

Financial inclusion is defined as "the provision of, and access to financial services to all members of population particularly the poor and the other excluded members of population"- Ozili (Ozili, 2020). It also defined by the committee on financial inclusion as "the process of ensuring access to financial services and timely and adequate credit when needed by vulnerable groups such as the weaker sections and low-income groups at an affordable cost by mainstream financial institutions players." (Singh & Roy, 2015).

Saudi Arabia moved forward the fintech since 1990s when the Saudi Central Bank (SAMA) launched MADA and SADAD as the national payment systems to reduce payment fees. In 2018, SAMA in cooperation with banks and financial institutes embarked an initiative of enabling youth and entrepreneurs' access to financial services, as a part to its goal to increase SMEs to 35% of GDP, and increase adults bank accounts' number to 90%. In the same year, SAMA and the Capital Market Authority (CMA) have initiated the regulatory sandbox to encourage fintech companies to invest in Saudi Arabia (Khan & Abdallah, 2022). According to annual fintech report 2023, KSA fintech ecosystem have about 216 fintech companies in 11 financial sectors, 113 fintechs operated under SAMA supervision, 44 fintechs operated under CMA supervision, 9 operated under Insurance Authority (IA) supervision, and 50 fintech organizations not regulated by the financial services regulator.

In a study by a researchers' group about the impact of financial inclusion on SMEs in KSA, it found that the financial inclusion has a positive effect on entrepreneurs financing, as this hypothesis is confirmed when inclusion coefficient is found to be statistically significant. In addition, it found that bank concentration and financial inclusion have a negative relationship. That a highly concentrated bank market, a decreased of the impact of financial inclusion, which mean that bank concentration can partially displaced by financial inclusion. Further, the size of business' funding increases when the bank concentration is below 32-38%, and it has a positive effect by the financial inclusion, as the SMEs have an easy access to fintechs when it simi difficult to have access to bank finance (Soliman, et al., 2022).

7. Conclusion

Finally, fintech has played a transformative role in shaping the e-commerce landscape in Saudi Arabia. The adoption of e-payment solutions, such as mobile wallets and online banking, has significantly enhanced the convenience and security of online transactions, encouraging more consumers to online shopping. Some initiatives like Buy Now, Pay Later (BNPL) have also gained traction, providing flexible payment options that appeal to a broader audience. Moreover, SAMA has been instrumental in fostering a supportive regulatory environment, enabling fintech companies to innovate and collaborate with e-commerce platforms. This synergy has not only boosted consumer confidence but also contributed to the Saudi Vision 2030 goals by driving digital transformation and economic diversification.

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