Journal of Innovative Digital Transformation

Digital financial services and gender dynamics: users' intention in the era of the Fourth Industrial Revolution

Mohammad Rifat Rahman
Department of Banking and Insurance, University of Chittagong, Chittagong, Bangladesh

Received 6 December 2024
Revised 28 March 2025
Accepted 12 May 2025

Abstract

Purpose – This study explores the gender-specific determinants of the adoption of digital financial services (DFS) in Bangladesh, with particular focus on how perceived ease of use (PEOU), perceived usefulness (PU) and external factors (EF) influence users' intentions within the context of the Fourth Industrial Revolution (4IR). The widely accepted model related to technology adoption, the technology acceptance model (TAM), is used to investigate how adoption of DFS varies according to gender.

Design/methodology/approach – A questionnaire-based survey with 394 respondents that covered the major determinants of DFS acceptance was conducted. PEOU, PU and the influence of EF were used to identify the relationship to adoption behaviors, with emphasis on a comparative analysis of male and female adoption patterns.

Findings – From the study results, PEOU was identified as a significant predictor of DFS adoption for both men and women. However, it was found that PU had a significantly positive effect on DFS adoption in the particular case of female customers. Moreover, EF may enhance ease of use through social media for both genders, but no significant impact was found regarding PU in the case of the male respondents.

Research limitations/implications – The study findings emphasize the need for gender-sensitive design and DFS adoption strategies for both genders, with particular focus on women's specific barriers, including digital literacy, trust and access to infrastructure. Financial regulators and DFS service providers should pay particular attention to developing inclusive DFS platforms that are easy to use, secure and responsive to diverse user needs. Future research should also examine the longitudinal impacts of DFS adoption on women's economic empowerment and explore innovative technological solutions, such as artificial intelligence-driven personalized services, to minimize gender gaps in digital finance.

Originality/value – The study's novel approach is to examine adoption behavior through the TAM. It also considers gender to be an important factor influencing the adoption of DFS among consumers in the context of the 4IR. In addition, the study provides new understanding of gender-oriented factors affecting the preferences for using a DFS and makes recommendations for making DFS more gender and user-friendly, oriented towards men and women in Bangladesh. The findings add to the growing body of literature on digital inclusion and financial empowerment.

Keywords Digital financial services, Gender attitude, Technology acceptance model, PLS-SEM approach, Bangladesh

Paper type Research article

1. Introduction

Digital Financial Services (DFS) are a financial product and service delivery system which include different electronic channels such as mobile phones, the Internet and electronic cards (World Bank, 2020). The system provides a wide range of digital services, including mobile

Funding: Data used in this paper are gathered from the project of the author titled "Impact of digital financial services factor on financial institutions choice: customer's perspective in Bangladesh" funded by University of Chittagong, Research and Publication Cell through its revenue budget of financial year 2022–2023.

Conflict of interests: The author declares no conflict of interest related to this research.

Journal of Innovative Digital Transformation
Emerald Publishing Limited
e-ISSN: 2976-906X
p-ISSN: 2976-9051
DOI 10.1108/JIDT-12-2024-0035

banking, online payments, mobile financial services (MFS), digital insurance and different types of debit and credit card facilities (Rana *et al*., 2020). DFS are mainly intended to improve the efficiency, effectiveness and affordability of financial services for marginal and underserved people in society by leveraging technology-based digital activities which overcome barriers such as geographic distance and different social constraints (Nizam and Rashidi, 2025). Moreover, DFS are a critical component of financial inclusion, strengthening the power of underserved people in society and empowering women through the adaption of technology which is secure, convenient and a cost-effective method for accessing financial resources.

A growing economy in south Asia, Bangladesh has experienced a revolution in DFS activities in the last decade, through MFS providers such as bKash, Rocket and Nagad, examples of DFS leaders in the market. As of 2023, nearly 120 million individuals had registered for MFS services, representing a strong nationwide adoption of (Bangladesh Bank, 2024). However, gender disparities in DFS adoption and use remain noticeable in the Bangladeshi scenario, as women account for less than 35% of active DFS users, reflecting the limited digital literacy of women in DFS adoption, restricted mobile phone use and social-cultural constraints, as reflected in a United Nations Capital Development Fund (2023) report. However, the government of Bangladesh and the central bank, Bangladesh Bank, have implemented different policies to foster financial inclusion, including agent banking services and MFS guidelines to minimize the significant gap and to ensure equitable access for women and marginalized groups in society.

Several studies have demonstrated the significant evolution in an increasingly interconnected global financial ecosystem, which is also a shift that will drive and unlock novel avenues for economic engagement and participation, which in turn will create empowerment across diverse demographic groups (Monye, 2022). DFS and gender are closely linked. Such services can contribute to narrowing or widening existing gaps in women's access to finance, and the control of financial resources must be carefully analyzed. The spread of technology in financial services includes mobile banking and electronic payments, to more advanced fintech innovations, which have all made the outreach of financial systems wider and also created new ways of interacting with the systems, particularly for women, marginalized and underserved communities (Blakstad and Amars, 2020).

The use of DFS as a means of enhancing gender equity will also depend on how well one understands the obstacles and the aspects that encourage digital financial inclusiveness. According to Mpofu (2023), the different patterns of using or accessing technologies that involve gender aspects are determined by socio-economic status, culture and education, so are critical in determining how useful and acceptable DFS will be in the future. For example, Fletschner and Kenney (2014) state that walking into a bank may be difficult for women, but with mobile banking they are able to conduct financial operations without the prying eyes of strangers. In addition, women's specific barriers and needs related to the use of such products are usually ignored in their conceptualization and distribution, meaning women's access problems persist.

The argument for DFS as a tool for gender empowerment also has a wider scope, which includes discussions on economic participation and independence. Dallimore (2013) states that accessibility to financial services is fundamentally associated with the ability to engage in entrepreneurship, investment and savings, all of which are essential components of being economically self-sufficient and are critical for economic independence. Consequently, Kong *et al*. (2024) state that the inclusion of digital financial platforms may play a balancing role that uplifts women and minorities into more active engagement with the formal economy. However, this optimistic view must be mitigated by critical analysis of the systemic and structural challenges that persist in the digital finance landscape.

Comprehensive study of DFS and its gender aspects, which encompasses both the transformative prospects of digital finance for fostering financial inclusion and emphasizes the equitable adoption of underserved communities in the perspective of Bangladesh is vital.

Therefore, this study will focus on examining how perceived ease of use (PEOU), perceived usefulness (PU) and external factors (EF) affect men and women differently in their adoption of DFS in the changing landscape of the Fourth Industrial Revolution (4IR). This will entail examining the external impacts, while considering societal impacts, for example social media platforms and financial attitudes, in relation to different genders in Bangladesh. The research then proceeds to examine the nexus between digital financial services (DFS) and gender relations, making a case for specific inclusive design principles and interventions that can support the role of DFS in creating an equitable economic future.

This study is organized as follows. The introduction is included in the first section, with the theoretical framework and literature review presented in the second section. The hypothesis development and research framework are discussed in chapter three, together with the research framework. The main topics of chapter four are the research methodology and data, which include samples, data collection, model specification and econometric tools. The data analysis and results are discussed in this chapter five, with alignment of the research objectives and questions given in the introduction. The key conclusions are presented in section six, including the limitations and future research directions.

2. Theoretical context and literature review

2.1 Digital financial services concept

DFS adoption among the millennial generation is forcing a dramatic shift in the operations of financial institutions. This shift involves two major processes: digitization and digitalization (Frenzel *et al*., 2021; Gradillas and Thomas, 2023). Digitization is the process of converting traditional forms or paper documents into digital versions and changing operational procedures where necessary to fit this regime. On the other hand, digitalization is the transformation of business processes within financial institutions by introducing technology integration to allow for controlled and automatic execution of transactions.

According to Puschmann (2017), such aspirations of moving towards digitalization concern the ability to increase levels of efficiency, reduce errors, improve customer experience and provide a better level of service to the end customers through the use of the latest technologies such as blockchain, the Internet of Things (IoT), virtual reality (VR), augmented reality, artificial intelligence (AI), machine learning, big data, chatbots and cloud computing experiences. On their own or collectively, these technologies offer financial services and their customers greater advantages by reducing the cost of operations and errors, while increasing the quality of the services delivered. At present, the development of fintech and innovative DFS business practices is a global trend, especially among consumers; Chiu (2016) explains that this is due to the potential they have to provide value, availability and affordability.

2.2 Fourth industrial revolution (4IR)

The 4IR, also known as Industry 4.0, represents a rapid transformation and advancement of technological drivers, characterized by the fusion of technologies between physical, digital and biological worlds (Hossain, 2023). The technological drivers mainly associated with this are big data, AI innovations, blockchain, the IoT, machine learning, chatbots and cloud computing (Atlam *et al*., 2020). These innovations are reshaping financial sectors through their delivery of more efficient, effective, secure and inclusive DFS systems for economic development and financial inclusion. Bangladesh, an example of a developing nation, has the potential to explore the 4IR technologies in order to gain equitable access for women and marginalized people in society, emphasizing financial access and reducing physical and cognitive barriers. DFS adoption in 4IR is important for exploring the broader context of gender dynamics; that is, how different genders influence the intention (INT) to use DFS in the era of the emerging financial technologies revolution.

2.3 Technology acceptance model (TAM)

The technology acceptance model (TAM) is an extension of the theory of reasoned action (TRA) of Ajzen and Fishbein (1980). It suggests that an individual's INT to engage in or carry out a behavior is determined by their evaluation of the behavior and the social context of the behavior. The theory proposes that individuals' attitudes reflect their purpose, which in turn leads to actual behavior, as explained by Madden *et al*. (1992). Siah *et al*. (2023) state that since the 1980s, the TAM has been extensively applied in research to understand consumer INTs in adopting and using new technologies.

The model posits that one's attitude is a motivation-driven construct (Madden *et al*., 1992), which ultimately translates into action. From the mid-1980s, studies have widely reflected the changing trends in social networks using the TRA in understanding consumers' needs when accepting and using advanced technologies. Davis (1989) described two factors which enable and reward the use of new technology: PU and PEOU, which significantly affect a consumer's willingness to accept new technological innovations. PU considers the extent to which people feel that the technology will help them to perform better, while PEOU regards the level of effort expected in using the technology. However, TAM for digital services includes specially adapted constructs, such as users' intention (UI), actual use (AU) and EF, in addition to the foundation model based on Davis (1989).

The TAM model is a more appropriate framework for this study, which aims to evaluate UIs and adoption behavior towards DFS adoption through the key concepts of PEOU and PU. However, different models for assessing technology adoption, such as Unified Theory of Acceptance and Use of Technology (UTAUT) or the theory of planned behavior, also address the technology adoption behavior of users, but for this study TAM was considered especially advantageous due to its simplicity and adaptability in incorporating EF in the context of 4IR. Therefore, it will provide new understandings of gender-oriented factors affecting preferences for using DFS and contribute to recommendations for making DFS more gender and user-friendly oriented towards men and women in Bangladesh.

2.4 Literature review

The DFS concept has been widely accepted and acknowledged in the last decade for its enhancement of financial inclusion and economic empowerment in developing and emerging countries (Chamboko, 2024; Koswara, 2024). It is particularly known for its provision of mobile banking, e-money and electronic payment system mechanisms, which offer cost-effective and accessible solutions compared to the traditional banking system, especially for marginalized and underserved people in society. Different studies have shown how adults in low- and middle-income countries now hold mobile financial accounts rather than traditional ones, significantly transforming financial behavior (Chamboko, 2024). However, David-West *et al*. (2018) note that while technological innovations create new opportunities, limited supply side constraints such as inadequate infrastructure, limited human capital and insufficient strategic capabilities among providers may obstruct extensive adoption and meaningful usage.

Rahman and Rahman (2023) explored the key factors that influence the choice of financial institutions through DFS. They utilized the extended UTAUT model to explore the connection between social factors, trust (TRU), risks, advantages and the INT to select financial institutions in Bangladesh. Their results show that benefits and social influence have a significant impact on improving the selection of financial institutions in Bangladesh through DFS. However, their study found insignificant impacts of TRU and perceived risks (PRs) on UI to select such institutions. Similarly, Anane and Nie (2022) determined the factors that create influences on the adoption of DFS by using the representative national dataset of Ghana. They explored four sociodemographic attributes and measured their contribution for each of the six incorporated elements. Logit specification was utilized to estimate the DFS determinants, with marginal effects also being calculated. According to their study, DFS

adoption is positively influenced and increased by effort expectation, awareness, enabling conditions, transaction cost, security and privacy and self-efficacy in the country.

In addition, a study by Sadik and Rahman (2024) used artificial neural network (ANN) and structural equation modeling (SEM) methods to examine the potential factors that influence the adoption of DFS in Bangladesh. It was found that DFS adoption was significantly influenced by financial literacy, TRU and capital availability, as well as by the use of digital payments and digital financial inclusion (DFI). According to their study, financial literacy is the most significant driver, followed by DFI; confidence in DFS; access to capital; and digital payment mechanisms, as established through the ANN modeling also that emphasis on the relative relevance of these variables. Ismael *et al*. (2021) contributed to the theme by examining the essential elements that impact on Egyptian consumers' preferences in adopting DFS. By using the extended TAM model, they found that consumers' INT to use DFS systems was positively and significantly influenced by the perceived utility (PU) and TRU factors, but that PEOU, perceived risk (PR) and perceived cost (PC) had no significant relationship with the use of DFS in Egypt.

Although it is established that DFS has had a promising and potential impact on financial inclusion, a significant gap persists between DFS adoption and gender disparities. Women in developing nations face different barriers, including limited digital literacy, restricted mobile use and socio-economic barriers, which contribute to financial engagement and freedom (Arora, 2020; Bailur *et al*., 2020). According to Jahangir Rony *et al*. (2021), DFS has had a significant impact on empowering women, helping to suppress cultural barriers and upholding the ability to work independently. Their study also discussed developing nations, where many women rely on male family members to access DFS. These challenges are acute for young female DFS users under the age of twenty, who do not have any formal DFS accounts, but engage in DFS through their parents' mobile phones. Moreover, Yadav and Kalluru (2024) argue that TRU and lack of agent incentives also limit DFS adoption when commissioning structures are poor.

Tripathi and Rajeev (2023) developed the "Gender-based Financial Inclusion Index" to determine women's access to finance through DFS across 109 countries during the period 2011 to 2021. They found that the Gender Development Index (GDI) and Gender Inequality Index had a positive correlation with inclusive and sustainable development. Their study also highlights the significant impact of education, the labor force, health and the political empowerment of women on DFS inclusion, also suggesting inclusive growth and women's empowerment. In a similar vein, Chawla and Joshi (2020) considered the factors that influence attitude and behavioral INT toward the use of mobile wallets, together with the moderating role of age and gender in users' attitude and INT and the antecedents of mobile wallet adoption. Their findings indicate that age and gender have an effect on the relationship between particular antecedents and attitude and INT, with males and younger users being more affected.

Nugroho and Anita (2023) examined how gender diversity on boards affected financial and environmental performance in banks awarded for digital banking excellence from 2017 to 2022. Using the proportion of women on boards as a measure, the study found that female representation positively impacted financial results, but not environmental performance. Financial technology adoption enhanced the effect of female board representation on environmental performance, but not financial performance. Similarly, examining 14 emerging nations between 2005 and 2021, Ozili (2024) investigated how gender equality affected inclusion and financial stability. According to the research using two-stage least squares and generalized linear model regressions, gender equality and financial stability and inclusion in developing countries are significantly positively correlated. In particular, gender equality in African nations has a favorable impact on inclusion and financial stability.

Fintech in Bahrain was the central theme of Sanad and Al Lawati's (2023) study examining the performance of businesses in relation to gender diversity on corporate boards. Using the Global FinTech Adoption Index, the data in the study sample were obtained from the financial sector companies listed on the Bahrain stock market between 2016 and 2022. The study shows

a positive impact on financial performance when there is gender diversity on corporate boards when controlling them through fixed effect regression analysis. Arena *et al*. (2022) found the same relationship between gender diversity and fintech, while Saima *et al*. (2022), using the SEM method, assessed gender diversity in fintech usage to foster equity and sustainability in Bangladesh's fintech industry. Their findings highlight the positive impact of PEOU, credibility and usefulness on satisfaction, which in turn influences loyalty. Gender was not found to moderate the effects of ease of use, credibility nor satisfaction on loyalty, but did moderate the relationship between PU and satisfaction. Satisfaction emerged as a key predictor of fintech loyalty for both males and females.

Different research has examined the determinants that influence DFS adoption in recent times. Several studies (Nizam and Rashidi, 2025; Yadav and Kalluru, 2024) have explored financial and digital illiteracy, lack of TRU and dependency on using DFS as the major barriers to adopting DFS in developing nations. A study by Nizam and Rashidi (2025) found that in Pakistan 90% of the respondents were financially illiterate and 80% did not have proper knowledge of e-payment mechanisms, which limited engagement with DFS systems. Furthermore, Bailur *et al*. (2020) emphasized the design features of DFS that disproportionately affect women, particularly unclear transaction confirmations and complex user interfaces, thus hindering TRU and usability in adopting DFS. Finally, nowadays DFS adoption is not merely a technological issue, but is also deeply rooted in social, cultural and institutional contexts.

The widely accepted TAM has been used to explore mobile wallet and e-wallet adoption INTs. In the Indian context, Gupta *et al*. (2023) found that perceived value, compatibility, enjoyment and social influence significantly affected mobile wallet UI through the mediating factors of TRU and satisfaction. Furthermore, Bailey *et al*. (2017) explored US UIs, highlighted by the role of PEOU in shaping consumer behavior, while perceived value was shown to have little impact. Similarly, Fang *et al*. (2023) showed that in the Malaysian context, PU, PEOU, privacy and security drove e-wallet adoption significantly among young people. Lew *et al*. (2020) and Pertiwi *et al*. (2020) also found that PU and ease of use positively influenced behavioral INTs to adopt mobile wallets. However, Singh *et al*. (2020) found that UI was shaped by PEOU, PU, attitude and social influence, all of which had an impact on technology adoption INTs.

In the context of the 4IR, DFS are being significantly transformed through the adoption of the newest technology such AI innovations, blockchain, big data, machine learning and IoT developments. Although 4IR advancements offer different opportunities to improve DFS more efficiently and effectively for users, it introduced new barriers for women and illiterate persons to their adoption of technology. According to Le Quoc (2024), 4IR technology introduced positive outcomes for DFI, but it may create gender disparities in countries where underdeveloped financial ecosystems prevail. Similarly, Koswara (2024) found that in rural areas regulatory constraints, digital literacy gaps and infrastructural limitations can limit DFS adoption, despite technological advancements. Therefore, without appropriate product design and policy initiatives, 4IR may widen, rather than bridge, the gaps in DFS adoption.

Despite the growing importance of DFS in promoting financial inclusion, there remains a notable gap in understanding the gender dynamics influencing UIs to adopt these services, particularly in the context of 4IR. While previous studies have explored the adoption of DFS and its impact on financial inclusion, there has been limited research which specifically focuses on how gender influences individuals' INTs to use DFS in the era of rapid technological advancement. This research will therefore contribute to the literature by contextualizing the TAM framework within the socio-economic and cultural landscape of Bangladesh, thereby providing valuable insights for policymakers and financial service providers seeking to promote gender-inclusive digital financial solutions.

3. Hypothesis development and research framework

3.1 Perceived ease of use

According to Porter and Donthu (2006), individuals are more likely to accept technology which is easier to use and comprehend. Such is the case for DFS; if the services are seen to be relatively simple and uncomplicated by potential users, then they will be much more likely to use them (Devi *et al*., 2023). This was also indicated by the study findings. It is grounded on the cognitive burden that users have to put on themselves in order to master and utilize the components of new technologies. PEOU directly reduces such cognitive burden, while allowing for significant adoption of DFS and hence does yield a significant role in the relationships of TAM constructs.

DFS can provide better convenience for users (Karjaluoto *et al*., 2019). However, when considering the PU of DFS, users need to take into account the benefits versus the cost of DFS. Easier and cheaper services are probably more desirable and thus more valuable. The following hypotheses are therefore proposed:

H1a. Perceived ease of use has a positive and significant relationship with users' intention to use DFS in the context of 4IR.

H1b. Perceived ease of use has a positive and significant relationship with perceived usefulness in the context of 4IR.

3.2 Perceived usefulness

In the TAM framework, adoption arguments are based on PEOU and usefulness. Based on this framework, the likelihood of adoption is determined by benefits and costs (Lin *et al*., 2020; Lee, 2009). Such PU goes further than direct financial costs, including convenience, time saving and better financial management capabilities. It also indicates that a positive intent to use DFS not only relies on monetary incentives, but also has an impact on the system reliability and affordability of platforms. This would be the true of all perspectives. It is consequently posited that:

H2. Perceived usefulness has a positive and significant relationship with users' intention to use DFS in the context of 4IR.

3.3 External factors

The TAM framework also presents a sophisticated argument on how adoption decisions are influenced by EF in different ways. PEOU and PU are also significantly influenced by societal impacts which consider the social media impacts on DFS adoption decision and other influences (Fatokun, 2023; Islam *et al*., 2023). At the preemptive stage of technology adoption, PEOU limits the external barriers to DFS adoption. Later, external factors have a significant impact on PEOU and PU. This means that cost, control, social influences and additional benefits have an impact on the technology adoption over time, which also inspires users' confidence in such adoption. The following hypotheses are therefore proposed:

H3a. External factors have a positive and significant relationship with perceived ease of use in the context of 4IR.

H3b. External factors have a positive and significant relationship with perceived usefulness in the context of 4IR.

3.4 Users' intention

The TAM framework results in the construct of UI, which serves as the immediate antecedent to actual technology use. It can be argued that this construct acts as an intermediary between

perceived technology (ease of use and usefulness) and actual adoption behavior (Suki and Ramayah, 2010). Users are more willing to convert their INT to use DFS into actual usage as its ease of use and usefulness increase. This association strengthens the claim that knowledge and targeting of user intent are essential to driving user adoption of DFS. It is therefore hypothesized that:

H4. User's intention to use DFS has a positive and significant relationship with the actual use of DFS in the context of 4IR.

3.4.1 Research framework. As shown in Figure 1, the TAM model is used to determine the research framework related to exploration of the adoption behavior of DFS in Bangladesh, with consideration of gender-specific influences within the broader context of the 4IR.

4. Research methods and data

4.1 Respondents' demographic profile

Drawing upon the TAM, a five-point Likert scale questionnaire was developed (see Appendix I) and quantitative data were collected from 480 respondents concerning preferences in Bangladesh in terms of both male and female INTs to use DFS. As shown in Table 1, after thorough screening to exclude outliers and incomplete responses, a final sample of 394 was retained for analysis, with a focus on specific demographic characteristics to better interpret the results. This group comprised 218 males (55.48%) and 176 females (44.52%), with ages primarily ranging from 18 to 24 (37.79%) and 25–32 (27.52%), with the majority identifying as students (78.71%) This profile was important to identify individual behaviors and preferences among young, academically motivated sample through the structural factors of TAM.

The application of TAM in this context was significant for respondents' DFS choices, which were classified as digital or traditional. Interestingly, most were in favor of DFS, with 203 males and 153 females in support of such digital platforms. The preference for ease of access (finding something digitally accessible that appeals to respondents) is a notable trend in the bank economy among youth in Bangladesh, in line with the TAM hypothesized PEOU and PU as key determinants of technology adoption. In contrast, only 15 males and 23 females (38 in total) preferred traditional banking services, which indicates that a small proportion of this population continues to place some importance on traditional financial service elements. Finally, it is important to note that some of the study respondents did not have any DFS accounts, but did have some experience of using DFS through their parents' or relatives' mobile devices, these respondents being under 20 years of age and having strict family restrictions on using mobile devices.

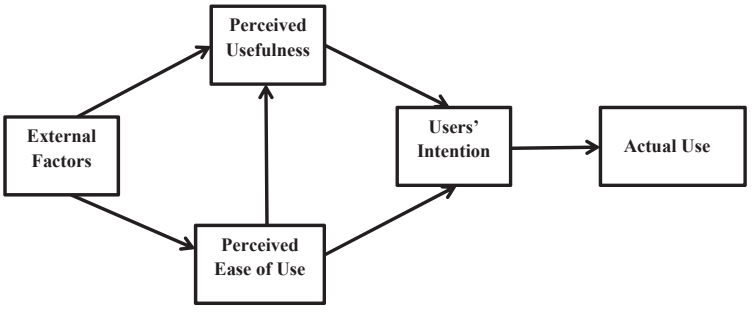

Figure 1. Research framework on TAM approach. Source: Developed by authors

Table 1. Respondents' data on demographic profile

Variables	Frequency (male)	Frequency (female)
Gender		
Male and Female	218	176
Age (Years)		
18–24	94	68
25–32	68	55
33–40	45	32
40–50	11	21
Total	*218*	*176*
Profession		
Students	112	116
Job (Private Sector)	45	33
Job (Public Sector/Govt.)	18	16
Business and Others	43	11
Total	*218*	*176*
DFS Account		
Yes	204	155
No	14	21
Total	*218*	*176*
Respondent's Preferences		
DFS System	203	153
Conventional System	15	23
Total	*218*	*176*

Source(s): Author's findings

4.2 Model specification

For the research on DFS preferences among Bangladeshi customers, the model was specified based on the TAM framework, which was developed in relation to both male and female differences in technology acceptance and use (Ozili, 2024; Nugroho and Anita, 2023; Saima *et al.*, 2022). The model includes PEOU and PU as independent variables, which were expected to have significant effects on the INT to use DFS among the male and female users. AU of DFS was a dependent study variable and also mediated behavioral INT. In addition, EF such as societal impacts and social media influences were assessed in relation to their impact on the PEOU and PU constructs. These were also important for explaining UI to employ DFS in Bangladesh.

4.3 Model estimation

Sarstedt *et al.* (2021) recommend that partial least squares structural equation modeling (PLS-SEM) is suitable for exploratory research and can deal with complex models with various constructs. For this reason, DFS UIs in the 4IR were estimated by this model, focusing on male and female INTs. The following methods were employed to check construct validity and reliability for the study. To check the internal consistency of the constructs, Cronbach's alpha (CA) and composite reliability (CR) were determined, with average variance extracted (AVE) utilized to explore their convergent validity. Moreover, the heterotrait-monotrait (HTMT) matrix was also assessed to describe the model's discriminant validity. The structural model was tested and explores the hypothesized relationship with the guidance of Hair *et al.* (2019) and Hair *et al.* (2017). The path coefficients were also examined by the relevant TAM constructs, namely PU, PEOU, behavioral INT and AU. Through the bootstrapping method, the hypothesized relationships were found in the study constructs.

5. Analysis and interpretation

5.1 Construct validity and reliability of the models

As shown in Table 2, CA was used to measure internal consistency. The value of CA ranging between 0 and 1 indicates how closely it relates with the construct items and how well it reflects the underlying concept. According to Hair *et al*. (2019), values greater than 0.70 are considered reliable and can be adopted for SEM analysis. In addition, CR values greater than 0.80 are considered excellent for developing the SEM constructs (Hair *et al*., 2019). Moreover, CR is also a better measure of the internal consistency of the latent constructs, since it takes account of the loadings of the indicators. According to the Hair *et al*. (2017), the rule of thumb for the construction of reliability is that CR values greater than 0.7 are fit and are an informative reflection of the latent constructs.

AVE examines the convergent validity of the latent constructs by incorporating the variance of the indicators and measurement error. AVE values must be greater than 0.50 for a latent construct to be considered acceptable. This value indicates that the latent construct accounts for more than half of the variance in its indicators (Hair *et al*., 2019). According to the recommendations of Hair *et al*. (2019) and Hair *et al*. (2017), these metrics confirm the constructs' validity and reliability, which are important as the constructs need to conform to SEM analytical principles.

5.2 Discriminant validity of the models

To assess discriminant validity, the HTMT matrix was used in the SEM analysis, as shown in Table 3. This focuses on the extent to which two latent variables are truly separate from one another within a model. This uniqueness is important to ensure that each of the constructs has a unique representation of elements. For discriminant validity, HTMT values should be between 0 and 1; the lower the better. In general, an HTMT value of less than 0.85 indicates acceptable discriminant validity (Henseler *et al*., 2015). The uniqueness of the latent constructs is tested based on the guidelines provided by Henseler *et al*. (2015), checking that the measurement models do not overlap each other through analysis of the HTMT matrix.

5.3 Multicollinearity test of the models

The VIF (variance inflation factor) statistics shown in Table 4 were used in the SEM to assess multicollinearity between the predictors, those variables which correlate well with another predictor. This property can jeopardize the stability of the parameter estimates and block

Table 2. Construct validity and reliability statistics

	Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	Average variance extracted (AVE)
Gender: Male				
A0	0.835	0.752	0.809	0.682
B0	0.743	0.641	0.787	0.641
I0	0.845	0.767	0.808	0.684
S0	0.793	0.713	0.731	0.734
T0	0.665	0.813	0.652	0.638
Gender: Female				
A0	0.794	0.796	0.798	0.764
B0	0.852	0.771	0.792	0.691
I0	0.707	0.709	0.836	0.630
S0	0.768	0.714	0.739	0.618
T0	0.793	0.697	0.719	0.597

Source(s): Author's findings

Table 3. Heterotrait-monotrait (HTMT) matrix

	A0	B0	I0	S0	T0
Gender: Male					
A0					
B0	0.561				
I0	0.678	0.605			
S0	0.359	0.324	0.417		
T0	0.314	0.619	0.448	0.518	
Gender: Female					
A0					
B0	0.801				
I0	0.879	0.713			
S0	0.546	0.425	0.582		
T0	0.664	0.78	0.722	0.546	

Source(s): Author's Findings

Table 4. VIF statistics

Variable's name	VIF value	Variable's Name	VIF value
Gender: Male			
A01	1.153	S01	1.07
A02	1.153	S02	1.15
B01	1.441	S03	1.135
B02	1.452	S04	1.108
B03	1.114	T01	1.081
B04	1.188	T02	1.024
I01	1.34	T03	1.036
I02	1.266	T04	1.059
I03	1.217		
Gender: Female			
A01	1.12	S01	1.187
A02	1.12	S02	1.291
B01	1.473	S03	1.238
B02	1.548	S04	1.158
B03	1.175	T01	1.127
B04	1.127	T02	1.094
I01	1.513	T03	1.182
I02	1.277	T04	1.093
I03	1.443		

Source(s): Author's Findings

interpretability of the model. A high VIF indicates a multicollinearity problem; in general, a VIF above 10 is considered high and a value below 5 considered good (that is, multicollinearity is not a problem). According to Härdle *et al.* (2015), in this context the VIF values are used to assess multicollinearity between predictor variables and can thus be used to confirm that multicollinearity is not a problem with respect to the estimated model.

5.4 Graphical representation of the models

This section presents separate visual diagrams (Figures 2 and 3) for the structural equation models that are specific to male and female DFS preferences in Bangladesh, based on the TAM

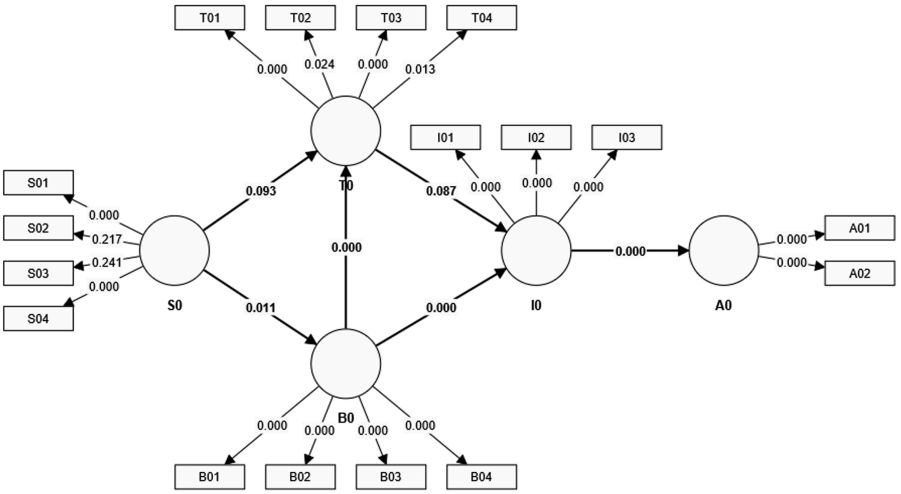

Figure 2. Path significance for males (TAM approach). Source: Developed by authors

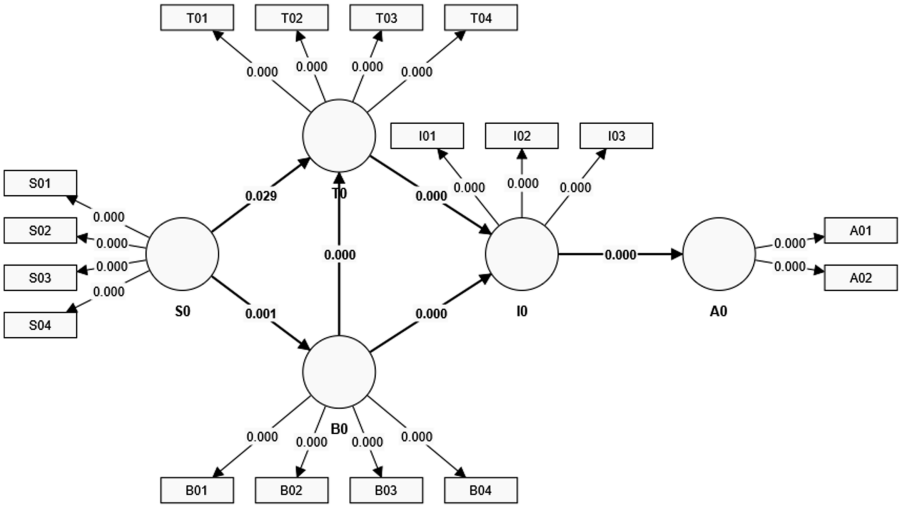

Figure 3. Path significance for females (TAM approach). Source: Developed by authors

framework. The models differ in their representation of the PEOU (B0), PU (T0), INT to use (I0) and AU (A0) of the DFS constructs, with EF (S0) for both male and female participants. The diagrams clearly outline the hypothesized pathways: the direct effects of PEOU and PU on the INT to use DFS and its subsequent AU, with EF influencing both PEOU and PU.

5.5 Male users' intention to use DFS

The analysis examines the factors influencing the adoption of DFS among male users, utilizing TAM as its theoretical foundation. In Table 5 it can be seen that for male users PEOU is a significant determinant in the adoption of DFS, confirming that H1a and H1b have significant impact to the users' adoption behavior. The analysis suggests that if DFS are perceived as

Table 5. Hypothesis decision for male

Gender: Male	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	*T* statistics (|O/STDEV|)	*p* values	Decision rule
B0 → I0	0.362	0.367	0.076	4.752	0.000***	H1a is Supported
B0 → T0	0.314	0.322	0.077	4.101	0.000***	H1b is Supported
T0 → I0	0.131	0.136	0.077	1.712	0.087	H2 is Not Supported
S0 → B0	0.187	0.21	0.074	2.534	0.011**	H3a is Supported
S0 → T0	0.159	0.168	0.095	1.678	0.093	H3b is Not Supported
I0 → A0	0.587	0.593	0.047	12.389	0.000***	H4 is Supported

Note(s): **significant at 5% level; *** significant at 1% level
Source(s): Author's Findings

straightforward and user friendly, male users are more likely to adopt them. This is attributed to the reduction in cognitive effort required to understand and use the technology, which in turn enhances its PU. PEOU also indirectly increases the service's PU, indicating that a user-friendly service is seen as being more beneficial and less costly.

PU, while central to the TAM framework, did not show a significant relationship with the INT to use DFS among the male users, meaning H2 is not supported. This finding suggests that the assessment of benefits against costs, including financial, time and convenience considerations, may not be as critical for male users in their decision to adopt DFS. However, EF, including social media and other societal impacts, had a mixed impact on the male respondents. While such factors positively influenced PEOU (supporting H3a), their relationship with PU (H3b) was not significant. This implies that providing a supportive external environment is helpful in achieving ease of use of DFS; however, it does not improve PU and does not reduce the PCs of the behavioral INT to use DFS among male users in Bangladesh. The INT to use DFS, which is the mediator between perceptions of technology and its actual usage, was found to have a positive and significant association with actual usage, thus H4 is supported. Understanding male UIs and their influence is clearly vital for driving DFS adoption.

5.6 Female users' intention to use DFS

The analysis also examined DFS adoption among the female users, also based on the TAM. Table 6 demonstrates the interplay between PEOU, perceived value, external variables and UI in relation to actual usage of DFS. PEOU is a key factor driving the adoption of DFS. The

Table 6. Hypothesis decision for female

Gender: Female	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	*T* statistics (|O/STDEV|)	*p* values	Decision rule
B0 → I0	0.366	0.367	0.071	5.134	0.002***	H1a is Supported
B0 → T0	0.413	0.418	0.067	6.141	0.001***	H1b is Supported
T0 → I0	0.278	0.283	0.073	3.790	0.000***	H2 is Supported
S0 → B0	0.291	0.305	0.090	3.248	0.001***	H3a is Supported
S0 → T0	0.172	0.191	0.079	2.190	0.029**	H3b is Supported
I0 → A0	0.523	0.531	0.054	9.658	0.000***	H4 is Supported

Note(s): **significant at 5% level; *** significant at 1% level
Source(s): Author's Findings

analysis indicates that if female users feel it is easy to use and operate, they are more likely to adopt it. Lower cognitive effort is needed to understand and use the technology, resulting in a higher INT to use it. To make these services more attractive, ease of use will increase the PU of DFS over its costs. In addition, PU is known to positively influence the INT to use DFS, which is also a key component of the TAM. The relationship of PU to costs, including price, time and convenience, also exerts a strong influence on female users' use of such services. High PU, in which the benefits largely outweigh the costs, is associated with a stronger intention to use DFS.

It was found that EF such as social media and other societal impacts positively relate to both PEOU and PU. Favorable EF such as motivation from friends and family weakens obstacles and raises the appeal and utility of DFS. Finally, user INT is a significant mediator between DFS perceptions (ease of use and PU) and actual adoption behavior. The findings highlight that among the female users, the INT to use DFS, which has a strong positive correlation with PEOU and PU, is a significant predictor of usage behavior.

5.7 Discussion of the results

The results concerning the DFS adoption of male and female users demonstrate a significant insight into bridging the gender gap in financial access. The results show that such adoption indeed has the potential to bridge the gender gap, especially for women in Bangladesh. For female users, PU and PEOU were to be found significant drivers of DFS adoption, enhancing the use of DFS. This means that the importance of providing user-friendly and accessible services can improve women's financial autonomy, digital literacy and access to financial resources (Agyemang and Bokpin, 2025). Nowadays, as DFS solutions become more personalized to meet individual needs, this can empower women with greater control over their finances and improve their financial inclusion. Male users also showed a positive response to the PEOU of DFS, but PU was not significant in this study. This means that male users may view DFS more as a convenient tool rather than a transformational financial service platform. Therefore, this gap in financial access remains narrower for men due to the lower social and cultural barriers they face in technology adoption.

6. Conclusion, policy implications and future directions

6.1 Conclusion

The study has explored the adoption behavior of DFS in Bangladesh, with consideration of gender-specific influences and the use of the TAM within the broader context of the 4IR. The results show that PEOU significantly influences the DFS adoption INTs of both male and female users, indicating that the user friendliness of digital financial platforms is generally important for users. However, PU significantly influences only female users' adoption INTs, indicating a gender difference in evaluating the benefits versus costs of DFS. While EF positively impact PEOU for both genders, the effect of EF on PU in fact differs in the case of male users, although a significant relationship was found in the case of female users.

The findings highlight the need for DFS providers to design their offerings to cater to the diverse user needs and preferences of male and female users, as well as to ensure that critical aspects such as user friendliness, security and value propositions are adequately communicated. These may serve as barriers to DFS adoption, thus attention needs to be paid on them to facilitate DFS adoption, leading to financial inclusion and economic empowerment for both men and women in Bangladesh. From the theoretical viewpoint, the research contributes meaningfully to gender-sensitive aspects in the era of 4IR through the widely accepted TAM model.

6.2 Policy implications

The study makes important contributions by offering a gender-sensitive perspective on DFS adoption through the TAM, framed within the 4IR context. Methodologically, it applied

PLS-SEM to capture gender-sensitive insights, providing a rigorous analysis of how men and women differ in adopting DFS in Bangladesh. From a practical view, the findings offer actionable guidance for policymakers, DFS providers and regulators to address gender-specific barriers and design more inclusive and user-friendly DFS platforms that advance financial inclusion and gender equity.

To create greater gender-inclusive adoption of DFS, different important policy actions are needed that contribute to women's advancement and economic freedom. Financial institutions and DFS providers need to prioritize gender-sensitive design and user-friendly platforms that can fulfill women's needs and priorities in DFS solutions. This includes easy installation procedures, simplification of user interfaces, essential privacy protocols, quick verification procedures and cost-effective transaction methods that build women's TRU in DFS, particularly in Bangladesh. In addition to this, a reliable and accessible infrastructure is essential for widespread and equitable DFS adoption. Moreover, government should invest in extending mobile and Internet coverage in rural and semi-urban areas, where gender gaps are significant.

Community-based social awareness programs related to DFS and economic empowerment could be a strategic solution for DFS adoption, particularly among women in rural areas. These initiatives could help women use DFS and foster positive attitudes towards women's financial autonomy, in addition to leveraging the support of community leaders, nongovernmental organizations and peer networks to overcome cultural barriers in Bangladesh. Moreover, female DFS agents and women entrepreneurs could play a vital role in DFS adoption in underserved areas in the country. Policymakers could facilitate this by offering targeted incentives, training and regulatory support for women agents. Last but not least, as the 4IR continues to reform the technological setting, so regulators need to give priority to such innovations, particularly in AI-driven DFS systems and personalized DFS solutions that address women's unique financial needs, ensuring technological advancements that contribute to inclusivity and do not widen existing gender gaps.

6.3 Future directions

Future research should incorporate long run impact assessment of DFS adoption on women's economic empowerment and its sustainability for improving women's financial autonomy, entrepreneurship motivation and overall well-being. Additionally, qualitative studies focusing on women's experiences, thoughts and challenges in adopting DFS would provide valuable insights to help overcome the barriers to DFS adoption in emerging nations. There is also a need to assess the critical role of emerging technologies in the 4IR scenario, such as AI-driven financial tools, blockchain technology, digital identity systems and the IoT, in creating more personalized and secure DFS solutions for women and marginalized groups. Finally, detailed comparative studies between urban and rural areas populations would create valuable insights into how infrastructure gaps and socio-cultural factors influence DFS usage in different ways across geographic regions in Bangladesh.

Data availability statement

On reasonable request, the corresponding author will provide the data to support the study's findings.

Supplementary material

The supplementary material for this article can be found online

References

Agyemang, E.F. and Bokpin, G.A. (2025), "Women economic empowerment through digitalization: analyzing social networks, risk and time preferences", *International Journal of Economic Policy Studies*, Vol. 19 No. 1, pp. 209-230, doi: 10.1007/s42495-024-00148-w.

Ajzen, I. and Fishbein, M. (1980), *Understanding Attitudes and Predicting Social Behavior*, Prentice-Hall, New Jersey.

Anane, I. and Nie, F. (2022), "Determinants factors of digital financial services adoption and usage level: empirical evidence from Ghana", *International Journal of Management Technology*, Vol. 9 No. 1, pp. 26-47, doi: 10.37745/ijmt.2013/vo9n1pp2647.

Arena, C., Catuogno, S., Crisci, A. and Naciti, V. (2022), "The mediating role of relational capital for the academic performance effect of IC: the influence of digital technologies", *Meditari Accountancy Research*, Vol. 30 No. 4, pp. 1050-1076, doi: 10.1108/medar-02-2021-1209.

Arora, R.U. (2020), "Digital financial services to women: access and constraints", in *Gender Bias and Digital Financial Services in South Asia: Obstacles and Opportunities on the Road to Equal Access*, Emerald Publishing, pp. 51-72.

Atlam, H.F., Azad, M.A., Alzahrani, A.G. and Wills, G. (2020), "A review of blockchain in internet of things and AI", *Big Data and Cognitive Computing*, Vol. 4 No. 4, p. 28, doi: 10.3390/bdcc4040028.

Bailey, A.A., Pentina, I., Mishra, A.S. and Ben Mimoun, M.S. (2017), "Mobile payments adoption by US consumers: an extended TAM", *International Journal of Retail and Distribution Management*, Vol. 45 No. 6, pp. 626-640, doi: 10.1108/ijrdm-08-2016-0144.

Bailur, S., Smertnik, H., Shulist, J., Katakam, A. and Kendall, J. (2020), "Moving beyond access to design: the relevance of the level one principles for the gender DFS gap", SSRN 3773132.

Bangladesh Bank (2024, January 14), *Annual Report (July 2022–June 2023)*, Bangladesh Bank, Dhaka, available at: https://www.bb.org.bd/pub/annual/anreport/ar2022-2023.pdf (accessed 15 May 2025).

Blakstad, S. and Amars, L. (2020), "FinTech at the Frontier: technology developments supporting financial inclusion in Niger", *Journal of Digital Banking*, Vol. 4 No. 4, pp. 318-331, doi: 10.69554/eowp6434.

Chamboko, R. (2024), "Digital financial services adoption: a retrospective time-to-event analysis approach", *Financial Innovation*, Vol. 10 No. 1, p. 46, doi: 10.1186/s40854-023-00568-1.

Chawla, D. and Joshi, H. (2020), "The moderating role of gender and age in the adoption of mobile wallet", *Foresight*, Vol. 22 No. 4, pp. 483-504, doi: 10.1108/fs-11-2019-0094.

Chiu, I.H. (2016), "Fintech and disruptive business models in financial products, intermediation and markets-policy implications for financial regulators", *Journal of Technology Law and Policy*, Vol. 21, p. 55.

Dallimore, A. (2013), "Banking on the poor: savings, poverty and access to financial services in rural South Africa", (Doctoral dissertation, London School of Economics and Political Science).

David-West, O., Iheanachor, N. and Kelikume, I. (2018), "A resource-based view of digital financial services (DFS): an exploratory study of Nigerian providers", *Journal of Business Research*, Vol. 88, pp. 513-526, doi: 10.1016/j.jbusres.2018.01.034.

Davis, F.D. (1989), "Perceived usefulness, perceived ease of use, and user acceptance of information technology", *MIS Quarterly*, Vol. 13 No. 3, pp. 319-340, doi: 10.2307/249008.

Devi, A., Firmansyah, I., Yuniarto, A.S., Hamid, B.A. and Nawawi, M.K. (2023), "Determinant factor analysis of financial technology adoption among Halal sector microenterprises in Indonesia", *Amwaluna: Jurnal Ekonomi dan Keuangan Syariah*, Vol. 7 No. 2, pp. 347-368, doi: 10.29313/amwaluna.v7i2.12546.

Fang, L.S., Othman, N.A.A., Supian, N.I.A. and Ali, S.N.A. (2023), "Factors influencing the use of E-Wallet as a payment method among students in University Malaysia Kelantan (UMK) City Campus", (Doctoral dissertation, Universiti Malaysia Kelantan).

Fatokun, B.O. (2023), "Customers' affective responses towards the key factors influencing E-Commerce adoption: extended technology acceptance model (TAM) approach", (Doctoral dissertation, Liverpool john Moores University, UK).

Fletschner, D. and Kenney, L. (2014), *Rural Women's Access to Financial Services: Credit, Savings, and Insurance*, Springer, Netherlands, pp. 187-208.

Frenzel, A., Muench, J.C., Bruckner, M.T. and Veit, D. (2021), "Digitization or digitalization?-Toward an understanding of definitions, use and application in IS research", *AMCIS*.

Gradillas, M. and Thomas, L.D. (2023), "Distinguishing digitization and digitalization: a systematic review and conceptual framework", *Journal of Product Innovation Management*, Vol. 42 No. 1, pp. 112-143, doi: 10.1111/jpim.12690.

Gupta, S.K., Tiwari, S., Hassan, A. and Gupta, P. (2023), "Moderating effect of technologies into behavioural intensions of tourists toward use of mobile wallets for digital payments: TAM model perspective", *International Journal of Hospitality and Tourism Systems*, Vol. 16 No. 1, pp. 43-56.

Hair, J.F. Jr, Matthews, L.M., Matthews, R.L. and Sarstedt, M. (2017), "PLS-SEM or CB-SEM: updated guidelines on which method to use", *International Journal of Multivariate Data Analysis*, Vol. 1 No. 2, pp. 107-123, doi: 10.1504/ijmda.2017.087624.

Hair, J.F., Risher, J.J., Sarstedt, M. and Ringle, C.M. (2019), "When to use and how to report the results of PLS-SEM", *European Business Review*, Vol. 31 No. 1, pp. 2-24, doi: 10.1108/ebr-11-2018-0203.

Härdle, W.K., Simar, L., Härdle, W.K. and Simar, L. (2015), "Canonical correlation analysis", in *Applied Multivariate Statistical Analysis*, pp. 443-454.

Henseler, J., Ringle, C.M. and Sarstedt, M. (2015), "A new criterion for assessing discriminant validity in variance-based structural equation modeling", *Journal of the Academy of Marketing Science*, Vol. 43 No. 1, pp. 115-135, doi: 10.1007/s11747-014-0403-8.

Hossain, K.A. (2023), "Analysis of present and future use of artificial intelligence (ai) in line of fouth industrial revolution (4ir)", *Scientific Research Journal*, Vol. 11, pp. 1-50.

Islam, H., Rana, M., Saha, S., Khatun, T., Ritu, M.R. and Islam, M.R. (2023), "Factors influencing the adoption of cryptocurrency in Bangladesh: an investigation using the technology acceptance model (TAM)", *Technological Sustainability*, Vol. 2 No. 4, pp. 423-443, doi: 10.1108/techs-07-2023-0025.

Ismael, D.M.A.M., Elsharkawi, S. and Ali, S. (2021), "Consumers intention to adopt digital financial services in Egypt: an extended technology acceptance Model 1", *Journal of Alexandria University for Administrative Sciences*, Vol. 59 No. 3, pp. 1-30.

Jahangir Rony, R., Shabnam Khan, S., Sinha, A., Saha, A. and Ahmed, N. (2021), "'COVID has made everyone digital and digitally independent': understanding working women's DFS and technology adoption during COVID pandemic in Bangladesh", *Proceedings of the Asian CHI Symposium 2021*, pp. 202-209, doi: 10.1145/3429360.3468212.

Karjaluoto, H., Shaikh, A.A., Saarijärvi, H. and Saraniemi, S. (2019), "How perceived value drives the use of mobile financial services apps", *International Journal of Information Management*, Vol. 47, pp. 252-261, doi: 10.1016/j.ijinfomgt.2018.08.014.

Kong, S.T., Xiang, X. and Chen, Q. (2024), "Quest for social inclusion on digital platform: evidence of gender-differentiated effects on micro and small businesses in China", *Asian Economic Papers*, Vol. 23 No. 3, pp. 1-29, doi: 10.1162/asep_a_00917.

Koswara, A. (2024), "The growth of digital financial services (Dfs) in Indonesia Amid tight regulations: drivers and barriers analysis", *Inflasi: Jurnal Ekonomi, Manajemen dan Perbankan*, Vol. 1 No. 2, pp. 55-61.

Le Quoc, D. (2024), "The relationship between digital financial inclusion, gender inequality, and economic growth: dynamics from financial development", *Journal of Business and Socio-Economic Development*, Vol. 4 No. 4, pp. 370-388, doi: 10.1108/jbsed-12-2023-0101.

Lee, M.C. (2009), "Factors influencing the adoption of internet banking: an integration of TAM and TPB with perceived risk and perceived benefit", *Electronic Commerce Research and Applications*, Vol. 8 No. 3, pp. 130-141, doi: 10.1016/j.elerap.2008.11.006.

Lew, S., Tan, G.W.H., Loh, X.M., Hew, J.J. and Ooi, K.B. (2020), "The disruptive mobile wallet in the hospitality industry: an extended mobile technology acceptance model", *Technology in Society*, Vol. 63, 101430, doi: 10.1016/j.techsoc.2020.101430.

Lin, K.Y., Wang, Y.T. and Huang, T.K. (2020), "Exploring the antecedents of mobile payment service usage: perspectives based on cost–benefit theory, perceived value, and social influences", *Online Information Review*, Vol. 44 No. 1, pp. 299-318, doi: 10.1108/oir-05-2018-0175.

Madden, T.J., Ellen, P.S. and Ajzen, I. (1992), "A comparison of the theory of planned behavior and the theory of reasoned action", *Personality and Social Psychology Bulletin*, Vol. 18 No. 1, pp. 3-9.

Monye, O. (2022), *Digital Financial Inclusion and Regulation*, 1st ed., Routledge, London, doi: 10.4324/9781003217886.

Mpofu, F.Y. (2023), "Gender disparity in digital financial inclusion and challenges affecting women in developing countries", *International Journal of Social Science Research and Review*, Vol. 6 No. 9, pp. 324-350.

Nizam, K. and Rashidi, M.Z. (2025), "Barriers to digital financial inclusion and digital financial services (DFS) in Pakistan: a phenomenological approach", *Qualitative Research in Financial Markets*, Vol. 17 No. 2, pp. 251-274, doi: 10.1108/qrfm-11-2023-0271.

Nugroho, D.S. and Anita (2023), "Gender diversity and sustainability performance: the role of financial technology adoption as moderator", *Ilomata International Journal of Tax and Accounting*, Vol. 4 No. 4, pp. 799-812, doi: 10.52728/ijtc.v4i4.910.

Ozili, P.K. (2024), "Effect of gender equality on financial stability and financial inclusion", *Social Responsibility Journal*, Vol. 20 No. 2, pp. 205-223, doi: 10.1108/srj-12-2022-0565.

Pertiwi, D., Suprapto, W. and Pratama, E. (2020), "Perceived usage of e-wallet among the Y generation in Surabaya based on technology acceptance model", *Jurnal Teknik Industri*, Vol. 22 No. 1, pp. 17-24, doi: 10.9744/jti.22.1.17-24.

Porter, C.E. and Donthu, N. (2006), "Using the technology acceptance model to explain how attitudes determine Internet usage: the role of perceived access barriers and demographics", *Journal of Business Research*, Vol. 59 No. 9, pp. 999-1007, doi: 10.1016/j.jbusres.2006.06.003.

Puschmann, T. (2017), "Fintech", *Business and Information Systems Engineering*, Vol. 59, pp. 69-76.

Rahman, M.R. and Rahman, M.M. (2023), "Impact of digital financial services on customers' choice of financial institutions: a modified UTAUT study in Bangladesh", *International Journal of Safety and Security Engineering*, Vol. 13 No. 3, pp. 409-421, doi: 10.18280/ijsse.130304.

Rana, N.P., Luthra, S. and Rao, H.R. (2020), "Key challenges to digital financial services in emerging economies: the Indian context", *Information Technology and People*, Vol. 33 No. 1, pp. 198-229, doi: 10.1108/itp-05-2018-0243.

Sadik, N. and Rahman, M.M. (2024), "Factors affecting digital financial service adoption in Bangladesh: evidence from SEM-ANN approaches", *Journal of Risk Analysis and Crisis Response*, Vol. 14 No. 4, doi: 10.54560/jracr.v14i4.555.

Saima, F.N., Rahman, M.H.A. and Ghosh, R. (2022), "Gender diversity in FinTech: an effort towards creating an inclusive and sustainable industry", in *AI-enabled Agile Internet of Things for Sustainable FinTech Ecosystems*, IGI Global, pp. 66-92.

Sanad, Z. and Al Lawati, H. (2023), "Board gender diversity and firm performance: the moderating role of financial technology", *Competitiveness Review: An International Business Journal*, Vol. 35 No. 4, pp. 647-669, doi: 10.1108/cr-05-2023-0103.

Sarstedt, M., Ringle, C.M. and Hair, J.F. (2021), "Partial least squares structural equation modeling", in *Handbook of Market Research*, Springer International Publishing, Cham, pp. 587-632.

Siah, C.J.R., Goh, Y.S., Lee, J., Poon, S.N., Ow Yong, J.Q.Y. and Tam, W.S.W. (2023), "The effects of forest bathing on psychological well-being: a systematic review and meta-analysis",

International Journal of Mental Health Nursing, Vol. 32 No. 4, pp. 1038-1054, doi: 10.1111/inm.13131.

Singh, N., Sinha, N. and Liébana-Cabanillas, F.J. (2020), "Determining factors in the adoption and recommendation of mobile wallet services in India: analysis of the effect of innovativeness, stress to use and social influence", *International Journal of Information Management*, Vol. 50, pp. 191-205, doi: 10.1016/j.ijinfomgt.2019.05.022.

Suki, N.M. and Ramayah, T. (2010), "User acceptance of the e-government services in Malaysia: structural equation modelling approach", *Interdisciplinary Journal of Information, Knowledge, and Management*, Vol. 5, pp. 395-413, doi: 10.28945/1308.

Tripathi, S. and Rajeev, M. (2023), "Gender-inclusive development through Fintech: studying gender-based digital financial inclusion in a cross-country setting", *Sustainability*, Vol. 15 No. 13, 10253, doi: 10.3390/su151310253.

World Bank (2020), *World Development Report 2020: Trading for Development in the Age of Global Value Chains*, World Bank, Washington, DC, doi: 10.1596/978-1-4648-1457-0.

Yadav, R.S. and Kalluru, S.R. (2024), "Principal–agent trust and adoption of digital financial services: evidence from India", *Economic Notes*, Vol. 53 No. 3, e12247, doi: 10.1111/ecno.12247.

Further reading

Chamboko, R. (2022), "On the role of gender and age in the use of digital financial services in Zimbabwe", *International Journal of Financial Studies*, Vol. 10 No. 3, p. 82, doi: 10.3390/ijfs10030082.

Kumar, J. and Rani, V. (2025), "Financial innovation and gender dynamics: a comparative study of male and female FinTech adoption in emerging economies", *International Journal of Accounting & Information Management*, Vol. 33 No. 2, pp. 334-353.

Corresponding author

Mohammad Rifat Rahman can be contacted at: rifat@cu.ac.bd