

A Structured Literature Review on Impact of COVID-19 Pandemic on Mobile Payment in Nepal

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Abstract – Digital payment is in the uptrends in the global market. Nepal had not practiced digital payment well before the pandemic hit Nepal. People relied on old-fashioned cash driven transactions. COVID-19 pandemic made the people realize that the nation could benefit from the digital transformation. The mobile payment facility helped to minimize the spread of coronavirus in some extent in Nepal. COVID-19 pandemic helped Nepal enter the first phase of digital transformation and this needs to be continued for the economic development of Nepal. The digital payment service providers should seek for the opportunities to enhance their service by adding more utilities in their application. The literature review helped to identify how a user perceives of the mobile payment facility, how a customer derives usefulness of mobile payment, how the attitude of customer derives the usage of mobile payment services, the various opportunities of mobile payment services, the classification of mobile payment technology, how demographic features can influence the use of mobile payment services. This paper finds that COVID-19 has a positive impact in the context of digital transformation in Nepal.

Index Terms – COVID-19, Pandemic, Mobile Payment, Digital Payment, Digital Transformation, NFC, TAM, UTAUT, MTAM.

1. Introduction

Mobile devices, smartphones, have created the utmost impact among the users enabling the excessive use of internet technologies. People inclined over to the smartphone industry after the introduction of first iPhone by Apple in 2007 but smartphones had been in the market since 1993 when IBM invented the first ever smartphone 'The Simon'. As a competition to Apple iOS, Google announced Android OS in the same year to approach the consumers in the smartphone business as mentioned by (Sarwar & Soomro, 2013) . GSMA Intelligence report for 2021 has stated that 38.61 million mobile connections have been established in Nepal which is more than the current population in Nepal. This has an indication that a single user might be connected through multiple mobile connections. This also draws to a fact that most of the population in Nepal has a reach to a mobile device.

Companies have been investing to enhance features on their smartphones since the beginning. The introduction of Infrared sensors, Bluetooth and Near Field Communication (NFC) has been significant to the users on their time-being. With the introduction of NFC technology, the manufacturers have aligned with it a useful operation for the customers which is the ability to transact through their mobile devices.

The impact of smartphones can be seen in different sectors such as business, social life, health and education. The impact can both be positive and negative at the users' end as it depends on how the technology is being used by them. The smartphones have been able to flourish the business by promoting their business online, reach out to multiple sources of reading materials for students, manage prescriptions and search for treatment options online as well as interact with friends and families who are apart. On the other hand, the smartphones have also been able to distract students from their learning process with the accessibility to entertainment activities on the internet, health hazards have been recorded on child due to exposure of smartphones in early age and people have been so addicted to social sites that the engagement with family members have been declined and the daily routine has also been affected (Sarwar & Soomro, 2013).

Number of mobile connections (excluding IOT)	38.61 million
Mobile connection of total population	131.3%

(in percentage)	
Pre-paid connections of all mobile connections (in percentage)	94.3%
Post-paid connections of all mobile connections (in percentage)	5.7%
Broadband connections (3G-5G) of all mobile connections (in percentage)	51.5%

Table 1: Mobile Connections by Type in Nepal (Kemp, 2021)

1.1 Mobile Payment

Mobile payment can be considered as paying for a service or a product using any kind of electronic device which is portable. The use of mobile payment is also extended with the ability to transfer fund to friends or family members in need which would require extra application layer. Mobile payment facilities have been integrated with banks globally. The foremost advantage of using a mobile payment is the elimination of a physical wallet and it guarantees a swift transaction. The application used for mobile payment can be secured by using PINs, passwords and even biometrics if the device supports which adds extra layer of security over physical cards. The following features have influenced in the growth of mobile payment technology:

- Security
- Easiness to use the application
- Integration of technology with POS systems

Mobile payments can be classified or differentiated by the technology it uses, location (remote or proximity) and the funding mechanism it uses (Raina, 2015).

Location-based mobile payments include:

- Remote
- Proximity

Technology-based mobile payments include:

- SMS or mobile application based
- Bar codes, QR codes and NFC enabled transactions based

Funding mechanism based mobile payments include:

- Real time transaction based
- Smart card based
- Credit card based
- mPOS (mobile point-of-sale)
- Mobile wallet based
- Bank account based

Mobile payment opportunities are large-scaled, and the technology requires linking either a payment card (credit or debit) or a bank account with the user's mobile device. The linking process however will need to be approved by the service provider. Some of the opportunities for mobile payments are as follows (Raina, 2015):

- i. Online Shopping

Every user in the market do not necessarily feel safe to enter their credit card details to purchase a good over internet. For such users, mobile authentication-based technology can come handy as they can verify their transactions over the phone for the goods they have purchased.

ii. mPOS

This can be a replacement for the existing POS systems which are currently being used to transact over a card (debit/credit). The merchant can initiate a transaction to the customer using the SIM toolkit menu entry in his mobile device, where he enters the amount that is needed to be received alongside the customer's phone number. The merchant sends the information which is received at the customer's end and he can validate entering his PIN. Once the transaction is completed, both will be alerted with a SMS on their mobile devices.

iii. Utilities Payment

Topping up mobile account, paying bills for the utilities like water, electricity, landline can be done via mobile payment.

iv. Scan Tags and Pay

The products can be labelled by various tags like bar code, NFC, QR and so on. The customers can get them scanned by their mobile devices and pay for the goods that are purchased using the mobile payment technology.

v. Fund Transfer

Fund transfer is a useful feature that is served by mobile payment technology. Considering a friend or a family member runs out of cash and needs to pay, his/her account can be topped up using the mobile payment technology instantly which can be a life saver.

On a global market led by top service providers, the following payment applications have been mostly preferred by the users:

- Google Pay
Google Pay is compatible with both the Android and iOS. Google has stated that a verified account is eligible to transact \$5,000 USD in a single transaction and that is reduced to \$700 USD for an unverified account for a 7-day period.
- Apple Pay
Apple Pay is compatible with iOS only. It allows to send/receive up to \$10,000 over a 7-day period as per Apple.
- Samsung Pay
Samsung Pay was introduced by Samsung for its mobile devices. As per Samsung, there are no limits for any transaction and no cost associated with any transaction.
- PayPal
PayPal is compatible with both Android and iOS. PayPal has stated that for a verified account one can transact up to \$60,000 but might be limited to \$10,000 in a single transaction.

1.2 Mobile Payment in Nepal

The global mobile payment services have not yet been implemented in Nepal which might have been delayed by the governmental regulations. However, there are certain digital payment service providers which have established themselves in the market. Utility payments, paying bills of mobile or landline devices, paying for airline tickets, movie tickets and transactions have been the mostly reached out features by the users in Nepal. The service providers have renowned themselves as the digital wallet in the context of Nepal. Some of the digital wallets are exposed by the operating banks in Nepal whereas some are developed by the IT companies. Below is the list of mostly used digital service providers in Nepal.

- ConnectIPS
- eSewa
- Khalti Digital Wallet
- IME Pay
- Prabhu Pay

- Fonepay

The above-mentioned application requires a merchant account (bank) and user account (bank) for the transaction. Each would require an account to login the application. The security features enrolled in the system allows protect the application from unintended use as PIN (login and transaction) and biometrics setup are enabled. The applications allow users to link their bank account after the verification from respective bank. The applications have an inbuilt QR code reader which allows to transact for the goods purchased. The notification system built in the application notifies each transaction. As per the regulation of Nepal Rashtra Bank (NRB), the accounts maintained in these applications would require KYC verification of the customers to allow transaction of higher amount. KYC verification would require personal identity card (preferably citizenship) and the users can transact once the KYC is verified by the service provider they are using.

The architecture for the mobile payment industry in Nepal is as follows:

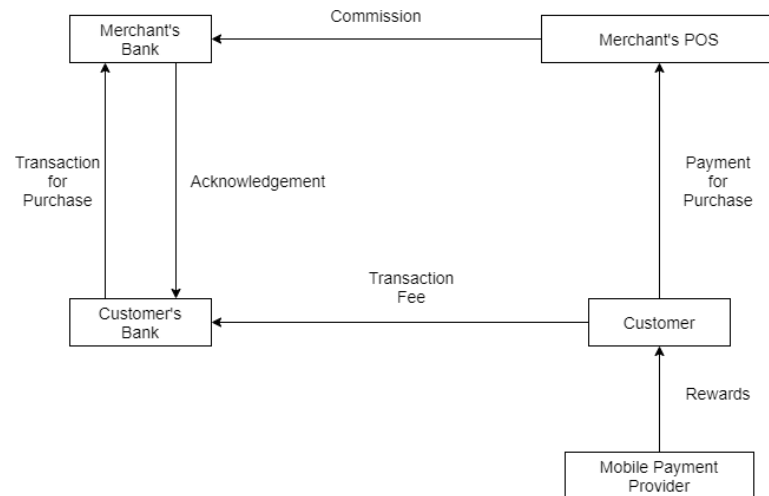


Figure 1: Mobile Payment Architecture in Nepal (Raina, 2015)

The digital providers except for ConnectIPS and Fonepay also provide the ewallet services in Nepal which allows to store mobile money as per the regulations of NRB. ConnectIPS, eSewa and Khalti have also extended their services to make payments for the capital market (NEPSE). The wide variety of services provided have made the daily lives easier for Nepalese people. There are certain restrictions for the transaction amount set by NRB for all the service providers. In case of ConnectIPS, the Clearing House also charges certain amount depending on the transaction amount.

The service providers have been rewarding their customers with certain cashback amount on the services they are offering. Generally, they would offer 1-2% cashback for the mobile top up facility, 2-3% for ordering recharge cards, 1-2% for the bill payments of landline, 1-2% on recharging their cable operator, 2-3% on recharging internet service provider and up to 25% on purchasing anti-virus applications. The customers are also provided loyalty points which provides further rewards on certain levels. The reward system has also encouraged the customers to pay their bills online as they are benefited with certain cashbacks.

1.3 Impact of COVID-19 in Nepal

The government of Nepal had issued a nationwide lockdown from March 24, 2020, to July 21, 2020 due to the first wave of COVID-19 pandemic. The domestic and international flights, road travels, non-essential services and borders were cancelled during the lockdown period. People were terrified walking outdoors to purchase the daily essential goods and most of the people relied on purchasing the groceries online during the lockdown phase. The mobile payment services also came useful during the lockdown phase as people easily transacted for their utilities (electricity, water), internet usage. The situation could have been even worse if people left their houses for these

activities. Mobile payment helped to limit the number of cases of covid patients to some extent. The customers also started accessing mobile payment services from their respective banks after the lockdown period ended as people realized the service could be a lifesaver in such pandemic. COVID-19 has helped for digital transformation in the context of Nepal. Earlier, people had the mentality to shop, transact with real cash whereas the fear of contamination from the objects during the first wave of COVID-19 in Nepal has made people realize that going cashless would be a better option to save their own life as well as others. People started to order goods required for them over the internet and pay accordingly using the mobile payment services. It would not be wrong to say that some were forced to use the mobile payment services against their willingness as the pandemic left no choice. Studies have shown that 35% of the customers have increased their banking usage once pandemic hit Nepal. There has also been significant increase in the use of services provided by eSewa, Khalti, PrabhuPay and IME Pay. Studies have shown that the transaction volume of PrabhuPay has gone up by 30-40% and most of it including mobile top ups and utility payments. Not only at the mobile payment services provider end, but the banks also started enhancing their services, technology and improve their application as they didn't want to miss the opportunity to retain their customers. The banking market has been so competitive that the customers immediately rush to the one who provides relatively better services.

The pandemic also has provided the opportunity to work collaboratively and approach for partnerships between the financial institutions and digital service providers. The educational institutions were also shut down during the lockdown phase and operated through online classes even after the lockdown ended. The possibility of contamination was the fear for all. Educational institutions also started collaborating with the digital service providers so the parents could pay education bills using the digital payment services available. Overall, COVID-19 has been a boon for digital transformation in the context of Nepal.

Article	Full Reference (APA Referencing Style)	Main Research Question/Objectives	Main Result/Issues	Why is this paper relevant?	Other Remarks
1	(Zhao & Bacao, 2021)	How is mobile payment facilitated by the pandemic?	Results: - Pandemic can change the users' payment habits. - Ability to flourish m-payment services provided the transaction security and efficiency to meet the users' requirements.	This paper interrelates the perception of users towards mobile payment during the pandemic in China and has investigated on the mental and technological factors which influences the intention of users for the adoption of mobile payment	The research paper has not covered the relationship between the mobile payment technology available (NFS, SMS) with the platforms available (Apple, Samsung) and electronic transaction which can be carried using a phone or a computer
2	(Galhotra & Dewan, 2020)	What are the varying trends in customer behavior while buying online during the different phases of lockdown and the	Results: - Increase in percentage of products ordered (mainly electronics, food	This paper has provided an idea on the uptrend of digital platforms usage	The research paper has not contrasted the usage of digital platforms before pandemic.

		performance of digital platforms during the COVID-19 pandemic?	items and groceries) during pandemic. - Respondents were satisfied with the digital platforms' ease of use and majority were satisfied alongside felt safe buying goods online.	during the four stages of lockdown in India and the perception of users towards buying goods online which can be inter-related with their payment methods.	The research paper has not covered data analysis for the use/effectiveness of health care applications, gaming applications.
3	(Sudha et al., 2020)	What is the impact of COVID-19 outbreak in the context of digital payments? What is the buying behavior of the consumers before and during the lockdown?	Results: - Significant difference was found in the mode of payment while purchasing before and during the lockdown period. - No significant relationship exists between age, gender, marital status, monthly income while using the digital payment modes.	This paper has provided results for the four different hypothesis which provides clear picture of the use of digital payments before and during the lockdown period in India along with the relationship of payment methods with demographic factors and users' preference.	The research paper does not provide insight of the online payment sites that were considered to find the association between the demographic factors and online payment sites.
4	(Immanuel & Dewi, 2020)	What are the impacts of the COVID-19 pandemic on consumer's attitude in relation to the adoption of M-payment?	Results: The personal attitude of users significantly affects the intention to adopt M-payment whereas the perceived usefulness has the least effect on the same.	This paper has provided a research model for M-payment adoption intention (MPAI) and the four different factors which might influence, and the results can be drawn to identify the impact of them on the payment	The research paper has not compared the demographic factors such as marital status, monthly income of respondents as carried out by researchers on (3) which could influence the intention to adopt M-payment.

				options.	
5	(Agarwal et al., 2020)	How has the addition of services provided by banks increased the use of M-Banking during the COVID-19 pandemic? How the customers have shifted from physical banking transactions to mobile banking transactions during the COVID-19 pandemic?	Results: - The research has illustrated a significant rise on usage of smartphones for mobile payments across India. - COVID-19 has been considered one of the catalysts which has flourished the adoption of mobile banking in India as per the research paper with nearly 8500 million transactions in the year 2019-2020.	The research paper has intended to provide the results on the change in transaction patterns of the customers and the effectiveness of online transactions during the COVID-19 pandemic in India.	The research is not based on survey and has relied on the data collected from different sources (RBI reports, newspapers, blogs, journals). The research uses secondary data to derive the various results as the duration of study was limited to 3 months.
6	(Liu et al., 2020)	What is the effect of mobile payment on urban and rural households during the COVID-19 pandemic?	Results: - The pandemic has badly affected the urban households whereas minimal affect can be seen on the rural households due to the pandemic. - Mobile payment can significantly improve the quality of promoting the household consumptions in urban areas.	The research paper has provided some statistical facts which implies that the use of mobile payment has direct influence on the rise of household consumption during the pandemic.	The paper has not proposed ideas to enhance the use of mobile payment opportunities for the rural households.
7	(Shree et al., 2021)	How does the factors such as 'perception' and 'trust' in digital payment methods affect the payment behavior of consumers?	Results: - The research paper has recorded the responses for the possible alternatives of payment (cash always, digital	The research paper has covered the aspect of increased usage of digital payment during the COVID-19 pandemic and	The research paper is limited to online fraud experience and has not included other dimensions like ease of use, security of digital payment to drive

			<p>payment always, somewhere in between).</p> <p>- The research paper also covers the effect of demographic factors on the mode of payment as well as a history of experience with online fraud and the possibilities associated.</p>	<p>tried to analyze if it would remain the same in future as well.</p>	<p>the consumer behavior.</p>
8	(Undale et al., 2020)	How does the security and comfortability affect the usage of eWallet during the COVID-19 pandemic?	<p>Results:</p> <p>The male respondents were neutral to the security concerns in eWallet and the younger age group were found to take high risk as per the research paper. The research paper also provides the fact that male users were more comfortable using eWallet than the female users. The research paper also concludes to drive a fact that COVID-19 has compelled some users to use eWallet even though they are not comfortable with it.</p>	<p>The research paper provides an idea on the spike of usage of eWallet as payment method during the COVID-19 pandemic although people know the fact about cyber-attacks and the security concerns of their eWallet transactions.</p>	<p>The research was carried out only on the urban population and has not included demographic factors such as age, education, occupation for the research activities.</p>
9	(Flavian et al., 2020)	How the mindfulness can be integrated with the mobile payment adoption intention?	<p>Results:</p> <p>- The research paper has illustrated that the mindfulness, perceived ease of use and usefulness have greater influence on the intention of mobile payment usage.</p>	<p>The research paper can be co-related as the mobile payment can be greatly influenced by the various factors such as mindfulness and ease of</p>	<p>The research was carried out on the limited geography (United States and Spain) and cannot be generalized. The research paper has greatly influenced by the</p>

			- The paper has highlighted on the technologies such as NFC and its impact on the rise of mobile payment.	use. The consumers' attitude also drives the use of mobile payment and the statistics from the paper can help to visualize the use of mobile payment during the pandemic.	pandemic as it has caused dramatic changes in the consumer behavior. So, the implications might need to be revisited once the behaviors are more stabilized in future.
10	(Ketema, 2020)	How does the COVID-19 pandemic impact the quality of service and the customer satisfaction?	Results: - As per the research paper, reliability, ease of use and security have a greater influence on e-service quality and possess greater criticality for a customer. - The research paper states that the security issue of m-banking service has never alarmed the customers during the COVID-19 pandemic.	The quality-of-service provider can be greatly influenced by the ease of use and security is an utmost concern to the customers as indicated by the research paper. The conclusions can be drawn to drive the research work forward and can be considered an important information.	The sample size is limited to the data gathered from a single district branch in Addis Ababa and cannot be generalized for all the branches.
11	(Puriwat & Tripopsakul, 2021)	How does the COVID-19 pandemic impact the usage of contactless technologies and its adoption?	Results: - The research paper has developed and Integrated Expectation Confirmation and Health Belief Model which illustrates that the perceived usefulness can be significantly affected by the seriousness of the user. - The research	Mobile payment is one of the contactless technologies and the paper can be related as it has provided some facts on the use of contactless technologies and its impacts. The statistics derived on the research paper also covers the	The research was carried out to the users who utilized contactless payment technologies in Thailand and generalizing the results with other countries could be difficult. - The research paper does not cover the cultural differences and

			paper also enlightens that contactless technology will minimize the chances of infection of coronavirus.	demographic factors and provides an insight to derive hypothesis from them.	its implications.
12	(Baicu et al., 2020)	What are the impacts of the COVID-19 pandemic on consumer behavior in retail banking?	<p>Results:</p> <ul style="list-style-type: none"> - The research paper illustrates that the mobile banking services consumption has raised during the pandemic. - The paper also highlights that the banks should communicate better with their customers on the benefits they are offering but also should focus to add measures to increase the security of online transactions. - The research paper covers various demographic factors such as gender, age, education, income and the mobile banking users in each group. 	The ease of use, attitude towards the mobile banking and trust shown in banks are the consumer behaviors and have greater influence in the use of retail/mobile banking. The facts derived from the paper can provide a guidance to carry out the research further.	The research paper is an implication of limited sample size only and the mechanism of adopting new technologies for mass consumption should be carefully tested before its implementation.
13	(Jakhiya et al., 2020)	What are the emergence and growth of mobile money and its effects in India?	<p>Results:</p> <ul style="list-style-type: none"> - The research paper has stated that 'demonetization' has been one of the catalysts that flourished mobile 	The facts and theories proposed in the research paper can provide guidance to carry out the research works	The research paper was derived from the data collected from the secondary sources and cannot imply

			<p>money in the past as the use of smart devices increased.</p> <ul style="list-style-type: none"> - Digital payment methods have been identified as a preventive measure against COVID-19. - The research paper illustrates that the consumers have been increasing the use of mobile payment methods like digital wallets, point of sales, unified payment interface in context of India. - The research has also highlighted how AI can enhance in reducing frauds in mobile payments and improve P2P payment platforms. 	<p>further. COVID-19 has adversely affected various sectors such as economy, hospitality and so on but also highlighted the significance of mobile money.</p>	<p>generalized facts for urban/rural areas.</p> <p>68% of the payments in India are still cash based and would require awareness among the people to enhance mobile payment.</p>
14	(Hoang & Le, 2020)	How does the promotion of mobile wallet impact the adoption of mobile wallet?	<p>Results:</p> <ul style="list-style-type: none"> - The research paper has proposed a conceptual framework based on nine hypothesis that were carried out. - The research paper illustrates that the promotion helps to adopt the mobile wallet by 10% more than without promotion. - The research paper also illustrates that Social Influence has no significant 	<p>The research model proposed in the paper provides an idea how the model can be formulated for the research topic selected further.</p>	<p>The research has been carried out with young and highly educated people as the responders and it will be difficult to generalize the results derived for diverse groups of people. The research has also been limited to an average city of Vietnam, Danang; which has a limited market and relatively less population.</p>

			effect on Intention of Use of mobile wallet.		
15	(SUNARJO et al., 2021)	How does the users' knowledge about the technology affects the technology adoption and is mobile payment adoption most effective during COVID-19 pandemic?	<p>Results:</p> <p>The research model consisted four different components: Characteristics of Technology Users, Knowledge of Technology Users, Utilitarian Value and Adoption Behavior.</p> <p>The research paper states that the characteristics of technology users had a positive but no significant relationship with the utilitarian value while knowledge of users had significant relationship with it.</p>	The research paper has derived a conceptual framework which can be guidance to develop a framework required for the research topic of mine. Also, the statistics and the sample questionnaires presented provides an idea to move ahead.	The research has been limited on a sample of diverse demographic population of Indonesia (Batik SME consumers) who have strong cultural and social influence. Online method was used to circulate the survey questionnaire which has resulted in limited interaction with the respondents.

Table 2: Research Articles with their major findings and research gaps

2. Relevant Theories

(Yan et al., 2021) have emphasized on Mobile Technology Acceptance Model (MTAM) on their research paper. Most of the research papers selected have highlighted that mostly adopted model to identify the factors that influence the mobile payment adoption are Technology Acceptance Model (TAM) and Unified Theories of Acceptance and Use of Technology (UTAUT).

Technology Acceptance Model (TAM) describes on how the users or customers tend to accept and use the technology. Customer has the bargain power for the use of the technology and the perceived usefulness and ease of use can easily govern the usage of that technology. Mobile payment usage in Nepal can have co-relation with the governing factors of TAM model, perceived ease of use and usefulness. The user attitude gets influenced by these factors which eventually leads to continue usage or decline the mobile payment usage.

3. Conclusion and Future Work

COVID-19 has encouraged people to adopt mobile payment technology for the utilities payment and transact using mobile money. This has helped Nepal step up in the context of digital transformation as well. The opportunity should be grabbed further to enhance the economy of the country and promote the use of mobile payment technology further. The country can save dollars required to print the Nepalese currency (cash). Cashless transactions are safe, reliable and won't require queueing up in the service provider office, grocery shopping or any such related activities. Further, the service provider should also conduct extensive research on how the services can be enhanced and secured further to encourage their customers continue the use of digital payment services.

People have realized the importance of mobile payment technology during the first wave of pandemic in Nepal and the digital service provider should take it as an opportunity to retain their customers and further extend their services to them. Only after which the customers will be loyal towards their provider and develop a positive attitude towards the usage of mobile payment technology.

The research article dwells the impact of COVID-19 pandemic on mobile payment in Nepal. The research also opens ways to derive a model which derives the factors that governs the attitude and usage of mobile payment technology in Nepalese people. The model should extensively account for the usefulness, ease of use, security concerns, familiarity of technology among the people.

Further, the research extends to identify the relation among various factors that influences the mobile payment usage in Nepal with a blended model of TAM3 framework and MTAM model.

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