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Factors impacting user acceptance of e-wallets in Bangladesh's transition towards a cashless society

Moutusi Tanha[1], Nurul Islam[2], Farhana Akter Priya[3], Mohammad Zonaed Emran[4], Tanvir Mahmud[5], Md. Mortuza[6]
University of Canterbury, Christchurch, New Zealand[1]
University of Dhaka, Bangladesh[2-5]
National University, Bangladesh[6]
mta150@uclive.ac.Nz[1], nurulislam40133@gmail.com[2], farhanapriya350@gmail.com[3], zonaed.emran@gmail.com[4], tanvir0321@gmail.com[5], mortuzamisu@gmail.com[6]

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Abstract
Purpose: This study investigates the impact of the digital revolution on everyday life, focusing mainly on the emergence of e-wallets as substitutes for traditional physical wallets, and the adoption of various banking technologies in Bangladesh.
Research Methodology: This study examines the utilization of several banking technologies in Bangladesh, including bKash Limited's mobile banking services, which were introduced in July 2011, and offer secure and convenient financial services to individuals with or without bank accounts. Additionally, this study explores the National Payment Switch developed by Bangladesh Bank in 2012, which aims to standardize electronic payments among commercial banks, facilitating cash withdrawals using plastic cards at ATMs and point-of-sale (POS) locations.
Results: The findings indicate that bKash Limited's mobile wallet facilitates secure transactions through its highly encrypted Visa technology platform, enabling customers to deposit for various services such as wages, loans, and domestic remittances. However, the availability of bKash is limited to specific networks and areas, with restrictions on the use of bank accounts. Moreover, implementing the National Payment Switch is expected to reduce transaction costs, enhance financial inclusivity, and streamline online transactions by eliminating individual payment networks.
Limitations: One limitation of the study is the limited availability of bKash in specific regions and networks, and the restrictions imposed on bank account usage within the system.
Contribution: This study contributes to the understanding of the evolving landscape of digital banking technologies in Bangladesh by offering insights into the adoption and impact of e-wallets and other banking solutions. The findings may inform policymakers, financial institutions, and researchers about strategies to enhance financial inclusivity, reduce transaction costs, and promote digitalization in the banking sector.
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1. Introduction

Cashless alternatives to physical notes and coins have been observed for a considerable duration, undergoing development in tandem with advancements in payment technologies and the financial acumen of its users. Some examples of payment methods include checks, debit cards, and credit cards. Each cashless alternative possesses distinct layers of security, user safeguards, settlement duration, user friendliness, and corresponding expenses and charges. Mobile Money is an emerging payment method that utilizes national currencies while storing funds as credit on a smart card or a system provider's ledger. An instance is bKash, a widely used service in Bangladesh that provides financial services such as payments to individuals with mobile phones. The article "A Cashless Society in 2018" initially outlined the critical trends for the year, highlighting the significant disruption of the payment system caused by conflicting forces. Subsequently, it provided an account of regional advancements in the subject matter, highlighting India, Kenya, the UK, and Australia. The technological environment was favorable for the acceptance of mobile payments, particularly in Asia, where there was a significant advancement in the implementation of QR code payments as part of national payment programs aimed at enhancing the cost-effectiveness of payment solutions and promoting financial inclusivity (Ganti, 2024).

Nevertheless, numerous significant disruptions in payment systems linked to underlying systems or telecommunications infrastructure have prompted apprehension regarding our dependence on technology for vital economic operations. The popularity of contactless cards and smartphone payments for low-value purchases was driven by convenience, as seen by the regional preferences in 2017. Security and privacy concerns were brought to the forefront by data breaches, cybercrime, and apprehensions about totalitarian society. Ongoing innovation has resulted in a growing range of integrated retail experiences for consumers while broadening their options for financial service providers to include new and more competitive digital players. The decline in cash usage has increased transaction costs within the commercial payment system, imposing financial burdens on consumers and enterprises (Achord, Chan, Collier, Nardani, & Rochemont, 2017). This poses a continuous challenge to the sustainability of the current ATM infrastructure and a risk to the unrestricted availability of cash. Throughout history, numerous payment methods have emerged. Initially, bartering became a prevalent practice. Over time, a multitude of monetary systems were introduced.1 Charge cards were introduced in the mid-twentieth century. Subsequently, experts have been forecasting the decline of physical currency and the rise of a "cashless society." Cash and checks remain the primary payment methods, whereas credit and debit cards have gained significant popularity as alternative payment devices. The utilization of physical currency is diminishing but at a gradual rate. This study analyzes the costs and advantages of using various payment instruments, impacting the transition to a cashless society. The introduction of additional payment methods has prompted scholars to critically examine their costs, considering both individual and social aspects.4 Researchers have analyzed the motivations of payers in selecting a specific payment instrument, the motivations of retailers to accept such instruments, and the reasons behind the employment of different payment methods in diverse contexts. Researchers have conducted studies from a social standpoint to investigate the potential impact of the displacement of specific payment instruments on economic welfare, such as the replacement of paper-based instruments with electronic instruments (UPI vs. NEFT vs. RTGS, which is a better electronic money transfer service, 2024). This study represents an inaugural empirical investigation of the transition towards a cashless society by employing a comprehensive framework encompassing both advantages and disadvantages. There has been significant scholarly interest in payment instrument economics. Two recent instances revolved around the question of whether payment cards are excessively utilized in the context of social assistance. The first case involved the examination of MasterCard by the Office of Fair Trading in the United Kingdom. In contrast, the second case involves the inquiry of Master Card and Visa by the Australian Central Bank. The authorities assert that payment card networks impose "excessively high" fees on retailers for payment cards. Simultaneously, issuing banks offer consumer services and loyalty points at prices lower than the actual cost. Therefore, authorities argue that payment card systems incentivize customers to excessively use their cards by not imposing a complete marginal cost. This is because merchants bear the expenses, allowing them to do so profitably.

In recent decades, financial markets and institutions have experienced significant changes and rapid growth due to overall trends in deregulation, liberalization, globalization, and advancements in

computer technologies. The intensity of international capital flow has increased, leading to the development of new and advanced financial instruments. This has resulted in a significant reduction in financial transaction costs due to substantial improvements in execution speed. There has been a significant increase in cross-border financial interdependence, with the expansion of the financial sector surpassing that of the real economy. Consequently, industrialized countries have witnessed substantial gains in their financial assets, surpassing their GDP by a factor of multiple. These trends have also resulted in improved capital allocation, cost reduction, and other favorable outcomes. However, they have also facilitated the occurrence of crisis spillovers and alterations in economic policy pursuit, which increasingly rely on discretion rather than rigid norms. The payment method underwent a corresponding transformation, alongside the aforementioned alterations. The prevalence of credit and debit cards has led to reduced reliance on cash transactions. At the same time, contactless technology has further facilitated using these payment methods. The prevalence of non-cash transactions for a wide range of products and services, including, but not limited to, applications, bus fares, airline tickets, and online retailers, has been steadily increasing. Smartphones have also transformed the manner in which payments are made.

Based on a survey by The World Bank, it is estimated that over 1.7 billion adults globally lack access to financial institutions and cannot make payments using mobile money providers. According to Figure 2, 80% of adults in wealthy nations reported using a banking account or mobile device, whereas only 22% reported doing so in low-income economies. Therefore, it is noteworthy that, except Scandinavia, most nations that desire to transition towards a "cashless society" are classified as developing countries. These countries face significant challenges, difficulties, and inconveniences in integrating individuals into their monetary systems. However, the governments of these countries emphasize that a cashless future would primarily benefit the financial inclusion of individuals without access to traditional banking services and facilitate convenient payment methods. The lack of paper currency in society poses a significant risk to privacy because of the transparency and traceability of every transaction. Hence, the advantages for individuals stemming from a "cashless society" are uncertain, affirming increasing cash demand. Based on a study undertaken by the Deutsche Bank, there has been a notable rise in the market for euro cash, with the quantity in circulation three times more in 2016 than in 2003. The per capita income in the United States is $4.200, while it is $3.400 in the Eurozone. However, it is improbable that every individual, regardless of gender or age, in the United States possesses $4.200 in cash. Another noteworthy aspect is that a significant portion of the sum is held in high-denomination banknotes, notably those with denominations of $50 or above, which the average individual only sometimes carries (UPI vs. NEFT vs. RTGS: Which Is Better Electronic Money Transfer Service, 2024).

According to 2015 data, large denomination notes account for 84% of all paper money in the USA, while in the Eurozone, they make up 90%. Despite the abundance of alternative payment options available, the prevalence of cash continues to increase (Abdullah, Redzuan, & Daud, 2020). Conversely, using cash phasing can enhance transparency, facilitate tax collection, and reduce instances of tax evasion. This issue must be addressed globally because of the prevalence of anonymous and untraceable cash transactions. Governments would exert greater authority over corporations, individuals, and the overall economy. Banks could also be significant beneficiaries, mainly because of the elimination of their primary competition, cash. The subsequent chapters will analyze and evaluate the benefits and limitations of governments, individuals, and banks (bKash, n.d.).

1.1 Mobile Payment Development in Bangladesh

bKash

bKash Limited, Bangladesh's mobile banking service provider, is licensed and approved by the Central Bank. A subsidiary of BRAC Bank Limited. bKash offers secure, expedient, and user-friendly mobile payment and money transfer services to unbanked and banked individuals in Bangladesh. BKash is a prominent mobile banking service provider bKash was established in 2010 by BRAC Bank Limited in Bangladesh and Money in Motion LLC in the USA. In April 2013, the International Finance Corporation (IFC) of the World Bank Group entered into a partnership as an equity partner. In March 2014, the business received investment from the Bill and Melinda Gates Foundation. In April 2018, Ant

Financial (Ali Pay), a subsidiary of the Alibaba Group, acquired the bKash. The primary goal of bKash is to enhance the accessibility of financial services to people in Bangladesh. The objective is to advance financial inclusion by providing straightforward, cost-effective, and dependable services to individuals with few economic means.

More than 70% of the Bangladeshi population resides in rural regions where conventional banking facilities are limited. Most individuals who use these services receive funds from relatives who live far away or enhance their financial situations. Approximately 15% of the population in Bangladesh have the privilege of utilizing formal banking services, whereas more than 68% have mobile phones. In addition to communication, these phones can also execute more intricate computational tasks. The primary objective of BKash was to provide secure financial services to the distant people of Bangladesh using mobile devices and ubiquitous telecom networks. bKash functions on all mobile networks in Bangladesh. BKash has a network of more than 200,000 agents in urban and rural Bangladesh, facilitating the establishment of more than 50 million authenticated accounts. bKash was ranked 23rd in Fortune Magazine's annual 'Change the World in the 2017 list, recognizing the top 50 companies that significantly contributed to addressing social issues. A consumer study conducted by the Bangladesh Brand Forum in 2019 and 2020 recognized bKash as the top brand in Bangladesh (bKash, n.d.). bKash has consistently maintained its position as a leading mobile financial services (MFS) brand for the past four years.

Nagad

In 2010, the Bangladesh Post Office revised the Postal Service Act to promote rural financial inclusion and to foster the expansion of e-commerce. Implementing the Electronic Money Transfer System in 2010 and the Postal Cash Card in 2011 aimed to enhance the efficiency, speed, and security of financial transactions and payments. The Bangladesh Post Office offers money transfers and online payment services through its extensive postal outlet network. With the establishment of its two preceding services, Nagad achieved the distinction of becoming the initial state-owned Mobile Financial Service (MFS) on November 11, 2016. The service was built through cooperation between the Bangladesh Post Office and Third Wave Technologies. The ownership of Bangladesh Postal Service is 51%, while that of Third Wave Technologies is 49%. Before the ceremonial commencement on March 26, 2019, physical and technological preparations were made nationwide at 10,000 post-office locations.

ROCKET

DBBL provides the ROCKET mobile banking services. In September 2016, the company underwent a rebranding process, changing its name from DBBL Mobile Banking. ROCKET provides peer-to-peer (P2P) and business-to-person (B2P) cash transfers, bill payments, merchant payments, smartphone top-ups, and international remittances. ROCKET funds may be deposited and withdrawn from DBBL branches, Bangladesh Krishi Bank branches, ATMs, and any extensive network of over 142,000 agents in Bangladesh. Access to accounts with specific mobile phone numbers and checking digits necessitates using Personal Identification Numbers (PINs). Users can utilize the USSD service by dialing *322# on any mobile network, excluding Citycell, to access their accounts. Attention: The USSD menu is available exclusively in English. SMS was utilized to obtain the city cell account details.

ROCKET accounts may be accessed using a complementary smartphone application, with a user base of more than 300,000 members and 40,000 agents. ROCKET offers two account options: ATM-free- and cash-in-free. The account type is selected during the initial account opening process and has the flexibility to be modified later.

Upay

Upay is a subsidiary of the United Commercial Bank and operates as a digital financial service brand. Starting in early 2021, Upay started providing mobile banking services to all users after acquiring a license from Bangladesh Bank. Upay offers various financial services, including mobile transactions, utility bill payments, in-store and e-commerce payments, inward remittances, salary distribution, airtime recharge, and other value-added financial services. Our extensive network of agents and merchants allows us to provide cost-effective nationwide services. Upay aimed to revolutionize the

financial sector in Bangladesh, drawing inspiration from the concept of Digital Bangladesh. Upay's convenient and efficient digital banking services facilitate financial inclusion by benefiting numerous individuals in the country. Funding for UPAY was provided by a prominent commercial bank in Bangladesh (Abdullah et al., 2020). The primary objective was to enhance user experience and optimize efficiency in mobile finance. Developing a banking application for a user base of 160 million was arduous, and competition was intense. This exceptional product has been widely adopted across the country and has achieved remarkable success.

SureCash

SureCash is a prominent Bangladeshi brand in the financial technology field. We partner with four Bangladeshi organizations, including Rupali Bank Limited, which is one of the main government-owned banks. We cater to almost 20 million clients through these partnerships, and have 1,500 payment partners. Our mobile banking and payment services encompass a range of alternatives, such as peer-to-peer money transfers, government payments, education payments (known as 'Edu pay'), utility bill payments, and many other payments for items and services across the country. More than 180,000 retail agents offer cash withdrawal.

OK Wallet is a mobile banking system developed by ONE Bank Ltd.. It provides unparalleled control when shopping or paying monthly expenses, and simplifies cash-in, cash-out, and money-transfer operations. ONE Bank fosters inclusivity and collaboration among individuals from diverse backgrounds. The Wallet guarantees that this objective can be achieved. The mobile account was designed to provide users with ease. We developed a system that allows customers to deposit and withdraw money from any of our agent locations, providing them with ease across 95 locations. Portable electronic devices can be charged during the motion. OK Wallet facilitates the connection between users and their respective bank accounts and ATMs. Non-registered users can benefit from various OK Wallet promotions. Processing occurs in real time and is safe, as stated by Wallet in 2022.

Trust Axiata Pay (TAP) is a mobile finance company established on May 29, 2020, by Trust Axiata Digital Limited. The company obtained ownership of the 'tap' brand name following regulatory permission from the Bangladesh Bank Mobile Financial Services. It was established by Trust Bank Limited and Axiata Digital Services Sdn Bhd as a collaboration in accordance with the "Bangladesh Mobile Financial Services Regulations, 2018." Trust Bank Limited and Axiata Digital Services Sdn Bhd established a collaborative enterprise to operate Mobile Financial Services (MFS) and Payment Service Providers (PSP) in Bangladesh. The ownership of shares is divided between Trust Bank Limited (51%) and Axiata Digital Services SDN Bhd (49%). TADL launched its Mobile Financial Services (MFS) "tap" product on December 30, 2020. This product aims to provide financial services to both banked and unbanked individuals. The TADL offers accessible, adaptable, protected, and cost-effective services to foster financial inclusivity across all economic brackets. "Tap" enhances the advanced digital payment system by introducing new features to improve user experience beyond Mobile Financial Services. The primary objective of "tap" is to develop creative services, establish strategic partnerships with key players in the value chain, and emerge as a prominent provider of mobile financial services in the country. The nation has a comprehensive digital payment infrastructure. The "tap" service is being utilized by diverse agents in urban and rural Bangladesh, and substantial growth in its user population is being seen.

MYcash

MYCash is a mobile banking solution provided by Mercantile Bank Limited (MBL). It prioritizes client satisfaction and provides a diverse array of financial products and services to the Bangladeshi population via mobile phones. The Bangladesh Bank authorized MYCash to provide and operate Mobile Financial Services. MYCash guarantees a combination of convenient and secure services to simplify life.

Islamic Bank mCash

Islamic Bank mCash is the mobile banking platform offered by Islami Bank Bangladesh Limited, enabling clients to access mobile banking services 24/7, regardless of their location inside the country, without needing to visit any branches. Despite notable advancements in various aspects pertaining to financial sustainability, profitability, innovation, and competitiveness, there exist apprehensions regarding the limited inclusion of a substantial portion of the population, particularly the underprivileged segments and rural populations, within the realm of fundamental banking services. However, the significant increase in mobile phone users and expanded reach of Mobile Network Operators (MNOs) have made their distribution channels a crucial tool for developing banking services for both unbanked and banked individuals. The Bangladesh Bank has granted authorization to initiate mobile banking operations to adopt unbanked individuals with mobile connectivity to facilitate access to this demographic through nationwide mobile network coverage. The expansion of mobile banking presents an ideal opportunity for Bangladesh to provide financial services to its unbanked population in a cost-effective and efficient manner.

2. Literature Review

The Technology Acceptance Model (TAM), developed by Davis (1989), is a commonly used paradigm for studying how individuals embrace and use information technology, including mobile payments. The Technology Acceptance Model (TAM) suggests that customers' attitudes and intentions toward adopting various forms of technology are affected by two key factors: perceived utility (PU) and perceived ease of use (PEU). The existing body of research on mobile payment has reached a consensus that the perceived utility (PU) and perceived ease of use (PEU) of mobile payment systems positively impact consumers' willingness to adopt and utilize mobile payment. Considering this specific case, including PU (perceived usefulness) and PEU (perceived ease of use) in the conceptual framework may be overly comprehensive (Abdullah et al., 2020).

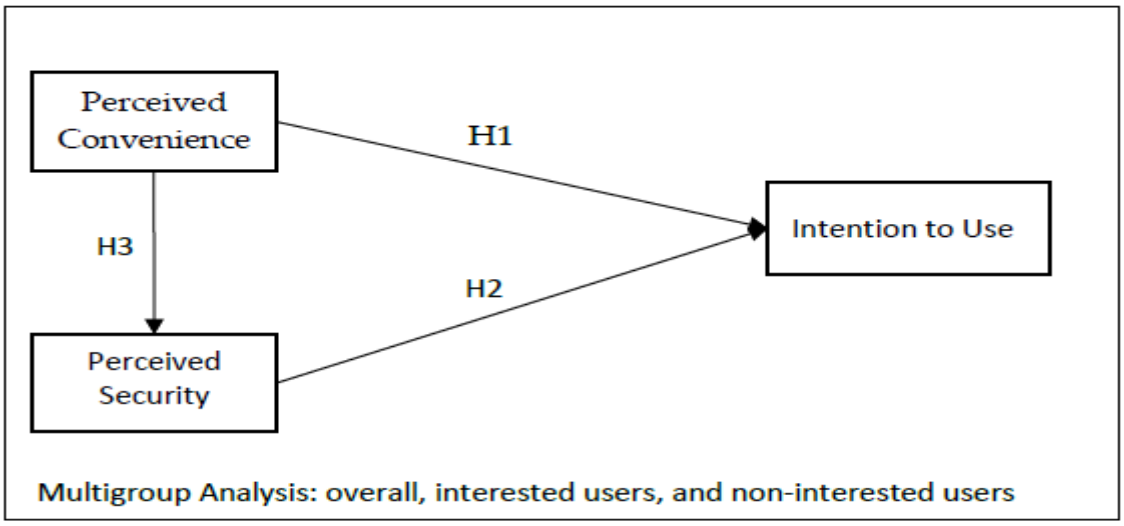
Another viewpoint is the value-based adoption model (VAM) Kim, Chan, and Gupta (2007), which emphasizes optimizing value. The fundamental objective of the original VAM was to analyze the adoption of mobile Internet among people who simultaneously act as technology consumers and service providers (Achord et al., 2017).

Journal of Information Systems in Australasia, The research piece is titled "Towards a Cashless Society.". Customers play a significant role in the adoption of mobile payment. Users commonly evaluate the balance between the advantages gained and the overall costs of giving up while using mobile payment systems, considering their views on value because of the voluntary nature of adoption. From a practical standpoint, those working in a service business assess the overall worth of a product or service by maximizing the positive advantages they experience and minimizing the negative sacrifices they perceive. The perceived practical benefit of convenience is a substantial aspect that significantly influences the adoption of mobile payments (Berkimbayeva, 2019). Security risks refer to the perceived costs associated with consumption that are detrimental to future financial and psychological well-being.

A study done in Bangladesh has extended the Technology Acceptance Model (TAM) to include convenience and security as external variables that impact the perceived utility (PU) and perceived ease of use (PEU) of mobile payment adoption. Liu et al.'s (2019) extensive analysis of sixty-one (61) studies on information systems (IS) found no significant correlation between perceived convenience, perceived security, perceived usefulness (PU), and perceived ease of use (PEU) in relation to the adoption of mobile payment. The variables PU (Perceived usefulness) and PEU (perceived ease of use) have not included in our conceptual model. Our investigation primarily focuses on examining how ease and security influence the desire to adopt, with a special focus on perceived value (see Figure 5). The VAM framework is more appropriate than the TAM framework for precisely evaluating the costs (particularly perceived security) and benefits (specifically, perceived ease) associated with customers' desire to utilize a product or service (Datta, 2021).

According to perceived value theory, this study proposes a research methodology that excludes the essential elements of the TAM, namely PU and PEU. The aim of our proposed model is to examine

how the perceived ease and perceived security of a gamified mobile payment platform affects the behavioral intentions of individual users in the service marketing industry. The analyzed model also explores the relationship between convenience and security, previously defined as external attributes in the Technology Acceptance Model (TAM) (Davis, 1989).



Proposed Research Model

Convenience

The notion of perceived ease has gained significant traction in traditional retail and online buying, which is crucial for determining customer satisfaction and intention. Convenience is essential in determining the perceived value of e-commerce adoption, especially regarding mobile payment acceptance. The term "convenience" was initially established by Copeland in 1923. This pertains to the extent to which decision-making processes, such as purchasing or saving time, necessitate minimal cognitive exertion. Convenience is defined as the ability of a product or service to save time and alleviate users' mental, emotional, and physical difficulties. Regarding the regulation of consumer behavior, it is suggested that a definition of convenience that focuses on the customer is more desirable than the definition provided by the researcher (Davis, 1989).

Moreover, consumers' perceived convenience is contingent upon context and may differ across contexts. Therefore, it is pertinent to this study since it focuses on investigating the 'location' aspect. When designing a gamified mobile payment platform, it is essential to consider user convenience and geographical location (DiFranco, 2008). Previous research indicates that customers prefer mobile payment channels that offer convenience and practicality, enabling them to purchase on their mobile phones anytime and anywhere. Consumers with limited time seek mobile payment services that provide value-added. They assess the benefits of these services in comparison to the costs associated with making mobile payment transactions. This study defines perceived convenience as a notion that includes six dimensions of practical value: time efficiency, reduced physical currency, immediate financial needs, versatile design, personalized apps, and a unified platform (Fabris, 2019).

In line with the principle of consumer-centric convenience, individuals make decisions regarding the timing and location of their shopping activities, based on their preferences and needs. Consumers in cash-centric cultures, particularly in poor nations, find mobile payment attractive. This study posits that the increasing need for convenience among users, leading to a frequent shift towards mobile payment as an alternative payment method, will result in a corresponding increase in user intention to embrace mobile payment (Abbas, 2017). Using elements on the mobile payment platform would serve as a motivating factor and encourage mobile payment adoption. Therefore, the initial hypotheses are as follows:

Hypothesis 1: The perception of convenience positively influences the inclination to adopt mobile payment.

Security

The platform ecosystem is seeing a growing concern regarding security owing to the rapid evolution of technology and the proliferation of e-commerce products. Blockchain technology employs cryptography to ensure privacy and security by implementing a system that prevents hostile activities from modifying the chain of peer-to-peer transactions. In contrast to privacy, security protects mobile payment platforms from unauthorized infiltration, illegal theft, or destruction, rather than focusing on user control over personal information. This study defines security as the comprehensive set of six elements that provide reliability, privacy, authentication and authorization, integrity, non-repudiation, and secrecy of blockchain promises (Reddy, Indraja, & Nikhil, 2017). The primary focus of this study pertains to users.

Previous research indicates that the inclination of individuals to utilize mobile payment services is influenced by their perception of security exposure during the initial adoption phase. In general, individuals are more likely to embrace a novel payment option when they experience a reduced level of security exposure, characterized by feelings of reliability, safety, and lack of threat, which surpasses the perceived security of their previous payment methods. A practical and dependable gamified mobile payment platform will integrate adequate security protocols to give consumers confidence when conducting transactions. Consequently, users are relieved of concerns regarding fraudulent activities, identity theft, and divulgence of personal information during the mobile payment procedure (Farquhar & Rowley, 2009). This study posits that a positive perception of security will give consumers confidence in the dependability, confidentiality, and safety considerations of mobile payment platforms. Hence, the second hypothesis is formulated as follows:

Hypothesis 2: The perception of security positively influences the inclination to adopt gamified mobile payment.

The Trade-off Between Convenience and Security

The correlation between the perception of convenience and the perception of security in connection to mobile payment adoption needs to be addressed or overshadowed by other factors of interest in previous studies., prominent service providers like Apple, Google, Alibaba, Grab, and AirAsia have generated fresh attention towards gamified mobile payment platforms, which have the potential to drive widespread adoption and contribute to a bright future of convenience. However, technology adoption has been hindered by concerns regarding security and privacy (Goel, Sahai, Vinaik, & Garg, 2019). These concerns are often influenced by a country's developmental stage and the readiness of its digital infrastructure, particularly in developing contexts.

The use of gamification in mobile payment platforms functions as a convenient design element that promotes the adoption of mobile payment methods. In contrast, the monetary tokenization of the system functions as a security mechanism to protect against unauthorized breaches. The existing body of research indicates that perceived convenience influences the adoption of mobile payment systems. However, additional research is needed to explore the impact of perceived security. However, it emphasizes the significance of security in terms of convenience. However, there is limited knowledge regarding whether the coexistence of perceived ease and perceived security is necessary to adopt mobile payment or whether there is a trade-off with an inverse relationship. The relationship may also differ between various cohorts of interested users and those who are not interested. The present study posits that the perception of security plays a mediating role in the association between perceived convenience and the intention to utilize a gamified mobile payment platform (Hidayah, Waspada, & Sari, 2023). The correlation between perceived convenience and perceived security may resemble the impact of PEU on PU in TAM. Users who believe that mobile payment transactions involve minimal cognitive effort (favorable perceived convenience) will develop a positive perception of security, motivating them to use a gamified mobile payment platform.

System of Online Payments

Bangla QR is a QR code-based payment solution compatible with a wide variety of systems. This advancement signifies strides in the implementation of a cashless payment system in Bangladesh that

obviates the need for physical currency or intimate interaction. The mVisa platform powers the payment system, providing all Visa features and services without the need for a point-of-sale (POS) terminal (Fachrudin & Silalahi, 2022).

Transaction volumes at Point of Sale (POS) terminals accepting debit, credit, and prepaid cards increased by 23% year-to-date in November 2021, as reported by the Bangladesh Bank, in comparison to the corresponding period of the prior year. The proliferation of digital payment systems and networks coupled with financial institutions offering exclusive promotions on debit, credit, and prepaid cards to members of all income groups (especially millennials) stimulates the growth of card culture and card transactions. Mobile Financial Services (MFS) is a prevalent mode of payment that propels the expansion of digital payments throughout the country. Since its inception in 2011, 29 institutions have obtained MFS licenses. Bangladesh has 170 million mobile users and 112 million internet subscribers. Mobile Financial Services (MFS) have become the favored method for conducting a wide range of digital transactions, such as registering with academic institutions, making bill payments and tax returns, accessing digital health services, and utilizing online banking systems (Ebole, Kuyoro, & Aremu, 2016).

Recognizing the potential of electronic payment methods, the Bangladesh Bank implemented the Bangladesh Automated Cheque Processing System (BACPS) in 2010 to supplement manual regional clearing houses. By implementing this methodology, financial institutions accelerate the resolution of interbank checks, reducing the processing time from two to three days, which was necessary under the manual system, to a mere business day. The central bank established the Bangladesh Electronic Fund Transfer Network (BEFTN) in 2011 to facilitate the seamless transfer of wages and salaries to employees and large-scale payments for corporations (USAID, 2016). Further, the platform enables individuals to pay utility bills, loan installments, and insurance premiums.

Agent banking is a relatively new development in Bangladesh's banking services. The primary objective is to extend official banking services to traditionally inaccessible or difficult-to-reach individuals. Bangladesh Bank officially sanctioned agent banking in late 2013, but its widespread adoption in Bangladesh did not begin until 2015. The agent banking model mandates that banks maintain a ratio of two agent points in rural communities for each agent point in urban areas, emphasizing rural access. Currently, 16 institutions in Bangladesh have authorization to offer agent-banking services. However, only two institutions have expanded their operations to dominate the industry. Recently, the Bangladesh Bank enforced a policy mandating the establishment of two branches in the rural sector before the launch of a branch in the metropolitan sector by a private bank. The mentality of rural residents presents an additional obstacle to banking. Several agent banking establishments and representatives face a lack of trust and reliability in the rural population (USAID, 2016).

According to analysts, the pandemic significantly accelerated Bangladesh's transition to a virtual economy, resulting in a substantial surge in online commerce and digital payment methods. They asserted that this contemporary payment method frequently depends on credit cards. We observed that the shift towards more reliable digital payment systems began before the pandemic. However, the outbreak of the virus, which coincided with travel restrictions to prevent disease transmission, accelerated this change. In March 2022, the number of Internet banking clients increased by approximately 400,000. According to data from the central bank, the total value of transactions in March increased by Tk 25.82 billion, reach Tk 231.4 billion. According to the data, ATM, POS, CRM, and e-commerce transactions increased 3.63 million in March. As a result, the overall volume of these transactions increased by Tk 43.2 billion since December of the prior year, reaching Tk 313.88 billion. The aggregate worth of real-time gross settlement (RTGS) transactions reached 3.79 trillion Tk in March of the preceding year, reflecting an expansion of more than 1.0 trillion Tk in the three months leading up to December 2021. This electronic settlement method entails the total transfer of funds from one bank account to another in real-time.

By implementing digital transactions, the payment system can improve its efficacy and mitigate financial risks such as liquidity, default, and systemic risks. In contrast, the automated banking industry in Bangladesh has depended on electronic payment methods such as Internet Banking Fund Transfer

(IBFT), Mobile Financial Services (MFS), Automated Teller Machines (ATM), and Debit Cards to facilitate transactions. Profitability indicators include return on assets (ROA) and Return on equity (ROE). To foster a society devoid of tangible currency, Bangladesh must actively encourage its populace to embrace digital payment methods, including mobile financial services (MFS) and credit cards. As of January 2020, the Bangladeshi Central Bank had issued a cumulative sum of 2.86 crore in debit, credit, and prepaid cards. The total number of transactions performed using these cards was Tk 27,072 in cumulative value. In that particular month, card transactions experienced a 31% surge in volume compared with the previous year's corresponding period, with a cumulative value of Tk 20,624 crore.

The coronavirus pandemic Over the last decade has strongly influenced the proliferation of cashless transactions. Notwithstanding this, "plastic money" has been in existence for nearly twenty-five years. The central bank implemented a one-time password (OTP) or two-factor authentication for debit and credit cards in 2010 to encourage cardholders to use electronic payment methods and promote e-commerce. In light of the potential of electronic payment systems, Bangladesh Bank implemented the Bangladesh Automated Cheque Processing System (BACPS) in 2010 to supplement manual regional clearing houses. This technology enables banks to resolve interbank checks on a single business day instead of the two to three days required by the manual process. Based on the data provided by the central bank, the daily check payment volume exceeded 10,000 in December 2021, with an average transaction value of 72.39 lakh rupees.

The Bangladesh Bank established the Bangladesh Electronic Fund Transfer Network (BEFTN) in 2011. This network facilitates the payment of wages and compensation to employees, enabling corporations to do so easily. Users can also pay insurance premiums, loan installments, and utility expenses through the program. Until December last year, BEFTN processed 477,000 items with an average transaction value of Tk 48,254. Since its inception by the central bank in 2011, MFS has gained immense popularity among individuals of all backgrounds, owing to its user-friendliness and accessibility. The Bangladesh Bank established the Bangladesh Electronic Fund Transfer Network (BEFTN) in 2011 (Srouji & Torre, 2022). This network facilitates the seamless transmission of wages and salaries to employees and volume payments to corporate entities. Furthermore, the program allows users to settle energy expenses, insurance premiums, and loan installments. Until December of the previous year, BEFTN processed 477,000 products, with an average transaction value of Tk 48,254. Since its inception by the central bank in 2011, MFS has gained immense popularity among individuals of all backgrounds, owing to its user-friendliness and accessibility. In January, the mobile financial services industry recorded an average daily transaction volume of Tk 2,366 crore, with 11.4 crore registered consumers.

According to the data, the transaction volume increased by 3.08 percent compared with the previous month. The Central Bank of Bangladesh established the National Payment Switch Bangladesh (NPSB) in 2012 to facilitate card-based online retail transactions among institutions. The NPSB currently processes Internet banking fund transfers (IBFT), point-of-sale (POS), and interbank automated teller machine (ATM) transactions. The Real-Time Gross Settlement System (RTGS) of 2015 was implemented by the central bank to create a secure and streamlined digital interbank payment system. This technology enables banks to make instantaneous and complete fund transfers between accounts. The primary objective of the Real-Time Gross Settlement (RTGS) system is to expedite the resolution of significant financial transactions involving Tk 1 lakhs or more in value, denominated in either domestic or foreign currency.

3. Methodology

3.1 Information

Information from an online questionnaire survey was acquired using non-probabilistic intentional sampling. The study only included Bangladeshis who had used mobile payment methods for online purchases or services in the past year. ICT investor expositions in Dhaka attracted 1358 users. The list was sent. Bangladeshi research on questionnaire convenience and usability was also conducted.

3.2 Statistical data

Non-responses and incomplete responses were excluded, leaving 388 valid responses for future studies. Male users (230, 59.3%) outnumbered female users (158, 40.7%), especially in the age categories 41–55 (102, 26.3%) and 26–40 (181, 46.6%) years. Eighteen users (4.6%) were over 56 years old and had retired. There were 87 under-25 users, 22.4% of the total). Of these, 264 (68.0%) had a college or university degree, 78 (20.1%) had completed secondary or high school, and 46 (11.9%) had a graduate degree. Of the respondents, 52.6% were single and 47.4% were married. Most respondents (172, 44.3%) worked in manufacturing and ICT, excluding 78 students. Other industries (67, 17.3%), banking and finance (37, 9.5%), and retail and hypermarkets (34, 8.8%) follow. Of the 165 respondents, 42.5% occupied middle management positions, 14.4% held junior management positions, 11.9% held professional positions, 6.2% held senior management positions, and 25.0% held other positions.

Of the total number of users, 61.9% (240) were very interested and 3.6% (14 users) were moderately interested in using the mobile payment platform, compared to 27.3% (106 users) who were indifferent, 6.7% (26 users) who were not interested, and 0.5% (2 users) who were not interested.

3.3 Statistics-based data analysis

SmartPLS 3 multivariate analysis using partial least squares structural equation modeling (PLSSEM).

4. Result and discussions

The Partial Least Squares Structural Equation Modeling (PLS-SEM) statistical method offers causal explanations in SEM without making data distribution assumptions. Covariance-based CB-SEM optimizes the model fit to satisfy the theoretical assumptions while imposing limitations. This study used PLS-SEM because of its non-parametric nature and capacity to investigate the causal association between adoption intention and perceived security and convenience. PLS-SEM can also anticipate mobile payment platform use and examine a less popular value-based theoretical framework than mainstream TAM.

4.1 Results from observation

Joseph F. Hair, Babin, Black, and Anderson (2019) evaluated PLS-SEM measurement and structural models according to research criteria. The measurement model met discriminant, concurrent, and internal consistency reliability requirements. Structural model testing was used to assess the hypotheses. Statistical conclusions were drawn from t-statistics above ±1.96, indicating a two-tailed test at the 5% significance level.

4.2 Model for Measurement

All constructs passed the validity and reliability tests. Table 1 shows that the average variance extracted (AVE) and composite reliability (CR) exceeded 0.50 and 0.70, respectively. Most commodities had loadings of over 0.800, and practically all exceeded 0.708. Adding one item (S4) with a loading of 0.646 did not change the concept of the security's internal consistency or convergent validity (Hair et al., 2018). The composite reliability (CR) was 0.917, and the average variance extracted (AVE) was 0.691 when the item was omitted, compared with 0.914 and 0.643 when added. Thus, Item S4 remained in the model. Table 1 also contains the component correlation latent variables.

Table 1. Construct Reliability, Validity, and Latent Variable Correlation

	CR	AVE	Convenience	Security	Intention to use
Convenience	0.961	0.806	1.000		
Security	0.914	0.643	0.516	1.000	
Intention to Use	0.909	0.714	0.426	0.573	1.000

The discriminant validity of the components was validated using the heterotrait-monotrait ratio of the correlations (HTMT) devised in. Table 2 shows that the two-tailed 95% bias-corrected confidence intervals of the HTMT were between 0 and 1, indicating a valid range. Additionally, all inter-construct HTMT values were below the threshold of 0.85, as required by the HTMT.85 criteria. The model fit

was determined by evaluating the standardized root mean square residual (SRMR) value of 0.088, which is below the cutoff threshold of 0.10. Table 3 indicates no multicollinearity issue in the measurement model, as all inner VIF values were below the threshold of 3.3. The authors of this study are Joseph F Hair, Hult, Ringle, and Sarstedt (2014).

Table 2. Discriminant Validity Assessment based on HTMT Criteria

	Convenience	Security	Intention to Use
Convenience			
Security	0.545*** [0.387, 0.666]		
Intention to Use	0.463*** [0.318, 0.578]	0.649*** [0.491, 0.757]	

Note: The symbols ***p < 0.01, **p < 0.05, *p < 0.10, and n.s. Indicates the degree of significance with n.s.. However, the results were not significant. The significance level was determined using bootstrapping. The numbers within brackets represent 95% bias-corrected confidence intervals for the HTMT values. These intervals were computed using 5000 resamples during bootstrapping.

Table 3. Inner VIF values

	Convenience	Security
Convenience		
Security	1.000	
Intention to Use	1.362	1.362

Using a distribution-free sampling technique, a structural model was employed to evaluate the hypotheses, using a bootstrapping process that included 5000 samples. Based on the R2 data, the model accounted for 35.2% of the variation in customer inclination to utilize a gamified mobile payment platform.

Perceived convenience accounted for 26.6% of the variation in perceived security. All three theories are valid.

4.3 Model of the structure

Based on the findings in Table 4, perceived convenience has a moderate direct positive impact on consumers' intention to use ($\beta = 0.178$, $p<0.002$). In contrast, it had a significantly positive impact on perceived security ($\beta = 0.516$, $p<0.000$). The impact of the latter was less substantial than that of the former, as indicated by the magnitude of the route coefficients. Perceived convenience significantly influences consumers' intention to use, with a large total impact ($\beta=0.426$, $p<0.000$) and a moderate indirect effect ($\beta=0.248$, $p<0.000$). Nevertheless, perceived security had a significantly greater impact on intention to use ($\beta=0.482$, $p<0.000$) than the total effect of perceived convenience. The impact of perceived security was equivalent to its direct effect. Based on the two statistics, it was shown that perceived security had a moderate impact on intention to use, with an effect size of 0.263. On the other hand, the perception of convenience substantially impacted security ($f 2 = 0.362$) but only had a minimal influence on the intention to use ($f 2 = 0.036$).

Table 4. Direct, indirect, and total effects of hypothesized relationships

Hypothesized relationships		Direct Effect	Effect size f^2	Indirect Effect	Total Effect
H1	Convenience → Intention to Use	0.178 (3.168)***	0.036 (1.315) n.s.	0.248 (6.285)***	0.426 (7.436)***
H2	Security → Intention to Use	0.482 (7.987)***	0.263 (2.855)***	-	0.482 (8.021)***
H3	Convenience → Security	0.516 (9.108)***	0.362 (2.819)***	-	0.516 (9.148)***

Note: The significance level (bootstrapped) is represented as follows: ***p < 0.01, **p < 0.05, *p < 0.35, medium > 0.15, small > 0.02

The blindfolding technique revealed that all built cross-validated redundancy Q2 values above the zero threshold. Specifically, the Q2 value for security was 0.152, whereas the Q2 value for intention to use was 0.230. Therefore, the structural model has proven to have sufficient predictive value.

Table 5. Comparing Information Criteria between PLS-SEM and LM Predictions

Predicted Indicators	PLS-SEM prediction				Linear Model (LM) prediction				PLS-SEM versus LM		
	RMSE	MAE	MAPE	Q^2	RMSE	MAE	MAPE	Q^2	RMSE	MAE	MAPE
INT1	0.491	0.403	18.895	0.196	0.484	0.381	17.877	0.221	LM	LM	LM
INT2	0.562	0.489	22.839	0.098	0.566	0.492	22.930	0.084	PLS	PLS	PLS
INT3	0.565	0.478	22.690	0.036	0.565	0.488	23.130	0.036	LM	PLS	PLS
INT4	0.502	0.397	18.491	0.132	0.518	0.408	18.831	0.077	PLS	PLS	PLS
S1	0.491	0.326	17.308	0.219	0.497	0.310	16.533	0.198	PLS	LM	LM
S2	0.568	0.475	23.613	0.236	0.580	0.464	23.026	0.203	PLS	LM	LM
S3	0.638	0.433	16.842	0.066	0.646	0.437	17.219	0.041	PLS	PLS	PLS
S4	0.687	0.558	19.988	0.034	0.681	0.544	19.824	0.051	LM	LM	LM
S5	0.561	0.482	22.888	0.179	0.565	0.481	22.913	0.166	PLS	LM	PLS
S6	0.508	0.428	19.419	0.177	0.514	0.428	19.478	0.156	PLS	PLS	PLS

We anticipated the use of indicators (INT1-4) for hypothesis H1 and security indicators (S1-6) for hypothesis H2. We used H3 to predict the security indicators (S1-6) from the convenience indicators (C1-6). We conducted comparisons using the model with the lowest values of information criteria, such as the root mean squared error of predictions (RMSE), mean absolute error (MAE), mean absolute percentage error (MAPE), and blindfolding-based Q2.

This study utilized a PLSPredict approach to evaluate the predictive significance of empirical data. We performed the PLS prediction process on a 10-fold cross-validation using training estimates from the PLS-SEM model to predict the testing sample (Shmueli et al., 2019). The results indicated that all indicators predicted in the PLS-SEM model had Q2 values that were statistically significant, surpassing the zero criteria. Furthermore, the partial least squares structural equation Modeling (PLS-SEM) model demonstrated superior performance compared to the linear regression model (LM), with fewer prediction errors (root mean square error, mean absolute error, and mean absolute percentage error) for the majority of the predicted indicators (specifically, 18 out of 30).

The findings suggest that the PLS-SEM model exhibits moderate predictive capability and outperforms the linear model in terms of prediction. This study may exhibit the observed heterogeneity, which is contingent on user characteristics. Users with varying levels of pre-existing interest in utilizing a gamified mobile payment platform may have differing perceptions of ease and security. First, the study must determine whether there is a significant comparison between different groups of users, including those who are interested, those who are not interested, and all users. We evaluate the measurement

invariance of the empirical model using the MICOM approach. The results indicated that the empirical model demonstrated configural invariance, meaning that the PLS models, data treatment, and algorithm settings were equivalent. However, composite invariance is not observed. Table 6 lists the results for 1000 different combinations. The construct of convenience is the only one with a between-group correlation (c) of 0.999, which is not significantly different from 1 ($p = 0.121 > 0.05$). Therefore, a multigroup comparison using an empirical model would not be significant. Nevertheless, this study can potentially conduct an individual analysis for each user group without making comparisons between interested and non-interested users.

Table 6. Measurement Invariance Assessment

Constructs	Correlation, c	95% confidence interval	p-value	Compositional invariance?
Convenience	0.999	[0.999, 1.000]	0.121	Yes
Intention to Use	0.923	[0.991, 0.997]	0.000	No
Security	0.987	[0.994, 0.998]	0.006	No

Ultimately, an importance-performance map analysis (IPMA) was conducted to understand the impact of users' intentions to utilize a gamified mobile payment platform based on perceived ease and perceived security. The IPMA compared the performance of linked constructs (based on average latent variable scores rescaled from to 0-100) with the significance of the proposed linkages (based on unstandardized total effects of the PLS estimates). To assist managers in setting priorities for performance improvement, IPMA seeks to identify priority areas of constructs and indicators that show high importance but poor performance scores.

Table 7 indicates that security could be a priority area for performance enhancement based on IPMA results at the build level among interested users and all users. On the other hand, non-interested users would put convenience ahead of the performance enhancement. The security construct was shown to have higher relevance (0.46 for all users and 0.483 for interested users) and higher performance (40.59 for all users, 37.31 for interested users) at the construct level. Nevertheless, prioritizing security is vital because PLS-SEM results have already demonstrated that security significantly contributes to the overall effect of convenience. Therefore, even though perceived convenience has lower performance ratings than perceived security, enhancing perceived security indirectly enhances perceived convenience. On the other hand, convenience is a crucial area for users who are not interested, with higher importance (0.258) but lower performance (37.44) scores.

Table 7. IPMA Construct-level Priority Areas for Performance Improvement

	Importance (based on total effects)			Performance (based on mean latent variable scores)		
Construct level:	All (n=388)	Interested (n=254)	Non-interested (n=132)	All (n=388)	Interested (n=254)	Non-interested (n=132)
Convenience	0.444	0.451	0.258	31.88	28.62	37.44
Security	0.460	0.483	0.111	40.59	37.31	47.34

Note: Importance is based on the total effects (x-axis) and performance scores on the intention to use (y-axis).

Users' intention to use (performance) improved by an average of 0.46% for all users and 0.483% for interested users (importance) for every unit increase in security. Security improvement affects users of interest more than all users. On the other hand, a convenience improvement of one unit would result in a 0.258% increase in users' intention to use (performance) among disinterested users. These findings indicate that satisfying security concerns for interested users has a more significant impact than satisfying convenience considerations for users who are not interested.

Table 8 displays the top five priority subareas for performance improvement based on the indicator-level IPMA results. These sub-areas feature indicators with significant importance (total effects > 0.08), but below-average performance (intention to use < 0.50).

Although they were ranked differently in relevance, security concerns accounted for most of the top five priority subareas among all users and interested users. Except for one indicator (C1), which shows the convenience of carrying less currency, four of these indicators highlight the security features of dependability (S1), privacy (S2), non-repudiation (S5), and confidentiality (S6). With the highest priority (0.093) and lowest overall user performance score (28.54), reliability (S1) topped the list. Reliability (S1) had the lowest performance score (23.819) among the interested consumers, despite ranking third in terms of importance (0.093). Therefore, the indicator-level results demonstrate that among interested users and all users, a gamified mobile payment platform's reliability (S1) component should be prioritized for performance development.

Table 8. IMPA Indicator-level Priority Areas for Performance Improvement

All (n=388)			Interested (n=254)			Non-interested (n=132)		
Ind.	IMP	PERF	Ind.	IMP	PERF	Ind.	IMP	PERF
S1	**0.093**	**28.54**	**S6**	0.098	39.08	**C2**	**0.053**	**32.77**
S6	0.092	42.59	**C1**	0.096	33.20	**C3**	0.045	36.74
S2	0.085	35.05	**S1**	**0.093**	**23.82**	**C5**	0.043	37.31
C1	0.084	37.08	**S2**	0.084	29.53	**C4**	0.042	38.07
S5	0.083	39.63	**S5**	0.083	34.84	**C6**	0.039	38.26

Note: Ind = indicator. Importance is based on unstandardized total effects (IMP); Performance is based on rescaled average latent variable scores (PERF

However, the convenience of multiple functions (C2), financial emergencies (C3), time-saving (C4), personalized applications (C5), and a single platform (C6) were the top concerns for non-interested users, and security was not among them.

Multi-function (C2) earned the lowest performance score (32.77) but the highest importance (0.053). Therefore, the most essential feature for mobile payment platforms to focus on improving performance among indifferent consumers is their multifunctionality.

The results reveal several key factors influencing user acceptance of e-wallets in Bangladesh's transition towards a cashless society (Indrasari, 2022). First, perceived usefulness emerged as a significant determinant, with users valuing e-wallets for convenience in conducting transactions and managing finances (Ricardianto 2023). Second, perceived ease of use played a crucial role, as users favored intuitive and user-friendly e-wallets.

4.4 Contributions in the realm of theory

This study's empirical findings support the assumption that users' intent to use gamified mobile payment systems is favorably influenced by their perceptions of ease and security. Perceived convenience indirectly affects the intention to use through perceived security, while perceived security directly influences the desire to use. There was no substantial correlation between perceived convenience and intention to use. The findings offer a valuable understanding of the correlation between security and convenience and how the acceptance of mobile payments is enhanced by this robust connection. Hence, to encourage the use of a mobile payment platform, platform providers and governments should focus on the dual approach of "ensuring convenience" and "ensuring security." These findings have implications for emerging nations, such as Bangladesh, which have similar growth trajectories (Uddin & Akhi, 2014).

Based on the provided demographic profile, 254 users showed interest in and support for using a mobile payment platform, which is higher than the number of users (132) who were indifferent or disinterested. This study yielded two unique outcomes when we analyzed users' interests separately instead of

utilizing a multigroup analysis. Emphasizing the "reliability" aspect of security is crucial for all users, particularly those interested, as it enhances their inclination to use gamified mobile payment services. To promote the willingness of indifferent users to adopt, it is essential to prioritize the "multifunctional" aspect of ease. The findings provide insights for developing strategies to ensure the usability of multifunctional design to attract apathetic consumers, and security reliability to attract and retain engaged users.

4.5 Practical Consequences

Many government-led technological advancements and initiatives have increased the digital preparedness of Bangladeshi consumers' and businesses.' Through partnerships with commercial telecommunications companies, the Bangladeshi government has actively promoted 4G mobile Internet and high-speed broadband in urban and rural areas. Demand-side and supply side preconditions must be aligned for mobile payment deployment in a dynamic and competitive platform market. A nation's digital infrastructure and marketing design strategies must work together to embrace a gamified mobile payment platform. The business angel ecosystem and other informal co-investing and networking structures enable investors and SMEs in Bangladesh to overcome financial, legal, and political problems (Ravi 2018).

Gamification in our mobile payment software has demonstrated the benefits of mobile payments and blockchain-based cryptocurrencies. This combination is appealing in underdeveloped nations with obstacles to adopting digital technology. Gamification on our platform increased user involvement in Bangladeshi mobile cryptocurrency payment services. Demonstrating the use of gamified mobile payment systems in poor nations. People in these countries are also concerned about decentralized blockchain ecosystems.

"Towards a Cashless Society" Lai and Liew (2021) appears in the Journal of Information Systems in Australia, Volume 25, Issue 17. Gamification and merchant reward schemes can improve app usage. Users can earn loyalty points by collecting e-stamps. These points may be exchanged for monetary tokens to purchase from a gamified mobile payment network. Users may recharge their monetary tokens using mobile payments, internet banking, and online payments such as credit cards, debit cards, and PayPal. 2021 (Lai & Liew, 2021).

BoostUP "shake" incentives, CashUP cashback savings, and QR payment systems let customers earn e-coins or "shake" for cashbacks and rewards. Bangladeshis were satisfied with their cashless experience. The rapid development of 5G technology and inexpensive phones has accelerated the spread of multichannel financial services on a single platform.

Pin, image, OTP, finger, or face recognition can be added to the app architecture to improve security. The mobile payment platform ecosystem has several security standards and protocols for mitigating blockchain and mobile payment vulnerability. They provide blockchain ecosystem authentication, encryption, integrity, and non-repudiation while rapidly spreading across mobile platforms. Bangladesh has local information protection laws such as ISO 27000. Bangladeshi mobile wallet users must undertake eKYC authentication to utilize all functionalities. For authentication, a registered Bangladeshi cellphone number, a selfie photo, and a national identity card or passport were used. Platform service providers and non-banking marketers should incorporate security compliance into the architecture and design of gamified mobile payment platforms. Obinabo (2017) states that this is vital for national security and data protection.

Users' perceptions of the platform's security and design can help dispel the myth that customers will immediately accept any new mobile payment option. Businesses can consider user interests when creating gamified mobile payment platforms to attract the right audience (Ong and Chong, 2023).

5. Conclusion

This study adds to the literature by evaluating how perceived security and simplicity affect consumer willingness to adopt gamified mobile payment platforms. Security has a significant direct positive

influence on use intention, whereas convenience has a solid indirect positive effect. How secure anything affects perceived ease of use and user demand. The empirical model is also used in emerging nations such as Bangladesh, which have seen rapid digital development, yet are subject to the risks and volatility of each technology phase.

The user category-based empirical model analysis yielded two outcomes. Disinterested customers valued the product's convenience and adaptability, whereas interested users and the public valued the dependability of security features. The research revealed that a "security" and "convenience" strategy will enhance the adoption of mobile payment systems in Bangladesh. Thus, enterprises and platform service providers must create a multifunctional, gamified mobile payment platform.

This study has some limitations. The study focused on those who reported using gamified mobile payment systems for at least one year and had Internet or mobile data connectivity. This study's urban sample limits its applicability to Bangladeshi regions.

Cross-sectional statistics can change as users learn and adopt increasingly complex mobile payment solutions. Future studies in Bangladesh should use probabilistic sampling to include individuals without the Internet or mobile devices to obtain a more representative sample. Longitudinal research would be helpful for tracking user impressions over time.

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