

Merchant adoption of mobile payment: pre, during and post COVID-19 analysis using text mining

Md Rizwan Noori and Nagapavan Chintalapati

Department of Business Administration, Central University of Jharkhand,
Ranchi, India

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Received 25 May 2024
Revised 14 October 2024
22 March 2025
6 October 2025
27 December 2025
Accepted 2 February 2026

Abstract

Purpose – The research paper examines the adoption of mobile payment apps by merchants and analyses how Covid-19 affected the mobile payment adoption by merchants.

Design/methodology/approach – This study analysed 214,498 google play store reviews of seven merchant apps using sentiment analysis and Latent Dirichlet Allocation (LDA) topic modelling technique.

Findings – Sentiment analysis results reveal that most of the merchants have given positive reviews in pre, during and post Covid-19 time periods but the percentage of positive reviews decreased after Covid-19 which signifies that willingness of merchants towards merchant apps reduced after long term usage under constrained conditions. This study highlighted several important issues using LDA such as bank helpfulness, account payment timing, sign in or login error, service experience, offer and cashback and useful for business.

Practical implications – Concerned banks and app developers should update their apps as per the requirement of the merchants so that they can willingly accept payment through these apps. The identified issues should be resolved in their updated version of the apps.

Originality/value – This study contributes to the literature on technology adoption through a study analysing customer reviews of merchant apps. It is a study that conceptualised an understanding of merchant apps usage for mobile payments before, during and after Covid-19.

Keywords Merchant adoption, Mobile payment, Covid 19, LDA, Sentiment analysis, Text mining, Merchant apps, Online reviews

Paper type Research article

1. Introduction

COVID-19 restrictions have provided an impetus towards contactless payments systems. Prior to Covid-19 pandemic, customers mostly used cash for bill payment to merchants. During Covid-19, due to the various restrictions in personal touch and compulsory social distancing, customers use of cash for payment purposes is constrained. Merchants have QR code scanner in their shops. Customers pay their bills by scanning QR code. The purpose of this study is to undertake a longitudinal study on the perceptions of the merchants towards the merchant apps available over Google Play store. Merchant apps are specially designed by payment app developers for the merchants for business purposes. The apps are used only to receive money from the customers using Bhim UPI, Credit card, Debit card and wallets. The number of downloads shows that more than 5 Crores of merchants are using merchant apps for receiving mobile payment in India. This study analysed online reviews provided by the merchants on the merchant apps based on their usage behaviour as shown in [Table 2](#).

As per the National Payment Corporation of India (NPCI), which started publishing P2M (Person to Merchant) data from April, 2020 during Covid-19 period, a total of 105,220.7 million of transactions made to the merchants of value ₹ 74,88,478.81 Crores till September,

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There is no funding provided for this research study and no conflicts of interests exist for any authors with the findings of the research.



2023. Covid-19 period (April, 2020 to March, 2022) comprises of 22 months have just 28,697.54 million of transactions of value ₹ 22,19,790.34 Crores. Post Covid-19 period (April, 2022 to September, 2023) comprises of 16 months have 76,523.16 million of transactions of value ₹ 52,68,688.47 Crores. This data is tabulated and shown in [Table 1](#).

There is limited information on how merchants' perceptions evolved during the period covering pre, during and post Covid-19. The current study aims to study how Covid-19 affected the mobile payment apps perception of the merchants. Accordingly, the study addresses the following questions: 1) How Covid-19 affected the mobile payment adoption by merchants? 2) What are the major issues/concerns of Indian merchants towards acceptance of mobile payment? The first question is addressed through a longitudinal study of the reviews published under the apps in Google Play store. The reviews are divided into three time period: Pre Covid-19, during Covid-19, Post Covid-19. The second question is addressed through the text analysis of the reviews posted by the merchants. Various themes identified in this customer reviews-based study are compared with the constructs of the established technology adoption theories. This will help to contribute towards advancing the theoretical understanding of technology adoption of mobile payments. In this paper, the researchers analysed online reviews merchants posted using text mining technique. Online reviews contain users' thoughts, feelings, and, opinions about a particular app ([Samanmali & Rupasingha, 2024](#)). These are considered a data source for an in-depth understanding of mobile payment apps adoption by merchant.

1.1 Objectives of the study

- (1) To study the effect of Covid-19 on the acceptance of mobile payment by merchants as expressed in the customer reviews on Google Play store.
- (2) To identify the major concerns/issues of Indian merchants towards acceptance of mobile payment.

2. Review of literature

The review of literature section provides a synthesis of previous studies related to the research questions. The literature is classified into three sections: adoption of mobile payment by merchants; papers on mobile payments with COVID-19 focuses; and text mining methodology papers. This classification helps position the current research in the context of previous studies.

2.1 Mobile payment adoption by merchants

The first section of the review of the relevant literature is regarding the Merchant adoption of mobile payment. Various factors influenced the merchant adoption of mobile payments such

Table 1. P2M volume and value of transactions

Period	Volume of transactions in million	Value of transaction in crore (amount in rupees)
Pre Covid 19 period	Data not available	Data not available
April, 2020 to March, 2022 (During Covid 19 period)	28697.54	2219790.34
April, 2022 to September, 2023 (Post Covid 19 period)	76523.16	5268688.47
Total	105220.7	7488478.81

Source(s): NPCI; www.npci.org (Data accessed on 15/05/2024)

as mindfulness, technology development, controls over online fraud, sentiments in handling money, etc. Mindfulness of the merchant play a key role in influencing intention of merchant to adopt mobile payment (Srivastava, Rai, Mishra, & Madupalli, 2025). Advancement in technology like all-in-one QR and cross platform money transfer solved the previous challenges like fraud and also explained the new hurdles (Kumar, Singh, & Sharma, 2025). According to Kumar and Yadav (2025) psychological beliefs and sentiment of vendors affect mobile payment adoption. According to Mishra, Walsh, and Srivastava (2022), merchant's behaviour is determined by time varying interactions among its components which results adoption or non-adoption of mobile payment. Another research paper concluded that task technology fit, price value, perceived trust, performance expectancy, social influence and facilitating conditions have significant impact on behavioural intention of merchant towards mobile payment in India (Gupta, Dhingra, Tanwar, & Aggarwal, 2022). Behavioural intention of unorganised merchants in India is influenced by awareness, cost, entrepreneurial motivation, customer acceptance, perceived usefulness and personal innovativeness (Karthik & Selvabaskar, 2023). In a study conducted in Indonesia, MSMEs faced several problems of digital payment adoption such as lack of digital knowledge, high amount of cash use and socialisation (Rafferty & Fajar, 2022). Several drivers of mobile payment adoption such as merchant compatibility, trust, facilitating conditions and relative advantages are similar in India also. Perceived value creation significantly affects merchant continuous usage of mobile payment (Yang, Chesney, Yang, & Hao, 2024). Analysis of merchant adoption in Malaysia using UTUAT and ECM model has been studied by Tan, Chong, and Ong (2024). This study identified that effort expectancy, network externalities and satisfaction level positively affect adoption of mobile payment. Summary of findings reported in the above literature review illustrates that popular variable used in the studies are similar to the variables proposed under TAM, UTAUT, etc. such as perceived usefulness, perceived ease of use, social norms, task fit, user attitude, facilitating conditions, etc. The above research papers are based on survey data and focused on measurement of variables to study merchant adoption of mobile payment. The current study based on the user's reviews is useful to identify the themes for merchant adoption, which can be used as variables for future research.

2.2 Covid-19 period based research papers

The second section of review of literature is focused on the research on adoption on mobile payments during the entire duration of the study covering pre-Covid, during Covid –19, and post Covid-19. Hamzah (2024) analysed impact of Covid-19 on mobile payment adoption by retail merchants by applying Protection Motivation Theory. This paper observed that perceived severity, response efficacy, and self-efficacy have significant impact on continuous adoption. Major challenges faced by retailers during Covid-19 in their study such as unfamiliarity of customers, lack of employees' knowledge of mobile payment, lack of computer literacy of customers and poor management orientation (Jayarathne, Chathuranga, Dewasiri, & Rana, 2022). Again, we can observe that the studies in the context of covid-19 utilised popular variables such as self-efficacy, technology competence, etc.

To the best of authors knowledge and literature search, the current paper analysing reviews of merchant apps to understand the effect of Covid-19 on mobile payment acceptance by merchants in India has not been reported previously. This study fills the gap in the research by analysis of online reviews using sentiment analysis and Latent Dirichlet Allocation (LDA) topic modelling technique. The finding reported will help the App developers to understand the issues and problems faced by the merchants while using these apps.

2.3 Summary of relevant text mining papers

The third section of the review of literature is based on the research tool used – text mining and analysis. Shah *et al.* (2026) analysed online reviews of meal delivery apps using LDA. LDA is the technique used in the current study also to find out the themes underlying our research

questions. [Teichert and Shah \(2026\)](#) analysed customer reviews of Uber eats using LLMs (Large Language model). They provide theory driven method to apply customer behaviour models in analysing customer-authored feedback. [Dahlke et al. \(2021\)](#) provides a theoretical framework to identify societal needs amidst crises. They have used text mining to analyse textual data related to Covid-19 innovations. It indicates that Covid – 19 based studies used secondary data due to the advantage of data being available already. They have found domains of innovations which addresses human needs. One such innovation that become popular during the COVID – 19 crisis is mobile payments. Sentiment analysis is used for studies during Covid-19 by [Wrycza and Maślankowski \(2020\)](#), [Praveen, Ittamalla, and Deepak \(2021\)](#). The same technique is used in the current research also. [Basu, Sebastian, and Kar \(2024\)](#) analysed consumer reviews of Phone pe and Paytm to study adoption intention of mobile banking. According to them, Perception of resources, internet anxiety from cyberthreats and technology-trusting performance have significant impact on mobile banking intention. [Verkijika and Neneh \(2021\)](#) in their study analysed 5,955 reviews of 16 mobile payment apps from Google play store using LDA technique and extracted themes such as ease of use, convenience, reliability, usability, trust, customer support, usefulness, security, satisfaction, transaction speed, time saving, output quality and perceived cost. [Fuad and Yahya \(2021\)](#) applied LDA topic modelling technique and analysed Google play store Arabic apps. [Calli \(2023\)](#) had explored mobile banking adoption and service quality features from Google play store reviews using LDA technique and found that perceived usefulness, convenience and time saving were critical factors. [Kumar, Chakraborty, and Bala \(2023\)](#) explored determinants of customer satisfaction towards grocery mobile apps using customer reviews. They had applied LDA technique to study reviews of the customers, similar to our study. The current study based on customer reviews undertakes sentiment analysis and used LDA technique for identification of the relevant themes. This paper's major contribution to the literature and originality of the paper is in the application of these techniques to customer reviews of payment apps, which was not seen in the previous research. Another contribution of the paper is the longitudinal classification of the customer reviews and the changes in customer reviews in the three different time periods. This paper also tries to link identified themes with the constructs of established theories of technology adoption.

3. Research methodology

The current study is designed to use secondary data available under the Google Play store Apps in India. The reviews are downloaded and are analysed using sentiment analysis and LDA topic modelling technique. Previous researches have used sentiment analysis to study payment apps' reviews ([Balakrishnan, Lok, & Abdul Rahim, 2021](#); [Kathiravan et al., 2021](#); [Hossain, Dahiya, & Al Noman, 2023](#); [Perea-Khalifi, Irimia-Diéguez, & Palos-Sánchez, 2024](#); [Shah et al., 2026](#)). Sentiment analysis is a natural language processing technique used to analyse textual data to classify emotional tone of the text in positive, negative and neutral. In this study, sentiment analysis is used to understand merchants' attitude towards merchant app usage and effects of Covid-19 on the merchant payment adoption using Google play store reviews. Sentiment analysis is carried out with the help of library Sentiment Intensity Analyser. Polarity score is used to determine sentiment of the users as positive, neutral and negative. LDA is text mining technique to extract themes from reviews contained in large data set which helps to understand major concerns of the reviewers regarding app usage. LDA was run using Gensim model library ([Genism, 2024](#)) and pyLDAvis package in python ([pyLDAvis, 2024](#); [Xie, Chu, Chiu, & Wang, 2021](#)). Gensim is python library used for topic modelling. pyLDAvis package is used for visualisation of LDA topic model. Previous researchers have used LDA topic modelling technique to study payment apps ([Verkijika & Neneh, 2021](#); [Widiantoro & Harnadi, 2022](#); [Darko, Liang, Xu, Agbodah, & Obiora, 2023](#)). This research has three steps – Data collection, Data preprocessing and Data analysis discussed in the below sections.

3.1 Data collection

The reviews were extracted using Google play scrapper in Python. 214,498 reviews were downloaded from seven different merchant apps (Table 2). The reviews written by Indian users in English language are only extracted. The reviews were downloaded for the period of 22/11/2016 to 06/10/2023. All reviews available for download were collected and that set the period of the data collected. The collected reviews were classified into three time periods, i.e. pre Covid-19 period (22/11/2016 to 24/03/2020), during Covid-19 period (25/03/2020 to 16/03/2022) and post Covid-19 period (17/03/2022 to 06/10/2023). The periods were determined on the basis on Covid-19 lockdown implemented in India. The lockdown (major restriction by Government of India) started on 25/03/2020 and ends on 16/03/2022.

3.2 Data pre-processing

After separating the dataset, the researchers have performed data cleaning process. In this step, the unwanted or irrelevant contents were removed from the dataset. This step is called Data pre-processing. Stop words include articles, prepositions and pronouns were removed. After removing stop words, tokenisation, lemmatisation and stemming were run to get the data completely ready for analysis. These are the necessary steps of data pre-processing (Kathuria, Gupta, & Singla, 2021). In tokenisation, sentences are split into words called tokens. This step helps in filtering out unwanted words before further processing. Tokenisation was run using RegexpTokenizer library. Stemming is a word shorting technique which brings words into their root form. Porter Stemmer library was used for stemming purpose. Lemmatisation removes the suffix of the word or replace the words with their base form to have meaning word. This helps in removal of occurrence of same word in multiple form. Lemmatization was run using Word Net Lemmatizer library.

4. Data analysis and results

4.1 Sentiment analysis

It can be seen from Tables 3 and 4 that positive reviews dominated the data frame. Nearly 63% of total reviews are positive while 23% are negative and 14.28% are neutral. The sentiment analysis was carried out for each merchant apps (Table 3). Google pay for business contains maximum positive reviews with a percentage of 67% followed by Phone pe business which contains 65.57% of reviews. Bajaj FinServ for business app holds maximum negative reviews with percentage of 24.25 followed by Paytm for business with percentage of 22.67. The maximum neutral reviews contain in Airtel merchant app with percentage of 34.74% followed by Bajaj FinServ for business with percentage of 29.83. The sentiment analysis shows that merchants are satisfied with Google pay for business and Phone pe for business these contains maximum positive reviews and least negative reviews.

The sentiments expressed through reviews are analysed for all three time periods. It can be seen from Table 4 that positive reviews increase during Covid-19 period but the number of positive reviews decreases after Covid-19 period. There was an increase of 1.55% in positive reviews during Covid-19 period but after this, the percentage decrease by 4.83%.

The percentage of neutral reviews decreases by 2.1% during Covid-19 period but increases after Covid-19 period. In the case of negative reviews, the percentage got increases during Covid-19 period as well as after Covid-19 period by 0.55% and 2.14% respectively. It can be observed that merchants are not liking the merchant apps for facilitating mobile payment after Covid-19 period as the positive reviews decreases and negative reviews increases after Covid-19 period. The graphical representation of sentiment analysis results is shown in Figure 1.

4.2 Topic modelling

Though sentiment analysis has given an insight into merchant's attitude towards mobile payment and effect of Covid-19 on merchant perception of mobile payments. It has not helped

Table 2. Summary of merchant apps taken for this study

Name of the app	Rating on google play store	No. of downloads	Launching date	Number of reviews taken for this study					Total
				Rating 1	Rating 2	Rating 3	Rating 4	Rating 5	
Airtel merchant	3.5	10 Lakh +	22/11/2016	3,315	260	331	366	2,779	7,051
Amazon pay for business	4.3	50 Lakh +	14/04/2021	1,222	264	497	1,092	7,272	10,347
Bajaj Finserv for business	3.7	10 Lakh +	19/05/2022	457	33	28	34	417	969
BharatPe for merchants	3.9	1 Crore +	19/12/2017	16,971	1,455	1,906	3,525	26,143	50,000
Google Pay for business	4.1	5 Crore +	17/09/2019	8,606	1,464	2,450	4,962	32,518	50,000
Paytm for business	3.9	5 Crore +	13/10/2017	18,297	1,160	1,230	2,836	22,608	46,131
PhonePe business	4.0	5 Crore +	24/10/2018	9,345	1,442	2,224	4,659	32,330	50,000
Total				58,213	6,078	8,666	17,474	124,067	214,498

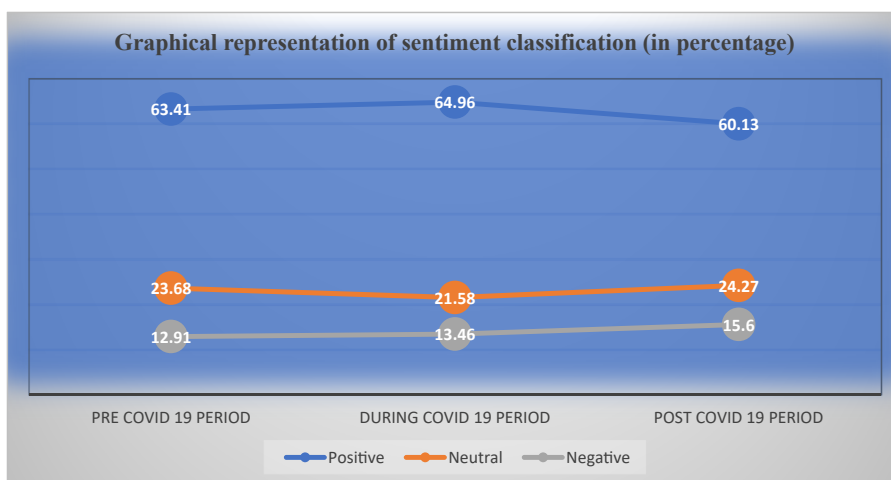
Source(s): Data retrieved from Google play store (Compiled by authors)

Table 3. Sentiment analysis of each merchant apps

Name of the app	Number of reviews	Neutral	%	Positive	%	Negative	%
<i>Airtel merchant</i>	7,051	2,450	34.74	3,045	43.19	1,556	22.07
<i>Amazon pay for business</i>	10,347	2,472	23.89	7,567	73.13	308	2.98
<i>Bajaj finserv for business</i>	969	289	29.83	445	45.92	235	24.25
<i>Bharat pe for business</i>	50,000	10,153	20.30	30,295	60.60	9,553	19.10
<i>Google pay for business</i>	50,000	12,463	24.92	33,501	67	4,036	8.08
<i>Paytm for business</i>	46,131	9,775	21.19	25,914	56.18	10,442	22.63
<i>Phone pe business</i>	50,000	13,003	26	32,784	65.57	4,213	8.43
<i>Total</i>	214,498	50,605	23.59	133,551	62.27	30,343	14.14

Source(s): Compiled by authors**Table 4.** Sentiment analysis based on Covid-19

Period	Number of reviews	Neutral	%	Positive	%	Negative	%
<i>Pre Covid 19 period (22/11/2016 to 24/03/2020)</i>	30,241	7,160	23.68	19,177	63.41	3,904	12.91
<i>During Covid 19 period (25/03/2020 to 16/03/2022)</i>	93,958	20,279	21.58	61,035	64.96	12,644	13.46
<i>Post Covid 19 period (17/03/2022 to 06/10/2023)</i>	90,300	21,919	24.27	54,296	60.13	14,085	15.60
<i>Total</i>	214,499	49,358	23.01	134,508	62.71	30,633	14.28

Source(s): Compiled by authors**Figure 1.** Graphical representation of sentiment classification of reviews. Source: Compiled by authors

to understand the major issues of mobile payment that reflected merchants' attitude. To understand this, the researchers have performed LDA topic modelling to extract major issues

from the reviews. The extracted topics are bank helpfulness, Account payment timing, Sign or Login error, Service experience, Offer and cashback and Useful for business. The results of the LDA were illustrated in Figure 2.

5. Discussion and implications

RQ1. How Covid-19 affected the mobile payment adoption by merchants?

The study clearly established empirically that the merchants have report positively on mobile payment apps. The trend shows that the number of positive reviews has increased during the Covid-19 duration. There is a relative percentage decrease in positive reviews. The study considered Covid-19 as a constrained condition where the performance lag is reflected in the comments of the Google Play store reviews. After Covid-19 restrictions are relaxed merchants were accepting both cash and mobile payments and relatively found more comfort in handling the cash payments. This is shown in the decrease in positive reviews. The decrease in positive

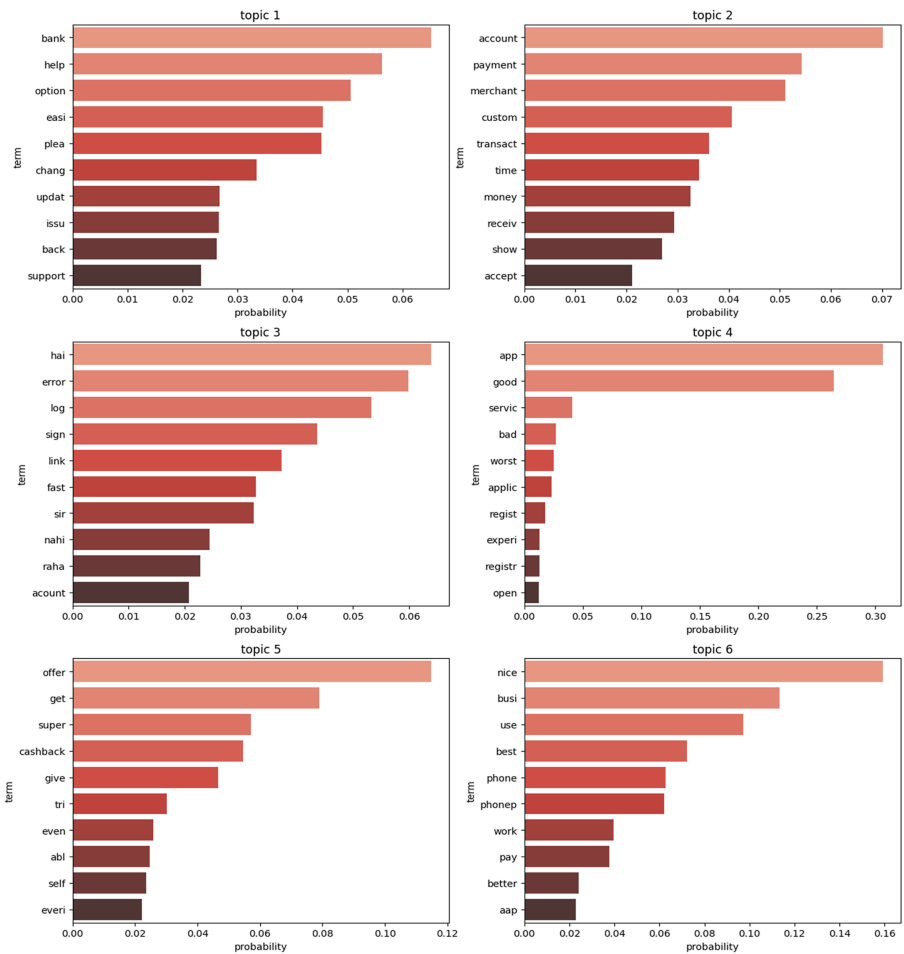


Figure 2. LDA result. Source: Compiled by authors

reviews can be attributed to comfort with cash, rising expectations, reduced incentives and system saturation. Overall, we may see that the technology adoption of mobile payments has been viewed positively with major concern highlighted in the merchant reviews.

RQ2. What are the major issues/ concerns of Indian merchants towards acceptance of mobile payment?

The LDA results highlighted the major concerns of the merchants towards acceptance of mobile payment as shown in [Figure 2](#). The various issues are bank helpfulness, account payment timing, Sign in or login issue, service experience, offer and cashback and useful for business.

Bank helpfulness refers to the extent to which bank employees help the merchants in using merchant apps. Bank employees can help merchants in account settlement, fraud transaction, recovery of failed transaction and change of bank account or mobile no. linked with merchant app. Merchants may face difficulty in using apps because of not having knowledge of using mobile apps. These merchants need help from the bank employees to use the apps correctly and effectively. The theme “Bank helpfulness” is similar to the variable “Effort expectancy” of UTUAT2 model ([Venkatesh, Thong, & Xu, 2012](#)). The abbreviation of UTUAT2 is Unified Theory of Acceptance and Use of Technology 2. Effort expectancy refers to the degree of easy associated while using merchant apps.

Account payment timing – the second issue – refers to time taken by the customer in payment and transfer of money in bank account. Merchants face this issue because of high traffic in payment through UPI, server downtime of the concerned bank and network problem. This increases payment processing time of the customer. Customers have to wait till the confirmation of payment received. Merchants face difficulty in transferring the money received in the wallet of payment apps. There is condition in merchant app that merchants can transfer the money only for one time on daily basis. They may face problem in case of emergency requirement of money in their bank account. A real time linking of bank account to mobile payments apps will address this key issue. The theme “Account payment timing” is similar to the “Performance expectancy” of UTUAT2 model. This refers to degree to which merchant believes that merchant apps would help them in payment system of their business.

The third issue is Sign in or login issue. Merchants are unable to login the merchant apps properly because of network issue or technical issue of the app. The third issue can be related to “Facilitating conditions” construct of UTUAT2 model. This refers to the degree of which the merchant apps have better technical infrastructure to support the payment system.

The fourth issue highlighted service experience in which merchant have bad experience with the apps and found waste or useless for their business. The service quality offered by the app is a key concern of the merchants who desire a reliable app for their payment systems. The service experience theme is similar to the “Facilitating condition” construct of UTUAT2 model. This refers to the quality of service provided on the merchant apps.

The fifth issue highlighted is Offers and rewards are the offers provided by the merchants for using their apps for receiving payment from customers. This may encourage them to use merchant apps for accepting payment. During adoption phase of merchant apps, service providers were giving attractive cashbacks and offers to the merchants but after Covid-19, there are no such offers provided to the merchants. “Offers and rewards” theme can be related to “Hedonic motivation” construct of UTUAT2 model. This refers to pleasure or fun derived from the use of merchant apps. This theme can also be related to “price value” construct. This means the monetary benefits provided to the merchants for using merchant apps.

The sixth issue is useful for business. Merchant apps are very useful for business and saved merchant as well as customers time in processing payments. Few other advantages to merchants are keeping track of sales of the business on daily basis, no problem of maintaining change at the counter, no worry about fake currency or damaged notes. The last theme is related to “Performance expectancy” construct of UTUAT2 model. This refers to the degree to which the merchant apps are useful for the merchants in doing their business.

It is clear from the discussion of identified themes closely relate to the constructs used in the UTUAT2 model of Venkatesh *et al.* (2012). This clearly shows that the themes identified in the current study are related to technology acceptance and adoption theories. This research therefore contributes to the literature on technology adoption and use.

Though, it is obvious that merchant apps have changed the way of doing business the issues raised by the merchants in the reviews are serious concerns. Addressing these issues will improve the acceptance levels for mobile payments and aid towards higher digital transactions and less cash transactions in India. Another implication of the study is the government policies to promote the digital transactions in India. NPCI should track the issues to formulate a holistic perspective towards promotion digital transactions. Concerned banks and app developers should update their apps as per the requirement of the merchants so that they can willingly accept payment through these apps. The discussed issues should be resolved in their updated version of the apps. The study contributes to merchant payment adoption literature by providing insights into merchant payment adoption trends over time.

6. Conclusion

The study of the merchants' reviews for mobile payment apps clearly reveal that merchants are comfortable to use the payments apps and have reported positively as seen in the percentage of positive comments. The LDA has clearly highlighted key issues that the merchants considered critical dimension in their adoption of the technology of mobile payments and they have been highlighted in this. The highlighted key themes can be related to constructs of UTUAT2 model. This paper provides a framework for analysis of user reviews on Google Play store India and also provides a mechanism for identifying critical factors using qualitative research methodology.

This study is limited to seven Apps and defined time periods. Researchers may conduct research on other different apps and for the upcoming time periods. This will help track the perceptions of the users better. The current study used only one source of data – google play store. Future research may consider other data sources, both primary and secondary. This study used qualitative research tools. Other research may look at quantitative research or mixed method research design in their studies.

Author contributions

All the authors have contributed to this research study. Md Rizwan Noori has contributed in identification of the research topic for study, data collection and analysis and writing the manuscript. Dr Nagapavan Chintalapati designed the study, reviewed the data collection and analysis and written the manuscript. All authors reviewed the manuscript and accepted the final version.

References

- Balakrishnan, V., Lok, P. Y., & Abdul Rahim, H. (2021). A semi-supervised approach in detecting sentiment and emotion based on digital payment reviews. *The Journal of Supercomputing*, 77(4), 3795–3810. doi: [10.1007/s11227-020-03412-w](https://doi.org/10.1007/s11227-020-03412-w).
- Basu, B., Sebastian, M. P., & Kar, A. K. (2024). What affects the promoting intention of mobile banking services? Insights from mining consumer reviews. *Journal of Retailing and Consumer Services*, 77, 103–695. doi: [10.1016/j.jretconser.2023.103695](https://doi.org/10.1016/j.jretconser.2023.103695).
- Çallı, L. (2023). Exploring mobile banking adoption and service quality features through user-generated content: The application of a topic modeling approach to google play store reviews. *International Journal of Bank Marketing*, 41(2), 428–454. doi: [10.1108/ijbm-08-2022-0351](https://doi.org/10.1108/ijbm-08-2022-0351).
- Dahlke, J., Bogner, K., Becker, M., Schlaile, M. P., Pyka, A., & Ebersberger, B. (2021). Crisis-driven innovation and fundamental human needs: A typological framework of rapid-response COVID-19 innovations. *Technological Forecasting and Social Change*, 169, 120–799. doi: [10.1016/j.techfore.2021.120799](https://doi.org/10.1016/j.techfore.2021.120799).

- Darko, A. P., Liang, D., Xu, Z., Agbodah, K., & Obiora, S. (2023). A novel multi-attribute decision-making for ranking mobile payment services using online consumer reviews. *Expert Systems with Applications*, 213, 119–262. doi: [10.1016/j.eswa.2022.119262](https://doi.org/10.1016/j.eswa.2022.119262).
- Fuad, A., & Yahya, M. A. (2021). Topic identification and classification of google play store reviews. In *Presented at the 15th National Convention on Statistics* (Vol. 3, pp. 5).
- Gensim (2024). Available from: <https://pypi.org/project/gensim/> (accessed 15 January 2024).
- Gupta, S., Dhingra, S., Tanwar, S., & Aggarwal, R. (2022). What explains the adoption of mobile wallets? A study from merchants' perspectives. *International Journal of Human-Computer Interaction*, 39(19), 1–13. doi: [10.1080/10447318.2022.2104408](https://doi.org/10.1080/10447318.2022.2104408).
- Hamzah, M. I. (2024). Fear of COVID-19 disease and QR-based mobile payment adoption: A protection motivation perspective. *Journal of Financial Services Marketing*, 29(3), 946–963. doi: [10.1057/s41264-023-00246-4](https://doi.org/10.1057/s41264-023-00246-4).
- Hossain, M. S., Dahiya, O., & Al Noman, M. A. (2023). User sentiment prediction and analysis for payment app reviews using supervised and unsupervised machine learning approaches. In *Handbook of Research on AI and Machine Learning Applications in Customer Support and Analytics* (pp. 342–361). IGI Global.
- Jayarathne, P. A., Chathuranga, B. T. K., Dewasiri, N. J., & Rana, S. (2022). Motives of mobile payment adoption during COVID-19 pandemic in Sri Lanka: A holistic approach of both customers' and retailers' perspectives. *South Asian Journal of Marketing*, 4(1), 51–73. doi: [10.1108/sajm-03-2022-0013](https://doi.org/10.1108/sajm-03-2022-0013).
- Karthik Ram, M., & Selvabaskar, S. (2023). Intention to use mobile payment systems among unorganised retailers in India. *Journal of Payments Strategy and Systems*, 17(2), 200–222. doi: [10.69554/rcsa3090](https://doi.org/10.69554/rcsa3090).
- Kathiravan, D. C., Rajasekar, A., Velmurgan, S., Mahalakshmi, P., Chandramouli, E., Suresh, V., & Dhanalakshmi, K. (2021). Sentiment analysis and text mining of online customer reviews for digital wallet apps of fintech industry. *International Journal of Aquatic Science*, 12(3), 2139–2150.
- Kathuria, A., Gupta, A., & Singla, R. K. (2021). A review of tools and techniques for preprocessing of textual data. In *Computational Methods and Data Engineering: Proceedings of ICMDE 2020* (Vol. 1, pp. 407–422).
- Kumar, N. K., & Yadav, A. S. (2025). Critical factors of mobile payment usage in the unorganized retail sector in Kerala. *Vikalpa: The Journal for Decision Makers*, 50(4). Akter.
- Kumar, A., Chakraborty, S., & Bala, P. K. (2023). Text mining approach to explore determinants of grocery mobile app satisfaction using online customer reviews. *Journal of Retailing and Consumer Services*, 73, 103–363. doi: [10.1016/j.jretconser.2023.103363](https://doi.org/10.1016/j.jretconser.2023.103363).
- Kumar, M., Singh, J. B., & Sharma, S. K. (2025). Evolving 'affordances' and 'constraints' in mobile payment use: A study of Indian micro-enterprises' UPI adoption process. *Journal of Enterprise Information Management*, 38(2), 660–678. doi: [10.1108/jeim-09-2023-0455](https://doi.org/10.1108/jeim-09-2023-0455).
- Mishra, V., Walsh, I., & Srivastava, A. (2022). Merchants' adoption of mobile payment in emerging economies: The case of unorganised retailers in India. *European Journal of Information Systems*, 31(1), 74–90. doi: [10.1080/0960085x.2021.1978338](https://doi.org/10.1080/0960085x.2021.1978338).
- Perea-Khalifi, D., Irimia-Diéguez, A. I., & Palos-Sánchez, P. (2024). Exploring the determinants of the user experience in P2P payment systems in Spain: A text mining approach. *Financial Innovation*, 10(1).
- Praveen, S. V., Ittamalla, R., & Deepak, G. (2021). Analyzing the attitude of Indian citizens towards COVID-19 vaccine—a text analytics study. *Diabetes and Metabolic Syndrome: Clinical Research Reviews*, 15(2), 595–599. doi: [10.1016/j.dsx.2021.02.031](https://doi.org/10.1016/j.dsx.2021.02.031).
- pyLDAvis (2024). Available from: <https://pypi.org/project/pyLDAvis/> (accessed 15 January 2024).
- Rafferty, N. E., & Fajar, A. N. (2022). Integrated QR payment system (QRIS): Cashless payment solution in developing country from merchant perspective. *Asia Pacific Journal of Information Systems*, 32(3), 630–655. doi: [10.14329/apjis.2022.32.3.630](https://doi.org/10.14329/apjis.2022.32.3.630).

- Samanmali, P. H. C., & Rupasingha, R. A. H. M. (2024). Sentiment analysis on google play store app users' reviews based on deep learning approach. *Multimedia Tools and Applications*, 83(36), 84425–84453. doi: [10.1007/s11042-024-19185-w](https://doi.org/10.1007/s11042-024-19185-w).
- Shah, A. M., Ahmad, P. N., Abbasi, A. Z., Parvez, M. O., Han, S. H., Bayram, G. E., & Lee, K. (2026). Decoding customer experiences on meal delivery apps: A cross-platform text-mining analysis of online reviews through the lens of service psychology theories. *Journal of Retailing and Consumer Services*, 89, 104–598. doi: [10.1016/j.jretconser.2025.104598](https://doi.org/10.1016/j.jretconser.2025.104598).
- Srivastava, A., Rai, N., Mishra, V., & Madupalli, R. K. (2025). Role of mindfulness in merchant's adoption of mobile payments in an unorganized sector. *Journal of Business and Industrial Marketing*, 40(3), 653–668. doi: [10.1108/jbim-11-2023-0661](https://doi.org/10.1108/jbim-11-2023-0661).
- Tan, S. H., Chong, L. L., & Ong, H. B. (2024). Continuance usage intention of e-wallets: Insights from merchants. *International Journal of Information Management Data Insights*, 4(2), 100–254.
- Teichert, T., & Shah, A. M. (2026). From reviews to constructs: Using LLMs to model customer satisfaction in platform-based services. *Journal of Retailing and Consumer Services*, 88, 104539. doi: [10.1016/j.jretconser.2025.104539](https://doi.org/10.1016/j.jretconser.2025.104539).
- Venkatesh, V., Thong, J. Y., & Xu, X. (2012). Consumer acceptance and use of information technology: Extending the unified theory of acceptance and use of technology. *MIS Quarterly*, 36(1), 157–178. doi: [10.2307/41410412](https://doi.org/10.2307/41410412).
- Verkijika, S. F., & Neneh, B. N. (2021). Standing up for or against: A text-mining study on the recommendation of mobile payment apps. *Journal of Retailing and Consumer Services*, 63(10), 27–43. doi: [10.1016/j.jretconser.2021.102743](https://doi.org/10.1016/j.jretconser.2021.102743).
- Widiantoro, A. D., & Harnadi, B. (2022). Review of user comments for the OVO fintech application using LDA. In *2022 6th International Conference on Information Technology (InCIT)* (pp. 326–330). IEEE.
- Wrycza, S., & Maślankowski, J. (2020). Social media users' opinions on remote work during the COVID-19 pandemic. Thematic and sentiment analysis. *Information Systems Management*, 37(4), 288–297. doi: [10.1080/10580530.2020.1820631](https://doi.org/10.1080/10580530.2020.1820631).
- Xie, R., Chu, S. K. W., Chiu, D. K. W., & Wang, Y. (2021). Exploring public response to COVID-19 on Weibo with LDA topic modelling and sentiment analysis. *Data and Information Management*, 5(1), 86–99. doi: [10.2478/dim-2020-0023](https://doi.org/10.2478/dim-2020-0023).
- Yang, Y., Chesney, T., Yang, S., & Hao, Z. (2024). Why do merchants continue to use mobile payment? A data-information-value perspective. *International Journal of Mobile Communications*, 23(1), 110–125. doi: [10.1504/ijmc.2024.10047176](https://doi.org/10.1504/ijmc.2024.10047176).

Further reading

National Payment Corporation of India (2024). Available from: <https://www.npci.org.in/what-we-do/upi/upi-ecosystem-statistics#innerTabThreeOct23> (accessed 5 November 2023).

Corresponding author

Md Rizwan Noori can be contacted at: rizwanims10@gmail.com