

Impact of COVID-19 Pandemic on Mobile Payment in Nepal: A Case Study of Kathmandu Valley

Prashant Paudel¹, Dr. Sandeep Kautish²

¹PG Scholar, Lord Buddha Education Foundation, Kathmandu, Nepal

²Director (Academics), Lord Buddha Education Foundation, Kathmandu, Nepal

Abstract

Technology has become an integral part of our lives, and mobile payment services are an excellent example of how technological advancements have transformed the way we carry out financial transactions. To ensure that these services are reliable and effective, service providers need to engage contributors and receive support from the government. To encourage more people to use these services, the government can lift the forced limits on digital wallets. By adopting mobile payment services, we can establish a digital Nepal, where transactions are processed electronically with ease. Moreover, the creation of a global payment gateway that collaborates with financial institutions would enhance the efficiency of transactions. Although implementing a common payment gateway would be challenging in developing countries like Nepal, the benefits would be enormous.

Keywords: *Mobile Payment, Mobile Ease of Use, Mobile Usefulness, Technological Advancements.*

1. Introduction

According to Dahlberg et al. (2015), payment can be defined as the exchange of cash or equivalent items for goods or services. Cash-based transactions have been the most used method of payment throughout history. However, financial institutions have introduced alternative payment methods such as debit and credit cards and checks, making transactions safer and more convenient (Dahlberg et al., 2015). These innovations have also enabled intra-banking and inter-banking transactions, providing customers with more options, and reducing the need to carry cash while traveling.

Technology has brought significant changes in the field of finance, including the development of mobile payments, which is considered a blessing in the industry (Jakhiya et al., 2020). These advancements have led to multiple payment options for customers, with efficiency and ease of use being the key factors for adoption (Ketema, 2020). The evolution of payment options has gone through several phases, from cash-based transactions to paper-based checks, debit, and credit cards, and now to mobile payments and digital wallets (Donald Menezes & Pinto, 2017). The adoption rate of mobile payments is high globally, with companies like Apple, Google, PayPal, and Samsung leading the way (World Bank, 2020). In Nepal, digital wallets and mobile payments are facilitated mainly by QR technology, with over 3 million users enjoying the facilities offered by eSewa (Khanal, 2019). The establishment of a secure, affordable, and accessible payment system will help ensure financial stability (World Bank, 2020).

1.1 Problem Statement

Several research studies have investigated the impact of the COVID-19 pandemic on mobile payments, including the adoption of m-payment options, factors influencing user attitudes towards m-payment technology, and the potential for increased m-payment usage due to the pandemic. Many of these studies have drawn on the Technology Acceptance Model (TAM) to develop frameworks and draw conclusions. Notable studies include (Zhao and Bacao, 2021) on how the pandemic facilitates m-payment, (Galhotra and Dewan, 2020) on the performance of digital platforms during the pandemic, (Immanuel and Dewi, 2020) on the impact of the pandemic on customer attitudes towards m-payment, (Undale et al., 2021) on the relationship between eWallet usage, security concerns, and comfort during the pandemic, and (Flavian et al, 2020) on the relationship between mindfulness and m-payment adoption intention. However, as government regulations and adoption rates of digital platforms vary widely across different countries, it is important to contextualize these findings to the local context. Therefore, this research focuses on the

Kathmandu valley in Nepal, examining the unique challenges and opportunities for mobile payments in the region. Additionally, the research proposes a framework based on the TAM and MTAM frameworks to help stakeholders understand the various factors that influence the adoption and usage of mobile payments in the region.

1.2 Objectives of the Research

- To find out how perceived ease of use affects the m-payment usage.
- To find out how perceived usefulness affects the m-payment usage.
- To find out how the user's experience with technology affects the m-payment usage.
- To find out how perceived security affects the m-payment usage.
- To propose a suitable conceptual model which helps in better implementation of m-payment.

1.3 Research Questions

- Is there any significant relationship between perceived ease of use with the m-payment usage?
- Is there any significant relationship between perceived usefulness with the m-payment usage?
- Is there any significant relationship between the user's experience with technology and the m-payment usage?
- Is there any significant relationship between perceived security and the m-payment usage?
- Is there any suitable conceptual framework that helps better implementation of m-payment service?

1.4 Scope of the Research

The research focuses on how people in Kathmandu valley used mobile payments during the COVID-19 pandemic. It also aims to identify factors that may affect users' willingness to adopt this technology. Additionally, the study proposes a conceptual model to help improve the implementation of mobile payment services.

1.5 Significance of the Research

This research examines m-payment usage in Kathmandu valley during the COVID-19 pandemic, analyzing factors that may affect user intent, and proposing a conceptual model for enhancing m-payment service implementation.

Fellow Researchers: This research can provide insight into previously untouched figures and facts on m-payment usage, offer direction for further research, and present statistical analysis for exploring other dimensions.

Government/Concerned Regularities: This research can provide a clear picture of m-payment usage to the concerned bodies, encourage the government to conceptualize digital possibilities and benefits for Nepal, and provide direction for formulating regulations to boost m-payment usage among Nepalese people.

M-Payment Service Providers: This research can provide directions for m-payment service providers on how to enhance their service offerings and encourage customers to transact digitally.

2. Literature Review

2.1 Mobile Payment: An Overview

The history of mobile payments dates to 1997 when the first transaction was recorded. Coca Cola experimented with vending machines that accepted SMS payments, leading to early research on mobile payments. However, researchers concluded that existing issues with technology were not being explored by the academic community, limiting their understanding (Dahlberg et al., 2015). Mobile money has emerged as a dominant form of payment, surpassing traditional forms such as coins, paper, and plastic. In

India, mobile payment usage has increased due to affordable internet prices, growth in the user base of mobile devices, and the demonetization of currency notes (Jakhiya et al., 2020). Promotion plays a significant role in driving the adoption of mobile wallets. A study in Vietnam found that promotion activities positively influence customer behavior and attitude towards mobile payments, creating awareness and interest in the service (Hoang & Le, 2020). The study also found that the usefulness of mobile payment services and social influence are positively impacted by promotion, while there is no adverse relation to the perceived risk associated with the service.

2.2 Consumer Intention and Belief on M-Payment Adoption

The customers' etiquette in using m-payment facilities is influenced by performance expectations, anticipation of effort, societal influence, usage conditions, product impression, and customer patterns (Gupta and Arora, 2020). Habits and ease of use have been identified as significant factors in m-payment adoption. Environmental factors, such as government policies and uncertainty avoidance, can also influence m-payment adoption. In Pakistan, ease of use and trust are found to be important factors in m-payment adoption (Islam et al., 2020). Trust is also a significant factor in m-payment adoption in China, where people have high faith in the government's role in building trust among m-payment service users (Sleiman et al., 2021). The findings suggest that governments play a crucial role in building trust and encouraging m-payment adequacy, alongside paying attention to user interests at different levels.

2.3 Security and Threats Associated with M-Payment: Effect on User Adoption Rate

Mobile payment security is essential for user authentication, access control, confidentiality, integrity, and availability. Various security mechanisms such as biometrics, login username and password, multi-factor authentication, and SSL/TLS are being implemented to enhance security (Wang et al., 2016). Anticipated risk and recognized trust have a remarkable impact on customer satisfaction towards mobile payment services. Trust is considered the most influencing factor for boosting happiness in consumers, and greater satisfaction is key to boost loyalty (Hossain, 2019). The COVID-19 pandemic has increased the adoption of eWallets due to safety concerns. However, users remain anxious about the security of their transactions. Families in mid-income groups in India are highly sensitive towards the risk factors (Undale et al., 2021). Perceived risk has an adverse influence on the willingness to use mobile payment services. Privacy disclosure and security threats are major concerns among users. The younger age group tends to neglect the risks associated with mobile payments, but a wider demographic still considers risk a major obstacle (Y. Liu et al., 2019). Confidentiality, authentication, integrity, availability, and authorization are major aspects for any mobile payment platform. Mobile payment systems should be able to tackle attacks against all of these to attract users to adopt their technology (Ahmed et al., 2021).

2.4 QR Code and its Alignment with M-Payment

QR code mobile payments are becoming popular in retail due to their convenience and time-saving benefits (Yan et al., 2021). To increase customer acceptance, service providers should focus on improving the practicality of QR code mobile payments and offer incentives such as discounts (Chang et al., 2021). Customers value transaction effectiveness and cost reduction, and factors such as age, risk, trust, and benefits influence a customer's interest in QR payments (Kosim & Legowo, 2021). To increase adoption, QR payment providers need to collaborate with merchants and banks to offer persuasive advantages and establish a robust social impact for using QR payments. Anticipation of enhanced performance and smoothing circumstances does not significantly impact consumer attraction towards QR payments (Kosim & Legowo, 2021).

2.5 Consumer Behavior Towards M-Payment During COVID-19 Pandemic

Factors such as cost, security, credibility, usefulness, trust, social influence, and ease of use have a positive impact on m-payment adoption. (Kar, 2020). (Flavian et al., 2020) found that perceived usefulness has a significant positive impact on customer's intent to use the technology. In the context of COVID-19, (Galhotra

& Dewan, 2020) suggested that mobile payment facilities can flourish, while (Baicu et al., 2020) and (SUNARJO et al., 2021) recommended that banks increase financial literacy campaigns and communication with customers to enhance the security of online banking transactions. (Zhao & Bacao, 2021) found that technology impressions and mental predictions play a significant role in the utilization intentions of m-payment, while Cao (2021) highlighted the importance of security and user trust while acknowledging the transactions made are efficient. (Liu et al., 2020) emphasized the importance of mobile payment in promoting efficiency in transactions, particularly for urban households.

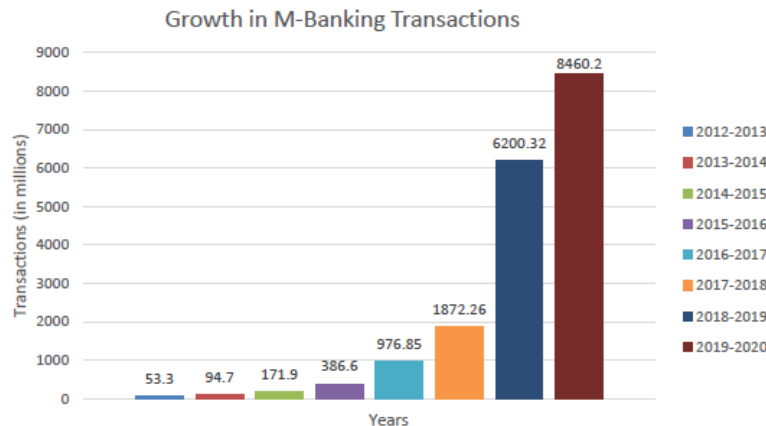


Figure 1: Growth in M-banking Transactions (Agarwal et al., 2020)

2.6 Customer Satisfaction on Quality of Service Received During COVID-19 Pandemic

The adoption of digital payment systems can be accelerated by understanding how users perceive the options available to them. A study by (Shree et al., 2021) found that a consumer's attitude towards digital payments impacts their payment behavior, and demographic factors also influence adoption. However, widespread socio-economic development is needed for successful adoption. In the service industry, both physical outlets and online platforms need constant monitoring to ensure customer satisfaction. A study by (Ketema, 2020) on Abyssinia Bank in Ethiopia found that loyalty and ease of use have a significant impact on customer perception of quality in mobile banking, with security also playing a crucial role. Although customers enjoy the platform, areas of improvement still exist, and the desired service quality is yet to be achieved.

2.7 Technology Acceptance Model (TAM) and Mobile Technology Acceptance Model (MTAM)

TAM, introduced by Davis in 1986, analyzes indicators of information system affirmation. PU and PEU are primary influencers, dealing with users' perception of usefulness and ease of use. Different researchers have tested and modified TAM to predict consumer behavior for technology adoption. External factors can influence technology acceptance.

MTAM was introduced in 2016 to address the limitations of classic TAM which did not consider factors beyond organizational circumstances. MTAM is specifically designed to study mobile environments and accounts for variables beyond perceived usefulness and ease of use. It includes mobile practicality and mobile ease of use as base variables for technology acceptance (L. Y. Yan et al., 2021).

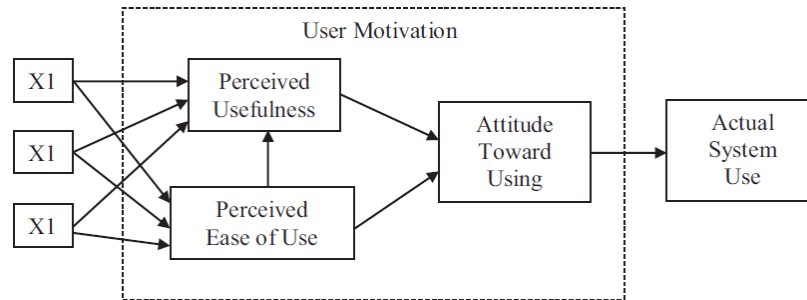


Figure 2: Classic TAM

3. Research Methodology

The acceptance of m-payment technology can be impacted by technological factors as well as intellectual factors (Zhao & Bacao, 2021). COVID-19 outbreak has enforced an impact on people regarding the minimization of contamination from coronavirus with the use of contactless payment (Puriwat & Tripopsakul, 2021). M-payment utilization in the context of Nepal in-between COVID-19 outbreak is yet to be uncovered since no research works have been conducted on the subject matter till date.

3.1 Research Design

The research used both qualitative and quantitative methods, with a mix of descriptive and exploratory approaches. The questionnaire for the survey contained Likert-type, single and multiple-choice questions for descriptive research, and two open-ended questions for exploratory research. This helped to obtain a clear viewpoint of the respondents on the subject matter and identify the importance of security features in m-payment applications.

3.1.1 Data Collection

Primary data was collected through an online survey questionnaire developed on Google Survey. The survey included Likert-type questions, pre-coded or single-choice questions, and two open-ended questions. The Likert-type questions helped in deriving the research outcomes, while pre-coded questions ensured uniformity of responses. Open-ended questions helped in analyzing the impact of features on usage patterns. Secondary data was also used to provide guidance and create the fundamentals of the research work.

3.1.2 Sample Selection

The research surveyed people from different occupational backgrounds and income groups in Nepal to investigate the usage pattern and factors affecting the use of m-payment through digital wallets. The survey was conducted online due to COVID-19 restrictions, and 583 responses were received out of 670 distributed survey links, with an 87% response rate.

3.1.3 Sampling Method

The research used a simple random sampling method to collect data from respondents in Kathmandu valley. The target audience was the general population, including working professionals in IT industries, students from law, business, and engineering colleges, and retailers.

3.1.4 Data Validation

For the reliability of the research, validation of the prepared survey questionnaire was done from the supervisor as well as solution architects from IT industries. The prime intent was to ensure the relevance

of prepared questions to the subject matter. Likewise, some of the prepared questionnaires were adapted from past research activities which helps in validation of research. The referred journals also assisted in finalizing the research variables.

4. Data Analysis and Interpretation

4.1 Reliability Testing (Cronbach's Alpha Reliability Test)

Reliability testing is performed to measure the relevance of the survey questionnaire. The survey is trying to analyze the predictors that impact the m-payment usage in the context of Nepal. The survey also extends its efforts to identify the service provider which the users are currently enjoying. Reliability testing also determines the quality of the questions that were distributed to the survey participants. Cronbach's alpha testing was performed to identify the consistency of the selected variables and the result obtained from the survey respondents.

Table 1: Reliability Statistics

Case Processing Summary			
		N	%
Cases	Valid	583	100.0
	Excluded ^a	0	.0
	Total	583	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics	
Cronbach's Alpha	N of Items
.811	43

4.2 Demographic Data of Respondents

The survey was conducted among different age groups, gender, occupational background, and income group. The table below highlights the demographic data of the survey respondents. 74.1% of the respondents were within the age group of 25-40 and 77.2% of the respondents were from a technological background.

Table 2: Demographic Data of Respondents

		Frequency	Percentage
Age	11 – 24	129	22.1
	25 – 40	432	74.1
	41 – 54	22	3.8
	>54	0	0
Gender	Male	411	70.5
	Female	172	29.5
	Others	0	0
Occupational Background	Technological	450	77.2
	Non-Technological	133	22.8
Income Group	Less than Rs.15,000	77	13.2
	Between Rs.15,000 and Rs.50,000	219	37.6
	Between Rs.50,000 and Rs.1,00,000	198	34
	Above Rs.1,00,000	89	15.3

4.3 M-Payment Preference

Table 3: M-Payment Preference

\$MPaymentPreference Frequencies

		Responses		Percent of Cases
		N	Percent	
Mobile Payment Preference ^a	Mobile Banking Applications (Provided by Respective Banks)	374	30.2%	64.2%
	eSewa Application	395	31.9%	67.8%
	Khalti Application	201	16.2%	34.5%
	Phonepay Application	156	12.6%	26.8%
	IMEPay Application	65	5.2%	11.1%
	Other Applications	48	3.9%	8.2%
Total		1239	100.0%	212.5%

a. Dichotomy group tabulated at value 1.

As per the 583 responses collected to identify the m-payment service provider preference, people loved using eSewa application the most with 31.88% engaged; the mobile banking applications (provided by respective banks) was found to be neck-to-neck with 30.19% enjoying the service. Khalti application and Phonepay application were found to be preferred by 16.22% and 12.59% respectively. As per the survey, the least preferred m-payment services were IMEPay with only 5.25%. 3.87% of the respondents preferred the other m-payment service such as ConnectIPS.

4.4 Descriptive Analysis

Table 4: Descriptive Statistics

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
User Experience with Technology	583	2	5	3.37	.550	.209	.101	-.567	.202
Perceived Ease of Use	583	1	5	3.79	.753	-1.125	.101	2.429	.202
Perceived Usefulness	583	2	5	4.12	.615	-.211	.101	.123	.202
Perceived Security	583	1	5	3.43	.643	-.174	.101	-.072	.202
Valid N (listwise)	583								

The questions targeted for each independent variable were averaged and rounded off to derive values for each independent variable. Table 4 shows the descriptive statistics for the independent variables of the research. The mean values of 3 and 4 suggest inclination towards the positive influence of independent variables selected with the m-payment usage.

4.5 Correlation Analysis

Table 5: Correlation Analysis

		M-Payment Service Usage	User Experience with Technology	Perceived Ease of Use	Perceived Usefulness	Perceived Security
M-Payment Service Usage	Pearson Correlation Sig. (2-tailed)	1				
User Experience with Technology	Pearson Correlation Sig. (2-tailed)	.427** .000	1			
Perceived Ease of Use	Pearson Correlation Sig. (2-tailed)	.088* .033	.23** .000	1		
Perceived Usefulness	Pearson Correlation Sig. (2-tailed)	.182** .000	.231** .000	.405** .000	1	
Perceived Security	Pearson Correlation Sig. (2-tailed)	.086* .038	-.008 .844	.165** .000	.081 .050	1

***. Correlation is significant at the 0.01 level (2-tailed).*

**. Correlation is significant at the 0.05 level (2-tailed).*

Table 5 represents the correlation of research’s dependent variable with the independent variables alongside independent variable’s correlation with the other independent variables. The correlation analysis shows the dependent variable’s relation with all the independent variables is positive and highly significant with obtained values of 0.427, 0.088, 0.182 and 0.086 for independent variables (user experience with technology, perceived ease of use, perceived usefulness, and perceived security) respectively.

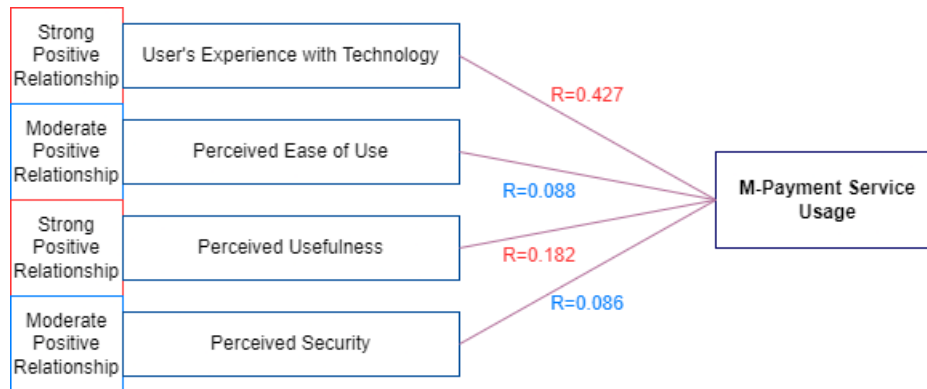


Figure 3: Simplified Correlation Analysis

4.6 Linear Regression Analysis

Table 6: Linear Regression Analysis

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.447 ^a	.200	.194	.802	.200	36.084	4	578	.000

a. Predictors: (Constant), Perceived Security, User Experience with Technology, Perceived Usefulness, Perceived Ease of Use

ANOVA^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	92.886	4	23.222	36.084	.000 ^b
	Residual	371.961	578	.644		
	Total	464.847	582			

a. Dependent Variable: M-Payment Service Usage

b. Predictors: (Constant), Perceived Security, User Experience with Technology, Perceived Usefulness, Perceived Ease of Use

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	.770	.322		2.393	.017	.138	1.402
	User Experience with Technology	.680	.063	.419	10.806	.000	.557	.804
	Perceived Ease of Use	-.078	.049	-.065	-1.569	.117	-.175	.020
	Perceived Usefulness	.151	.060	.104	2.523	.012	.033	.269
	Perceived Security	.127	.053	.092	2.424	.016	.024	.230

a. Dependent Variable: M-Payment Service Usage

The regression analysis found that user's experience with technology, perceived usefulness, and perceived security positively influence m-payment usage, while perceived ease of use has a negative impact. The R-square value indicates that 20% of the variation in m-payment usage can be explained by these factors. The F-test was significant at the 0.05 level, indicating that these independent variables have a notable impact on m-payment usage, but perceived ease of use does not have much effect.

5. Interpretation of Findings

The survey results indicate that there is a higher inclination towards m-payment services among the male population, young age group (25-40), and those belonging to a technological background. Most of the respondents had a salary ranging from Rs.15,000 to Rs.1,00,000. The COVID-19 pandemic had a positive impact on the adoption of m-payment services as people found it convenient to pay for services online and avoid the risk of being exposed to the virus. eSewa was the most preferred m-payment application among the respondents. Global m-payment platform can be implemented with collaboration between governmental bodies and service providers, which would provide benefits such as improved customer satisfaction, convenience, advanced data protection, and increased revenues. Despite the security features currently implemented, most transactions in Nepal are still cash-based due to NRB regulations, which limit digital wallets to store only up to Rs.25,000.

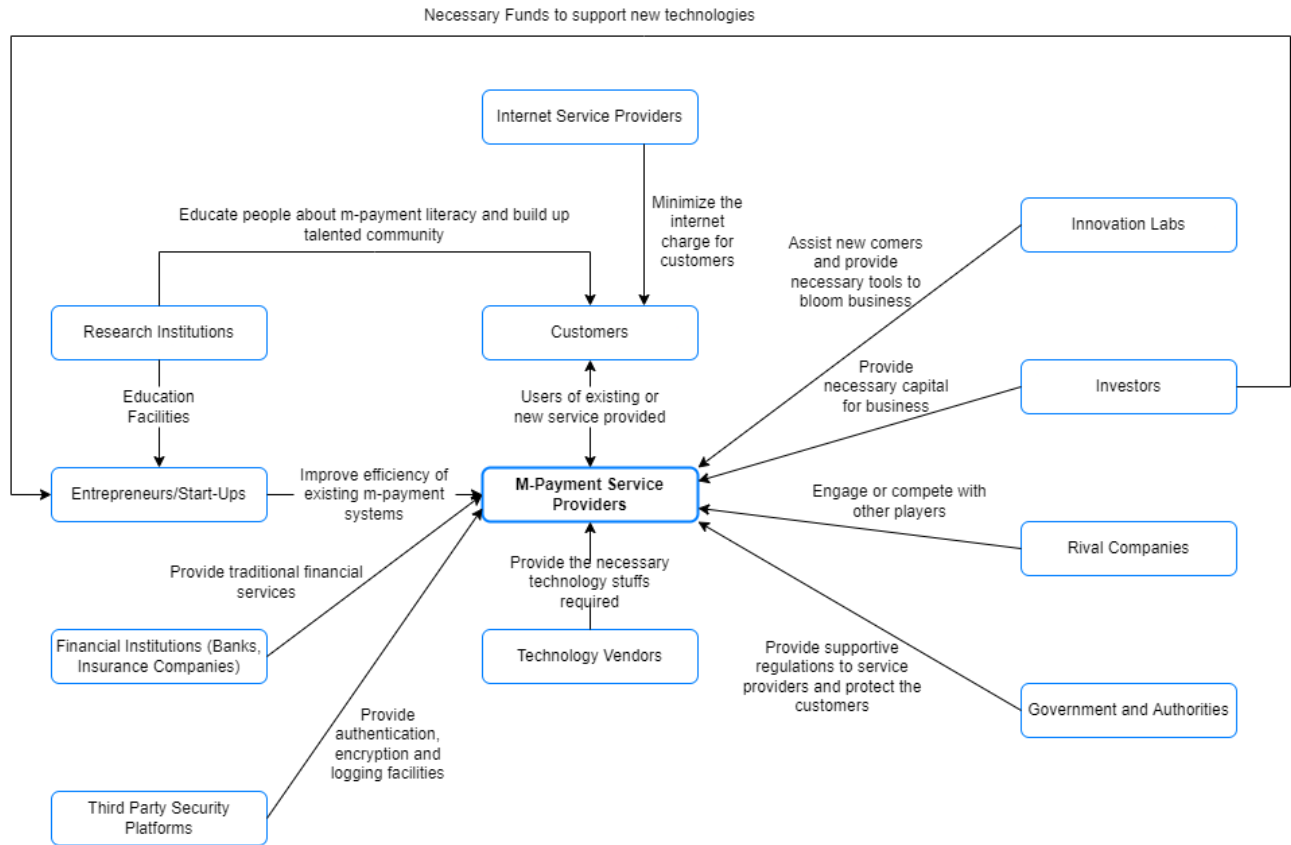


Figure 4: Proposed M-Payment Conceptual Model

Figure 4 illustrates the stakeholders that could possibly impact the utilization and continuance of m-payment service in Nepal. M-payment service providers will require equal participation from the concerned authorities like governmental bodies, potential investors, innovation labs, third party security platforms, financial institutions, technology vendors and entrepreneurs to enhance the service they are providing currently. Each of the stakeholders will have their own role to support the entire payment system. Likewise, research institutions and internet service providers could also encourage the potential customers with their efforts on m-payment literacy and minimal internet fares to connect m-payment applications respectively.

6. Conclusion

Mobile payment services have the potential to transform the way transactions are conducted in Nepal, but there are several areas that need improvement. The most significant of these is the security of m-payment applications, which is a major concern for users. In addition to security, reliability and availability are also important factors that need to be addressed by service providers. The government can help by increasing the limits on digital wallets and by implementing laws and regulations that minimize risks associated with digital transactions. Despite these challenges, users have a positive attitude towards m-payment services, with many appreciating the efficiency, timesaving, and responsiveness of the applications. If service providers can address these concerns, they could further motivate users and increase adoption of m-payment services in Nepal.

7. Recommendations

Digital payment platforms offer a wide range of services to the customers which has also been depicted by the research work conducted. However, there are still some challenges and limitations to it. The research work has presented the challenges, benefits, and limitations of continuance of m-payment service in Nepal.

Developing nations like Nepal can boost the economy with the usage of m-payment platforms as it will allow them to step towards the direction of globalization. The statistical analysis shows higher participation from the people between the age group of 25-40 and their engagement in the system can further be enhanced. The below mentioned are some of the recommendations of this research:

- **Research Institutions:** Increase awareness about m-payment literacy, highlight its significance on the economy, and collaborate with authorities to monitor the situation.
- **Entrepreneurs/Start-Ups:** Improve efficiency of existing systems, brainstorm new ideas, and explore global payment systems to improve service quality.
- **Financial Institutions:** Integrate m-payment applications into their system, facilitate traditional financial services required for m-payment, and maintain financial regulations to handle potential risks.
- **Third-Party Security Platforms:** Provide multi-factor authentication, data encryption, logging facilities, and tokenization to enhance data security; analyze global platforms' security measures and adopt them in local systems.
- **Internet Service Providers:** Integrate SMS features or low-cost internet services with m-payment platforms, encourage adoption through advertisements, and offer loyalty discounts for paying internet charges through m-banking applications.
- **Customers:** Use existing applications or support new ventures, adopt m-payment technology to improve standard of living, and participate in programs to improve knowledge.
- **M-Payment Service Providers:** Encourage active participation with lucrative offers and cashback features, maintain confidentiality and integrity of user's data, collaborate with financial institutions to link multiple bank accounts with digital wallets, enhance customer relationships to retain customers.
- **Technology Vendors:** Provide necessary technology for developing efficient platforms, extend services to retailers and supermarkets for cashless payment, launch awareness programs for enhanced security features and improving quality of life.
- **Innovation Labs:** Assist newcomers in the industry, provide necessary tools, explore global market scenarios, and suggest features/facilities to encourage usage.
- **Investors:** Provide necessary capital, franchise global payment technologies, integrate existing systems for better efficiency, fund startups to explore further possibilities.
- **Rival Companies:** Compete or merge/acquire for a huge customer base, improve payment efficiency with analysis of competitor offerings, offer lucrative benefits to motivate public.
- **Government and Authorities:** Formulate and implement rules and regulations to minimize risks, frequently monitor the situation, address alarming issues promptly to encourage end users to continue usage.

8. Limitations

Limitations in any research should be considered practical to minimize the vagueness of the topic and guide the researcher to be authentic. Following are some of the limitations of this research:

- Sample size has been restricted as the research has been conducted in a particular city of Nepal. Considering the time of pandemic, conduction of online surveys can imply participation of fewer people than expected.
- The research has not included all the mobile payment service providers operating in Nepal.
- The unwillingness of people to share their transaction history in general has a slight effect on the findings of the research.
- None too few research articles have been discovered regarding the chosen topic which resulted in an unclear picture and data validity could be questioned.

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