*Original Research Article*

# Influencing Factors in Binimoy Acceptance and Use: A SEM Approach


## ABSTRACT

The aim of this study is to examine the factors influencing users' intentions to use Binimoy, an interoperable digital transaction platform that was launched in November 2022. To gather empirical data for the research model, a structured questionnaire was employed, and the UTAUT model was utilized, which focuses on four major variables that impact behavioral intention and use of Binimoy: performance expectancy, effort expectancy, social influence, and facilitating condition. Face-to-face interviews and online surveys both were used to collect data, with a sample size of 250 people surveyed in Sylhet. SmartPLS 4 was employed for the evaluation of Partial Least Squares Structural Equation Modelling (PLS-SEM). The study discovered that all constructs, except for facilitating conditions, demonstrated acceptable levels of internal consistency, reliability, and convergent validity. Five hypotheses were tested, and all were found to be statistically significant. The goodness of fit of the model was evaluated using the SRMR value, which was deemed to be good. This research contributes significantly to the knowledge domain by integrating system-specific and individual-specific models in an interoperable digital transaction platform context. Furthermore, the results of this study would benefit service providers and policymakers by offering comprehensive insights into the behavioral intention and usage behavior of the Binimoy users in Sylhet.



*Keywords: Binimoy, IDTP, MFS, PSP, SEM, UTAUT, Sylhet, Bangladesh.*


## 1. INTRODUCTION

As technology advances and digital transformation becomes more prevalent in modern times, people worldwide are constantly searching for innovative financial intermediaries to simplify daily transactions. Bangladesh, like many other developing nations, has made impressive strides in financial transactions and the IT sector. The use of cell phone-based monetary transactions has greatly expanded the scope of digital financial services (DFS) in the country. DFS operates on the basis of three fundamental components: an online infrastructure capable of facilitating transactions, retail intermediaries, and the use of a device (usually a cell phone) to conduct online transactions (Mujeri & Sifat-E-Azam, 2018). The transfer of financial services via various media has been common for a long time. However, a new horizon has emerged with the assurance of interoperability, enabling instant cashless monetary transfers between multiple applications. This Interoperable Digital Transaction Platform (IDTP) is called "Binimoy" and is considered one of the pioneering initiatives by the government of Bangladesh in their efforts towards digitalizing the nation (UNB, 2022).

The unique Binimoy platform was launched in November 2022 by Sajeeb Wazed Joy, the Prime Minister's ICT Adviser, and has since served as a central point for conducting financial transactions between banks, financial institutions, customers, merchants, mobile financial services (MFS) operators, payment service providers (PSPs), and both government and private institutions. Its standout feature is interoperability, which allows users to access all types of PSPs through Binimoy and conduct financial transactions with any PSP of their choice (UNB, 2022; Dhaka Tribune, 2022). The emergence of the Interoperable Digital Transaction Platform (IDTP) has paved the way for seamless, convenient, cost-effective, and cashless monetary transactions while ensuring the integrity and robust security of each transaction through its mandatory two-factor authentication process (UNB, 2022). In pursuit of the goal of implementing IDTP, Bangladesh Bank has initiated a preliminary project aimed at integrating the Binimoy platform with mobile banking, online payment systems of various banks, Payment Service Providers (PSPs), and Mobile Financial Service (MFS) providers (UNB, 2022). This innovative tool holds immense potential to revolutionize various public and private services, such as salary

payments, tax and VAT payments, utility bill payments, remittance operations, online ticket purchases, transport toll collections, and other e-commerce transactions.

The presence of interoperability in virtual marketplaces offers significant advantages in terms of competitiveness and integrity. This feature allows users to access the corresponding network structure of the authoritative organization while ensuring that the network externalities' proprietary features remain with the actual users of the platform on both sides (Morton, et al., 2021). Moreover, interoperability reduces the entry barriers of digital markets by enabling users to access new network platforms without having to switch to a new social network. This contributes to improving the network outcome at the market phase rather than the firm's limited phase (Kades & Morton, 2020). Ultimately, interoperability enhances the overall efficiency and effectiveness of virtual marketplaces.

The level of success of any information technology or system depends largely on the acceptance by its users. To study user adoption, the Unified Theory of Acceptance and Use of Technology (UTAUT) Model has been widely used (Davis, 1989). The UTAUT Model was created to evaluate technology acceptance and is based on eight behavioral models previously used in IT acceptance, including the Theory of Reasoned Action, Technology Acceptance Model, Theory of Planned Behavior, integrated TAM and TPB, Motivational Model, Personal Computer Utilization Model, Innovation Diffusion Theory, and Social Cognitive Theory (Venkatesh V., Morris, Davis, & Davis, 2003). Its main objective was to address the limitations of each model and integrate their advantages. The UTAUT Model includes four variables (age, gender, experience, and spontaneity of use) and four major constructs: Performance Expectancy (users' belief in the potential benefits of technology usage), Effort Expectancy (the ease of using the technology), Social Factors (users' perception of how others appreciate the technology) and Facilitating Conditions (users' perception of the necessary infrastructure to support the technology) (Venkatesh et al., 2003).

The UTAUT Model has been extensively used to assess the adoption of technology in various study areas, such as mobile health, home telehealth services, interactive whiteboards, ERP software, and near-field communication technology (Slade, Dwivedi, Piercy, & Williams, 2015; Wei, Luh, Huang, & Chang, 2021; Hoque & Sorwar, 2017; Cimperman, Brenˇciˇc, M., & Trkman, 2016; Chauhan & Jaiswal, 2016; Khalilzadeh, Ozturk, & Bilgihan, 2017). It has been helpful in demonstrating the adoption of IT and explaining the actual use of IT systems. Thus, this study uses the UTAUT model as the conceptual basis to evaluate the factors influencing users' intentions to use the Binimoy Interoperable Digital Transaction Platform.

## 2. LITERATURE REVIEW

This section begins with an examination of pertinent theories before looking at recent research on the numerous aspects of determinants of Binimoy Interoperable Digital Transaction Platform Usage. Many studies have been done in this field to examine the factors that affect how users behave when using Interoperable Digital Transaction Platform.

### 2.1 Interoperable Digital Transaction Platform (IDTP)

Despite making significant progress in recent years, there are still economic areas in Bangladesh that have yet to be fully developed, leaving many citizens excluded from the financial system (UNDP, 2021). Mobile Financial Services (MFS) offer an efficient solution to this problem by allowing underprivileged individuals to store, manage and access their finances through a mobile device (BB, 2012). The first MFS service was launched in March, 2011 by Dutch-Bangla Bank Limited, followed by bKash and BRAC Bank Limited in July, 2011 (DBBL, 2011; BRAC, 2011). Other providers have since joined the market, but bKash remains the most popular. With the introduction of an Interoperable Digital Transaction Platform (IDTP), which links mobile financial services and financial institutions via a single application programming interface (API), Bangladesh has entered a new era of financial technology, enabling the transfer of funds between any financial service provider (Massally, Khurshed, & Tellez-Merchan, 2022).

Bangladesh has adopted a new financial technology called Interoperable Digital Transaction Platform (IDTP), which connects mobile financial services and financial institutions through a single Application Programming Interface (API). This innovative system allows for the transfer of funds between all financial service providers, including banks and Mobile Financial Services (MFS). Currently, fourteen organizations, including nine banks, three MFS operators, and one payment service provider, have already utilized the IDTP system, making financial services more accessible and convenient for users. The implementation of IDTP represents a significant advancement for the financial industry in Bangladesh (Islam, 2022).

Interoperability refers to the ability to transfer money between customer accounts at various mobile money platforms and banks. It is crucial for developing economies to promote financial inclusion, reduce transaction costs, and improve transaction volumes (Chiu & Wong, 2022). However, it requires careful supervision as technical, commercial, and operational complexities can arise. All parties involved must follow the same rules to maintain the system's integrity, and interoperability should only be implemented in marketplaces that have achieved a sustainable economic position. In developed economies, it can help organizations manage costs and increase efficiencies through shared infrastructure while benefiting consumers through network effects and lower transaction costs. Governments can also benefit from reduced costs associated with printing and managing money. Nonetheless, the imposition of interoperability too early may impede investment, particularly during the early stages of business creation or channel expansion (Mujeri & Sifat-E-Azam, 2018).

**2.2 Binimoy**

Bangladesh has significant potential to improve its financial services by leveraging digital technology. More than 60% of the population in the country do not have a bank account, and a staggering 90% are unable to obtain bank financing, while only 1% have insurance coverage. However, with the proliferation of mobile phones, there is an opportunity to overcome these obstacles (Khan, 2022). Mobile phone usage has rapidly expanded throughout the developing world, with more individuals owning mobile phones than bank accounts (Porteous, 2006). As per the latest statistics provided by the Bangladesh Bureau of Statistics (2022), the population of the country stands at 169.4 million. Out of the total population, 37.69 percent of people above the age of 14 years have a bank account (The Global Economy, 2023). Moreover, the total number of mobile phone subscribers in Bangladesh has reached 176.94 million as of the end of July 2021 (BTRC, 2021). Consequently, Bangladesh Bank authorized commercial banks to provide financial services through mobile networks to both banked and unbanked individuals. These services, which include mobile banking, transfers, and payments, have gained widespread popularity (Rahman, 2021).

There has been a notable increase in the usage of MFS as more than 180 million account customers send almost Tk 3,000 crore daily through the thirteen MFS companies operating in the country. This trend away from cash-based payment methods, along with the growing adoption of debit and credit cards, demonstrates a shift in the public's payment preferences. However, despite the proliferation of MFS providers, there are still several challenges hindering the widespread use of mobile banking, such as inadequate knowledge and awareness levels, high transaction costs, and technological issues. One significant obstacle to achieving a cashless society is the lack of interoperability among different MFS providers. Interoperability, which enables seamless transactions between various providers, allows users to transfer money between different wallets. The inability to easily switch between providers has limited customers' ability to use different MFS providers based on convenience and cost-effectiveness. By enhancing interoperability, MFSs can become more user-friendly, especially for those who need to use multiple providers for different purposes, thereby increasing the adoption of MFSs in Bangladesh (Hossain, 2022; Rahman, 2021).

Bangladesh's journey towards Digital Bangladesh has taken a significant step forward as the country transitions towards becoming a Smart Bangladesh, as reported by UNDP in 2021. The FinTech industry has made a major breakthrough with the launch of Binimoy, an Interoperable Digital Transaction Platform (IDTP). The period of IDTP began on November 13, 2022, and before that, it has never been so easier to transfer money across different mobile financial services (MFSs), banks, and payment service providers. This development in interoperability will help pave the way towards a more accessible and efficient digital economy in Bangladesh (Khan, 2022).

Binimoy, a Bengali term for exchange, is an Interoperable Digital Transaction Platform (IDTP) that has revolutionized the way money is transferred between banks, mobile financial services (MFSs), non-bank financial institutions (NBFIs), and payment service providers (PSPs). This platform has been established through a joint effort by the Department of Information and Communication Technology and Bangladesh Bank, the central bank of the country. Initially, three MFS providers, bKash, Rocket, and mCash, along with a wallet provider named Tallykhata, participated in this platform. Sonali Bank Limited, a publicly owned bank, along with Islami Bank Bangladesh Limited, Pubali Bank Limited, BRAC Bank Limited, City Bank Limited, Mutual Trust Bank Limited, Eastern Bank Limited, United Commercial Bank PLC, Al-Arafah Islami Bank Limited, Midland Bank Limited and other banks are expected to join the collaboration over time. Developed by Velwire Limited, Microsoft Bangladesh, and Orion Informatics Limited, Binimoy costs BDT 65 crore and is based on India's Unified Payments Interface (UPI). The Innovation and Entrepreneurship Development Academy (IDEA) project of the Information and Communication Technology Department spearheaded the development of this app, which is expected to make the digital economy more accessible and efficient in Bangladesh (The Daily Star, 2022; Hossain, 2022).

Binimoy has several useful features, including strong security controls that allow users to check their account balance using a mobile phone and set up a PIN to prevent unauthorized transactions. It can also transfer money between bank accounts and Binimoy's wallet, making it particularly useful. The cost of transferring money from MFS to MFS has been

set at Tk 5 per Tk 1,000, while the same amount sent to banks will cost Tk 10. Additionally, transferring funds from an MFS provider to a payment service provider account will cost Tk 5. Users must register with Binimoy through their bank, MFS, or other financial institution accounts to access these services (The Daily Star, 2022).

Binimoy is an IDTP developed in Bangladesh that enables secure, user-friendly, and dependable payment transactions between bank accounts, MFSs, non-bank financial institutions (NBFIs), and payment service providers (PSPs). Binimoy is a highly secure payment platform in Bangladesh that allows users to check their account balances and set up PINs to prevent unauthorized transactions through their mobile phones. It also facilitates easy and instantaneous transfers between users' bank accounts and Binimoy's wallet, which is connected to major banks in the country. The platform supports two payment methods, Direct Pay and Request to Pay, that enable various transactions, including mobile recharge, bill payments, and salary disbursements. Users must register through their financial institution accounts to access these services. Binimoy has a three-tiered security system that ensures data protection during transactions. The platform is a significant milestone in Bangladesh's journey towards a cashless future, but it needs improvement to become more efficient and user-friendly for a wider range of users to access (Khan, 2022; Hossain, 2022; The Daily Star, 2022).

### 2.3 UTAUT- Unified Theory of Acceptance and Use of Technology

The Unified Theory of Acceptance and Use of Technology (UTAUT) was developed in 2003 by Venkatesh, Morris, Davis, and Davis. It combines eight acceptance theories, including the Technology Acceptance Model (TAM), to create a more accurate model for predicting technology adoption. TAM, introduced by Davis in 1989, is a widely used model that explains how users' attitudes towards technology influence their intention to use it. This is determined by two factors: perceived usefulness, or the belief that technology will enhance productivity, and perceived ease of use, or the ease with which the technology can be used.

UTAUT is different from other models because it includes external factors that enhance its predictive efficiency by up to 70%. The model is made up of four main factors: performance expectancy, which helps users increase their activity performance; effort expectancy, which refers to the ease of using the technology; social influence, which is the influence of others on the user's decision to use technology; and facilitating conditions, which are tools that support the user in their use of technology (Venkatesh et al., 2003).

UTAUT also takes into account external variables such as gender, age, experience, and voluntariness of use, which can all affect user behavior. The model is shown in Figure 1 and is made up of four main variants and several external variants that all impact the user's decision to adopt technology.

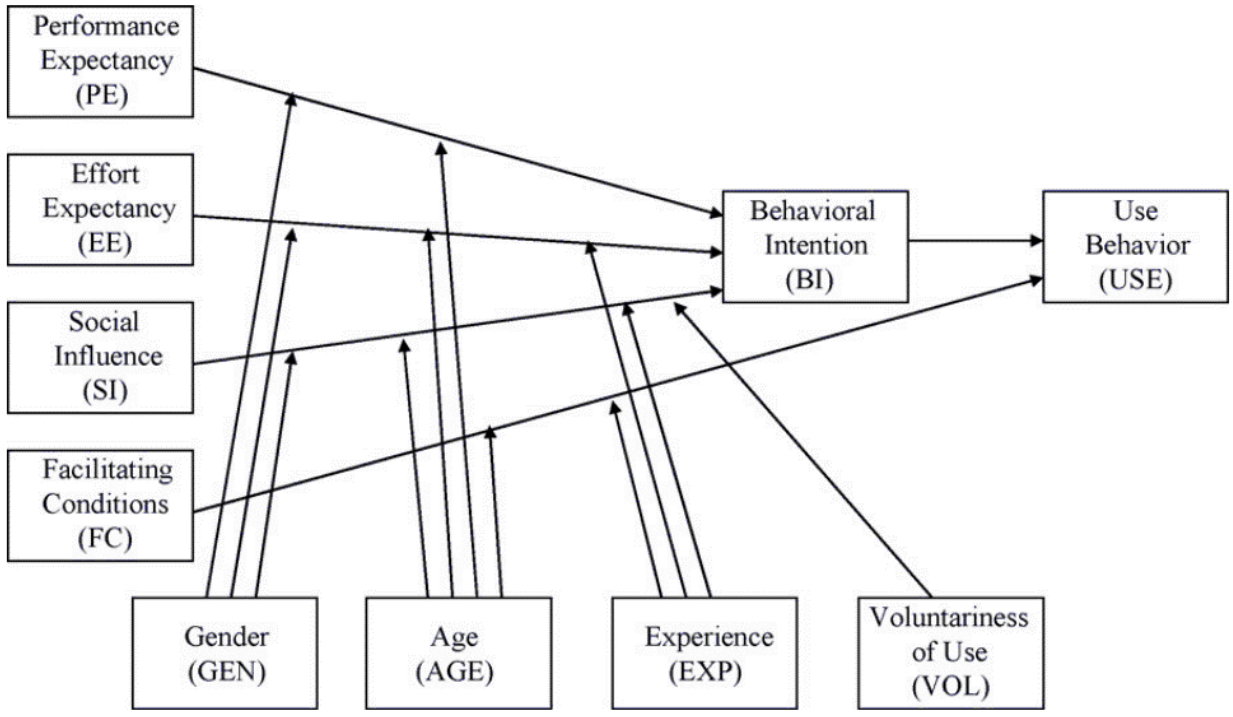


**Figure 1. UTAUT Model (Venkatesh et al., 2003)**

### 2.3.1 Determinant Factors of Use Behavior

**Performance Expectancy (PE)**

Performance Expectancy (PE) refers to an individual's belief that the use of new and advanced technology will enhance their job performance. However, from a customer perspective, PE relates to how a specific technological innovation can benefit consumers when carrying out a particular function. PE is synonymous with Perceived Usefulness (PU) and is a crucial component of the Technological Acceptance Model. Studies have shown a positive correlation between PE and the Behavioral Intention to adopt digital payments, lending support to existing research (Venkatesh et al., 2003; Venkatesh et al., 2012; Slade, Williams, Dwivedi, & Piercy, 2015; Patil, Tamilmani, Rana, & Raghavan, 2020; Oliveira, Thomas, Baptista, & Campos, 2016; Kar, 2021).

**Effort Expectancy (EE)**

The level of ease and convenience that consumers experience when using innovative technology is known as Effort Expectancy (EE). This factor is similar to the "Ease of Use" component in the Innovation Diffusion Theory (IDT) and the "Perceived Ease of Use" factor in the Technological Acceptance Model (TAM). Digital payments require significantly less effort than traditional cash purchases, resulting in reduced wait times at bank facilities (Venkatesh, Thong, & Xu, 2012; Rogers, 1995; Davis, 1989; Sivathanu, 2018). A study has found a significant correlation between EE and BI, indicating that mobile payment providers should prioritize usability and simplicity in their payment applications to encourage user adoption (Patil et al., 2020). Other studies also support the association between Effort Expectancy and Behavioral Intention (Tang, Lai, Law, Liew, & Phua, 2012; Abidin, Rivera, Maarop, & Hassan, 2017; Khalilzadeh, Ozturk, & Bilgihan, 2017; Fitriani, Suzianti, & Chairunnisa, 2017).

**Social Influence (SI)**

Social influence is the perception of an individual regarding the thoughts of significant individuals in their life about the adoption of a new technology. Research has indicated that social impact has a significant effect on the adoption of digital payments, with many studies supporting this finding. The adoption of mobile payments can also be influenced by coworkers, friends, and other social networks (Venkatesh et al., 2012; Venkatesh et al., 2003; Karsen, Chandra, & Juwitasary, 2019). Several studies have combined elements of the Diffusion of Innovations (DOI) theory and the UTAUT model to create an integrated framework that shows a strong positive correlation between social influence and the intention to utilize digital payment systems. Furthermore, the relationship between social influence and behavioral intention has been demonstrated in several studies (Oliveira, Thomas, Baptista, & Campos, 2016; Hunafa, Hidayanto, & Sandhyaduhita, 2017; Junadi & Sfenrianto, 2015; Liébana-Cabanillas, Sánchez-Fernández, & Muñoz-Leiva, 2014).

**Facilitating Conditions (FC)**

Facilitating conditions, which relate to the availability of resources and assistance to carry out a particular behavior, play a crucial role in determining consumer adoption of innovative technology. Studies have shown a positive correlation between facilitating conditions and the intention to use mobile payment systems. The concept of facilitating conditions is similar to the compatibility factor proposed by the Innovation Diffusion Theory, which states that an innovation's adoption depends on how well it aligns with the values, experiences, and needs of potential adopters (Venkatesh et al., 2012; Teoh, Chong, Lin, & Chua, 2013; Moore & Benbasat, 1991; Brown & Venkatesh, 2005). Training and support programs for customers could improve the facilitating conditions and make digital payments more accessible and affordable for users. To encourage customers to adopt digital transaction platforms, mobile payment service providers must prioritize enhancing the facilitating environment (Patil et al., 2020; Madan & Yadav, 2016; Sivathanu, 2018).

**Behavioral Intention (BI)**

Behavioral Intention, defined as the willingness and readiness of users to embrace and utilize mobile information technology, is a crucial factor in determining the success of mobile IT systems and applications (Trakulmaykee & Benrit, 2015). It directly influences users' actual usage behavior and their inclination to recommend the system to others, thereby increasing system adoption and success (Brown & Venkatesh, 2005). Several factors can affect user intention, including Performance expectancy, effort expectancy, and social influence, price value and trust in the system. Performance expectancy refers to the extent to which users believe that a mobile IT system will enhance their performance or help them achieve their objectives (Venkatesh, Morris, & Davis, 2003). Effort expectancy, on the other hand, relates to users'

perception of the system's simplicity and comprehensibility, while social influence refers to the impact of other people's actions and opinions on users' intention (Madan & Yadav, 2016).

### 2.4 Research framework and hypothesis development

The research framework presented in Figure 1 builds upon the UTAUT model literature and proposes the following hypotheses:

$H_1$: Performance expectancy has a positive influence on behavioral intentions to use Binimoy.

$H_2$: Effort expectancy has a positive influence on behavioral intentions to use Binimoy.

$H_3$: Social influence has a positive influence on behavioral intentions to use Binimoy.

$H_4$: Facilitating condition has a positive influence on acceptance and use of Binimoy.

$H_5$: Behavioral intention has a positive influence on acceptance and use of Binimoy.

## 3. METHODOLOGY

This study focuses on users of the Binimoy Interoperable Digital Transaction Platform located in the Northeast part of Bangladesh, specifically in Sylhet. To collect empirical data for the research model, a structured questionnaire was utilized. The questionnaire consisted of three sections: Section A included three screening questions related to the respondents' gender, age, and education. Section B had three questions related to frequency of usage, preferred platform, and device preference. Section C contained a 21-item UTAUT scale adapted from Venkatesh et al. (2003). A seven-point Likert scale ranging from 1 (strongly disagree) to 7 (strongly agree) was used for responses. Prior to questionnaire distribution, a pilot study was conducted in the Sylhet Metropolitan Area to assess the quality of the questions. A total of 60 valid responses were collected and analyzed using partial least squares structural equation modelling (PLS-SEM). The results indicated that no item needed to be omitted from the questionnaire.

The data collection for this study was conducted in Sylhet, which is known as the fastest-growing district in Bangladesh and has a high acceptance rate of the Binimoy Interoperable Digital Transaction Platform. Face-to-face interviews and online surveys both were utilized to collect data through a questionnaire, which was distributed through WhatsApp, Messenger, and email using a Google Form link. A team of graduate students who had undergone training was responsible for data collection. The targeted respondents for this study were actual users of Binimoy, and their user accounts and transaction histories were monitored to ensure their authenticity. The researchers approached and invited these users to participate in the study, obtaining written and verbal consent prior to conducting the survey. Within a two-month period (February and March, 2023), 250 valid responses were gathered and used for further analysis. IBM SPSS Statistics Version 25.0 and SmartPLS 4 were the two software used for data analysis. IBM SPSS Statistics Version 25.0 was mainly used for data screening and descriptive analysis of the respondents' profile and usage behavior, while SmartPLS 4 was used for Partial Least Squares Structural Equation Modelling (PLS-SEM) evaluation.

## 4. RESULTS

This section discusses the results obtained from the study, which are presented in several tables and a figure. Table 1 presents the profile of the respondents, while Table 2 illustrates the usage behavior of the respondents. Descriptive statistics were used to analyze and present the data. Table 3 represents the assessment of the measurement model, and Table 4 shows the assessment of the structural model from SEM analysis. Figure 2 depicts the model that hypothesizes the relationships among the critical variables of the study.

### 4.1 Profile of the respondents

**Table 1. Profile of the respondents**

| Measure | Items | Percentage |
|---|---|---|
| Gender | Male | 81.2 |
| | Female | 18.8 |
| Age | 18-29 | 67.6 |
| | 30-39 | 25.2 |
| | 40-49 | 7.2 |
| Education | High school | 4.0 |
| | Undergraduate student | 23.6 |
| | Bachelor (graduated) | 48.8 |
| | Master's Student | 8.4 |
| | Higher than Master's | 15.2 |

Table 1 provides a summary of demographic information of Binimoy Interoperable Digital Transaction Platform users. The population is divided by gender, age, and educational level. Out of the total respondents, 81.2% are male and 18.8% are female. In terms of age, the majority of the respondents fall within the 18-29 age range (67.6%), followed by the 30-39 age range (25.2%), and the 40-49 age range (7.2%). Regarding educational level, 4.0% of the respondents have completed only high school, 23.6% are currently undergraduate students, 48.8% have completed a Bachelor's degree, 8.4% are Master's students, and 15.2% have attained education higher than the Master's degree.

### 4.2 Usage behavior of the respondents

**Table 2. Usage behavior of the respondents**

| Measure | Items | Percentage |
|---|---|---|
| Usages experience | 1 Month | 30.1 |
| | 2 Month | 67.8 |
| | 3 Month | 2.1 |
| Frequency of usages (in a month) | Less than 5 times | 65.2 |
| | 5 to 10 times | 28.4 |
| | 11 to 15 times | 6.4 |
| Preferred platform | MFS Apps | 57.6 |
| | Banking Apps | 42.4 |
| Device preference | Mobile phones | 82.0 |
| | Desktop computer | 21 |
| | Tablets/iPads | 4.4 |
| | Laptops | 5.2 |

The above table presents data on the usages experience, frequency of usage, preferred platform, and device preference for the Binimoy Interoperable Digital Transaction Platform application users of Sylhet. According to the table, the majority of users (67.8%) have a usage experience of 2 months. A smaller percentage of users (30.1%) have a usage experience of 1 month, while only very small percentage (2.1%) have a usage experience of 3 months. The data shows that 65.2% of the respondents use Binimoy less than 5 times a month, while 28.4% use it between 5 to 10 times, and only 6.4% use it 11 to 15 times in a month. In terms of preferred platform, 57.6% of the respondents use mobile financial services (MFS) apps to access Binimoy, while 42.4% use banking apps. Regarding device preference, 82.0% of the respondents prefer to

use mobile phones for Binimoy transactions, while 21% use desktop computers, 5.2% use laptops, and 4.4% use tablets/iPads.

### 4.3 Measurement model

Partial least squares structural equation modelling (PLS-SEM) was chosen as the method to estimate and test the causal relationships in the study. This choice was based on the suitability of PLS-SEM for complex structural models, as well as its ability to facilitate exploratory studies and predict outcomes (Hair, Ringle and Sarstedt; 2015). The study sought to use PLS-SEM to analyze and explore the relationships between the constructs under investigation, as well as to make predictions based on the variables included in the model. PLS-SEM is a flexible and robust method for structural equation modelling, particularly in cases where the data may not conform to the assumptions of traditional covariance-based methods.

**Table 3. Assessment of the measurement model**

| Construct | Items | Loadings | CR | AVE |
|---|---|---|---|---|
| Performance Expectancy (PE) | PE1 | 0.682 | 0.909 | 0.676 |
| Alpha = 0.838 | PE2 | 0.622 | | |
| | PE3 | 0.784 | | |
| | PE4 | 0.832 | | |
| Effort Expectancy (EE) | EE1 | 0.833 | 0.962 | 0.731 |
| Alpha = 0.867 | EE2 | 0.843 | | |
| | EE3 | 0.870 | | |
| | EE4 | 0.699 | | |
| Social influence (SI) | SI1 | 0.85 | 0.962 | 0.895 |
| Alpha = 0.941 | SI2 | 0.764 | | |
| | SI3 | 0.768 | | |
| Facilitating Conditions (FC) | FC1 | 0.887 | 0.816 | 0.598 |
| Alpha = 0.661 | FC2 | 0.899 | | |
| | FC3 | 0.722 | | |
| Behavioral Intention (BI) | BI1 | 0.946 | 0.740 | 0.489 |
| Alpha = 0.476 | BI2 | 0.956 | | |
| | BI3 | 0.936 | | |
| Use Behavior (USE) | USE1 | 0.749 | 0.849 | 0.585 |
| Alpha = 0.764 | USE2 | 0.737 | | |
| | USE3 | 0.818 | | |
| | USE4 | 0.752 | | |

The above table displays the results of a structural equation modeling (SEM) analysis, which investigates the relationships between latent constructs and their corresponding indicators. The constructs in this model are Performance Expectancy (PE), Effort Expectancy (EE), Social Influence (SI), Facilitating Conditions (FC), Behavioral Intention (BI), and Use Behavior (USE). The items for each construct are listed, along with their corresponding factor loadings, which represent the strength of the relationship between each item and its corresponding construct. The composite reliability (CR) values indicate the internal consistency reliability of each construct, with values above 0.7 indicating acceptable reliability. The average variance extracted (AVE) values represent the amount of variance in the construct that is explained by its indicators, with values above 0.5 indicating acceptable convergent validity. The results show that all constructs have acceptable levels of internal consistency reliability (CR) and convergent validity (AVE), except for Facilitating Conditions (FC), which has a lower AVE value than the recommended threshold of 0.5. This suggests that the indicators for FC may not be as strongly related to the underlying construct as they should be.

### 4.4 Structural model

**Table 4. Assessment of the structural model**

| Hypotheses | Beta Coefficient | Standard deviation | T statistics | $f^2$ | P values | Result |
|---|---|---|---|---|---|---|
| PE -> BI | 0.272 | 0.073 | 3.737 | 0.083 | 0.000 | Significant |

| | | | | | | |
|---|---|---|---|---|---|---|
| EE -> BI | 0.322 | 0.062 | 5.183 | 0.132 | 0.000 | Significant |
| SI -> BI | 0.179 | 0.059 | 3.054 | 0.066 | 0.002 | Significant |
| FC -> USE | 0.29 | 0.075 | 3.855 | 0.042 | 0.000 | Significant |
| BI -> USE | 0.257 | 0.09 | 2.859 | 0.086 | 0.004 | Significant |

Note: ***p < 0.01, **p < 0.05, *p < 0.10.

The above table represents the results of a structural model assessment, which includes the beta coefficient, standard deviation, t-statistics, $f^2$, p-values, and result for each hypothesis in the model. The table includes five hypotheses, and each hypothesis has been tested for its significance in predicting the outcome variable. The five hypotheses are PE -> BI, EE -> BI, SI -> BI, FC -> USE, and BI -> USE. The beta coefficient represents the strength and direction of the relationship between the predictor and outcome variable. The standard deviation measures the variability of the beta coefficient. The t-statistic indicates the level of statistical significance of the relationship between the predictor and outcome variable, with higher t-statistics indicating stronger evidence for the relationship.

The $f^2$ score represents the effect size of the predictor variable on the outcome variable, with values ranging from small (0.02), medium (0.15), and large (0.35). The p-value measures the probability of obtaining a result as extreme as the one observed, assuming that the null hypothesis is true. A p-value less than 0.05 is generally considered statistically significant. The results indicate that all five hypotheses are statistically significant, with p-values less than 0.05. Therefore, the study provides evidence to support the relationships between each predictor variable and outcome variable. The table suggests that the model has good fit and provides support for the theoretical framework.

**Table 5. R-square and R-square adjusted**

| | R-square | R-square adjusted |
|---|---|---|
| BI | 0.34 | 0.332 |
| USE | 0.221 | 0.215 |

This table presents the R-squared and R-squared adjusted values for two latent variables, namely Behavioral Intention (BI) and Use Behavior (USE), as derived from a structural equation model using SmartPLS software. The R-squared represents the proportion of variance in the endogenous latent variable that can be explained by its corresponding exogenous latent variable(s), and the R-squared adjusted provides a more conservative estimate by adjusting for the number of predictors in the model. The BI latent variable has an R-squared of 0.34 and an R-squared adjusted of 0.332, indicating that approximately 34% of the variability in BI is accounted for by the exogenous latent variables in the model, with the adjusted value being slightly lower due to the number of predictors. Similarly, the USE latent variable has an R-squared of 0.221 and an R-squared adjusted of 0.215, suggesting that around 22% of the variability in USE can be explained by the exogenous latent variables in the model, with the adjusted value being lower due to the complexity of the model. These findings provide insight into the goodness of fit of the SEM model and highlight the proportion of variance explained by the exogenous latent variables in the model.

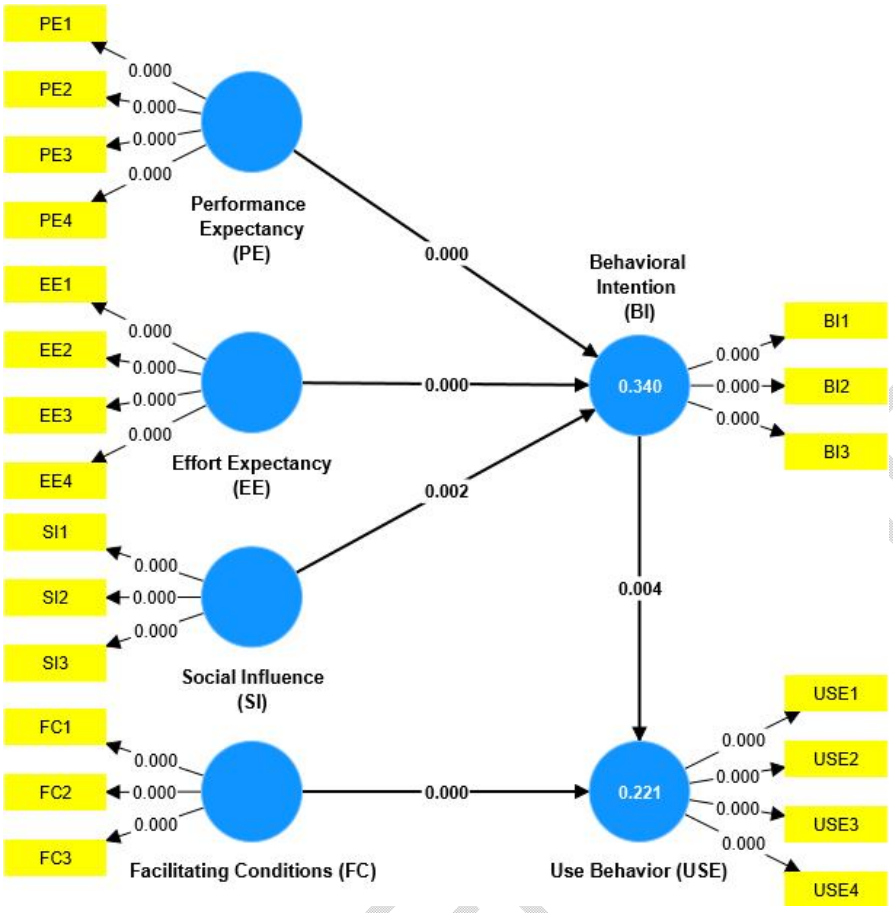


**Figure 2. The model that hypothesizes the relationships among crucial variables**

Figure 2 illustrates the relationship between variables under study and based on the Standardized Root Mean Square Residual (SRMR) value of 0.076, the generated model is deemed to have met the criteria for good fit. Generally, an SRMR value less than 0.10, or 0.08 in a more conservative approach, is regarded as an indication of good fit (Hu and Bentler 1998). The SRMR, introduced by Hair, Henseler, et al. (2014) serves as a goodness of fit measure for PLS-SEM and is helpful in avoiding model misspecification. Additionally, the Bentler and Bonett Index, also known as the Normed Fit Index (NFI), is a statistical tool used to evaluate the goodness of fit of a structural equation model. A score ranging from 0 to 1 is assigned to the NFI, with higher values indicating a better fit between the model and the data. In this case, the NFI score of 0.720 suggests a moderate level of fit between the model and the data.

## 5. CONCLUSION AND IMPLICATIONS

### 5.1 Concluding discussions

The study examines the usage of a financial service application, Binimoy, by gathering data on user demographics and usage patterns. The data was analyzed using structural equation modeling (SEM) to explore the relationships between latent constructs like Performance Expectancy, Effort Expectancy, Social Influence, Facilitating Conditions, Behavioral Intention, and Use Behavior. The study found that all constructs, except Facilitating Conditions, exhibited acceptable levels of internal consistency, reliability and convergent validity. Additionally, five hypotheses were tested using beta coefficients, standard deviations, t-statistics, $f^2$, and p-values, and all were found to be statistically significant. The R-squared and R-squared adjusted values were utilized to determine the proportion of variability in the endogenous latent variables that could be accounted for by the exogenous latent variables in the model. The Standardized Root Mean Square Residual (SRMR) value was also used to evaluate the goodness of fit of the model, which was found to be good.

The Binimoy Interoperable Digital Transaction Platform is a crucial tool in enabling secure and seamless electronic transactions in today's digital economy. To ensure the smooth functioning of Binimoy, it is vital to standardize the IDTP protocols and interfaces. Standardization will help to minimize the complexity and costs associated with developing and maintaining Binimoy. To safeguard against cyber-attacks, data breaches, and other malicious activities, Binimoy should incorporate robust security features. Multi-factor authentication, encryption, and other security mechanisms can be used to protect transactions and data from unauthorized access. In addition to security features, Binimoy should provide intuitive and user-friendly interfaces, including dedicated apps, to promote adoption and usage of the platform. A positive user experience is critical in attracting and retaining users. To ensure legal and regulatory compliance, Binimoy should adhere to relevant regulations and standards. Complying with regulations such as GDPR, PCI-DSS, and ISO 27001 can help build trust and credibility with users and stakeholders.

### 5.2 Implications

The Binimoy Interoperable Digital Transaction Platform presents an essential area of exploration for researchers across different fields. It offers valuable insights into the adoption and usage of digital platforms for financial transactions, which is particularly significant in today's digital age. Researchers can investigate the factors that influence the adoption and usage of such platforms, including user interface design, ease of use, and perceived security, among others. Additionally, the interoperability aspect of the platform raises questions about the technical requirements and standards for integrating different digital payment systems, which researchers can explore to determine the feasibility of interoperability, including the compatibility of payment protocols and systems.

Furthermore, the use of digital transaction platforms can significantly impact financial inclusion, particularly in areas where traditional banking services are limited or non-existent. Therefore, researchers can examine the extent to which interoperable digital transaction platforms promote financial inclusion and their potential to enhance the delivery of financial services to underserved populations.

The study's outcomes provide valuable insights into the personality traits and perceptions of Binimoy users in Sylhet. Policymakers and Binimoy service providers can leverage these insights to gain a better understanding of users' behaviors, needs, and preferences, and focus on improving the platform's usage and enhancing its features to better meet the users' requirements. Thus, the Binimoy Interoperable Digital Transaction Platform presents various areas of exploration and offers significant implications for research across technical, social, and economic aspects.

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