Consumer adoption of mobile payment services during COVID-19:

Extending meta-UTAUT with perceived severity and self-efficacy

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Abstract

Purpose – The purpose of this paper is to identify and examine the important factors that could affect consumers' behavioural intention and use behaviour towards mobile payment services during COVID-19.

Design/methodology/approach – The proposed model extends meta- Unified Theory of Acceptance and Use of Technology (meta-UTAUT) model with perceived severity and self-efficacy factors affecting consumers' behavioural intention and use behaviour towards mobile payment services. A convenient sampling technique is used to gather data from a self-administered questionnaire. The data collection was restricted to the online mode to avoid any physical contact considering the COVID-19 situation.

Findings – The findings revealed that performance expectancy, effort expectancy and perceived severity have a significant positive impact on consumers' attitude; facilitating conditions has a significant positive impact on effort expectancy; self-efficacy has a significant positive impact on effort expectancy; attitude has a significant positive impact on behavioural intention; and behavioural intention has a significant positive impact on use behaviour. Social influence did not confirm any significant relationship with attitude.

Research limitations/implications – The current research study has utilized a non-probability convenient sampling technique to gather data through a self-administered questionnaire. The data collection was restricted to the online mode to avoid any physical contact considering the COVID-19 situation. The respondents were adopters of mobile payment services. The scope of the study is the COVID-19 context or related chronic diseases context where major preventive mechanisms such as social distancing and avoidance of physical contacts are vital.

Originality/value – This study has extended the meta-UTAUT model with the COVID-19 context-specific constructs and relationships. The undertaken work has strengthened the explanability of the model. The inclusion of context relevant variables such as perceived severity and self-efficacy and their association with the existing meta-UTAUT framework have enriched the context of the study. The current study offers a holistic understanding of significant factors influencing Indian consumers adoption of mobile payment services in the COVID-19 context.

Keywords meta-UTAUT, Intention, Adoption, Mobile payment, Use behaviour, COVID-19, Contactless payment

Paper type Research paper

1. Introduction

India predominantly deals with cash-based transaction where transactions are performed through paper-based currency, and it is the dominating monetary mode for all significant commerce (Chakravorti, 2017; Singh et al., 2020). With 616 million mobile subscribers, India contributes largely to the worldwide mobile market by placing it as the second-largest mobile market (Gsmaintelligence, 2017). Earlier, people considered mobile-based payments as a medium of convenience, but this status-quo changed due to the outbreak of COVID-19. The spread of COVID-19 has severely impacted the world economy and financial markets. World Bank estimates a shrinking global economy in 2020-2021 by 5.2%, causing a massive recession (World Bank, 2020). In line with other countries, India too announced nationwide lockdown and social distancing policies. The ripple effect was also seen in the cash-based payment transactions that positioned the digital mode of payment at the mainstream (Auer et al., 2020). Besides, COVID-19 pushed and expanded mobile payments usage majorly for two reasons.

Firstly, such transactions are considered to be instrumental in adhering to social distancing norms. Individuals during the lockdown or quarantine period could conveniently execute digital payment transactions. Secondly, many delivery services started accepting digital payments, and customers were left with no choice but to adopt digital payment services. Even a sharp increase in contactless payment is evident in significant economies during COVID-19 (Auer et al., 2020).

Business environments and consumers are slowly adjusting to the new normal by adapting to e-commerce solutions to break the physical barriers. It is anticipated that people would act on primary social distancing norms (like maintaining social distance, wearing masks, and hand sanitization) and take up secondary actions (such as adapting online behaviours in payments, trade, and commerce). As such, it is suitable to study, explore, and understand the impact of COVID-19 on consumers' behavioural intention and use behaviour towards mobile-based payment services. Besides, during the early stages of technology adoption, individuals' attitudes are critical in determining their intentions. Dwivedi et al. (2019) and Dwivedi et al. (2020) re-examined the Unified Theory of Acceptance and Use of Technology (UTAUT) based theories. They found that those are limited in capturing the variance and predicting the individual technology acceptance. The authors validated the claim by performing meta-analysis and structure equation modeling on the UTAUT model. Further, they identified that including the individual attribute "attitude" the emergent model, meta-UTAUT, significantly increases the model's variance depicting the individual acceptance of the technology. Therefore, we consider the meta-UTAUT model suitable for understanding Indian consumer adoption and acceptance of mobile payments. However, as we explore the consumer's behavioural intention and use behaviour towards mobile-based payment services during COVID-19, we plan to extend the meta-UTAUT model with the relevant constructs.

In the absence of full operationalization of vaccines during COVID-19, it is necessary to follow social distancing norms and health behaviour. Even various health organizations, including WHO(2020) and CDC(2020), suggest using contactless payment and avoidance of debit & credit cards, paper currency, and touch surface terminals as a preventive mechanism to avoid COVID-19 contraction. Consumers of banking services may switch to mobile payment services (Lew et al., 2020; Loh et al., 2019; Mostafa, 2020; Souiden et al., 2021; Tew et al., 2021) by primarily considering health behaviour (Flavián, Guinaliu and Lu, 2020; Sreelakshmi and Sangeetha, 2020). As such, usage of such services can be considered as a preventive behaviour reflecting adhering to social distancing norms (shifting from accepting physical banking services to digital payment services). Adopting the preventive behaviour showcases an individual's perception of the severity of the pandemic and his/her feeling about the COVID-19 contraction. The constructs such as perceived severity and self-efficacy of the protection motivation theory (PMT) (Rippetoe and Rigers, 1987) explain an individual's actions to prevent or control a threatening event or a disease.

The current study's context deals with adopting/accepting the technology (mobile payment services), reflecting the protection motivation contributing to the preventive health behaviour and helps individuals prevent COVID-19 contraction. Hence, the research study serves two primary purposes. First, explore and review the existing literature and critical adoption models to identify suitable underlying theory and relevant contextualized constructs to examine the behavioural intention and use behavior of Indian consumers towards mobile payment services. And second, to empirically validate the developed conceptual model by gathering the data from the Indian mobile payment users to identify the antecedents of the mobile payment service.

Given the coverage mentioned above, the current study aims to develop a unified framework that extends meta-UTAUT with perceived severity and self-efficacy affecting consumers'

behavioural intention and use behaviour towards mobile payment services. The present research study contributes to the mobile banking and technology adoption literature by describing the context-specific constructs (endogenous: behavioural intentions, use behaviour, attitude, and effort expectancy; exogenous: performance expectancy, facilitating conditions, social influence, perceived severity, and self-efficacy) and relationships amongst the constructs, more specifically to the Indian context, to explain the consumer's behaviour intention and use behaviour of mobile payment services. There have been many studies on the relationships of the few constructs but their focus is primarily on western countries such as the USA (Garrett et al., 2014; Morosan & DeFranco, 2016), UK (Slade et al., 2015a, 2015b), Finaland (Karjaluoto et al., 2020), and France (De Kerviler et al., 2016; Koenig-Lewis et al., 2015). Additionally, adoption research in the domain of mobile payment domain has been mostly studied by using Unified Theory of Acceptance and Use of Technology (UTAUT) and Technology Acceptance Model (TAM), which have limited scope to understand as they are applicable for the technology users in the organizational context (Chhonker et al., 2018; Slade et al., 2015b). UTAUT was extended to UTAUT2 (Venkatesh et al., 2012), focusing on the individual acceptance context. Still, it is also not devoid of inherent limitations such as a lack of "individual" specific attributes (Tamilmani et al., 2021). Besides, current research findings and models are not relevant to the Indian context considering India as a multicultural and multilingual country. This study attempts to fill this gap by exploring relationships amongst the exogeneous and endogenous constructs. This study, therefore, illustrates a more robust and predictive model (meta-UTAUT with perceived severity and self-efficacy) that can overcome the fundamental constraints of the existing models and provide a predictive analysis of the consumer's behaviour intention and use behaviour towards mobile payment services. The findings of the research study will be beneficial for various key stakeholders of the mobile

payment ecosystem such as policymakers, fintech, payment service providers, marketers, and bankers.

Firstly, we explore and review the prominent technology adoption models. Secondly, we identify relevant theoretical constructs to examine consumer's adoption behaviour intention and use behaviour of mobile payment services during COVID-19. Thirdly, we introduce our conceptual model, beginning with analyzing the constructs of consumer behaviour intention and use behaviour towards mobile payment services. The constructs are grounded on the in-depth literature review, see Table 1. A summary of literature exploring mobile banking payment service, including the context, methodology and major findings of each study, is presented in Appendix A.

<<Insert Table 1 Constructs for the consumer behaviour intention and use behaviour towards mobile payment services (during COVID-19)>>

In the subsequent sections, this paper presents detailed information on the theoretical background and hypotheses development, usage of the methodological framework, results of the study, discussion, implications, limitations, and future research directions. Finally, the conclusion is presented.

2. Theoretical background and hypotheses development

Scholars advocate several technology adoption theoretical models (Giovanis et al., 2019) such as the theory of planned behaviour (TPB) (Ajzen, 1985), the theory of reasoned action (TRA) (Fishbein and Ajzen, 1975), the technology acceptance model (TAM) (Davis, 1989), and Unified Theory of Acceptance and Use of Technology (UTAUT). However, models such as TAM and UTAUT have been widely used to investigate individual level of adopting technology (e.g., Chhonker et al., 2018; Slade et al., 2015b). It is necessary to explore the

underpinning limitations of such models before we select an appropriate theoretical lens to develop and propose the model for the current study.

2.1 TAM, UTAUT and meta-UTAUT

The TAM model captures the technology adoption and has been established as a widely accepted technology adoption model (Taherdoost, 2017). Researchers have extensively used the TAM model to understand and explore mobile (contactless) payments by adapting and extending its underlying constructs. For instance, while Cocosila & Trabelsi (2016), Zhanga et al. (2011) and Jenkins & Ophoff (2016) utilized TAM standalone to understand mobile payments adoption (considering NFC features). Augsburg and Hedman (2014) employed TAM by integrating constructs of innovation diffusion theory (IDT) to understand mobile payments and value-added services (VAS) adoption and Wang & Lin (2019) explored contactless cards adoption intention by including constructs such as risks, innovativeness and trust alongside TAM. Scholars while reviewing adoption studies for consumer mobile payment adoption (Slade et al. 2015b) and mobile commerce (Chhonker et al., 2018) argue TAM to be a preferable model for technology adoption. However, TAM is also not devoid of limitations as its original context is scoped to the organization's boundary and provides generic information on individual's opinions about the adoption of the technology (Agarwal & Prasad, 1999; McMaster & Wastell, 2005).

Scholars have proposed many competing theories to overcome the limitations of TAM, such as IDT. However, multiple theories in the technology adoption domain also raised several challenges to the IS/IT researchers. To overcome the challenges of the multiple existing theories, Venkatesth et al. (2003) proposed the UTAUT by studying eight behavioural research models to understand and explore usage behaviour of individual adopting technology. According to UTAUT, factors such as effort expectancy, performance expectancy, facilitating

conditions, and social influence, affects individual intention to accept/use technology. Patil et al. (2020) advocate the popularity of the UTAUT model to examine the consumer mobile payment technology adoption. Scholars have utilized UTAUT in various contexts, such as the adoption of mobile payments in a proximity mode (Slade et al., 2015a), online shopping (Celik, 2016), NFC in smartphone (Chen & Chang, 2013), mobile banking (Alalwan et al., 2017), and smartwatch (Wu et al., 2016). Min et al. (2008) claim that UTAUT has been used to explain almost 70% variance in individuals' behaviour. However, UTAUT also has limitations as it was developed considering the organizational context to explain employees' acceptance of technology. Thus, Venkatesh et al. (2012) propounded UTAUT2 an extension of the UTAUT model to the context of consumer technology acceptance.

Tamilmani et al. (2021) and Dwivedi et al. (2019) identified several limitations so UTAUT based theories. Additionally, Dwivedi et al. (2019) performed a meta-analysis and structural modeling (MASEM) to address the limitations, such as limited and scarce use of moderator relationships in the undertaken research by the scholars. Dwivedi et al.'s (2019) revised model, meta-UTAUT, includes attitude as a mediating relationship, and they claim that such inclusion has increased the model explanation. The construct attitude plays an essential role on individual's behavioural intentions towards performing underlying behaviour, especially during the early stages of adopting technology. It is appropriate to consider the meta-UTAUT model to understand mobile payment services adoption of Indian consumers. Because it is less complicated to use and also utilizes an additional variable attitude to increase the explanation of the model. However, it still contains some limitations as it does not include context-specific constructs. Since the current study examines the Indian consumer adoption behaviour of mobile payment services in the context of the COVID-19 pandemic, it is important to include contextual constructs to capture all possible aspects of mobile payment. Protection motivation theory (PMT) examines the coping behaviour of an individual when faced or informed with a

threatening event (Rippetoe and Rigers, 1987). An individual exhibits coping behaviour based on the coping response, which is a net evaluation of an individual's threat appraisal and coping appraisal. While threat appraisal is assessed via perceived severity that determines an individual's evaluation of the level of the danger. Coping appraisal is determined by self-efficacy of an individual's evaluation of his/her ability to cope and avert the potential loss or damage from the threat. Scholars argue that individuals exhibit certain behaviour during the adoption of goods or services when facing certain threats. For instance, in the case of adoption of anti-spyware technological solutions (Liang & Xue, 2010), mobile health solutions (Lv et al., 2012), and wearable solutions for healthcare (Wang et al., 2015), certain specific behaviours were found to be exhibited by the individuals. The constructs (perceived severity and self-efficacy) are found to be apt to employ alongside meta-UTAUT as adoption of mobile payment services is affected by perceived health threats. Such an inclusion help to address the context of adoption behaviour of mobile payment services considering the prevailing COVID-19 pandemic situation.

Potent research in the domain of mobile payment services considering the COVID-19 pandemic context is scarce. Therefore, additional constructs derived from PMT (perceived severity and self-efficacy) are included alongside meta-UTAUT constructs in the current study. The present study was performed to study and examine the relevant factors affecting the adoption of mobile payment services considering the prevailing COVID-19 pandemic situation. Figure 1 illustrates the proposed research model considering the appropriate hypothesis. The proposed research model comprises of a total 9 hypotheses. The model has retained six hypotheses (H1, H2, H3, H4, H8 and H9) of the meta-UTAUT model. The proposed research model includes 3 new hypotheses (H5, H6, H7) with three new relationships. While one of the new relationship within in the existing meta-UTAUT model is referred as new internal mechanisms. The other relationships (hypotheses: H6, H7) spawned due to

involvement of new external variables and existing endogenous variables are referred to new endogenous mechanism (Dwivedi et al., 2020).

<<Insert Figure 1. Proposed research model (Source: Adapted from Dwivedi et al., 2019)>>

2.2 Hypotheses Development

In this section, hypotheses development is elaborated covering aspects of variables relationships in the context of the proposed model.

2.2.1 Performance expectancy

Performance expectancy (PE) refers to the consumer perception of the specific technology or information system to offer benefits to perform activities (Alalwan et al., 2017; Baabdullah et al., 2019; Venkatesh et al., 2012). Venkatesh et al. (2012) argue PE to be the significant predictor of consumers' beliefs and intentions for technology adoption. Several studies (e.g., Alaeddin et al., 2018; Bailey et al., 2017; Tian & Dong, 2013; Wulandari, 2017) have established relationships of PE on consumer's attitude in the mobile payment systems context. Both in Eastern (Aslam et al., 2017; Tian and Dong, 2013) and Western context (Bailey et al., 2017; Schierz et al., 2010) concerning mobile payment services adoption, researchers have highlighted the impact of PE or its surrogate perceived usefulness on attitude to be significant. Therefore, it could be argued that mobile payment services during COVID-19 exhibit a positive attitude towards service usage. Thus, the following hypothesis is formulated:

H1: Performance expectancy positively impacts consumer attitude towards behavioural intention for mobile payment services.

2.2.2 Effort Expectancy

Effort expectancy (EE) refers to the degree to which consumer perceives the technology as easy to use (Venkatesh et al., 2012). Studies investigating the adoption of technology or mobile payment systems resulted in mixed outcomes. For instance, while several studies (e.g. Bailey et al., 2017; De Luna et al., 2019; Karjaluoto et al., 2010; Schierz et al., 2010; Wulandari, 2017) consider the positive relationship between EE and adoption of service or technology. However, Aslam et al. (2017) argue that there exists a non-significant relationship between EE and adoption of service or technology. India has the second-largest mobile subscribers. Despite having a huge number of subscribers in India, mobile payment service usage is not high. However, COVID-19 poses a threat to use such services. Thus, this research argues that EE impacts consumers' attitude towards usage of mobile banking (contactless) payment services. Therefore, we posit the following hypothesis:

H2. Effort expectancy positively impacts consumer attitude towards behavioural intention for mobile payment services.

2.2.3 Social Influence

Social influence (SI) relates to the degree to which consumers perceive specific technology important considering the peer and important people's opinions (Baishya & Samalia, 2020; Venkatesh et al., 2012;). Several studies considering UTAUT and UTAUT2 have found SI to be a significant predictor of behevioural intentions (Sharma et al., 2020) under the moderating variables such as age, gender, and experience. However, Dwivedi et al. (2019) validated the significance of SI without any moderating variable. Additionally, few other studies (Guo & Lu, 2017; Musa et al., 2015; Oliveira et al., 2016) in the scope of mobile payment systems adoption have established SI to be significant. Thus, we posit the following hypothesis:

H3. Social influence positively impacts consumer behavioural intention for mobile payment services.

2.2.4. Facilitating conditions

Facilitating conditions (FC) refers to the consumer belief about the availability of necessary infrastructure, resources, and support to accomplish a behaviour (Dwivedi et al., 2007; Venkatesh et al., 2012). Several studies (e.g., Morosan & DeFranco, 2016; Sivathanu, 2019) have found FC to be a significant influencing behevioural intention. A few studies (e.g., Oliveira et al., 2016) found such relationships as non-significant. The reason for the same is that the undertaken research is targeted for the specific sample of the university. As such, the respondents do need any particular infrastructure or resources to utilize the services. Thus, the FC relationships resulted as non-significant. The current study focuses on gathering data from diverse backgrounds. Additionally, scholars have established significant relationships of FC on EE or its surrogates (e.g. perceived ease of use) (e.g., Stefi, 2015; Venkatesh & Bala, 2008). It is argued that the availability of the operational infrastructure, including training programs, necessary organizational and technology infrastructure, and knowledge to facilitate the mobile service usage and transactions, would help consumers to perform essential operations and commerce and as such following hypotheses are formulated:

H4. Facilitating conditions positively impacts consumer behavioural intention for mobile payment services.

H5. Facilitating conditions positively impacts effort expectancy.

2.2.5 Perceived severity

Perceived severity measures the extent of the individual's consequences due to the threat (Milne et al., 2000). Scholars argue the indirect influence of perceived severity on intention to use technology or systems. Several studies have found significant relationship of perceived severity and attitude (e.g. Gao et al., 2015; Zhao, & Zhou, 2018). Zhao, & Zhou (2018) confirmed perceived severity as significant predictor for attitude towards adopting mobile health services. Gao et al. (2015) confirmed perceived severity as a significant predictor affecting consumers' attitudes towards adopting healthcare-based wearable technology solutions. It is argued that individuals perceived severity threat from the COVID-19 pandemic situation affects attitude. As such, the following hypothesis is formulated:

H6. Perceived severity positively impacts consumer attitude towards behavioural intention for mobile payment services.

2.2.6 Self-efficacy

Self-efficacy measures the ability of an individual to perform a particular task by using technology (Venkatesh et al., 2003). Several studies have endorsed the influence of Self-efficacy on effort expectancy towards adopting technology (e.g, Balkaya & Akkucuk, 2021; de Veer et al., 2015; Shiferaw et al., 2021). Self-efficacy was confirmed as a significant predictor for effort expectancy towards consumers adoption intention of Internet technology (de Veer et al., 2015). Additionally, Balkaya and Akkucuk (2021) confirm the influence of self-efficacy on effort expectancy towards consumers adoption intention of the learning management system. In another research work, Shiferaw et al. (2021) observed self-efficacy to be significantly influencing effort expectancy. It is expected that individuals' self-efficacy during the COVID-19 pandemic situation influence effort expectancy. As such, we posit the following hypothesis:

H7. Self-efficacy positively impacts effort expectancy.

2.2.7 Attitude toward using mobile payment services

Attitude refers to the degree to which consumers evaluate the behaviour in question resulting to positive or negative evaluation (Ajzen, 1991). Existing studies argue that a user's adoption of digital technology is affected by his/her positive attitude no matter how sophisticated is the technology (Dwivedi et al., 2007; 2017; 2019; Dwivedi, & Weerakkody, 2007; Huang and Liaw, 2005). The meta-UTAUT propounded by Dwivedi et al. (2019) argue that attitude plays a significant role in explaining the model and understanding consumer use of technology. Additionally, scholars have also supported influence of attitude on behavioural intentions (Schierz et al., 2010; Wulandari, 2017) with in the mobile payment systems context. As such, following hypothesis is proposed:

H8. Attitude towards using the mobile payment services positively impacts consumers' intention to use it.

2.2.8. Behavioural intentions toward use behaviour for mobile payment services

Behavioural intention (BI) refers to the willingness and effort of the individual to perform the underlying behaviour. Scholars argue that intentions could possibly capture various motivational factors that influence individuals to perform a behaviour. However, majority of studies limit their Dwivedi et al. (2011) claim to establish a significant relationship of behavioural intention on use behaviour. Several studies (e.g., Alaeddin et al., 2018; Bailey et al., 2017; Kumar et al., 2018; Wulandari, 2017) consider behavioural intention as a surrogate to use behaviour. But, other studies have also warned of measuring behavioural intention use without actually assessing the actual use of technological systems (Wu & Du, 2012). A few studies (e.g., (Sivathanu, 2019) established the significant relationship of behavioural intention

on actual use of the digital payment. However, no study investigates the impact of this relationship for behavioural intention and use behaviour towards mobile payment services considering the COVID-19 pandemic situation. As such, the following hypothesis is proposed:

H9. Consumers' behavioural intention for mobile payment services positively impacts their use behaviour.

3. Research Methodology

The current research study followed the quantitative survey methodology as the validated instruments were readily available from the earlier studies (Cheah et al., 2020; Patil et al., 2020; Rana et al., 2013; Slade et al., 2015b) to measure the latent constructs. Additionally, Patil et al. (2020) suggest to adopt the quantitative survey methodology when the latent constructs can be measured by the validated scales. The survey questionnaire was developed considering the constructs, see Table 1, resulting to 35 questions, Table 2. The questions were framed and adapted to eliminate confusing, controversial, or leading questions. In the mobile adoption studies, scholars (for example, Patil et al., 2020) argue the importance of seven-point Likert scale for a wider coverage and have utilized it to measure the latent constructs. Since, the validated constructs were readily available and measured on a seven-point Likert scale, hence seven point Likert scale comprising of scores ranging from 1(="Strongly disagree") to 7(="Strongly agree") was deployed to assess the Latent constructs indirectly. We adopt a non-probability convenience sampling technique to gather the data as it is economic, efficient, simple to implement, promising for capturing high quality data (Bornstein et al., 2013; Jager, Putnick & Bornstein, 2017; Sharma et al., 2021; Yao et al., 2015) and provide control over type of the respondents (Chatzi- georgiou et al., 2019). Earlier studies have also confirmed and supported the use of a convenience sampling technique (Patil et al., 2020; Saunders et al., 2007).

A two-step procedure comprising of expert evaluation and pilot study was adopted to validate the questionnaire. Scholars have suggested seeking expert support to evaluate and validate the questionnaire (Saunders et al., 2007; Hair et al., 2010). Firstly, experts from an elite Institution of India were contacted to assess the survey questionnaire as this research study is focused on Indian context. Secondly, a pilot study was conducted among 30 Indian students to gather the feedback on the readability aspects of the questionnaire (Bhattacherjee, 2012; Saunders et al., 2007). Based on the feedback, not much modification was made, except a few corrections in spelling mistakes and layout.

Online channels (for example, LinkedIn, Facebook sharing Google forms to collect data) do not have any time and space barrier and are considered apt to gather the survey information (Couper 2017; Evans & Mathur, 2018; Upadhyay et al., 2021). Additionally, researchers utilized online channels to gather the survey data to avoid any physical contact or distribution of physical documents during COVID-19. The survey was distributed through social networking sites (Saunders et al., 2007; Upadhyay et al., 2021) to gather responses from general public (for example LinkedIn and Facebook sharing Google survey form) and to staff and students of two elite educational Institutions via email. Ilieva, Baron, and Healey (2002) recommend an average response time of 5.59 days to garner data through online surveys. Considering the slack time due to Pandemic (COVID-19), the survey was kept online for 21 days. We received complete filled inputs from 411 respondents. Armstrong and Overton (1977) suggest checking for a non-responsive bias considering measures of normality, kurtosis, and skewness of the differences and performed t-tests to verify the means of early respondents and late respondents (Kline, 2011). However, non-responsive bias risk was found to be low as researchers did not observe any significant difference in the early (response received within 7 days) and the late responses. We utilize G*power v3.1.9.2 software to compute the minimum sample size required considering statistical power (Faul et al., 2009). To achieve the statistical

power of 0.95 with an effect size of 0.05, a sample size of 264 is required. As a result, the sample size of 411 was considered for further analyses, which is sufficient sample size to conduct a statistical analysis (Deb & David, 2014; Sharma et al., 2019).

PLS-SEM is considered as effective for synthesizing an exploratory study like this (Hair et al., 2018). PLS-SEM works effectively to test the complex model without any sample restriction (Willaby et al., 2015; Upadhyay et al., 2021). PLS-SEM analysis was conducted using SmartPLS 3.3.2 software to verify the proposed theoretical model and hypotheses (Lim et al., 2021; Ringle, Wende & Becker, 2015). The analysis of the measurement model was accomplished considering the construct's reliability and validity. Several parameters were considered to analyse the structural model, such as R^2, $Q^2\_predict$ and path coefficients (Henseler, Hubona & Ray, 2016). Additionally, for assessing the model fit (goodness of fit), prominent factor such as standardized root mean square residual (SRMR) is used as the potential measures (Cheah et al., 2020; Henseler, Hubona & Ray, 2016; Tenenhaus et al., 2005).

<<Insert Table 2 Items and Source of constructs>>

4. Results

4.1 Profile of respondents

Table 3 depicts the demographic characteristics such as gender, age, education, marital status and occupation of 411 respondents. Sample represents that 64.96% of the respondents are male while 35.02% are female. Respondents aged between 18 and 24 years (43.79%) and 25 and 30 years (19.96%) represented 63.74% of the total sample. Respondents aged between 31 and 35 years (23.11%), and 36 and 40 (25.42%) represented 48.53% of the total sample. Finally, respondents aged above 40 years represented 8.75% of the sample. The respondents are

dominated by those who have bachelor's degree as the majority respondents (i.e. 74.20%) held bachelor's degree, while 17.27% of the respondents pursued master degree course and 6.08% of the respondents held doctorate degree. Only 2.43% of the respondents were senior high school graduate. Additionally, 27.76% of the respondents are married, while 73.23% of the respondents are single. Sample represents 48.66% as students, while 25.79% have occupation in the Public Sector. Private Sector occupation is represented by 20.68% respondents. While the remaining respondents have occupation as – Unemployed (2.91%), Pensioner (0.24%), and Self-Employed (1.70%).

<<Insert Table 3 Sample profile>>

4.2 Common Method Bias

The research study is also prone to common method bias (CMB) due to the inherent attribute of the self-report survey (independent and dependent variables were from the same respondents). Thus, the Harman's single-factor test was employed to test for the CMB. Even, the recent studies (for example, Cheah et al., 2020; Patil et al., 2020; Sharma et al., 2021) recommend to utilize the Harman's single-factor to test for CMB. The result of the Harman's single-factor test showcased the absence of the CMB due to the cumulated variance value of 35.076 % which is well below the suggested threshold value of 50% (Fuller et al., 2016; Podsakoff et al., 2012; Sharma et al., 2021).

4.3 Measurement Model assessment

The measurement model is assessed based on the constructs reliability and validity. The construct reliability is evaluated considering composite reliability (CR) and convergent validity. Hair et al. (2017) suggest value of CR to be greater than 0.70. Besides, convergent validity is established when items' loading and average variance extracted (AVE) are greater

than 0.70 and 0.50 respectively (Hair et al., 2017). Table 4 depicts that all constructs are having recommended values for CR (>0.70), items' loading (>0.70) and AVE (>0.50). The discriminant validity (DV) signifies the degree to which each of the constructs measure different variables. Henseler et al. (2015) suggest constructs to have Heterotrait-Monotrait Ratio (HTMT) criterion value not more than 0.85 to achieve discriminant validity (Sharma et al., 2021). The HTMT scores of all constructs do not violate the threshold value of 0.85, Table 5. Additionally, as the bi-variate correlations are less than the square root of AVE the evidence acceptable level of discriminant validity (Fornell and Larcker, 1981), Table 5.

<<Insert Table 4 Constructs reliability and validity>>

<<Insert Table 5 Discriminant validity>>

4.4 Structural model assessment

After verifying the reliability and validity of the measurement model, the next step is to analyze the structural model to verify the hypothesized relationship (Hair et al., 2017). Several parameters were considered to analyse the structural model, such as R^2, Q^2_predict, path coefficients and confidence intervals (Henseler et al., 2016). Henseler (2012) suggest using measurement of approximate fit such as standardized root mean square residuals (SRMR) (Hu & Bentler, 1999; Henseler et al., 2016) to test the structural model Goodness of Fit (GoF). We examine the collinearity through lateral collinearity test (VIF) to ensure the absence of multi-collinearity. Normally, the values of VIF 3.3 or higher, indicate a potential collinearity (Diamantopoulos & Siguaw, 2006). Since, VIF of the constructs (falls within in the range 1~2.72) are far below the cut-off range thus the absence of multi-collinearity is established. Hair Jr et al. (2014) suggest running bootstrapping procedure considering 5000 samples to test the proposed hypotheses. The estimates of the relationships of the structural model are

captured through path coefficients (Streukens & Leroi-Werelds, 2016). The hypotheses have specified the relationships direction of the variables.

<<Insert Table 6 Hypothesis Test results>>

We can observe from Table 6 and Figure 2 that the construct attitude has the highest significant impact on behavioural intention towards using the mobile banking (contactless) payment services (H8: AT→BI; β = 0.720, t=9.441, p<0.0001). Additionally, the constructs facilitating condition demonstrate effect on the behavioural intention (H4: FC→BI; β = 0.212, t= 2.639, p<0.0001). However, the relationship between social influence and behavioural intention is not confirmed (H3:ns). The construct behaviour intention depicts high effect on use behaviour (H9: BI→UB; β = 0.707, t= 8.945, p<0.0001). The construct facilitating condition signifies high effect on effort expectancy (H5: FC→EE; β = 0.640, t= 7.643, p<0.0001). While, self-efficacy depicts the positive effect on effort expectancy (H7: SE→EE; t= 3.031, β = 0.211, p<0.0001). The constructs performance expectancy (H1: PE→AT; β = 0.458, t=4.588, p<0.0001), perceived severity (H6: PS→AT; β = 0.121, t= 2.053, p<0.0001) and effort expectancy (H2: EE→AT; β = 0.328, t= 3.121, p<0.0001) demonstrate significant effect on attitude.

<<Insert Figure 2. Mobile Payment Services Adoption Model>>

The variance and the explanation of the model is captured through the predictor variables of the endogenous construct (effort expectancy, attitude, behavioural intention, and use behaviour) of the model. In the theorized model, the variance is explained through UB (50.10%) , BI (77.8), AT (60.5%), and EE (55.10%). Table 6 depicts the effect size (f^2) values demonstrating the large effect on the outcome. The f^2 values of use behaviour (1.001), attitude (0.576), effort expectancy (0.796) and behavioural intention (1.510) indicate a large effect in

generating predictability of the model (Cheah et al., 2020; Chin et al., 2003). Finally, PLSpredict technique is employed to determine the predictive relevance (Q^2_predict) of the model (Sharma et al., 2021). It is found that Q^2_predict values for use behaviour (0.417), attitude (0.555), effort expectancy (0.524) and behavioural intention (0.635) demonstrates that the model is predictively valid (Chin et al., 2020; Shmueli et al., 2019), Table 6. We also checked the GoF index. Henseler (2012) suggest using measurement of approximate fit such as standardized root mean square residuals (SRMR) (Hu & Bentler, 1999) to test the structural model GoF. The model is considered as a good fit when SRMR value is less than 0.08. The estimated model's SRMR value is (SRMR = 0.069), which means that it is considered a good fit.

5. Discussion

In this research, the meta-UTAUT model has been utilized as the primary theoretical lens to understand and explore the Indian consumers' mobile (contactless) payment services adoption. Additionally, constructs (perceived severity and self-efficacy) from protection motivation theory were utilized considering the COVID-19 pandemic context of the study. The proposed model included four endogenous (i.e., behavioural intentions, use behaviour, attitude, and effort expectancy) and five exogenous variables (i.e., performance expectancy, facilitating conditions, social influence, perceived severity, and self-efficacy) through 9 paths (H1-H9). The current model extends the meta-UTAUT (and UTAUT model) by including the COVID-19 context-specific constructs and relationships to understand the behavioural intention and use behaviours of the Indian consumers towards the adoption of mobile payment (contactless) services. The model explained variance of 77.8% on Indian consumers behavioural intention towards adoption of mobile payment services, which has strengthened the findings as compared with the studies done by Patil et al. (2020), Alshare & Mousa (2014), Gupta et al.

(2019), and Slade et al. (2015b) resulting in the variance between 60% and 68%. However, none of the studies have considered actual use behaviour as an outcome variable and their attitude to influence consumers' adoption of mobile payment (contactless) services, especially considering the COVID-19 pandemic situation. Therefore, the current research fills this gap and provides model variance of 50.10% and 60.5% on Indian consumer use behaviour and attitude towards consumers adoption of mobile payment (contactless) services. The current model has strengthened the variance of use behaviour and attitude as reported in the study performed by Patil et al. (2020).

Performance expectancy has emerged as the significant predictor of the Indian consumers' attitude towards adopting mobile payment services. The findings are inline with the studies undertaken on mobile payment adoption by Patil et al. (2020), Alaeddin et, al. (2018) and Shaikh et al. (2018). The findings confirm that Indian consumers value utilitarian support for availing mobile payment services and it is vital factor contributing to their attitude towards adopting mobile payment services. In the current model, performance expectancy has emerged as the fourth significant factor and indicates that utilitarian behaviour of the experienced consumer has influence on use beahviour. As such, confirmation of significant performance of the mobile payment services may create better perception and utility of the service. If the performance is expected or higher than it leads to the adoption of the mobile payment services. Besides, effort expectancy emerged as the significant predictor of attitude reaffirming this relationship in the domain of mobile payment adoption (Patil et. al., 2020; Shaikh et al., 2018). The current research confirms that effort expectancy is important for the consumers as they seek easy to use façade to avail the services. Considering high outflow of applications and subscription to various application based services, it is important the easy to use façade to be considered to influence consumers' adoption of the those applications and services. Additionally, perceived severity has also emerged as the significant factor influencing the

attitude of the Indian consumers towards adoption of mobile payment (contactless) services. A possible reason for having perceived severity as significant is due to the prevalent information about COVID-19 pandemic across the world, including its spread and death toll (Elflein, 2021). Further, India has imposed several lockdown and unlockdown during the first and second waves of the pandemic (Kumar, 2021). The pandemic has developed perception of severity of a disease among Indian consumers and contributes to their attitude towards mobile payment services adoption. The finding confirms that Indian consumers have a high perception of the disease severity, and mobile payment services help them avoid physical cash-based transactions. Dou et al. (2017) study confirms the importance of perceived severity on consumers attitude towards adopting technology in the context of mobile healthcare solutions. Thus, perceived severity is the significant predictor of the Indian consumers attitude towards adoption of mobile payment services.

Several existing research studies (Patil et al., 2020; Morosan & DeFranco, 2016; Sivathanu, 2019) have confirmed the role of facilitating conditions towards adopting technology in the mobile payment domain. While Patil et al., (2020) establish the influence of facilitating condition construct on behavioural intention of Indian consumers for mobile payment. Sivathanu (2019) confirms the relationship for the digital payment context. Besides, Morosan & DeFranco (2016) identifies facilitating conditions significantly affecting behaviour intentions of consumers in using near field communications in USA. However, there are a few studies (for e.g., Slade et al., 2015a ; Baptista & Oliveira, 2015) mentioning such relationships as non-significant. In the current research, the significance of such a relationship signifies the availability of infrastructure, resources and support to consumers for developing intentions towards mobile payment services. Besides, facilitating conditions also significantly influenced effort expectancy (FC$\rightarrow$ EE, 0.640***), resulting in the third strongest path in the model. Patil et al. (2020) and Stefi (2015) have reported high influence of facilitating condition on effort

expectancy or its surrogates (e.g. ease of use). In the current research, it is argued that availability of necessary resources, infrastructure and support influence consumers intention towards mobile payment services. Self-efficacy has also found to be affecting effort expectancy. Balkaya and Akkucuk (2021) confirms the relationship of self-efficacy on effort expectancy. They argue that self-efficacy help the teachers to use learning management system technology in the classroom. Besides, Singh and Srivastava (2018) identified self-efficacy influencing perceived ease of use towards behavioural intention to use mobile banking. It is argued that preventive health behavior perception triggers adoption of mobile payment services as it helps in avoiding physical cash or touching objects, surfaces and people while performing transactions thereby reducing likelihood of virus contraction. Besides, consumers who perceive less severity while using mobile payment services may inclined towards usage of mobile payment services. Thus perceived severity and self-efficacy emerged as a critical factor which leads to the mobile payment service adoption.

Besides, attitude has emerged as the strongest factor influencing intentions of consumers towards mobile payment services. This signifies the role of considering attitude an important construct and adapting meta-UTAUT model while understanding behavioural intention and the behaviour of consumers towards technology adoption. However, social influence is resulted as a non-significant relationship to behavioural intention. Possible reason for having social influence as non-significant towards behavioural intention is due to the prevailing COVID-19 pandemic situation and the inherent need of initiating contactless transactions. Several mandates have been released by the Government addressing to follow COVID-19 appropriate behaviour which help the people to follow social distance and avoid any physical contact with object, human or surfaces. Such protocols push people to adopt certain services and thus adoption of such services are not primarily influenced by the peer group. For example, Fastag (contactless) services at the toll plaza have been pushed by the Ministry of Road Transport and

Highways, Government of India, during COVID-19 to minimize operational issues and prevent health threat, thereby travelers and commuters are inclined to use it. Similarly, It is argued that public mandates or Government imposed protocols that help oneself to avoid any potent threat influence intention to adopt technology or services. There are a few studies that disapproved the significance of social influence (or its surrogates like subjective norms) on consumers' intention towards adopting technology (for e.g. Alalwan et al., 2017; Riffai et al. 2012; Gerrard and Cunningham, 2003).

Finally, use behaviour as an outcome variable has behaviour intention as antecedent. Very few studies (e.g. Patil et al., 2020; Salahshour Rad et al., 2019; Escobar-Rodrguez et al., 2014; Sivathanu, 2019) have measured such a relationship in the domain of technology and digital payment. Since Indian consumers are habituated towards using physical cash as driven by their culture (Sivathanu, 2019), it is argued that consumers having high intent to use mobile payment services would also likely to use such services.

5.1 Implications to Theory

The current research work has contributed immensely to theory. Firstly, it has extended the meta-UTAUT model with the COVID-19 context-specific constructs and relationships. The undertaken work has strengthened the explanability of the model (Patil et al., 2020; Whetten, 2009, p. 37). Secondly, it has empirically validated the meta-UTAUT model, which is a step forward in filling the research gaps towards understanding and explaining Indian consumers behavioural intention and use behaviour towards mobile payment services, especially in the COVID-19 context. The inclusion of context relevant variables such as perceived severity and self-efficacy and their association with the existing meta-UTAUT framework have enriched the context of the study. The current research study also included new association in the existing meta-UTAUT framework, FC→EE. Such a inclusion has increased variance of the

model (Patil et al., 2020; Whetten, 2009). Thirdly, new association and inclusion of constructs have strengthen the contribution of the research to theory. Researchers can utilize the proposed model and use it to understand consumers' behaviour intention and use behaviour of other similar socio-economic developing countries. Finally, The model explained variance of 77.8% on Indian consumers behavioural intention, 50.10% and 60.5% on Indian consumer use behaviour and attitude respectively, towards consumers adoption of mobile payment services. The current model has strengthened the variance of behavioural intention, use behaviour, and attitude as compared to existing studies (e.g., Patil et al., 2020).

This research thus makes a significant contribution to the mobile banking and technology adoption literature by describing the context-specific constructs and relationships, more specifically to the Indian context, to explain the consumer's behaviour intention and use behaviour of mobile payment services. Mobile payment service adoption considering the developing countries and COVID-19 context has not been comprehensively studied. This study attempts to fill this gap by exploring relationships amongst the exogeneous and endogenous constructs. By detailing the relationship between these constructs, this study makes a significant contribution to mobile banking literature. In particular, the most significant contribution is its work on the process by which the effect of perceived severity, self-efficacy, and attitude is accountable for behavioural intention and use behaviour towards mobile payment services. One of the significant theoretical contributions of this study is its context-specific integrated model and investigation of endogenous (i.e., behavioural intentions, use behaviour, attitude, and effort expectancy) and exogenous variables (i.e., performance expectancy, facilitating conditions, social influence, perceived severity, and self-efficacy). Other existing studies failed to consider such a context and thus have limited contributions. The proposed model is more inclusive with high explainability than existing studies as it relies on the context-specific integrated approach.

5.2 Implications to practice

The current study offers a holistic understanding of significant factors influencing Indian consumers adoption of mobile payment services in the COVID-19 context. The facilitating condition is an important factor to consider as it significantly influences behavioural intention and use behaviour. It is suggested that policy makers, regulators and solutions providers must ensure availability of necessary infrastructure, resources and support. Besides, suitable training and support programmes that may lead to improved understanding of mobile payment services in the COVID-19 context can be designed and materialized. Additionally, performance expectancy has emerged as significant, which means service providers and marketers targeting Indian consumers need to ensure the sharing of relevant information confirming usage of mobile payment services (Bailey et al., 2017). Since effort expectancy contributes to the third strongest variable, it is essential for the vendors, developers, service, and solution providers to appropriately design and offer the services that will ease the usage of the applications and services (Dwivedi, et al., 2019). The banks and other service providers can share appropriate information and include relevant service façade to engage Indian consumers towards mobile payment services. Such a relationship also offers managers guidance to incorporate suitable features and add-ons to improve mobile payment services such as wallets (Alaeddin et al., 2018).

The study confirmed the role of protection motivation theory constructs (perceived severity and self-efficacy) in Indian consumer's behavioural intention and use behaviour towards mobile payment service during the pandemic. The study reflects the health protection behaviour towards establishing resilience during (health) crisis. The study highlights the crucial role of self-efficacy and perceived severity in consumers' confidence in using the service. The introduction of the mobile payment service reduces the requirement of physical transactions,

thereby reducing the likelihood of direct contact with surfaces, objects, and people to avoid contracting the disease (Chang et al., 2020; Eikenberry et al., 2020; Fong et al., 2020). The policymakers need to address the consumer's mobile payment service utilization as a health financial tool. Additionally, service providers and policymakers can provide suitable, appropriate, and timely information depicting mobile payment service as a preventive health behaviour in the context of COVID-19 (Chang et al., 2020). As such, consumer's health literacy needs to be enhanced by rolling out effective health communication, which helps to mobilize consumers (IOM, 2004). A health-related score can also be explored and developed for mobile payment service usage, motivating consumers to adopt and use the service. Additionally, Service providers, including fintech companies and banks, are recommended to improvise the design, layout, content, and features of mobile payment services to match the capabilities of the consumers. As such, a user-centric service design approach can be considered to address the complexity of using the service. Besides, an appropriate market segment needs to be explored to identify consumers' perceived severity level (who are more likely to experience threats). Accordingly, tailored-made training programs need to be developed. Additionally, awareness programs, audio-visual campaign and relevant content addressing the health benefits of mobile payment service needs to be developed. Service providers should develop strategies and execute relevant mechanisms to enhance the consumers self-efficacy to stimulate the adoption and usage of mobile payment services.

5.3 Limitations and future research

The current research study is also not devoid of limitations. Firstly, a non-probability convenient sampling technique has been adopted. Earlier studies have also confirmed and supported the use of a convenient sampling technique (Patil et al. 2020; Saunders et al., 2007). The data collection was restricted to the online mode to avoid any physical contact considering

the COVID-19 situation. Additionally, online surveys are very likely to exclude those in the target population without internet access (Bhattacherjee, 2012; Zikmund et al., 2013) and thus it is advisable to adopt the mixed approach using both paper-print and web-based to distribute the survey instrument to gather data (Evans & Mathur, 2018; Sharma et al., 2021). Secondly, most of the respondents were educated, internet friendly, and adopters of mobile payment services. Thus usage of a non-probability sampling should not have achieved a substantial impact on the results of this study. However, future studies can investigate non-adopters and compare the results with the studies performed on the adopters. Additionally, future studies can undertake a probability sampling based study and compare the results with the studies which have employed non-probability convenient sampling technique. Additionally, the questionnaire was in the English language. As India depicts a multilingual and multi-cultural country, future studies can consider questionnaires in different languages to capture diverse respondent bases. Besides, the sample is dominated by male (64.96%), thus future studies can examine the role of gender in adoption of mobile payment services. Finally, the scope of the current research is limited to the COVID-19 context or related chronic diseases where major preventive mechanisms such as social distancing and avoidance of physical contacts are vital.

6. Conclusion

This research study aimed at identifying and examining the important factors that could affect consumers' behavioural intention and use behaviour towards mobile payment services during COVID-19. It has extended the meta-UTAUT model with perceived severity and self-efficacy factors. A convenient sampling technique has been utilized to gather data from Indian consumers through a self-administered questionnaire. The data collection was restricted to the online mode to avoid any physical contact considering the COVID-19 situation. The model was tested empirically with 411 respondents data. The model demonstrate the inclusion of

context relevant variables such as perceived severity and self-efficacy and their association with the existing meta-UTAUT framework have enriched the context of the study. The findings revealed that perceived severity and self-efficacy both emerged as an indirect determinant of consumer use behaviour through attitude and effort expectancy. Additionally, facilitating conditions found to have a significant positive impact on effort expectancy; self-efficacy has a significant positive impact on effort expectancy; attitude has a significant positive impact on behavioural intention; and behavioural intention has a significant positive impact on use behaviour. Social influence did not confirm any significant relationship. The undertaken work has strengthened the explanability of the model. The model explained variance of 77.8% on Indian consumers behavioural intention, 50.10% and 60.5% on Indian consumer use behaviour and attitude respectively, towards mobile payment services. The current study offers a holistic understanding of significant factors influencing Indian consumers adoption of mobile payment services in the COVID-19 context.

Acknowledgments

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