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Determinants of Electronic Payment System Use in the Kathmandu Valley: A Structural Equation Modeling Approach Integrating TAM and TPB

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Abstract

Background: The growing digitalization of financial transactions, driven by rising internet penetration in Nepal, has accelerated the adoption of electronic payment systems. However, understanding the determinants influencing users' behavioral intentions remains critical for sustainable growth.

Purpose: This study aims to examine the key factors shaping customers' perceptions and adoption of e-payment systems in the Kathmandu Valley by integrating the Technology Acceptance Model (TAM) and the Theory of Planned Behavior (TPB) within a unified analytical framework.

Design/methodology/approach: An explanatory research design was employed, collecting data from 433 customers of commercial banks in the Kathmandu Valley through convenience sampling. Both descriptive and inferential analyses were performed, while Structural Equation Modeling (SEM) was utilized to evaluate the relationships among variables derived from TAM and TPB constructs.

Results: The findings reveal that awareness of e-payment systems is high, primarily driven by exposure to social media. Most respondents actively use e-wallets and online gateways for bill payments and mobile transactions. Nevertheless, security concerns remain a major barrier, significantly affecting users' trust and satisfaction. The constructs of perceived usefulness, ease of use, and customer satisfaction emerged as strong predictors of behavioral intention toward e-payment usage.

Conclusion: The study highlights the need to enhance system security, simplify user interfaces, and reinforce trust-building mechanisms. Service providers and policymakers should prioritize security improvements, promote awareness of benefits, and continuously refine digital payment platforms in response to user feedback and technological advancements.

Keywords: Electronic payment, technology acceptance model, theory of planned behavior, structural equation modeling, behavioral intention, Kathmandu Valley

1. Introduction

The rapid advancement of information and communication technology (ICT) has transformed economic systems, business models, and financial transactions worldwide (van Zanden, 2023). ICT serves as the foundation for digital economies, enabling innovation, connectivity, and efficiency across industries. Over the past two decades, ICT-driven tools have reshaped how consumers and firms interact, giving rise to electronic commerce (e-commerce) and, by extension, electronic payment systems (EPS) (Sikder et al., 2025). These systems are essential for conducting online transactions securely and efficiently. The evolution of digital payments represents not merely a technological advancement but also a structural shift in financial behavior, reducing reliance on cash and accelerating the integration of financial markets into the digital economy (Putrevu & Mertzanis, 2024). As emerging economies embrace digitalization, understanding the determinants of EPS adoption has become central to financial policy and regulatory discourse.

Electronic payment systems play a pivotal role in supporting e-commerce and the broader digital economy (Khanin et al., 2022). They facilitate seamless financial transactions, reduce transaction costs, and enhance transparency and traceability within the monetary system. In developed economies such as the United States, the United Kingdom, and France, EPS adoption has reached maturity, supported by robust digital infrastructure and strong regulatory frameworks (Kim et al., 2010). In contrast, developing economies face multiple barriers, including weak ICT infrastructure, low digital literacy, and limited trust in digital systems. According to Khiaonarong (2000), payment systems form the backbone of national financial architecture and are critical to strengthening monetary policy transmission and financial stability. For developing nations, improving electronic payment systems contributes to greater financial inclusion and integration into global financial networks. Thus, the diffusion of EPS is not only a matter of convenience but also a strategic policy tool for economic modernization and governance efficiency.

Despite global progress, traditional payment systems continue to constrain digital financial growth. High transaction costs, security vulnerabilities, and dependence on intermediaries such as banks and card issuers limit the effectiveness of conventional cash and card-based systems. As Abrazhevich (2001) notes, users often perceive these systems as insecure and inconvenient, particularly in online environments where trust and data privacy are critical. Merchants similarly face challenges due to complex payment processing procedures and the risk of fraud. Electronic payment systems emerged as an alternative to overcome these limitations by leveraging encryption technologies, authentication protocols, and real-time transaction processing (Anand & Madhavan, 2000). The integration of these security features enhances user confidence, making EPS a safer and more efficient substitute for conventional payment modes. This transformation highlights the need to examine the behavioral and technological factors that influence users' willingness to adopt and continuously use such systems.

The expansion of e-payment usage depends not only on technological capabilities but also on users' psychological and attitudinal factors. Theoretical frameworks such as the Technology Acceptance Model (TAM) and the Theory of Planned Behavior (TPB) provide critical insights into technology adoption behavior. TAM emphasizes perceived usefulness and ease of use as key predictors of acceptance, while TPB highlights subjective norms, perceived behavioral control, and attitudes toward behavior. Integrating these models allows a comprehensive understanding of both cognitive and social dimensions of EPS adoption. Empirical evidence shows that perceived security, trust, convenience, and regulatory support significantly shape users' behavioral intentions toward digital payment systems (Venkatesh et al., 2003; Kim et al., 2010). Consequently, analyzing EPS adoption through the combined TAM–TPB lens helps bridge the gap between technical feasibility and behavioral acceptance, an area that remains underexplored in developing economies.

In Nepal, the growing emphasis on digital transformation has accelerated the adoption of electronic payment systems, particularly in urban areas such as the Kathmandu Valley. The expansion of mobile banking, internet banking, and digital wallets reflects changing consumer behavior and an evolving financial landscape. The Nepal Rastra Bank (NRB) has introduced several initiatives, including the National Payment System Development Strategy and regulatory guidelines for digital transactions, aimed at enhancing financial inclusion and promoting cashless payments. Despite these advancements, challenges such as inconsistent internet access, low trust in online transactions, and limited awareness about digital security continue to restrict widespread adoption. Cultural and behavioral dimensions, such as perceived risk, social influence, and user attitudes, also play a critical role in determining whether individuals adopt or resist digital payment solutions. Therefore, understanding the interplay of technological, psychological, and institutional factors is crucial for strengthening Nepal's digital payment ecosystem and guiding evidence-based financial policy.

This study seeks to identify and analyze the determinants influencing the use of electronic payment systems among users in Kathmandu Valley by integrating the Technology Acceptance Model (TAM) and the Theory of Planned Behavior (TPB). By employing a structural equation modeling (SEM) approach, the study aims to capture the direct and mediating effects of key variables, including perceived usefulness, ease of use, attitude, trust, and subjective norms, on EPS adoption. The findings are expected to contribute to both academic and policy domains. Academically, the study enriches existing literature by extending established technology adoption theories to the Nepalese financial context. From a policy perspective, it provides evidence to assist regulators, banks, and fintech companies in designing strategies that enhance user confidence, streamline payment systems, and promote digital financial inclusion.

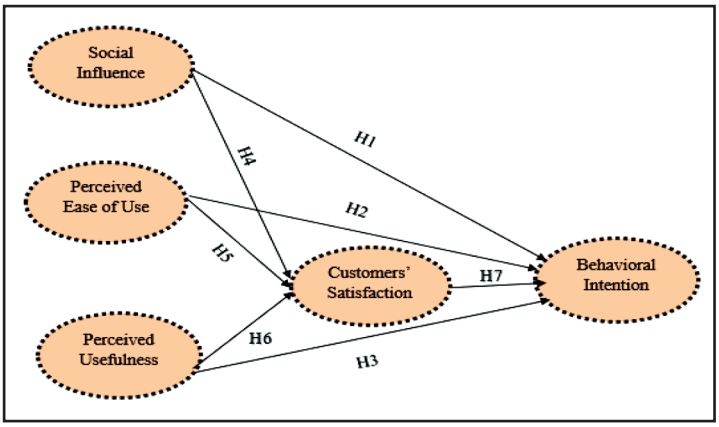
In essence, the increasing convergence of ICT and finance underscores the urgency of developing effective, inclusive, and secure electronic payment ecosystems. The Kathmandu Valley, as Nepal's economic hub, offers an ideal setting to examine these dynamics within a rapidly transforming financial environment. By investigating the determinants of EPS adoption through an integrated TAM–TPB framework, this study contributes to understanding the behavioral underpinnings of digital financial transformation. The outcomes are anticipated to inform both institutional practice and public policy, supporting Nepal's transition toward a robust and inclusive digital economy.

2. Literature Review

Theoretical Framework and Development of Hypotheses

A conceptual framework was developed to illustrate how classical theories inform and guide this research, outlining key variables, their interrelationships, and their relevance to e-payment system adoption (Choudrie et al., 2018). Since e-commerce payment systems vary across countries due to cultural and infrastructural differences, it is essential to identify the factors influencing consumer behavior toward e-payment use (Junadi, 2015). Earlier studies based on the Technology Acceptance Model (TAM) have been criticized for overemphasizing perceived usefulness (PU) and perceived ease of use (PEOU) while neglecting other external influences (Gefen & Keil, 1998; Gefen & Straub, 2000). Empirical findings suggest that user behavior and attitudes are shaped by more complex determinants beyond PU and PEOU (Alsajjan & Dennis, 2010). To address these limitations, this study integrates the Theory of Planned Behavior (TPB), which posits that behavior is determined by behavioral intention, shaped by attitude, subjective norms, and perceived behavioral control (Ajzen, 1991; Lee, 2009). Perceived behavioral control (PBC) reflects individuals' perception of their ability to perform a behavior, while subjective norms (SN) capture social pressures or expectations (Ajzen & Fishbein, 1977; Zolait, 2014). Combining TAM and TPB provides a comprehensive understanding of users' acceptance of e-payment systems. Accordingly, the study's conceptual framework, adapted from Chandio et al. (2017), focuses on three main dimensions: system characteristics, user motivation, and response, offering an integrated approach to analyze users' perceptions and behavioral intentions toward e-payment adoption.

Figure 1: Conceptual Framework



Source: Chandio et al. (2017) and Zhou (2011)

Table 1: Observed Variables

Construct	Variables	Description
Social Influence	Important people's views	Many people who matter to me suggest that I use e-payment.
	Expectation	The e-payment is intended for my use.
	Important	In my opinion, it is essential for everyone to use e-payments in society.
	Opinion	Those whose opinions I respect expect mobile payment to be used.
	Structure and contents	It is easy to understand the website's structure and content.
	Learning to use	It is easy to learn how to use an e-payment.
Perceived Ease of Use	Flexibility	When I make e-payments, I feel flexible
	Various payment channels	E-payment offers various wallet platforms to make online shopping easier.
	Effort	When I make an e-payment, less effort is required.
	Search for the mode of payment	E-payment will enhance my quest for the desired payment method.
	Time minimization	E-payment lowers my payment period to a minimum.
Perceived Usefulness	Better payment	E-payment helps me to make better decisions about payment.
	Level of productivity	Using e-payment services adds to my productivity.
	Effectiveness	Having an e-payment service enhances my ability to make various payments.
Behavioral Intention	Sign-up availability	If it is possible to register for an e-payment service, I will suggest it to my family and friends.
	Experience	If I have good experience with e-payments, I recommend friends and family subscribe to the service.
	Financial Transactions	I'd do some research via electronic payment to connect to my financial account.
	More use	I will try to make more use of e-payments in my daily life.

	Decision	I assume it's a nice and good idea to use e-payment services.
	Transaction processing	I am satisfied with the transaction processing of the online payment system.
	Safety aspects	I'm pleased about the safety aspects of the website for online payments.
Satisfaction	Overall experience	I have had a good overall experience with this platform.
	Ability	I can use the e-payment system.
	Choice	I think I've been using this platform to make the right choice.

3. Research Methods

The study employs an explanatory research design, also referred to as an analytical design, which aims to explore issues that have not been extensively examined (Basnet et al., 2024; Rajbhandari et al., 2022). While it does not provide conclusive evidence, this design helps deepen understanding of the subject through systematic investigation. The research emphasizes flexibility and detailed explanation of key aspects, aligning with the nature of explanatory studies (Sunny & Yajurvedi, 2022). Data collection involved both surveys and interviews, beginning with pilot testing to refine the instruments before conducting the final rounds. The researcher collected the data and analyzed them to draw meaningful conclusions about the study's objectives.

Study Area, Population, and Sampling

The study was conducted in the Kathmandu Valley, the administrative and economic hub of Nepal, located in Province 3 (Lawaju et al., 2023). Geographically, the valley lies between 27°32'13"N and 27°49'10"N, and 85°11'31"E and 85°31'38"E, at an altitude of approximately 1,300 meters. It covers approximately 899 km² and comprises three districts: Kathmandu, Lalitpur, and Bhaktapur. The valley represents Nepal's most urbanized region, characterized by a dense population, rich cultural heritage, and growing technological adoption, making it an appropriate site for studying electronic payment behavior. During the study period, the Nepal Rastra Bank had licensed 27 commercial banks, 19 development banks, and seven finance companies as payment institutions, alongside 23 non-bank service providers. The rapid growth in mobile and online banking—35.46% and 12.41%, respectively, in 2076/77 — reflects the increasing adoption of digital payment systems. Accordingly, the study population comprises individuals who use e-payment services within the Kathmandu Valley, particularly customers of the 27 commercial banks. As the exact population size of e-payment users is unknown, a non-probability convenience sampling method was applied to obtain data from accessible respondents (Maharjan et al., 2022). The required sample size was determined using Singh and Masuku's (2014) formula i.e. $n = \frac{z^2 p\ (1-q)}{e^2}$ At a 95% confidence level ($Z = 1.96$), with $p = 0.5$ and $e = 0.05$, the estimated sample size was 384. Adding a 5% allowance for non-response yielded a final sample of 403 respondents.

Sources and Nature of Data

Both Primary and secondary data are used in the study, whereas primary data have been gathered from customers of a commercial bank in the Kathmandu Valley. A questionnaire was disseminated to collect primary data. For data collection, the researcher approached customers of 27 banks and interviewed 433 customers. Customers are given spare time when researchers ask for permission to collect the information. Once the customer grants permission, the data collection proceeds. Secondary data have been used to review the literature, strengthen research, and inform findings on customers' perceptions of the e-payment system. Data were gathered from various sources, including the National Planning Commission, the Ministry of Finance, the Nepal Rastra Bank, and the Financial Institution Act. Purposive sampling Method has been used in this research.

Research and Data Analysis Techniques

The study employed a structured questionnaire and interviews as the primary data collection tools (Lawaju et al., 2024). The questionnaire was designed to address the research objectives and distributed among e-payment users in the Kathmandu Valley. It consisted of multiple-choice, analytical, and five-point Likert scale questions, with some open-ended items for qualitative insights. A pretest was conducted on 50 respondents to ensure clarity and reliability before the final survey. Data were gathered through direct interviews to enhance accuracy and completeness. For analysis, both descriptive and inferential statistical techniques were used, including Structural Equation Modeling (SEM) to examine latent variables and relationships among factors influencing e-payment perceptions. Data entry and analysis were conducted using Microsoft Excel, SPSS 25, and AMOS 26, focusing on understanding customer status, identifying determinants of perception, and exploring challenges and managerial solutions for effective e-payment implementation.

4. Results

E-payment Users' Personal Characteristics

The demographic profile of the 433 surveyed e-payment users highlights a balanced gender distribution, with 239 males and 194 females, reflecting gender inclusivity in e-payment usage within the Kathmandu Valley. Most respondents (231) were aged 21–30, followed by 102 aged 31–40, indicating that young adults are the primary adopters of digital payments. Educational attainment was high, with the majority holding a bachelor's degree, suggesting that awareness and use of e-payment systems increase with education. In terms of occupation, students formed the largest group (119), followed by employees from the private and government sectors, business owners, and a few industrial workers. Overall, e-payment adoption appears to be strongest among educated, young, and digitally literate users, indicating a need for initiatives that enhance awareness among older and less tech-savvy populations.

User's Status on Electronic Payment System

The study revealed that awareness of e-payment systems in Nepal is relatively high, with 95% of respondents (411 out of 433) reporting familiarity with the concept. In comparison, only 5% remained unaware, indicating the need for further outreach. Social media emerged as the primary medium for spreading awareness, cited by 260 respondents, whereas other channels accounted for only 91. In terms of actual usage, 368 respondents reported experience using e-payment gateways, indicating a strong adoption rate compared to earlier studies, where a majority lacked such experience (Lee, 2009). Among the available gateways, e-wallets were the most frequently used, followed by debit cards, credit cards, e-cheques, and other digital payment modes.

Regarding transaction purposes, most respondents used e-payment for bill payments, followed by mobile recharges, cash withdrawals, online purchases, and periodic payments. Frequency analysis indicated that 25% of users used e-payment occasionally, 24% at other irregular intervals, while only 4% engaged in daily transactions. Overall, the findings highlight a broad level of awareness and growing utilization of e-payment systems in Nepal, though intensity and frequency of use vary among users.

Challenges of Electronic Payment Systems and Managerial Solutions

There are numerous challenges on the path to developing the e-payment system era in our country, Nepal. Regarding the challenges of the electronic payment system, the researcher asked open-ended questions with multiple possible responses. Among various challenges, eight challenges were identified from the respondents to gauge their views regarding these challenges associated with various aspects of the e-payment system. The highest number of respondents have shared their opinions on the challenges related to security issues. A total of 225 respondents have stated that security issues are one of the

major challenges in the development of e-payments in Nepal. Likewise, low internet penetration, an inappropriate legal framework, a low literacy rate, traditional payment methods, and other mentioned challenges are considered the main hurdles to the e-payment system simultaneously. Hence, low internet penetration, with 203 respondents, indicates that this challenge reflects another most impactful force for the development of the e-payment system.

In the part of the managerial solution that involved the open-ended question, various responses were gathered. Some of the respondents suggested that the e-payment was manageable, while others thought that it was not. However, the majority believe that the e-payment system was manageable. 30% of the respondents mentioned that the security must be strong so that the e-payment could be trustworthy. The second most strategic implication suggested was that the government's role is as a facilitator and regulator. To restructure the nation's payment system and establish a trading platform to mitigate financial and structural risks, and encourage efficiency, the NRB and the government should take appropriate measures. Other primary management techniques were digital literacy. All Nepalese people must clarify the nature of the digital payment system. Obviously, it is necessary to have sufficient internet facilities to operate e-payment transactions, ensuring a reliable and successful digital payment process. It was also proposed that it was important to upgrade the e-payment service provider to the new technology. They should be capable of supplying their clients with the latest technical equipment.

Inferential Analysis

Exploratory Factor Analysis

In this exploratory factor analysis, we analyze various results produced through the use of SPSS software, including KMO and Bartlett's Test, Communalities, Total Variance Explained, and the Rotated Component Matrix (Dhakal et al., 2023; Ponnam et al., 2014). Kaiser-Meyer-Olkin (KMO) sample consistency assessment and Bartlett's sphericity test are the methods used to assess if they are ideal for factor evaluation (Bailey et al., 2017). The results of the KMO and Bartlett's Test for this study are then presented in Table 2. The dataset also shows an acceptable KMO and Bartlett's value of 0.861, with a significant p-value of 0.000, which is the baseline for proceeding with factor analysis. Generally, anything above 0.5 is acceptable, although a value above 0.6 is preferred. In this case, the result shows that a statistically significant value for Bartlett's Test of Sphericity is obtained, with a value below 0.05. In comparison to previous studies, where the findings indicated that the Kaiser-Meyer-Olkin (KMO) sampling efficacy calculation (KMO = 0.886) and the Bartlett's sphericity test ($p < 0.001$) suggested that the study's factor analysis was sufficient (Agarwal et al., 2009), this study also met this criterion.

Table 2: KMO and Bartlett's Test

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.861
Bartlett's Test of Sphericity	- Approx. Chi Square	3373.542
	df	253
	Sig.	.000

Communities help determine the cut-off point of their own meaning, depending on the requirements to be met (Ponnam et al., 2014). In previous studies on the internet banking acceptance model, the findings for KSA showed an average population of 0.63, compared to 0.65 for the United Kingdom, indicating retention variables with own values greater than 1 (Kaiser Criterion) (Alsajjan & Dennis, 2010). According to Table 3, this study also met the Kaiser criterion.

Table 3: Communalities

	Initial	Extraction
SCI1	1.000	.729
SCI2	1.000	.736
SCI3	1.000	.551
SCI4	1.000	.656
PEU1	1.000	.524
PEU2	1.000	.683
PEU3	1.000	.606
PEU4	1.000	.678
PEU5	1.000	.548
PU1	1.000	.522
PU2	1.000	.536
PU3	1.000	.544
PU4	1.000	.640
PU5	1.000	.659
BI1	1.000	.643
BI2	1.000	.674
BI3	1.000	.581
BI4	1.000	.596
BI5	1.000	.572
SAT2	1.000	.601
SAT3	1.000	.610
SAT4	1.000	.688
SAT5	1.000	.612

Extraction Method: Principal Component Analysis.

In this communalities table, for the initial case, all values are 1, and there are some different values here for extraction. The extraction values indicate the proportion of variance for each variable that the factors can explain. In this case, the extraction values are very high, indicating good extraction. In the communalities table, the values should be greater than 0.5, which is met by the selected variables. Moving down to the next table, the Total Variance Explained table is shown in Table 3. To calculate the number of important variables, the Total Variance Explained table is employed. It is necessary to remember that for analysis, only extracted and rotated values are relevant (Ponnam et al., 2014).

Table 4: Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	6.937	30.162	30.162	6.937	30.162	30.162	3.225	14.023	14.023
2	2.105	9.153	39.315	2.105	9.153	39.315	2.855	12.415	26.438
3	1.824	7.932	47.247	1.824	7.932	47.247	2.824	12.278	38.716
4	1.745	7.587	54.835	1.745	7.587	54.835	2.649	11.516	50.233
5	1.574	6.844	61.678	1.574	6.844	61.678	2.632	11.446	61.678

In this total variance explained table, SPSS version 24 has extracted five factors or components, and the cumulative percentage is 61.678%. So, these five factors explained 62% of the variance. Related constructs were measured using both adopted and non-adopted scales. Thus, factor analysis was used to verify whether scales measure the related constructs or not. Then, the next table generated is the rotated component matrix presented in Table 4

Table 5: Rotated Component Matrix

Code	Items	1	2	3	4	5
BI1	I would recommend signing up for the e-payment service to my family and friends if it is available.	.724				
BI2	I would suggest that friends and family subscribe to the service if I have a good experience with e-payment.	.759				
BI3	I would set up an electronic payment method to connect with my financial account.	.738				
BI4	Throughout my daily life, I would try to make more use of e-payments.	.715				
BI5	I think using e-payment services is pleasant and a good idea.	.688				
PU1	E-payment has improved my search for a mode of payment that I desired.		.665			
PU2	E-payment minimizes the time I usually spend on payment.		.638			
PU3	E-payment helps me make better payment decisions.		.715			
PU4	The use of e-payment services helps increase my productivity.		.745			
PU5	Using an e-payment service enhances my ability to make various payments.		.755			
PEU1	The structure and content of the website are easy to understand.			.647		
PEU2	Learning to use an e-payment is easy.			.757		
PEU3	I feel flexible in performing e-payment.			.730		
PEU4	E-payment provides various payment channels that ease my online shopping process.			.771		
PEU5	Less effort is needed when I perform e-payment.			.610		
SAT2	I know that I have made the right decision in using this website.				.717	
SAT3	On the online payment platform, I am pleased with the safety aspects.				.735	
SAT 4	I have had a good overall experience with this platform.				.788	
SAT5	I'm able to use the e-payment system.				.736	
SCI1	Most people who are important to me think that I should use e-payment.					.819

SCI2	It is expected of me that I should use e-payment.	.800
SCI3	I believe it is essential that everyone in society should utilize e-payment.	.675
SCI4	People whose opinions I value prefer that I use mobile payment.	.780

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
a. Rotation converged in 6 iterations.

In the rotated component matrix table 5 it have been presented that the first four variables which are: SCI1, SCI2, SCI3 and SCI4 are correlated with cluster 5; likewise the values of variables PEU1, PEU2, PEU3, PEU4 and PEU5 are correlated with cluster 3, the values of variables PU1, PU2, PU3, PU4 and PU5 are correlated with cluster 2, the values of variables BI1, BI2, BI3, BI4 and BI5 are correlated with cluster 1. Then, the SAT1, SAT2, SAT4, and SAT5 correlate with cluster 4. Likewise, in another similar study conducted by RI (2017) with the topic "Factors adoption of e-payment among private university students in Kalang Valley," the table indicates that the rotated component matrix divides all twenty-three elements into five variables.

Linearity

Structural equation modeling is a component of factor and regression analysis. Therefore, linearity, which is a crucial assumption in regression analysis, also applies to structural equation modeling. In the structural equation model, it is assumed that there are linear relationships between latent variables and also between observed and latent variables. Figure 2 shows the plot of standardized residuals against standardized predicted values. This pattern is indicative of a situation in which the assumptions of linearity and homoscedasticity have been met.

Figure 2: Scatterplot

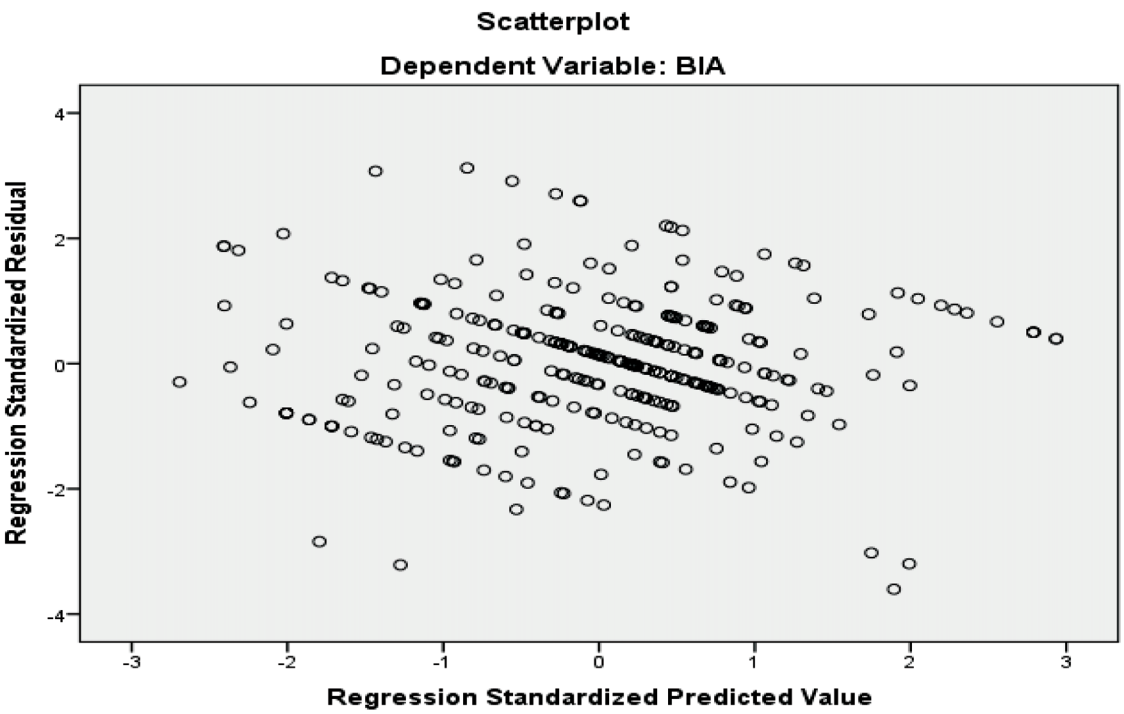
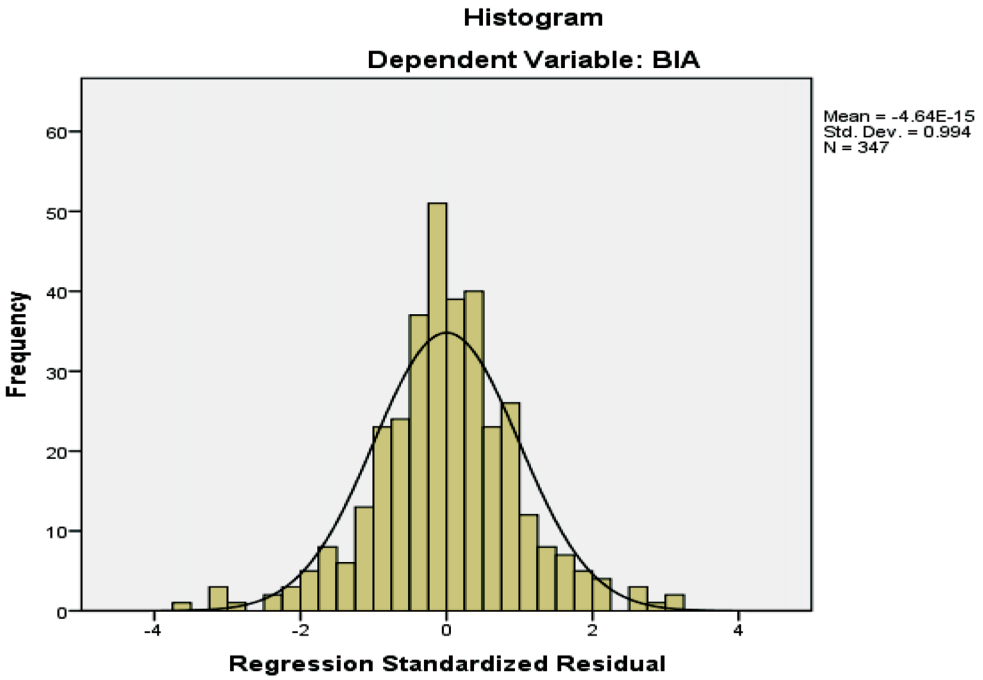
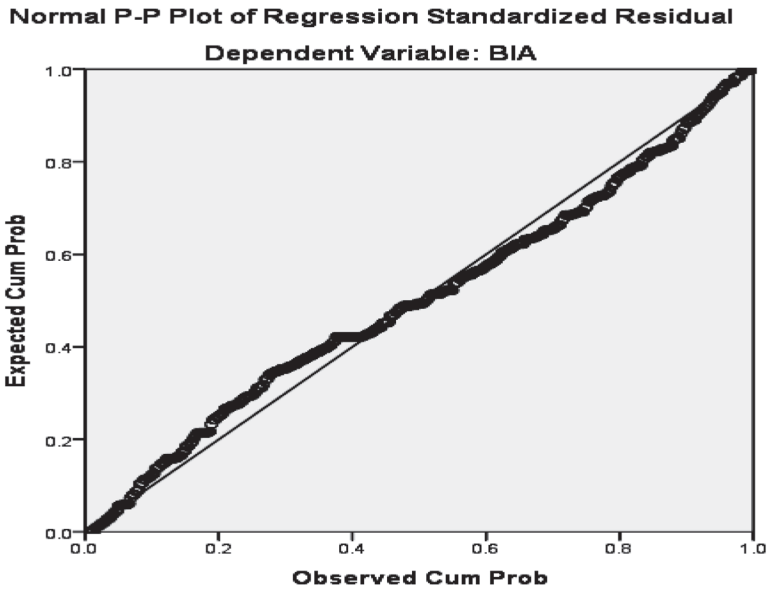


Figure 3: Histogram



To test the normality of residuals, one must examine the histogram and normal probability plot of the data. From Figure 3, the histogram should resemble a normal distribution (bell–shaped curve). SPSS draws a curve on the histogram to show the shape of the distribution. In Figure 3, the distribution is roughly normal. The normal probability plot also shows deviation from normality. The straight line in this plot represents a normal distribution, and the points represent the observed residuals. Therefore, in a perfectly normally distributed data set, all points will lie on the line.

Figure 4: Normal P-P Plot of Regression Standardized Residual



Multicollinearity is a case of multiple regression where predictor variables are highly correlated with each other (Paul, 2006). A multicollinearity test has been performed in this study to check for similarity between the variables. The result derived is presented in Table 6. According to Williams and Lubis (2021), if the VIF score is less than 10 and the tolerance is greater than 0.1, the model is considered free from multicollinearity. According to the results generated, the VIF is 1.207, indicating that the data set used for this analysis is free from multicollinearity.

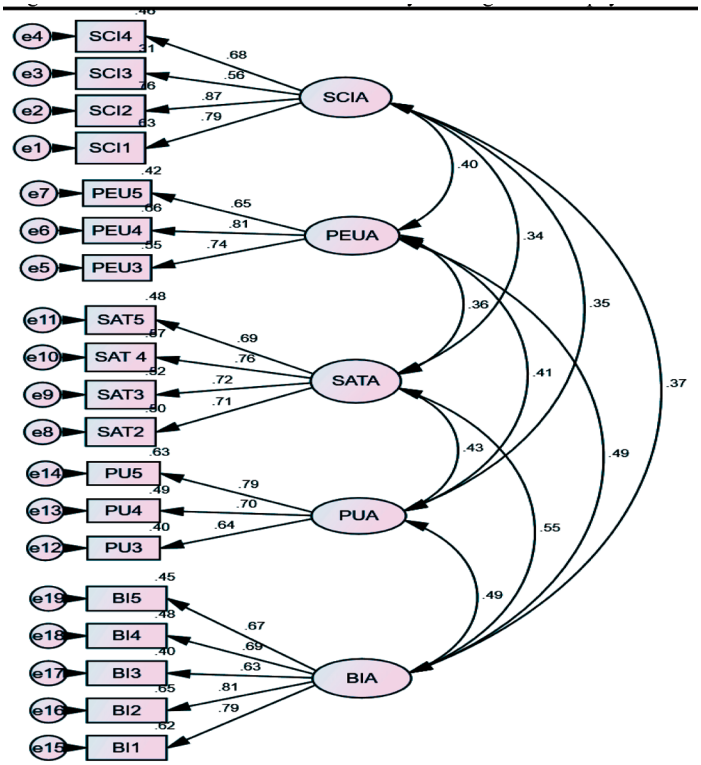
Table 6: Multicollinearity Test

Variables	Tolerance	VIF
SCIA	.840	1.191
SATA	.831	1.206
PUA	.812	1.232
PEUA	.835	1.201
Mean VIF		1.207

Confirmatory Analysis (CFA)

Confirmatory factor analysis (CFA) measures whether responses are affected in a projected manner by a given range of constructs (Pett et al., 2011). Confirmatory factor analysis is based on the information obtained from a respondent survey (n = 347) regarding the attitude of consumers towards the e-payment system. Therefore, for the study of perception, five variables are prepared. Using the Amos program, confirmatory factor analyses are calculated, and interpretation is based on the findings obtained from Amos. Additionally, specific variables/error variables are modified to have similar underlying structures in models.

Figure 5: Measurement Model Factor Analysis Diagram for e-payment



In Figure 5, we can see that there are 5 latent variables, and for each latent variable, the corresponding observed variables are also present. By examining the model fit of each observed variable, the final observed variables are allocated to each latent variable. Through analyzing their respective observed variables, the impact of the findings on the latent variables has been examined.

Measurement Model

The measurement model quantifies the relationships between hypothetical frameworks that could be known but not measurable elements and observed variables, which, in the form of a linear mixture, represent a particular imaginary construct (Lam & Maguire, 2012). In terms of reliability and convergent validity, the measurement model is usually examined (Akhlaq & Ahmed, 2013). For convergent validity, there are three criteria, i.e.1) AVE>0.5, 2) CR >0.7, and 3) CR>AVE. Then, for discriminant validity, there are two criteria: 1) AVE > ASV & MSV, and 2) The validity result for this study is then presented in Table 7.

Table 7: Validity Test

	CR	AVE	MSV	MaxR(H)	PEUA	SCIA	SATA	PUA	BIA
PEUA	0.781	0.545	0.245	0.797	**0.738**				
SCIA	0.820	0.539	0.159	0.859	0.399	**0.734**			
SATA	0.813	0.520	0.303	0.814	0.356	0.342	**0.721**		
PUA	0.752	0.505	0.244	0.767	0.411	0.347	0.428	**0.711**	
BIA	0.843	0.521	0.303	0.856	0.495	0.370	0.550	0.494	**0.722**

From Table 7, all constructs have AVE> 0.5, CR> 0.7, and CR>AVE. It fulfills the criteria for convergent validity as AVE>MSV, and . It then also fulfills the criteria for discriminant validity. It can be inferred that the square root of average variance extracted is greater than inter-construct correlations, supporting the discriminant validity for the variables (Gaskin, 2012; Hair Jr et.al., 2010)

Table 8: Reliability and Validity Test of the Model

Constructs	Indicator	Factor Loading	Composite Reliability (CR)	Average Variance Extracted(AVE)
Perceived ease to use (PEUA)	PEU3	0.730	0.781	0.545
	PEU4	0.771		
	PEU5	0.610		
Perceived usefulness (PUA)	PU3	0.715	0.752	0.505
	PU4	0.745		
	PU5	0.755		
Social Influence (SCIA)	SCI1	0.819	0.820	0.539
	SCI2	0.800		
	SCI3	0.675		
	SCI4	0.780		
Satisfaction (SATA)	SAT2	0.717	0.813	0.520
	SAT3	0.735		
	SAT4	0.788		
	SAT5	0.736		
Behavioral Intention (BIA)	BI1	0.724	0.843	0.521
	BI2	0.759		
	BI3	0.738		
	BI4	0.715		
	BI5	0.688		

Model Fit

In CFA, several statistical indicators are used to evaluate how well the model represents the data. In this study, all model fit indices for the SEM analysis fall within the acceptable threshold values.

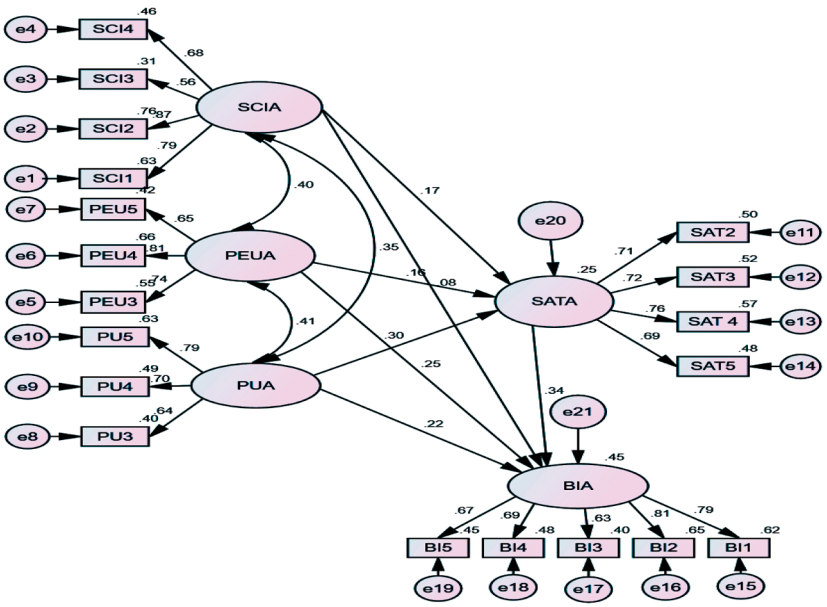
Table 9: Model Fit Indices of the Measurement Model

Index	Measurement Model Value	Acceptable Value
X2	325.304	
X2/df (CMIN/DF)	2.291	<3
P-Value	.000	≤ 0.05
GFI	0.909	≥0.90
RMR	0.024	<0.08
NFI	.881	
IFI	0.929	≥0.90
TLI	.914	Close to 1
CFI	0.929	≥90
RMSEA	0.061	≤ .08

Structural Equation Modelling (SEM)

Bootstrapping is a technique that involves drawing repeated samples from the parent sample for statistical inference, particularly when the data lack normality, and the population is unknown, for hypothesis testing. This technique was introduced by Bradley Efron in 1979 (Ferrsz, 2020). Bollen-steine P values also indicate whether bootstrapped samples have fit the model or not. Bootstrapping prediction provides a range of confidence intervals to find a significance value. Bootstrap P values are more predictive for small models with fewer than 10 variables and large sample sizes (Michael, 2014). There is no multicollinearity between the independent variables, as the correlations between independent variables are above 0.5, and the covariances between each independent variable are also below 0.5. The data lacks multivariate and univariate normality, so bootstrapping with 1000 samples has been performed to obtain nearly accurate significant values. Bollen-Stiene (P value =0.001), where the null hypothesis is that the model is correct. Since there is no evidence to reject the null hypothesis, it is accepted. The model indicates that it is correct to predict the dependent and independent relationship, with an R-squared value of 45%.

Figure 6: Model (SEM)



Hypothesis Testing Results

Table 10 illustrates that all seven hypotheses of this study were significantly supported, as the significance level (P-value) of all hypotheses is less than 0.05. Therefore, all the null hypotheses were rejected, and the alternative hypotheses are accepted. Perceived ease of use and perceived usefulness have a significant impact on the behavioral intention to use the e-payment system, which is consistent with the previous findings by C. Lin & Nguyen(2011) where on both the Taiwanese and Vietnamese data, it was found that e-payment use was affected by perceived ease of use and usefulness, perceived risk, and information. Further, H04 and H09 are also rejected, which reflects that social influence has a significant impact on the consumers' satisfaction level of e-payment users, contradicting the previous finding of Margaret (2000).

Table 10: Hypothesis Testing Results

Hypothesis	Significant/Insignificant	Conclusion
H1: SCIA ⟶ BIA	Insignificant	Hypothesis not accepted
H2: PEU ⟶ BIA	Significant	Hypothesis Accepted
H3: PU ⟶ BIA	Significant	Hypothesis Accepted
H4: SCIA ⟶ SATA	Significant	Hypothesis Accepted
H5:PEUA ⟶ SATA	Significant	Hypothesis Accepted
H6: PU ⟶ SATA	Significant	Hypothesis Accepted
H7: SATA ⟶ BIA	Significant	Hypothesis Accepted

In addition, as H4, H5, and H6 are accepted, it states that perceived usefulness, perceived ease of use, and social influence have a significant impact on satisfaction, and moreover, as H2, H3, and H7 are also accepted. It states that satisfaction also has a significant impact on behavioral intention. However, H1 is not accepted, as it states that social influence has no significant impact on behavioral intention. This finding is consistent with previous research (Zhou, 2011).

5. Discussion

This study tested the proposed model of analysis on an analytical basis. The reliability test and multiple linear correlation are used to establish and test all theories concerning the relationship between the variables. Overall, the findings have supported many of the relationships formed. The essential impact of perceived utility, ease of use, and social influence on behavioral intentions to use the e-payment system is examined.

This study finds that 95% of total respondents are familiar with the e-payment system, with awareness levels continuing to improve, reflecting a positive trend in the awareness of the e-payment system in Nepal. Nustini & Fadhillah (2020) further stated that the faith of other individuals, such as friends, authorities, and groups, would have a positive impact on social factors, influencing a person to use IT. Agarwal et al. (2009) contend that satisfied customers with e-banking sites' security and trust have the biggest effect on the total satisfaction of e-banking clients and customer satisfaction, including ease of access and usability. This study confirms the findings of Agarwal et al.(2009). It means that perceived ease of use, usefulness, and social influence have a significant impact on the customers' satisfaction level, implying that if e-payment is properly credible and easy to use, then it can lead to a higher satisfaction level among customers. The component associated with the behavioral intent to pay electronically also resulted in perceived ease of use in the e-payment system in this study, and the finding is highly significant. The results support previous research Ming-Yen Teoh et al., 2013), where user-friendly payment was found to have an essential link with consumers' e-payment perception, a study conducted in Malaysia.

In addition, trust, confidentiality, security, and convertibility are elements that determine e-payment acceptance in Indonesia, as per a study (Hidayanto et al., 2015). Indonesian customers are now more

concerned about the advantages they obtain and consider the risks associated with using technology. The features of an online banking system, such as utility, ease of use, perceived behavioral control, and subjective norm, influence judgment, attitude, and acceptance, as observed in the Lin et al. (2015) research undertaken in Vietnam. Supporting the results of previous research, the features of the e-payment system dominate the behavioral intention or judgment of users regarding the e-payment system, including the effect of social influence. Several theories, such as the theory of Planned Behavior (TPB), Diffusion of Innovation theory, Theory of Reasoned Action, Social cognitive theory, and Innovative Resistance theory, are widely used in explaining the customers' perception towards electronic payment system, and this study has anchored the TPB theory for providing an organized view of phenomena in the form of relationship between variables. Similarly, the conceptual framework was created by combining TAM and TRA, two commonly utilized methods for determining user acceptance of technology. Furthermore, the TAM-TRA conceptual model integration is a dependable instrument that is empirically sound, as it is highly credible in explaining behavioral intentions to use technology. Likewise, the selected theory and conceptual model provided a comprehensive explanation of the acceptance and behavior intention to use technology in relation to Nepal, where there is a lack of adequate awareness about the benefits of utilizing an e-payment system in their everyday activities.

In addition, as research conducted on Vietnamese and Taiwanese clients (Lin & Nguyen, 2011) suggests, perceived ease of use and usefulness also have a substantial effect on their intention to use, consistent with the initial TAM model and other tests, as well as on their actual use. Therefore, after considering the product characteristics and the use of new technologies, especially the e-payment system, it was favored. This report also notes that the e-payment method with greater accessibility is increasingly being adopted by consumers, as evidenced by those results. Furthermore, subjective norms or social influence implicitly impact e-behavior through other influential views, which are also confirmed by related observations made by Alsajjan & Dennis (2010).

6. Conclusion

This study offered valuable insights into customer perceptions of electronic payment systems (EPS) within the context of Nepal, where the adoption of digital transactions is gradually increasing. Using data from 403 respondents, analyzed through descriptive and inferential methods such as Structural Equation Modeling (SEM), the study identified key determinants influencing users' attitudes toward e-payments. Factors such as perceived usefulness, perceived ease of use, behavioral intention, trust, and security concerns shape customers' perceptions and adoption behavior. Although most hypotheses were statistically supported, social influence has an insignificant impact on behavioral intention. Overall, the findings confirm that improving security, usability, and perceived benefits is critical to fostering greater acceptance of e-payment systems in Nepal.

The results further indicate that Nepal's digital payment ecosystem is still in its early phase, with adoption hindered by low user confidence and limited trust. While internet and smartphone penetration, fintech growth, and government support are gradually promoting a shift toward a cashless economy, many users remain hesitant to transition fully to digital platforms. The study emphasizes the importance of enhancing accessibility, reliability, and public trust in EPS to promote broader adoption. Policymakers and financial institutions must therefore focus on enhancing infrastructure, consumer awareness, and data protection measures to bolster confidence in electronic transactions and foster sustainable digital inclusion.

From a theoretical perspective, this research contributes to the literature by integrating the Technology Acceptance Model (TAM) and Theory of Reasoned Action (TRA) within a Nepalese context, helping to bridge existing gaps in understanding e-payment adoption in developing economies. The validated framework can serve as a reference for future comparative studies across similar contexts in Asia and other emerging markets. Practically, the findings emphasize the need for service providers, banks, and fintech firms to enhance the usability and security of e-payments while aligning services with user expectations.

Developing competitive, user-centered, and cost-effective payment solutions, accompanied by effective awareness campaigns, will be key to increasing acceptance and trust.

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