

Bridging the Gap: Leveraging the technology acceptance model (tam) to understand how fintech, digital marketing strategies, and consumer intentions foster financial inclusion

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Keywords

FinTech, Digital Marketing, Financial Inclusion, Technology Acceptance Model, Egypt

Abstract

The research suggests a framework for analyzing the adoption and use of FinTech from a technology acceptance perspective in order to comprehend the ways in which Fintech, digital marketing strategies, and consumer intentions promote financial inclusion. The technology acceptance model was broadly classified in six dimensions by this research: perceived usefulness, perceived ease of use, attitude, consumer intention, trust, and risks. Additionally, it investigates the correlation between these characteristics and the adoption of fintech in Egypt. It also suggests that the relationship between the adoption of fintech and financial inclusion is mediated by digital marketing.

Cross sectional questionnaire was conducted to collect the data from Egyptian users who use fintech applications, the questionnaire distributed online through different social media platforms such as (LinkedIn, WhatsApp, and Facebook). The target respondents were customers located in Greater Cairo. Random sampling method was used

This research aims to assist FinTech service providers in developing FinTech services that cater to a diverse range of users. Greater emphasis should be placed on improving the functionality and security measures in order to establish social acceptance of FinTech services. This would stimulate users to engage in regular usage and allure nonusers to initiate their inaugural online financial transaction.

This research contributes to the existing body of knowledge on technology acceptance by integrating pertinent technological and behavioral characteristics and examining the intermediary impact of digital marketing. It enhances comprehension of consumer thoughts and perceptions regarding the practical utilization of FinTech services and financial inclusion.

Introduction

The Central Bank of Egypt has made substantial efforts to promote the expansion of the FinTech industry and to improve comprehension of its advancements. FinTech Egypt has recently released "Egypt's FinTech Landscape Report 2023" as part of this initiative. This comprehensive report was developed through surveys that were meticulously devised and administered to more than 250 organizations within the FinTech ecosystem. According to Al-Mohamady (2024), these organizations encompass FinTech businesses, Payment Service Providers, investors, accelerators, incubators, banks, and regulatory and government entities.

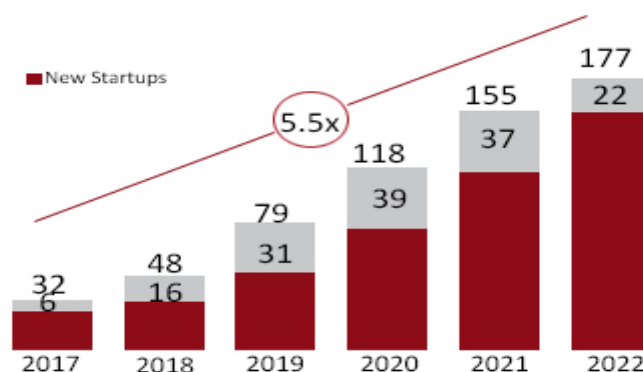
Over the past five years, the Egyptian FinTech Startup ecosystem has experienced significant growth, expanding by more than 5 times. Currently, there are a total of 177 startups and PSPs operating in this sector, covering 14 different innovative FinTech sub-sectors. Notably, 30% of these startups have achieved substantial growth and successfully expanded their operations to regional and global markets.

The finance industry is driven by innovation, encompassing various sectors such as banking, payments, lending, investment, insurance, and regulatory technology. The field of fintech is at the forefront of the finance industry, revolutionizing how people and businesses engage with money and financial transactions through the integration of technology (Karsh, 2021). This article delves into the ever-evolving world of Fintech in Egypt, providing insights into the concept of Fintech and examining the wide range of opportunities and challenges it offers to investors.

Aligned with the Egyptian government's dedication to achieving Egypt's less-cash framework and, on a broader scale, in line with Egypt's National Vision 2030, Egypt is actively promoting innovation and digitization within the banking and financial sectors. The Egyptian government demonstrates a proactive approach when it comes to fostering innovation. The sector's success can be attributed to its strong commitment to introducing and fostering Fintech. The government has established a regulatory environment that promotes innovation and fosters growth.

The Central Bank of Egypt (CBE) has been instrumental in the implementation of regulations that are advantageous to fintech firms, including the simplification of licensing procedures. A Fintech Regulatory Sandbox offers entrepreneurs the chance to test and enhance their products in a controlled environment, thereby reducing the barriers to market entry and innovation.

This regulatory framework is essential for offering the needed support and guidance to emerging fintech ventures. Figure 1 illustrates the emerging startups in Egypt.



Source: Central Bank of Egypt (2023), Egypt Fintech Landscape Report

Currently, the scope of FinTech services has expanded beyond the digitization of traditional financial services and electronic banking. The consumer perspective is presently being prioritized by the financial service industry in order to effectively develop and implement innovative technology that meets the financial requirements and demands of users (Diana & Leon, 2020). FinTech services have the potential to enhance efficiency, mitigate risk, and promote inclusive growth.

Financial inclusion has become a crucial focus for policymakers, researchers, and practitioners on a global scale. The objective is to ensure that individuals and businesses, especially those who have historically been marginalized from the conventional financial system, can access affordable and dependable financial services (Kreutz et al., 2020).

These technologies' scope and influence have been substantially increased by incorporating digital marketing techniques into fintech systems (Hollanders, 2020). Digital marketing is the utilization of a diverse array of online tools and strategies to promote products and services, attract consumers, and establish a brand. Financial service providers have been able to more effectively engage and interact with underprivileged groups by utilizing fintech in the financial industry, thereby promoting financial inclusion (Irimia Dieguez et al., 2023).

The purpose of the present study is to examine the mediating role of digital marketing in the ways in which fintech influences the behavioral intentions of individuals toward financial inclusion. The objective of this paper is to examine the impact of digital marketing strategies employed by fintech companies on the attitudes and intentions of individuals regarding the adoption and utilization of financial services. Legislators and practitioners can develop more effective policies to promote financial inclusion on a global scale by a comprehensive understanding of the intricate mechanisms that underlie the amplification of fintech's impact by digital marketing.

In order to investigate this intermediary function, the research will make use of a comprehensive theoretical framework that brings together theories from the fields of consumer behaviour, digital marketing, and fintech (Senyo and Osabutey, 2020). The technology acceptance model (TAM) will be

utilized in order to evaluate the propensity of individuals to adopt fintech and to provide insights into the ways in which digital marketing influences attitudes and subjective norms.

Numerous empirical studies have examined the influence of fintech on financial inclusion, with an emphasis on its ability to address obstacles associated with physical accessibility, documentation requirements, and exorbitant transaction costs. Three notable examples are the investigations conducted by Banna et al. (2022), Leong (2018), and Liu et al. (2020). The purpose for this research is the substantial influence that financial technology (FinTech) can have on the global advancement of financial inclusion. The implementation of cutting-edge solutions has completely revolutionized the provision of financial services, as evidenced by FinTech (Alshari & Lokhande, 2022). Nevertheless, the scarcity of research on the impact of FinTech development on the promotion of financial inclusion, particularly in countries that are in the process of transitioning, remains a significant source of concern. Additionally, Egypt has not received substantial attention in this particular context.

This study aims to fill this gap by examining the effects of FinTech adoption on financial inclusion in Egypt. The emergence of mobile devices has sparked a profound transformation in the realm of financial services. In this new landscape, FinTech companies have emerged as key players, providing users with the ease and convenience of digital money transfers and electronic payment systems. This study aims to examine the factors that influence the adoption and acceptance of FinTech services by consumers. It will delve into the various elements that shape consumers' perceptions and attitudes towards adopting new technologies. This will not only assist in attracting potential users, but it will also aid in retaining existing customers. Nevertheless, there is a lack of definitive research findings that establish the factors influencing the acceptance of FinTech and its subsequent utilization (Savitha & Hawaldar, 2022). Several studies have examined the obstacles to the acceptance and utilization of FinTech, primarily focusing on customers' behavioral intentions to use FinTech (Alnsour, 2022)

The impact of fintech on financial inclusion has been the subject of numerous empirical studies (e.g. Banna et al., 2022; Leong, 2018; Liu et al., 2020), which have emphasized its capacity to reduce barriers associated with high transaction costs, documentation requirements, and physical access. The individual effects of fintech and digital marketing on financial inclusion have been extensively investigated in prior research. Nevertheless, there has been a restricted emphasis on the function of digital marketing as a mediator in the expansion of fintech's influence.

The research will present a well-organized framework in Section 2, which will include a comprehensive analysis of relevant literature and previous scholarly works on Fintech, the technological adoption model, digital marketing, and financial inclusion. The research methodology will provide a comprehensive explanation of the strategies, processes, and approach employed to conduct the study in Section 3, thereby confirming its validity and reliability. The collected data will be comprehensively examined and the findings will be reported in Part 4, which will provide significant insights and conclusions. The primary findings of the research will be concisely summarized in the final section, Section 5. An examination of the implications of the findings, as well as suggestions for future research areas, will be included in this text. These chapters provide a thorough understanding of the study issue and its importance in the broader academic discourse.

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The literature review will introduce background knowledge on FinTech, Digital Marketing, Financial Inclusion, as well as, the Technology Acceptance Model and Financial Technology.

Financial Technology in Egypt

Egypt, a nation experiencing a rapid increase in population and a thriving economy, has been observing a notable upswing in the fintech sector. The fintech sector in Egypt has emerged as a hub of innovation and entrepreneurship, driven by the government's focus on digital transformation and financial inclusion. This

article provides an insightful analysis of the current state of fintech in Egypt, including its growth drivers and the potential opportunities it offers to the local and global financial ecosystem.

Financial Technology (FinTech) has emerged as a rapidly expanding and promising industry on a global scale, utilizing technology and innovation to broaden the scope of financial activities. The Egyptian economy has experienced development as a result of the advancements in information technology, communication, and innovative financial applications and solutions, which have equipped businesses with the requisite tools to enhance the efficiency of financial services. In March 2019, the Central Bank of Egypt implemented its FinTech and innovation integrated strategy as part of its responsibilities as a catalyst for change and supporter of the FinTech industry. The objective was to establish Egypt as the regionally recognized FinTech centre and promote the FinTech ecosystem. The fintech industry in Egypt has experienced accelerated growth due to a variety of factors (Al-Mohamady, 2024)

The Egyptian government has been actively promoting digital transformation and financial inclusion through initiatives such as the National Payments Council and the Financial Regulatory Authority's sandbox program. These initiatives promote the exchange of ideas and cooperation between fintech startups and traditional financial institutions. Moreover, Significant Smartphone Penetration: Egypt boasts a staggering 50 million smartphone users, indicating a substantial untapped market for mobile-based financial services. The rise of various mobile payment solutions, digital wallets, and other fintech applications has been notable. Egypt has a substantial unbanked population, offering a promising prospect for fintech companies to extend financial services to individuals who have historically been excluded from the formal financial system (Hussein,2020).

Egypt boasts a population that is both youthful and highly adept in the realm of technology, resulting in a flourishing entrepreneurial culture. This provides a conducive environment for the emergence of fintech innovation and startup. Fintech has been defined as a discipline that includes finance, technology management, and innovation management, as it is described as a cross-disciplinary field. The authors suggest that "FinTech" encompasses innovative ideas that improve financial service operations by utilizing technology solutions tailored to different business situations. Additionally, these ideas may lead to the development of new business models or even new companies. In a similar vein, Megahed et al. (2021) asserted that the advancement of Fintech is characterized as an ongoing progression in which finance and technology have progressed in tandem, leading to various incremental and transformative innovations. These include Internet banking, mobile payments, crowd funding, peer-to-peer lending, Robo-Advisory, online identification, and more.

(Abdelfattah & Rana, 2023) revealed that Fintech encompasses a wide range of innovations aimed at improving the production, distribution, and utilization of financial services. The financial industry is experiencing rapid evolution, with constant innovations aimed at improving the efficiency and consumer-friendliness of finance delivery. Several of the most significant advancements in fintech focus on enhancing the overall experience and engagement of consumers.

Senyo et al. (2021) demonstrated the positive effects of fintech in terms of increasing access to financial services, keeping transaction costs to a minimum, and reaching out to areas who have been historically neglected. It has been established that advances in the field of financial technology, such as mobile banking, digital payments, and alternative lending platforms, have the capacity to increase financial inclusion by overcoming traditional barriers such as physical distance, limits in infrastructure, and excessive expenses

Technology Acceptance Model and Financial Technology

The evaluation of the rapid advancement of the financial system and financial organizations is facilitated by FinTech. The development of technology has facilitated the consumption of financial services. This encompasses the enhancement of critical services and the development of new applications for tasks such as managing risk, borrowing, saving money, making payments, and acquiring financial advice (Aggarwal et al., 2023).

As digital transformations continue to shape various industries, there has been a growing Consumer demand for technologically driven financial solutions (Barroso & Laborda, 2022). FinTech companies are responding to consumer demands by providing cost-effective and convenient solutions for investments, financing, and money transfers. Retail organizations and telecommunications operators are utilizing

innovation to offer financial services through their established networks, which extends beyond conventional banking services and investment funds. FinTech refers to this phenomenon. In 2012, Yang et al. discovered that a number of FinTech service providers are presently providing and improving their services, despite the fact that FinTech services are still not widely adopted. Consequently, it is imperative to conduct a comprehensive analysis of the factors that influence the adoption and utilization of these services.

Therefore, the Technology Acceptance Model (TAM) is a suitable foundation for this study, which aims to examine the consumer adoption of FinTech services (Singh et al., 2020). The Technology adoption Model (TAM) has garnered substantial recognition for its precise and efficient capacity to predict and clarify the adoption of a variety of technologies, such as information technology, Internet-based information systems, business-to-consumer e-services, and online shopping.

In a study that was carried out by Singh and colleagues (2023). As a result, given that FinTech is a retail format of innovation, it is appropriate to make use of TAM constructs in order to examine user perception regarding the acceptance and utilization of FinTech services. This is because these elements play a significant part in the use of technology. The purpose of this study was to investigate the elements that influence the utilization of technology by classifying them into six distinct dimensions: perceived utility, perceived ease of use, attitude, customer intents, trust, and hazards (Figure 2).

The Technology Acceptance Model (TAM) posits that an individual's propensity to embrace a novel technology is influenced by two fundamental convictions: the perception of how effortless it is to use and the perception of its practical value. These elements impact the user's inclination to utilize the technology. The Technology Acceptance Model (TAM) has been consistently validated through multiple studies as a dependable framework for understanding user adoption of technology in various fields such as banking, mobile commerce, email services, online gaming, educational tools, desktop video conferencing, and the incorporation of information and communication technologies in schools (Singh et al., 2020). Furthermore, TAM has undergone extensive validation through multiple studies, confirming its reliability as a framework for understanding consumer acceptance of technology in various settings. These fields encompass banking technology, m-commerce, email, online games, educational technology, desktop video conferencing, and the incorporation of information and communication technologies in schools.

The Technology Acceptance Model (TAM) was proposed by Davis et al. (1989) as a predictive framework for determining the degree to which customers will accept and implement technology. The TAM model is frequently used in several research studies due to its strong correlation with the level of technological adoption. The present era is characterized by rapid technological advancements and the broad distribution of modern electronic programs and systems. As a result, researchers have increasingly embraced this approach. The study conducted by Davies and Venkatesh in 1995 offers proof of the effectiveness of this approach in the field of development.

Studies conducted by Jaradat & Twaissi (2010) and Meyliana et al. (2019) have investigated the utilization of FinTech services and mobile payment. These studies have utilized the Technology Acceptance Model (TAM) to evaluate client attitudes and interest in FinTech. According to Davis (1989), the level of acceptance of a technology is mostly influenced by the perceived usefulness (PU) and the advantages that customers gain from using it. When technology is difficult to use, people are generally unwilling or reluctant to accept it. Consumer attitudes have a crucial role in determining their willingness to adopt a specific technology. Consumers' intentions and expectations are influenced by their opinions towards the suitability of technology in a specific context (Ajzen, 1991).

The findings of the study (Meyliana et al., 2019) indicate that users' trust in FinTech services greatly influences their attitudes towards adoption (Fernando et al., 2021).

Although users' attitudes toward the adoption of FinTech services have not been influenced by the perceived risk, a study conducted by Fernando et al. (2018) presents contrasting findings, indicating that there is indeed an effect of perceived risk on the adoption of FinTech. (Fernando et al., 2021).

Consumer trust and its impact on the adoption and use of modern technology have been extensively studied by researchers in recent years. Opposite trust, in particular, has emerged as a significant perspective in understanding consumer attitudes and intentions (Fernando et al., 2023, and Jaradat & Twaissi, 2010). Risks, the generation of consumer intention to hesitate or not use new technology is influenced by consumer

behavior and beliefs about risks. The role of the risk factor in determining consumers' intention towards using new technology or a specific product has been extensively studied (Chen et al.,2022). As a result, the following hypotheses are formulated:

- H1:** Perceived usefulness has an effect on the use of Fintech applications
- H2:** Perceived ease of use affects the actual use of Fintech applications
- H3:** Attitude has an impact on using Fintech applications
- H4:** Customer intention positively affects the use of Fintech applications
- H5:** Trust has an effect on the use of Fintech applications
- H6:** Risks affects the use of Fintech applications

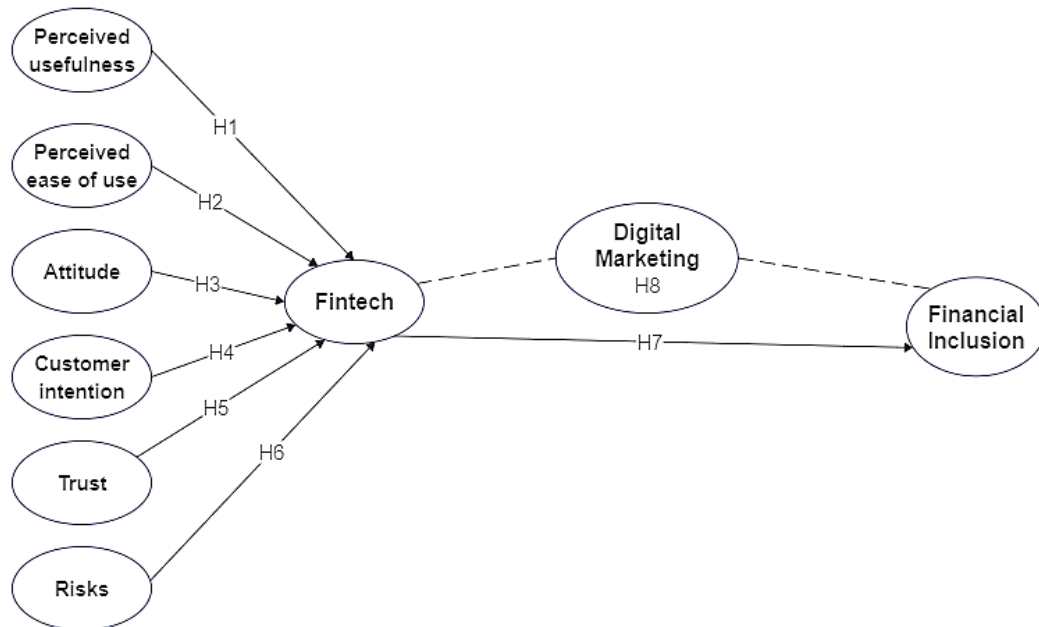


Figure 2: Conceptual framework

Digital Marketing

Companies utilize digital marketing strategies to effectively promote their products and services, thereby enhancing customer accessibility and fostering a favorable inclination towards customer engagement (Chakraborti, et al., 2022).

Research has shown that digital marketing places a strong emphasis on customer engagement and promptly addressing inquiries through digital channels. This approach enables businesses to gain insights into customer behavior and effectively reach a wide range of potential customers (Kowsalya, 2020; Mobydeen, 2021). Digital marketing is the process of promoting and selling products or services through the use of digital technologies, including the Internet, mobile phones, displays, advertisements, e-mail, electronic publications, and optical discs. It also encompasses the acquisition and examination of digital data that pertains to consumer behaviour and characteristics. Consequently, digital marketing generates demand by closely aligning with the challenges posed by digital media technology and the new opportunities in information technology (Chaffey et al., 2006). The utilization of mobile technology for fund transfers has piqued the interest of its consumers, as per Al-Slehat (2023).

Financial businesses can offer enhanced amenities to their consumers by improving their competitiveness and efficiency. Recent scholarly research indicates that the adoption of fintech has positively influenced consumer behaviour and has had a significant role in improving financial inclusion (Sanga and Aziakpono, 2022). From a different perspective, it is evident that behavioral intention plays a crucial role in influencing consumer behavior and achieving success in digital marketing. In recent years, digital marketing has become an essential tool for financial institutions to expand their reach and improve the overall customer experience (Al-slehat, 2023).

Digital marketing incorporates both tangible and intangible benefits, as per Chaffey et al. (2009). The tangible advantages consist of an increase in sales and sales opportunities. The revenues will be positively affected by the tangible benefits mentioned, which will attract new markets and customers. Furthermore, they will result in cost savings by reducing the amount of time spent on service and reducing the cost of printing and distribution. Additionally, the brand will be strengthened, customer service will be improved, marketing and customer-related information management will be optimized, and customer feedback will be capitalized on for all products. This will surpass customer expectations.

Jaafar and Khan (2022) assert that digital marketing has an impact on trust, brand awareness, and attitude. Scientific and technological advancements, such as artificial intelligence and big data analysis, are essential in the field of digital marketing, as they enhance marketing communication and ultimately increase the social impact of digital marketing. Li (2022) corroborated Purba et al.'s (2020) discovery that respondents' satisfaction levels are positively affected by fintech-enabled digital financial products.

The authors emphasized the significance of the banking sector in the implementation of new digital marketing techniques to resolve the crisis of confidence and promote financial inclusion. They underscored the necessity for financial institutions to implement digital innovations, such as digitizing business, in order to enhance cost efficiency.

According to Popović-Pantić et al. (2020), organizations that do not integrate digital technology into their innovation processes would not experience any performance increase. This finding reinforces the assumption. Al-Hakim and Al-Hamami (2017) did a comprehensive analysis on the many dimensions of digital marketing.

1. Attraction: a way that depends on how the user interacts with the interactive app.
2. Absorption: how involved, interested, and able to complete tasks users are in the process.
3. Retention: Keeping relevant and engaging material up to date to build a connection with customers and keep the promise over time.
4. Learning: the process of getting more customer data and information through interactive means, like through polls, questionnaires, and registration.
5. Communication: this means getting to know the customer better, giving them personalized services, and letting them know about other services that are available.

It is critical to understand how digital marketing influences people's behavioral intentions toward fintech adoption. Efficient digital marketing methods raise awareness, educate people about fintech services, build trust, and encourage positive attitudes. Several techniques, such as online advertising, tailored content, social media campaigns, and user involvement, have a big impact on people's willingness to adopt fintech. According to studies, the availability of fintech services increases people's willingness to use financial services. Fintech solutions are widely accepted because to their convenience, accessibility, and innovative character, resulting in higher acceptance rates among users.

Financial Inclusion and Financial Technology

Digital marketing has become increasingly crucial in promoting financial inclusion. Akpene Akakpo et al. (2022) highlight the potential of digital marketing to improve financial literacy, increase the reach of financial services, and nurture positive financial habits among marginalized and low-income communities. Digital marketing tactics, such as social media marketing, email marketing, and online advertising, can effectively reach a large and diverse audience while providing essential information and education about financial products and services (Irimia-Di eguez et al., 2023).

Financial inclusion is defined as the availability of a diverse set of inexpensive and dependable financial services that prioritize client satisfaction and protection (Korynski, 2019). Financial inclusion refers to the availability and affordability of financial services for all individuals and businesses, regardless of wealth or size (Demirgüç-Kunt et al., 2015). To gain access to digital financial services, you must register and obtain them quickly, easily, and at a cheap cost (Owens, 2013).

In contrast, Barajas et al. (2020) defined financial inclusion as the community's access to financial services, the amount of benefit obtained from them, the quality of these services, and the associated expenses. Zins and Weill (2016) define financial inclusion as persons having accounts with financial institutions that allow them to deposit and borrow money, as well as use electronic payment systems.

According to a study conducted by Al-Slehat et al. in 2023, financial inclusion is critical. Financial inclusion is a big undertaking that includes both humanitarian and commercial dimensions, with the goal of reaching the broadest possible segment of society. Financial inclusion attempts to close the substantial gap in access to financial services by reaching out to a diverse population and providing them with a broad variety of financial services. Financial inclusion is critical to achieving financial stability while also promoting economic prosperity. Financial inclusion encourages healthy competition amongst financial organizations. Financial inclusion is essential for protecting savings and promoting social development. Thus, the following hypothesis is formulated:

H7: The use of Fintech has an effect on customers towards financial inclusion

The influence of digital marketing on the relationship between Fintech and Financial Inclusion

Several studies (Al-slehat, 2023; Senyo and Osabutey, 2020) have shown that digital marketing has a major impact on the outcomes of financial inclusion. Studies have demonstrated that well-designed digital marketing tactics, such as targeted online campaigns, active social media involvement, and tailored content, can significantly improve people's comprehension, awareness, and use of financial services. Digital marketing makes a big contribution to boosting financial inclusion by reducing obstacles to entry and facilitating the dissemination of essential information.

Bongomin and Ntayi (2023) emphasized the importance of mobile phone uptake and usage, as well as digital consumer protection, in promoting financial inclusion. A recent study conducted by Siddiqui and Siddiqui (2021) discovered that telecommunications have an important influence in promoting financial inclusion. The report also highlighted the regrettable reality that low-income households encounter barriers to accessing basic financial services. Kurniasari et al. (2023) found that the growing influence of digital technology has a major impact on customer decision-making when it comes to fintech. This effect is mediated by consumer knowledge. As a result, it is critical to improve education and effectively convey complete knowledge in order to promote a better understanding of fintech.

Farida et al. (2021) discovered that financial culture has no influence on financial behavior. The use of fintech has a substantial impact on financial behavior, and the combination of financial culture and fintech usage leads to overall financial pleasure. Finally, when technology is used, the impact of finance on financial pleasure is not noticed since financial behavior serves as an intermediary variable.

According to a recent study by Vyas and Jain (2021), the technology acceptance model plays an important role in mediating the relationship between the digital economy and financial inclusion. Bongomin and Munene (2019) found that cultural norms play a significant and positive mediating impact in the relationship between mobile money acceptance and utilization and financial inclusion in developing countries' small and micro firms. Furthermore, Bongomin et al. (2018) revealed that social capital is a key mediator in the relationship between financial intermediation and financial inclusion. They also emphasized the importance of social capital in impoverished communities, which plays a critical role in promoting financial intermediation and increasing financial inclusion.

According to research, positive perceptions of fintech, which are shaped by digital marketing activities, have a significant impact on users' behavioral intentions to utilize fintech services. People with a stronger tendency toward particular behaviors are more likely to actively explore and use fintech services, resulting in better financial inclusion outcomes. Effective digital marketing techniques have a huge impact on people's awareness, attitudes, and intentions to use fintech. Increased digital marketing activities are expected to lead to better levels of behavioral intention, driving more fintech adoption and, ultimately, improving financial inclusion (Rizwan and Mustafa, 2022). Effective digital marketing techniques have a huge impact on people's awareness, attitudes, and intentions to use fintech. Increased digital marketing efforts are expected to result in higher levels of behavioral intention, which will promote increased fintech adoption and, ultimately, financial inclusion. During a literature review, the following hypotheses can be generated:

H8: Digital marketing has a mediating influence between Fintech and financial inclusion

Methodology

The current study relied on quantitative methodologies. More specifically, the researchers used structural equation modelling to assess the study hypotheses using Smart PLS V4.

3.1 Sample and data collection

For data collection in this study, a questionnaire was used. The questionnaire is a 24-item test that assesses respondents' trust, risks, perceived ease of use (PEOU), perceived usefulness (PU), attitudes, and intentions to use FinTech. The questionnaire was prepared with Google Forms. The survey was administered electronically, primarily using social media platforms such as WhatsApp and Facebook. The survey's goal was to obtain data on participants' perspectives, attitudes, and behaviors regarding fintech uptake, digital marketing efficacy, and financial inclusion outcomes.

The survey participants consisted of customers residing in the Greater Cairo area. The random sampling method was employed due to the challenge of acquiring a comprehensive sampling frame that includes information on all FinTech users. Before the research began, all participants received a detailed explanation regarding the FinTech service and the importance of this study. The explanation was given in a neutral manner to ensure that no bias was introduced.

Measurement

The research questionnaire has five sections. The first phase focuses on gathering demographic information from the participants. This section includes questions about the participants' ages, genders, educational backgrounds, and other relevant demographic information. The questionnaire's second component assesses the respondents' level of knowledge in the field of fintech. This section has 10 questions derived from a prior study conducted by Morgan in 2022.

The questions are created to evaluate the participants' comprehension and knowledge of fintech ideas and services. The questionnaire's third portion assesses the respondents' perceptions of digital marketing. The questionnaire has eight items that were sourced from a prior study conducted by Zhao et al. in 2019.

These questions assess the participants' perceptions on the effectiveness, influence, and significance of digital marketing tactics in the fintech industry. The fourth component of the questionnaire assesses individuals' involvement in financial services and systems. The questionnaire includes eight questions based on Senyo and Osabutey's 2020 research. These questions are designed to assess the degree to which participants consider themselves financially included, which means they have access to financial services and resources.

The five-point Likert scale was used to record participants' responses to questionnaire items. This scale allows researchers to assess data and categorize responses based on participants' levels of agreement or disagreement with the assertions. The fifth and final measurement is the Technology Acceptance Model, which has six dimensions: trust, risk, PEOU, PU, attitude, and intention. The assessment scale was adapted to examine attitudes and intentions about FinTech (Fernando et al., 2018; Hu et al., 2019; Jaradat & Twaissi, 2010). The factors assessing trust, risks, PEOU, PU, attitudes, and intentions to utilize FinTech are measured using a 5-point Likert-type scale ranging from "strongly disagree" to "strongly agree."

Discussing study results

To verify the stability and validity of the field study tool (questionnaire), Cronbach's alpha test was used for each dimension of the study, with the aim of ensuring the ability and reliability of the tool to give the same results. Below are the results of the Cronbach alpha test and the average variance (AVE).

Table (1) Validity and reliability coefficients and AVE

Variables	Cronbach's alpha	validity	Composite reliability (rho_a)	Composite reliability (rho_c)	Average variance extracted (AVE)
financial inclusion	0.956	0.978	0.963	0.964	0.769
Customer intention	0.950	0.975	0.958	0.964	0.870
Digital marketing	0.927	0.963	0.933	0.941	0.667
Fintech	0.946	0.973	0.960	0.955	0.682

Perceived ease of use	0.921	0.960	0.927	0.950	0.864
Perceived usefulness	0.788	0.888	0.893	0.900	0.819
Risks	0.920	0.959	1.125	0.932	0.775
Trust	0.946	0.973	1.085	0.961	0.892
Attitude	0.876	0.936	0.919	0.923	0.800

Source: from Smart-pls v4 output

It is clear from the previous table that the study’s measures recorded relatively high reliability coefficients, ranging from (0.788 to 0.956), which are coefficients that exceed the conventional minimum of (0.7)¹. It is also clear that these measures recorded high reliability coefficients. It ranged from (0.888 to 0.978), and the average variance values for the study dimensions ranged from (0.667 to 0.892).

To calculate the validity of the internal consistency, the Pearson correlation coefficient was used to measure the relationship between each dimension and the total score for the total dimensions related to the study. Below are the results of the internal consistency for the total study.

Table (2) Internal consistency of the study dimensions

Var.	item	r	Var.	item	r	Var.	item	r
Fintech	FIN1	.704**	Financial_inclusion	FINC1	.910**	Perceived usefulness	Pu1	.927**
	FIN2	.779**		FINC2	.886**		Pu2	.888**
	FIN3	.931**		FINC3	.793**	Trust	TR1	.969**
	FIN4	.863**		FINC4	.920**		TR2	.889**
	FIN5	.811**		FINC5	.797**		TR3	.971**
	FIN6	.681**		FINC6	.950**		TR4	.956**
	FIN7	.913**		FINC7	.887**	Risks	Rs1	.929**
	FIN8	.721**		FINC8	.854**		Rs2	.841**
	FIN9	.862**		CI1	.952**		Rs3	.918**
	FIN10	.921**		CI2	.925**		Rs4	.903**
Digital_marketing	DMAR1	.946**	Customer intention	CI3	.937**	** Correlation is significant at the 0.01 level (2-tailed).		
	DMAR2	.814**		CI4	.917**			
	DMAR3	.783**	Perceived ease	pe1	.906**			
	DMAR4	.691**		pe2	.924**			
	DMAR5	.779**		pe3	.958**			
	DMAR6	.802**	Attitude	AT1	.951**			
	DMAR7	.859**		AT2	.829**			
	DMAR8	.824**		AT3	.905**			

Source: from SPSS V25 output

It is clear from Table No. (2) that the relationship of the correlation coefficients for each dimension of the study is significant at the level of significance (0.01), and the correlation coefficients ranged between (0.681 - 0.969), which indicates that all dimensions are valid and associated with the tool. The study, which demonstrates the validity of the study tool and its suitability for a field study.

Hence, the previous results indicate that there is an appropriate degree of internal consistency between the statements used to measure all study variables, and thus the validity of the study tool logically and statistically for all field study data. After that, a descriptive analysis of the dimensions of the study was conducted, as is evident from the data of the tables that obtained the dimensions. The highest degree of agreement and the lowest degree of agreement according to the responses of the study sample items. Below are the descriptive measures for the dimensions of the study.

Table (3) Descriptive measures for the study dimensions

variables	N of items	Std. Deviation	Mean
Fintech	10	0.710	3.802
Digital_marketing	8	0.620	3.953
Financial_inclusion	8	0.619	3.916
Technology_Model (dimension)	20	0.621	4.082
Perceived_usefulness	2	0.584	4.110
Perceived_ease	3	0.754	4.087
Attitude	3	0.648	4.100
Customer_intention	4	0.728	3.995
Trust	4	0.725	4.143
Risks	4	0.669	4.080

Source: from SPSS V25 output

The trends of the research sample items in Table No. (3) showed a general trend towards “agree” on all dimensions of the Technology Model, where the arithmetic mean ranged between (3.99 - 4.14) and a standard deviation ranged between (0.584 - 0.754). The Trust dimension came in first place among the dimensions of the Technology Model and is the most consistent among the dimensions of the variable, followed in the order by the Perceived Usefulness dimension.

The research sample also showed a general trend towards “Agree” on the Fintech dimension, the Digital marketing dimension, and the Financial inclusion dimension, as the arithmetic mean for these dimensions reached (3.80 - 3.95 - 3.91), respectively, with a standard deviation of (0.71 - 0.62 - 0.61).

Table (4) Demographics Question result

		Frequency	Percent
What is your preferred method of using technology?	Both	156	40.6
	Smart Device	164	42.7
	Computer	64	16.7
	Total	384	100
What is your age?	18-30	237	61.7
	30+	147	38.3
	Total	384	100

How would you describe your ability to use technology?	Advanced	194	50.5
	Proficient	190	49.5
	Total	384	100
How long have you been practicing fintech applications?	Less than 5 years	96	25
	More than 5 years	288	75
	Total	384	100
What is your current employment status?	Full time	296	77.1
	Part time	88	22.9
	Total	384	100

Source: from SPSS V25 output

The previous data suggests that the majority of respondents favor smart devices, either entirely or in conjunction with computers, demonstrating a trend towards mobile and adaptable technology use. The respondents' age distribution exhibits a bias in favor of a younger population (61.7%). This age distribution suggests that young adults make up the majority of the research sample, which may have an impact on the study's findings on technological preferences and skill levels. As for the respondents' self-assessed levels of technological ability, they are split about evenly. This balance indicates that the sample is made up of people who, on the whole, are confident in their ability to use technology, with a tendency toward more advanced expertise.

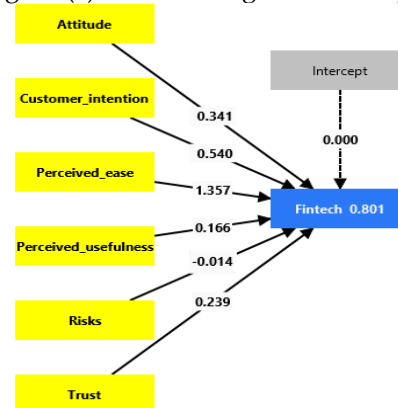
When it comes to the length of time they have used fintech applications, the majority of respondents have a significant amount of experience (75% having more than 5 years). This suggests that the research's conclusions are based on the experiences of seasoned users. There is a greater percentage of full-time employment among the respondents' job status (around 77%). This suggests that most of the sample's members have steady, full-time occupations, which may have an impact on how they access and use technology.

In conclusion, these insights offer a thorough understanding of the respondents' technical preferences, behaviors, and demographics.

Interpreting hypotheses results:

To analyze the study hypotheses from H1 to H6, the study uses simple regression analysis to determine the effect of Technology Model (dimensions) on Fintech applications. The following figure (1) is showing the results of regression analysis.

Figure (1) results of regression analysis



Source: from Smart-pls v4 output

Coefficient of determination was 0.801, meaning that the Technology Model dimensions (Perceived usefulness, Perceived ease, Attitude, Customer intention, Trust, and Risks) explain 80% of the changes in Fintech applications, with the remaining percentage attributed to other unaccounted factors. The following table shows the results of estimated model Coefficients.

Table (5) Regression Coefficients

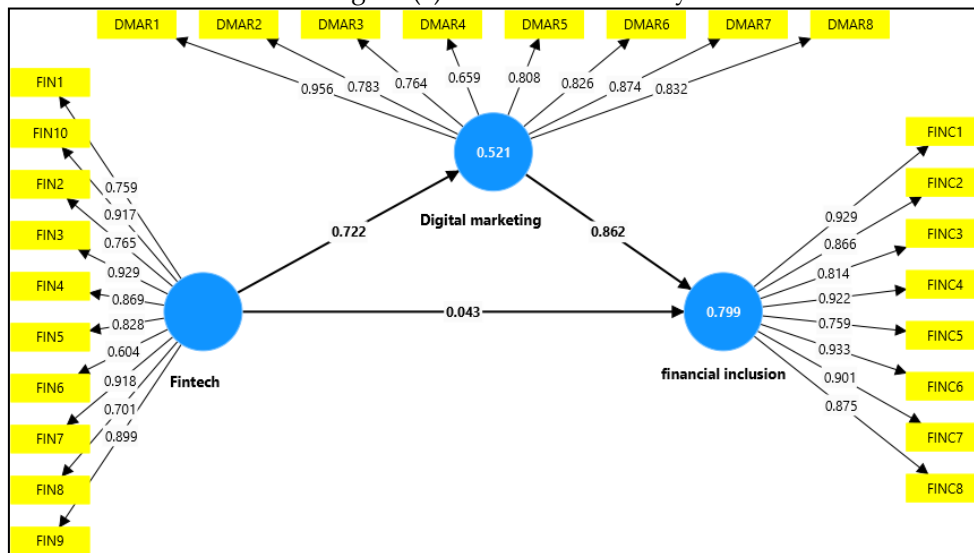
hypotheses	Variables	Coefficients	T value	P value	decision
H1	Perceived_usefulness	0.166	3.133	0.002	accepted
H2	Perceived_ease	1.357	6.930	0.000	accepted
H3	Attitude	0.341	4.255	0.000	accepted
H4	Customer_intention	0.540	7.459	0.000	accepted
H5	Trust	0.239	3.628	0.000	accepted
H6	Risks	-0.014	5.170	0.000	accepted

Source: from Smart-pls v4 output

Regression results indicate a positive effect of the Perceived usefulness on Fintech applications by 0.16 with a statistical significance value of 0.002 at a significance level of less than 5%. Accordingly, we accept the H1 of the study which states that Perceived usefulness affects the use of Fintech applications, also Perceived ease positively effect on Fintech applications by 1.35 and This effect is significant so we accept H2: Perceived ease of use affects the actual use of Fintech applications. Likewise, Attitude has a positive effect on Fintech applications by 0.341 at a statistical significance level of 0.05, and there is a positive effect of the Customer intention on Fintech applications by 0.540 and This effect is significant, so we accept H3: Attitude has an impact on using Fintech applications, and H4: Customer intention positively affects the use of Fintech applications. The Trust has a positive effect on Fintech applications by 0.239, but Risk has negative effect on Fintech applications -0.014 and this effect is significant, so we accept H5: Trust has an effect on the use of Fintech applications, and H6: Risks affects the use of Fintech applications.

To measure the seventh and eighth study hypotheses, path analysis was used using the Smart-Pls v4. Below is Figure 2 showing the results of the test.

Figure (2) results of Path analysis



Source: from Smart-pls v4 output

The results of Figure (2) show that Fintech explains 52% of the variance in digital marketing, and the rest of the percentage is due to other factors that were not included in the relationship between the variables. Likewise, both Fintech and digital marketing explain 80% of the variance in financial inclusion.

The path parameters also express the linear relationships between the study variables, including that we find that there is a positive effect of the Fintech dimension on the Digital marketing dimension by (0.772), and the Digital marketing dimension also has a positive effect on the financial inclusion dimension by (0.862). Below are the results of the path analysis parameters.

Table (6) path analysis Coefficients

	Coefficients	T statistics	P values	SRMR	NFI
Digital marketing -> financial inclusion	0.862	2.554	0.000	0.19	0.97
Fintech -> Digital marketing	0.722	5.434	0.000		
Fintech -> financial inclusion	0.043	9.155	0.000		

Source: from Smart-pls v4 output

Figure (2) and the results of Table (6) show that Fintech has a positive effect on the financial inclusion dimension, as the value of the T test reached 9.155, with a statistical significance value of 0.00, which is significant at a significance level less than 0.05, and thus we accept H7: Fintech use has an effect on customers' financial inclusion.

The goodness of fit results for the models show that the Standardized Root Mean Square Residuals (SRMR) value for the model is 0.19, which is less than (0.8), indicating that the model has a good fit, however the Normed Fit Index (NFI) suggests significance testing. Model-based descriptive matching. The model is acceptable with an NFI value of ≥ 0.95 . Looking at the results in Table (6), we see that the NFI value exceeds the acceptance criteria, i.e., is more than (0.95), indicating that the models are acceptable.

The following table also shows the results of the indirect effect.

Table (7) indirect effect Result

hypotheses	Path	indirect effects	decision
H8	Fintech -> Digital marketing -> financial inclusion	0.622	accepted

Source: from Smart-pls v4 output

Table 7's findings suggest that digital marketing has a mediating influence between fintech and financial inclusion, with a coefficient of 0.622. As a result, we are willing to accept hypothesis 8: digital marketing exerts a mediating influence between fintech and financial inclusion.

Conclusion and Discussion

This study proposes a methodology for investigating FinTech adoption and use via the lens of the technological acceptance model in order to better understand how consumer goals, Fintech, and digital marketing methods promote financial inclusion. First, the researchers conducted a basic regression study to determine the impact of the Technology Model (dimensions) on Fintech applications. The findings revealed that perceived usefulness has a positive impact on the use of Fintech applications, which is consistent with H.-S Ryu, 2018; Z.Hu, et al., 2019; Natsir et al., 2023, as Fintech benefits users by offering lower transaction and capital costs than other financial services such as banks.

FinTech also provides digital financial services that are available via smartphones, allowing consumers to use them at any time and from any location. Perceived ease of use also has a positive impact on Fintech usage; these findings are consistent with previous research (Riquelme & Rios, 2010; S.Alharbi & S.Drew, 2014; Khan S. et al., 2022 and Natsir et al., 2023), as users typically do not want to use sophisticated information systems when conducting financial transactions. Users are more likely to use FinTech services if they perceive them to be inviting, easy to use, and enjoyable.

Customer attitude and intentions also affect positively the use of Fintech application and these results are consistent with Rehamn& Rasheed, 2024 study. Trust has a positive effect: When financial institutions are able to ensure that any personal data shared with other parties is secure and that there is little to no chance of a security breach, such as hacking, this will boost trust, which in turn enhances the possibility that Fintech will be adopted. These findings are in line with the results of Khan S. et al.,2022; Shahzad A. et al., 2022 research and also in accordance with Junger and Mietzner's (2019) research who showed that a household's propensity to transition to FinTech is influenced by its degree of financial literacy, trust and familiarity with new technologies, and overall transparency.

The risk has a negative effect on using Fintech applications, and this is due to many concerns including fear of financial loss due to fraud or scams, worries about unauthorized transactions, and data breaches compromising their accounts. Security concerns about the safety of their personal and financial information further contribute to their apprehension. Also, Potential users of financial technology may become risk averse due to the technology's perceived complexity and fear when they are inexperienced with it. This finding is in line with Khan S. et al., 2022 research results.

Then a path analysis is conducted to test the effect of the use of fintech applications on the financial inclusion and the mediating role of the digital marketing between them both. The results showed that the use of Fintech has a positive effect on the financial inclusion. This result is in consistency with results of Kemal, 2019; Iskandar, 2020. Amnas, M.B. et al., 2024 explored in their paper that FinTech boosts financial inclusion by facilitating easier access to financial services and reducing transaction costs. The study showed that digital Marketing mediates the use of Fintech applications and Financial Inclusion, and this consistent with the results of Al-Slehat, Z. A., 2023 study. Digital marketing creates relationships and offers continuous assistance by addressing specific requirements, establishing trust, and interacting directly with consumers through tailored communication and targeted advertising, it actively participates in responding to customer questions. Additionally, it produces data-driven insights that assist fintech businesses in enhancing customer experience and fine-tuning their offers. Fintech companies may effectively reach and serve low-income groups through digital marketing, which is cost-effective. This leads to an improvement in financial inclusion as financial services become more widely known, easily accessible, and user-friendly.

Recommendations and Future Work

This study investigates how fintech and consumer intentions influence financial inclusion, with a focus on digital marketing's mediation function. The findings shed light on the complex relationship between these variables, providing valuable new information for scholars, financial organizations, and regulators. Fintech bridges the gap between formal financial services and underserved populations, which is crucial for increasing financial inclusion. The significance of consumer intention in fostering financial inclusion is also highlighted, since people's intents to embrace and use fintech services have a positive impact on their level of financial inclusion.

Moreover, the studies show that digital marketing is rather important as a mediator since good strategies help to adopt and use fintech. While legislators can use the promise of fintech by supporting policies and measures enhancing digital literacy, financial institutions can use digital marketing to raise awareness and foster trust in fintech services and the commercial banks should concentrate more on financial technology and provide staff members training on how to use it.

This study contributes to the existing body of knowledge by providing actual data and conducting an in-depth analysis of the interactions between fintech, consumers' intention, digital marketing, and financial inclusion. The conclusion of the study emphasizes the collaborative efforts that are necessary to use fintech and digital marketing to promote financial inclusion on a global scale and to create a financial system that is more just and inclusive.

The study advises conducting future research in other industries using a variety of mediating or moderating variables, such as banking awareness and business modelling. This is due to the fact that there is still a need for additional research in this particular field for further investigation. Egypt was chosen as a model for other developing countries to follow in the implementation of the study. It is possible for the findings of the study to be beneficial to developing nations that are on the same level. It is possible to do similar research in other industrialized countries for the purpose of making comparisons in subsequent studies.

Also, Future studies should think about including a more varied sample to guarantee more participant involvement in order to expand the scope of this investigation. A more thorough understanding would result from investigating additional contextual aspects that impact the complex link among fintech, digital marketing, consumers' intention and financial inclusion.

Furthermore, it is of the utmost importance to acknowledge the impact of social and cultural factors, which were not investigated in this study but may have a significant influence on the outcomes of financial inclusion.

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