

Service quality and self-determination theory towards continuance usage intention of mobile banking

Intention of mobile banking

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Abstract

Purpose – This research set out to investigate the quality service and self-determination theory (SDT) that contributes to the continuance usage of m-banking.

Design/methodology/approach – A valid of 310 respondents who experienced and intensified using the m-banking is collected. The proposed research model is empirically tested using structural equation modelling.

Findings – The result informs that the service quality can not only be significantly mediated by the SDT, but it also has a direct effect to the satisfaction. It also informs that the satisfaction and the perceived usefulness indeed have a significant effect to the continuance usage intention of the m-banking. In addition, it also demonstrates that the perceived competence and perceived relatedness of the SDT significantly influence satisfaction and perceived usefulness towards the continuance usage intention of the m-banking.

Practical implications – Practically, the results inform the bank management the factors to be taken into account to increase the motivation of the existing customers for them to continue using the m-banking.

Originality/value – Theoretically, these results contribute to the existing literatures of the m-banking by introducing the SDT that determines the continuance usage intention of it.

Keywords Satisfaction, Service quality, Perceived usefulness, Mobile banking, Self-determination theory, Continuance usage intention, Continuance usage

Paper type Research paper



1. Introduction

Using the m-banking technology means that customers are allowed to access their bank accounts and make all type of transactions as the manual ones but from anywhere and anytime. Transactions in this context, including retrieving the latest transactions, quick

access to peer-to-peer transfer, electronic bill payments, balance checking, remote check deposits and fund transfers between a customer's or another's accounts (Asnakew, 2020). What is need for all these transactions are only a smartphone with installed m-banking application. As aimed for improving the efficiency and effectivity of the transaction, this leads of it to be sustained used. In addition, all the benefits of harnessing the technology drive bank customers to adopt it as they can be able to process the transactions privately using their smartphone efficiently instead of queuing in the bank office or ATM or using internet banking (Thusia and Maduku, 2020; Rahi and Ghani, 2019a). Its inception in the banking industries provides comfortability, reliability and ease of use (Thusia and Maduku, 2020). The continuance usage of m-banking is also driven by the popularity of the mobile payment (m-payment) (Handarkho, 2020; Yu *et al.*, 2018) and e-wallet services (Singh, 2020; Ren and Tang, 2020; Grover and Kar, 2020). In fact, most businesses have turned to be cashless since the credit card era (Kumar *et al.*, 2018). This is not to mention that the cashless method is not only now a fast-growing demand for most people as the effective and efficient transactions, but more importantly, it is critical in the pandemic era of COVID-19 that stroke all nations since early this year. This is as advocated by the World Health Organisation to be the precaution measures to contain the spread of the COVID-19. What is needed from the individuals is to adapt to a new cashless environment. This shift is easily adopted as it is a demand from most people. Put simply, the m-banking has been radicalising effectively and efficiently the way individuals transact or purchase in any circumstance these days. For the banks, providing the m-banking service is part of the continuous effort because of its aim to retain the existing customers and is part of the promoting the bank *per se* to reach the customers. It essentially benefits both the providers and the customers *per se*. Therefore, continuous usage of m-banking by the customers has been the subject of researchers and practitioners. These scholars (Shankar *et al.*, 2020; Thusia and Maduku, 2020; Foroughi *et al.*, 2019; Yu *et al.*, 2018; Rezvani *et al.*, 2017; Yuan *et al.*, 2016) use various information system (IS) theories to examine the factors that might contribute the most to retain the m-banking customers who already used it, for instance, expectancy conformation theory (ECT) (Singh, 2020; Mandari *et al.*, 2020), DeLone and McLean IS (D&M IS) (Sharma and Sharma, 2019), trust transfer theory (Yuan *et al.*, 2019; Yu *et al.*, 2018), social impact theory (Handarkho, 2020), technology acceptance model (TAM) (Asnakew, 2020) and technology continuance theory by including the self-efficacy and channel preference (Foroughi *et al.*, 2019).

Although the benefits of m-banking are widely recognised, it also poses various challenges to its service providers, particularly its continuance usage by the existing customers. These challenges rely not only towards the investments that have been put in place to develop the m-banking environment to both the providers and the users, but more importantly it is because of the competitive advantage. In other words, only retaining users and facilitating users' continuance usage can recover these costs and achieve success (Yuan *et al.*, 2019; Yu *et al.*, 2018). Banks can only achieve success and recover their heavy investment in m-banking by retaining the existing users (Foroughi *et al.*, 2019). In addition, acquiring new customers may cost as much as five times more than retaining existing ones, given the costs of searching for new customers, setting up new accounts and initiating new customers to a particular IS (Bhattacharjee, 2001). As such, investigating the continuance usage of IS is the pathway towards successful implementation of IS.

In this context, individuals who adopt an m-banking initially might represent their need for an efficient and effective way for managing their transactions. But creating an environment in which the m-banking users who already accept it might be able to continue using it is intriguing. This is because the motivations between those who are the earlier

adopters of the m-banking are different and it is impossible to understand nor control all of them. This can be seen from the previous literatures showing that, for instance, although the user's satisfaction to an m-banking is positive, the coefficient of determination (R^2) of the continuance intention is only less than 60% (Poromatikul *et al.*, 2020; Asnakew, 2020; Yuan *et al.*, 2019; Rahi and Ghani, 2019a; Foroughi *et al.*, 2019; Rezvani *et al.*, 2017). In other words, this instance informs that the continuance intention can only be explained by 60% of its predictors' factors. There is 40% the unknown factors that contribute to the continuance intention of the m-banking. This is not to mention that these factors might have different impacts in the different socio-demographic contexts. One of the factors that are widely acknowledged to be the prominent one determining the users' continuance intention is the quality of the service and the product of the m-banking *per se*. In other words, once the users are satisfied with the quality of the product offered and service provided of the m-banking, they will keep using it with no intention to switch to others (Kumar *et al.*, 2018; Arcand *et al.*, 2017; Yuan *et al.*, 2016).

As mentioned earlier, equipping an m-banking environment encompassing good service qualities of the technology and the customer service that are suitable and useful for the users are envisaged as the most relevant way to retain the m-banking users (Shankar *et al.*, 2020). The significance these particular service qualities at improving the users' motivations intrinsically to continued use the m-banking is of the concern of the research. These service qualities perceived by users are seen to be the motivations that drive them intrinsically to continue using the m-banking. According to Deci *et al.* (1994), intrinsic motivation is an innate behaviour of an individual but it can also be developed in a certain condition. Deci *et al.* (1994) postulate that individuals' perceptions to the competence of a product or service, relatedness to others and autonomy to initiate activities might be the factors to measure the intrinsic motivation of them. Thus, self-determination theory (SDT) (Deci *et al.*, 1994) is used as a framework to understand the intrinsic motivation of the users once they decide to keep using an m-banking. Unlike the extrinsic motivation in which a user decides to pursue something because of an external motive, e.g. the reward or punishment, intrinsic motivation is build based on the users' self-awareness. On the one hand, SDT is envisaged as a representative framework to portray the motivation of the users' continuance intention of m-banking. Essentially, using SDT to understand the continuous usage of a particular IS/information technology (IT) based on service quality as the antecedent is not new, for instance, as in here (Rahi and Ghani, 2019a; Kumar *et al.*, 2018). However, this research differs from the previous ones in two different ways. First, in this research, service quality of interaction, the outcome and the technology *per se* are understood as a whole of interrelated factors composing the service quality, whereas in the previous ones, service quality is generally seen from the technology perspective only determining the individuals' motivations. Second, as earlier explained that the focus of the research is to understand the intrinsic motivation based on the service quality factors as it guarantees the long-term motivation to continued use of the m-banking (Deci and Ryan, 2008), whereas in the previous ones, they use both intrinsic and extrinsic motivations. On the other hand, this can also be seen that there is a dearth of the literature that uses service quality as the antecedent for the SDT in portraying the intrinsic motivation of the users in the continuance usage intention of the m-banking. Thus, this research is set out to fill this gap by using the SDT in capturing the intrinsic motivation of the m-banking users. In particular, how the service quality of the product and service influence the users' motivation to keep using the m-banking.

The paper is organised as follows. Section 2 provides the theoretical background overview. The research model and hypotheses are developed in Section 3. This is followed

by the research methodology in Section 4, and data analysis in Section 5. The theoretical and managerial implications, the limitations and directions for future research are discussed and concluded in Section 6.

2. Theoretical background

2.1 Service quality of m-banking

Service quality of the m-banking has been a continuous concern by various researchers (Shankar *et al.*, 2020; Poromatikul *et al.*, 2020; Mostafa, 2020; Sharma and Sharma, 2019; Baabdullah *et al.*, 2019; Kumar *et al.*, 2018; Arcand *et al.*, 2017; Jun and Palacios, 2016). Preceding to elaborating the service quality of the m-banking, a clear definition of the m-banking and the service quality themselves should be put in place. Essentially, there are various scholars that attempt to provide definitions regarding the m-banking (Shaikh and Karjaluoto, 2015; Barnes and Corbitt, 2003). Semantically they are similar. We adopt the most recent one offered in here (Shaikh and Karjaluoto, 2015), that m-banking can be defined as “a product or service offered by a bank or a microfinance institute (bank-led model) or Mobile Network Operator/MNO (non-bank-led model) for conducting financial and non-financial transactions using a mobile device, namely a mobile phone, smartphone, or tablet” (p. 131). In the context of research, the mobile-based technology (m-banking) is the media that facilitates the engagements between the users and the bank providers/financial institutions. Compared to the traditional engagements, the interaction between these two parties occurs virtually/electronically. As such, measuring the service quality in this context needs to be adapted correspondingly. We follow the definition of Fassnacht and Koese (2006, p. 25) that describes the e-service quality as “the degree to which an electronic service is able to effectively and efficiently fulfill relevant customer needs.” Essentially, the existing body of research on service quality suggests that there should be a more relevant and suitable criteria to measure the electronic service quality (e-service quality) (Parasuraman *et al.*, 2005; Santos, 2003). Generally, these proposed criteria are aimed to measure the service obtained and the expectations perceived by customers of an IS use. These gaps between the real one and the expectation can be categorised in two major dimensions to be better understood: technical and functional (Gronroos, 1984). While technical quality refers to how well the core service meets the customer expectation (the outcome quality), functional quality is defined as to how the service production and delivery process are perceived (interaction and environment qualities).

Given that using the m-banking is a personal activity of the customer as they access all the banking services using their own mobile phone, providing the services that meet the customers' expectation is urgent. Therefore, the gap between the expectation and the experience needs to be measured unequivocally to be the feedbacks by providers for improving the m-banking itself (Jiang *et al.*, 2002). However, measuring the quality *per se* cannot be straightforward and in fact it is not easily articulated by both customers and providers (Parasuraman *et al.*, 1985). Not only is it unlikely to measure it using only one single construct (Lu *et al.*, 2009; Gronroos, 1984), more importantly it has to be based on the environments and the adoption contexts of a particular IS use (Abbas and Hamdy, 2015). Therefore, in this research the service quality of the m-banking can be effectively measured in these three dimensions: interaction, environment and outcome quality.

Interaction quality refers to “the quality of a customer's interaction with the mobile service provider during the service delivery” (Lu *et al.*, 2009, p. 232). Put simply, interaction quality is about the quality of the interaction between the customer and the bank as the provider. It is related to the experiences that might be perceived during the interaction with the bank providers in case of an issue encountered by customers (i.e. given the constraints

under which the provider and customer cannot be met physically). Thus, it is heavily influenced by the dimensions of quality of the attitude and expertise of the bank providers in handling the complaints (for instance, the staff that handles the call centre of the bank), problem-solving during the interaction with the consumers and how well the detail and up-to-date the information provided by the staff during the problem solving with the customers (Lu *et al.*, 2009). Environment quality is described as the consumer's evaluation of the quality of equipment that is used, the extent to which the interface is well designed and the extent to which the service is delivered under proper contexts (Abbas and Hamdy, 2015). Put simply, it is about how well the environment supports the m-banking service to be delivered and accessed effectively by both provider and customer, respectively. The last one is the outcome quality. It essentially reflects how well the service perceived by the customers once it delivers to. It is "what the customer is left with when the production process is finished" (Gronroos, 1984, p. 38). The advance of m-banking allows the bank as the service provider to deliver and offer the information and the banking products directly to the customers by only using the mobile devices. This provides not only ease of use of the offered products but also the efficiency as the customers can access the product anytime and from anywhere. Therefore, ascertaining m-banking service quality to the customers is sought regularly by the providers to improve the product itself and to retain the existing customer.

2.2 Self-determination theory

The concern of the SDT essentially rests on the motivation of individuals. According to Deci and Ryan (1985), SDT refers to the individual motivation to carefully pick up and control a choice made. It views human beings as proactive organisms whose natural or intrinsic functioning can be either facilitated or impeded by the social context (Ryan and Deci, 2002). SDT hypothesises that instead of only the amount of motivation as the unitary concept to measure the individual's motivation, for instance, someone who has more and less motivation, what is more important is the types of it. Specifically "[. . .] the type or quality of a person's motivation would be more important than the total amount of motivation for predicting many important outcomes such as psychological health and well-being, effective performance, creative problem solving, and deep or conceptual learning" (Deci and Ryan, 2008, p. 182). In SDT, the motivation can be categorised as intrinsic and extrinsic ones. While intrinsic motivation is a volition as someone feels an enjoyment and interest of doing it, extrinsic motivation is a tendency to do something as it might have a reward in return (Deci and Ryan, 1985). Deci and Ryan (1985) defined it as autonomous and controlled motivations. SDT posits that extrinsic motivation can encourage a person to behave in a certain way to achieve a short-term goal, but fail to maintain that particular behaviour over time (Villalobos-Zúñiga and Cherubini, 2020). This is essentially in line with the context of the research, that is, to ensure the continuance of the m-banking instead of adopting it as a new emerging technology.

Behaviour change interventions that are designed based on extrinsic motivation fail to produce modifications of behaviour that last once the intervention ends. In contrast, in a case under which individuals reach the intrinsic level of motivation, they develop a self-determined behaviour towards the activity they aim to achieve. In this particular state, interventions are no longer needed as the modification behaviour has been internalised and persistent to the individuals (Deci and Ryan, 1985). Therefore, as described earlier, what is needed is not to control the motivation as it might affect only in short-term, but to create an environment in which individuals can feel interest and enjoyment so as to the motivations can be internalised intrinsically to the individuals (Deci and Ryan, 1985). In the context of this study, SDT will be the theoretical foundation to understand the factors that contribute

for the users' perception of the satisfaction and the perceived usefulness of the m-banking. Once these both are positively affected by the SDT factors, they will significantly influence the continuance intention to use the m-banking. Based on SDT, to be able to do that, three basics of psychological requirement need to be set up. They are: autonomy, competence and relatedness (Ryan and Deci, 2002). Autonomy refers to the desire to self-initiate and self-regulate own behaviour. Competence refers to the desire to feel effective in attaining valued outcomes, and relatedness refers to the desire to feel connected to others (Sorebo *et al.*, 2009). The SDT argues that to be able to optimally achieve the outcome of a set of activities, these three factors need to be satisfied continually. This is pursued by creating an environment to feel enjoyment and interest for the individuals to keep them intrinsically motivated.

2.3 Post-adoption model of is continuance

Investigating IS continuance is a continuing concern within various business organisations. While IS acceptance is important as the first step to transcend business organisations to be more effective and efficient in their activities, its post-adoption intention is critical to the competitive advantage. As argued that "the importance of continuance, *vis-à-vis* acceptance, is evident from the fact that acquiring new customers may cost as much as five times more than retaining existing ones, given the costs of searching for new customers, setting up new accounts and initiating new customers to the IS" (Bhattacharjee, 2001, p. 352). Drawing from the ECT, Bhattacharjee (2001) posits that any IS continuance is determined by the acknowledgment that the IS usage is useful and it satisfies the determined processes. In line with this paradigm, the perceived usefulness and satisfaction are the representative predictors to measure the continuance usage intention of the m-banking.

Continuance intention, as argued by Hellier *et al.* (2003), is a process in which an individual decides to continue to use a particular service or product from a particular party instead of switching to the competitors. While initial acceptance of IS is an important first step towards realizing IS success, long-term viability of an IS and its eventual success depend on its continued use rather than first-time use (Bhattacharjee, 2001). The continuance usage refers to a long-term or sustained use of an IT by individual users over a period of time. In the context of the research, m-banking continuance usage intention of the m-banking is demonstrated by the time an individual kept using the m-banking service instead of switching to other products (i.e. that individual also has more than one bank account and they are all also offering the m-banking services). Thus, the continuance usage of a particular m-banking reflects that it significantly meets the expectations of the individuals towards the m-banking services. The two antecedents of satisfaction and perceived usefulness are found to predict continuance intentions (Bhattacharjee and Lin, 2015). This is simply as users are more likely to rely more on their satisfaction than the relatively unknown future expectations. In addition, perceived usefulness and satisfaction have proven to be salient predictors of continued IS usage and success (Rezvani *et al.*, 2017). In a particular IS adoption, once individuals are satisfied in using it, they are more likely to continue using that particular IS.

The perceived usefulness *per se* is engrained in TAM (Davis, 1989), which is aimed to measure to what extent individuals perceive that the adoption of a particular technology is useful for them to enhance their performance. The perceived usefulness contributes to the satisfaction feeling perceived by individual in using the m-banking. In other words, perceived usefulness contributes to the m-banking continuance intention directly and indirectly mediated by satisfaction. In an m-banking acceptance, once individuals perceive that it is useful for them, it not only enhances the satisfaction to them towards the use of it, but it is most likely that they will continue to use the technology. In a similar vein,

satisfaction is another factor that can be able to determine the m-banking continuance usage. It is primarily related to the expectation of individuals towards the m-banking usage. It is the overall level of customer pleasure and contentment resulting from experience with the service (Hellier *et al.*, 2003). The customers will be satisfied once the m-banking adoption meets their expectations for completing the tasks they require. Once the services of m-banking have met the user’s expectation, then they are categorised to be satisfied (Singh, 2020; Sharma and Sharma, 2019; Foroughi *et al.*, 2019). The m-banking helps individuals in accomplishing tasks, in this context, it is financial-related activities, efficiently and effectively. Once the individuals’ satisfactions rise, their propensity to continue using the m-banking also increases.

3. Research model and hypotheses development

Research model proposed in this research is drawn in Figure 1. In the figure, our proposed model shows as to how the factors and their relations of service quality and the self-determination factors: perceived competence, perceived relatedness and perceived autonomy, determine the satisfaction and perceived usefulness of the continuance usage intention of the m-banking.

As previously described, the perceived usefulness and satisfaction are envisaged to have a significant contribution in determining the IS post-adoption (Bhattacharjee and Lin, 2015). These factors and their relations are elaborated in the following and are the basis of our hypotheses development. It is worth noting that service quality factor in this research is based on the one as in here (Lien *et al.*, 2017; Abbas and Hamdy, 2015) comprising interaction, environment and outcome qualities. However, as previously explained, as we aim to investigate these factors as an integrated one, we therefore do not treat them as independent ones separately. Instead, we combine them as an integrated service quality to be easily overseen. In other words, our interest is not to foresee the relations of each of these quality factors in their relation as the second-order constructs but to examine them as an integrated one. This approach has been common and widely investigated in IS research.

3.1 Relationship between service quality and self-determination theory

As earlier described, the relation between the service quality that influences the users’ motivations to retain their usage of the banking service has been acknowledged previously (Shankar *et al.*, 2020; Rahi and Ghani, 2019a; Sharma and Sharma, 2019; Kumar *et al.*, 2018). In Rahi and Ghani (2019a), the results reveal that the service quality has a significant impact on the user satisfaction which then contributes to the technology usage continuance. They are based on the service quality in their research model on D&M IS success model. Although their research focuses on the continuance usage intention of the internet banking service, it shows that the service quality statistically has a significant effect on the users’ motivation to continue used the m-banking technology. Similarly in Kumar *et al.* (2018), service quality is an external construct to be added to the expectation confirmation model that is related to the

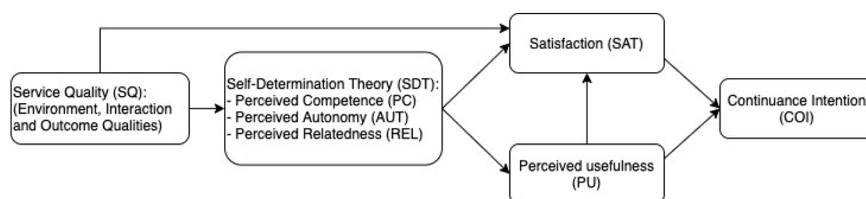


Figure 1.
Proposed research
model

SDT. The findings of their research inform that the service quality has a significant effect statistically on the user satisfaction of the m-banking which in turn contributes to the continuance usage of the m-banking.

As described the continuance usage intention of a particular IS is heavily affected by the acceptance or experience in using the m-banking technology in a certain period of time. As the users of the m-banking interacted with the services provided including the trouble shooting and problem-solving they encounter through their smartphones, then the perceived competence is assumed to be affected from these interactions. As argued by [Kumar et al. \(2018\)](#), it is crucial for a bank as a m-banking provider to have a sufficient and relevant knowledge to be able to provide a premier service to its customers. The more the perceived competence of the services provided, the higher the service quality perceived by the users of the m-banking product. In other words, the perceived competence the m-banking service by the users does not only inform the satisfaction level but also the knowledge relevancy the users' needs. This feeling, to some extent, influences the well-being subjectively of the users in this particular context. This is because the well-being concept itself, as argued by [Ryan and Deci \(2001\)](#), can be unpacked into various sub-concepts such as competence, confident, autonomy, relatedness and self-efficacy. Thus, it is not a surprise that [Ryan and Deci \(2001\)](#) later posit that the perceived competence and confident with respect to valued goal are associated with enhanced personal well-being [See also, for instance, [Deci and Ryan \(2008\)](#) and [Vansteenkiste et al. \(2004\)](#)]. As such someone's well-being is also directly proportional with both perceived relatedness and autonomy ([Ryan and Deci, 2001](#)). That is, the higher the perceived relatedness and autonomy of an individual, the higher the subjective well-being will be and otherwise. Well-being itself is essentially an optimal psychological functioning and experience ([Ryan and Deci, 2001](#)). It is about life satisfaction and fulfilling one's live ([Best et al., 2014](#); [Thrash et al., 2010](#)). Extensive research has shown that there appears a strong link between well-being and perceived relatedness ([Best et al., 2014](#)).

Therefore, understanding factors that effects well-being might improve our understanding of relatedness. However, perceived autonomy itself has been inherently an inseparable concept of well-being. Being autonomous means that someone who can be able to fulfil basic needs and is aligned with one's true self. These goals are well-internalized and therefore autonomous, and they emanate from intrinsic or identified motivations. People who attained more self-concordant goals had more need-satisfying experiences, and this greater need satisfaction was predictive of greater well-being ([Ryan and Deci, 2001](#)). On the other hand, the relationship between service quality and well-being is that individuals who are satisfied with m-banking service quality provided, their well-being status improves. This, for instance, is shown in here ([He et al., 2020](#); [Su et al., 2016](#)). These scholars confirm that the service quality affects satisfaction and well-being. Taken together, well-being is imbued from the presence of satisfaction perceived by individuals from their perceived service quality, in which it determines the perceived competence, relatedness and autonomy. Thus, in the context of the research, while service quality of the m-banking perceived by individuals relates to their well-being status, this state determines their perceived competence, relatedness and autonomy. In other words, the better service quality of the m-banking provided in terms of environment, interaction and outcome, the more satisfaction and well-being perceived by individual. This leads them to be more related to be more autonomous, competence and relatable. Withstanding these, we then hypothesise that:

- H1.* The service quality significantly influences the perceived competence.
- H2.* The service quality significantly influences the perceived relatedness.

H3. The service quality significantly influences the perceived autonomy.

H4. The service quality significantly influences the satisfaction.

3.2 Relationship between self-determination theory and satisfaction and perceived usefulness

This post-adoption of the m-banking essentially is determined by how satisfying and useful the m-banking is perceived by its customers in which they decide to keep using it. Once the services perceived by the customers are effective, then these will increase the satisfaction of the customers which lead them to continue use of the product (Bhattacharjee, 2001). In other words, the continuance usage intention can be both predicted directly by the level of perceived usefulness of the m-banking customers and also indirectly with the mediation of the satisfaction factor (Bhattacharjee, 2001). The users that have been intrinsically motivated to retain their usage of a particular technology essentially reflect that they are satisfied to it and perceive that it is useful to their behaviour. These relations have been the subjects of various researches (Nikou and Economides, 2017; Rezvani *et al.*, 2017). The perceived usefulness is highly related to the benefits obtained by customers through their engagements with the m-banking use over a certain period of time. It effects significantly to the customers over the course of their daily routines. In a similar vein, the satisfaction is also the primary factor in determining the continuance usage intention. In fact, the customers have a tendency to rely more on their satisfaction than on relatively unknown future expectations to determine the continuance intention of the m-banking (Rezvani *et al.*, 2017). That the satisfied users are more likely to continue their engagement with the m-banking or they will discontinue using it otherwise (Bhattacharjee and Lin, 2015).

In their research, Rezvani *et al.* (2017) demonstrate that while satisfaction is only influenced by perceived competence, the perceived usefulness is effected by the three SDT factors: perceived autonomy, perceived competence and perceived relatedness. The coefficient determination of perceived usefulness is quite substantial ($R^2 = 49\%$) which means that these three factors contribute to that percentage to determine the perceived usefulness. In addition, their findings also inform that the perceived usefulness has a significant effect to the satisfaction. In other words, once the users perceive that the IS is useful to transform the leadership style across the organisation, they will be satisfied using it. This in turn leads them to continue use the system. While in Nikou and Economides (2017), their results show that perceived relatedness and perceived autonomy have a significant effect on the perceived usefulness but the perceived competence. As perceived competence means that with a good service quality of the m-banking the customers believe they are capable to process the task using the application completely; this finding informs that the users perceived that the system does not provide enough quality for them to adopt the mobile-based assessment as an alternative computer-based assessment mode. Therefore, we derive the following hypotheses:

H5. The perceived competence significantly influences the satisfaction.

H6. The perceived competence significantly influences the perceived usefulness.

H7. The perceived relatedness significantly influences the satisfaction.

H8. The perceived relatedness significantly influences the perceived usefulness.

H9. The perceived autonomy significantly influences the satisfaction.

H10. The perceived autonomy significantly influences the perceived usefulness.

3.3 Relationship between the perceived usefulness and satisfaction with the continuance intention

Both perceived usefulness and satisfaction are the prominent factors that determine the continuance intention of the m-banking (Rezvani *et al.*, 2017). These, for instance, are also echoed by other scholars (Sharma and Sharma, 2019; Foroughi *et al.*, 2019; Kumar *et al.*, 2018). These researches conclude that the perceived usefulness of the customers of the m-banking is reflected through the intention to continued use of the product. For the customers, this is marked by the perceptions that using the m-banking is found effective and beneficial for them to complete their financial-related activities, for instance, in the process of money transferring, e-commerce payment and bill and so on. These perceptions then significantly contribute to the continuance usage intention of the m-banking (Mandari *et al.*, 2020). The higher the perceived usefulness of the m-banking the bigger the effect to the continuance usage intention of the application (Foroughi *et al.*, 2019). The perceived usefulness also influences the satisfaction perceived by customers through the m-banking usage. This means that the particular attitude is derived from the prior m-banking use, and therefore it can be viewed as experience response to the usage of that application (Bhattacharjee and Lin, 2015).

In Rezvani *et al.* (2017), while the results inform that both satisfaction and perceived usefulness have a significant effect statistically on the continuance usage intention of the information system, they also unveil that both satisfaction and perceived usefulness can moderately determine its variances ($R^2 = 38\%$). In other words, both constructs determine 38% of the variance of the IS continuance intention. In Rahi and Ghani (2019a), the finding shows that satisfaction positively impacts the continuance usage intention of internet banking. It also reveals that both satisfaction and perceived usefulness substantially control 75.4% of the variance of the continuance usage intention. Essentially, the perceived usefulness and the satisfaction that contribute positively to the continuance usage intention can be observed in the m-payment systems (Singh, 2020; Handarkho, 2020; Yu *et al.*, 2018; Azizah *et al.*, 2018), internet banking (Yuan *et al.*, 2019; Rahi and Ghani, 2019b) and medical-related IS (Cheng, 2020; Hadji and Degoulet, 2016), to name a few. Once the customers are satisfied in using the IS, it increases their continuance usage intention of the product. Therefore, the following hypotheses are proposed:

- H11.* The perceived usefulness significantly influences the continuance intention.
- H12.* The perceived usefulness significantly influences the satisfaction.
- H13.* The satisfaction significantly influences the continuance intention.

4. Research methodology

4.1 Research instrument

This is a quantitative type research. Therefore, we need a valid sample size that sufficiently meets the minimum requirement to proceed to the analysis stage. The sample for this research is gathered using a questionnaire with the focus to the m-banking users in Indonesia. We develop the questionnaire using Google form with the aim to submit it online to the target respondents efficiently. It is also part of the concern of a prevention measure during the condition of pandemic COVID-19. In addition, to be able to reach the more potential respondents geographically, this online questionnaire will be efficient. The developed questionnaire is composed of two parts. The first part is related to the question to ensure that respondents meet the required criteria: whether they are m-banking users and whether

they are m-banking frequent and weekly users (early adopters that tend to continued use it). These are the control questions to be asked first to ensure whether or not the respondents need to complete the questionnaire. If the answer is positive, the respondents can move to the second part which is about a series of questions regarding the demography of respondents and regarding the hypotheses development. Out of 319 respondents who respond to the questionnaire, only 310 of them can be further processed as they completed it. The responses from the respondents are measured using a five-point of Likert scale by which 1 (one) to 5 (five) represent completely disagree, disagree, neutral, agree and completely agree, respectively. Prior submitting the questionnaire to the respondents, it is piloted by all authors, four bachelor students, a professor and two senior lecturers of IS department to increase its readability and improve its ambiguities. Once the questionnaire is ready, we submit through social media channels such as Line, Instagram and Twitter. We approached the data collection by embracing a convenience sampling technique for the data collection. This technique is type of a non-random or nonprobability sampling by which target population meets certain criteria, e.g. accessibility, geographical proximity and willingness to participate (Etikan *et al.*, 2016). This sampling technique is used as it is impossible to list all the m-banking users in Indonesia. Table 1 presents socio-demographic respondents.

As in Table 1, the majority of the respondents are those who are in between 17 and 25 years old comprising almost 80%, students consisting of nearly 71% and the income between IDR 1 and 5m is a bit less than 60% respondents. Out of the total respondents, a little over 77% are those who have been using the m-banking up to seven years and nearly

Category	Characteristics	Frequency	(%)
Age	17–25 years old	253	79.31
	26–35	36	11.29
	36–45	14	4.39
	46–55	15	4.70
	>55	1	0.31
Occupation	Private employee	57	17.87
	Others	21	6.58
	Students	226	70.85
	Government employee	9	2.82
Monthly income	Entrepreneur	6	1.88
	<IDR 1m	55	17.24
	IDR 1–5m	190	59.56
	IDR 6–10m	13	4.08
	IDR 11–15m	26	8.15
Usage period	>IDR 15m	35	10.97
	<1 year	62	19.44
	1–3 years	197	61.76
	4–5 years	1	0.31
	6–7 years	49	15.36
	8–10 years	7	2.19
Weekly usage intensity	>10 years	3	0.94
	<2 times	91	28.62
	2–3 times	106	33.33
	4–6 times	78	24.53
	7–10 times	28	8.81
	>10 times	15	4.72

Table 1.
Social demographic
respondents with
period and intensity
weekly of usage

67% are those whose intensity of using m-banking is more than one time but less than ten times a week. We are also informed from the questioner that the majority of the respondents use the m-banking for topping up their mobile wallet and e-commerce payment.

In this research, partial least square-structural equation modelling (PLS-SEM) of SmartPLS 3.0 is used as an analysis tool. PLS-SEM is primarily used to develop theories in an explanatory research (Hair *et al.*, 2011). SEM is characterised by its capability to estimate the relations of variables, describing the concept that has never been explored and develop a model that defines all the existing relationships (Sarstedt *et al.*, 2017). In addition, PLS-SEM is also suitable and works efficiently in handling small sample sizes (Hair *et al.*, 2011) (Sarstedt *et al.*, 2017; Astrachan *et al.*, 2014). A 310 valid respondents collected in this paper are definitely more than the ideal sample size in PLS SEM based on any metrics [for instance, based on “10-times rule” method of Hair *et al.* (2011) or the “inverse square root” and gamma-exponential” methods of Kock and Hadaya (2018)]. There are two model types in SEM, measurement model and structural model or also known as outer model and inner model, respectively (Sarstedt *et al.*, 2017). While measurement model represents a theory specifying relationships between elements of a path model, the structural model is a theory describing as to how a construct is related to other constructs. As such, in this research PLS-SEM is used as its nature as a tool to investigate the structures and the relationships between dependent and independent variables expressed in formulation (Sarstedt *et al.*, 2017). The confirmatory factor analysis (CFA) as part of the SEM is used as the research model and the hypotheses have been explicitly stated. It also focus on the modelling and the relationship between the observed indicators and the latent variables (Gallagher and Brown, 2013).

4.2 Operationalisation of variables

We use the validated measurement items gathered based on our thorough literature review in the context of the continuance usage intention of the m-banking. All these measurements items can be seen in Table 2. The service quality items are adopted and adapted from Abbas and Hamdy (2015). As earlier explained, the service quality factor comprises the interaction, environment and outcome qualities. In this paper, they are all listed in a single construct for measuring the service quality of the m-banking. There are seven, five and four items in service quality measuring the environment quality, interaction quality and outcome quality, respectively. An instance of the item for measuring the environment quality, interaction quality and outcome quality are “The m-banking can address all my problems when transacting using the application,” “I feel secured transacting using m-banking” and “I am very happy with the service provided by the m-banking to its customers,” respectively.

The perceived competence, perceived autonomy and perceived relatedness as the constructs composing the SDT, each of them is represented by four measurement items. For the perceived competence and relatedness, we adopted the items in each of them from Nikou and Economides (2017) and those in the perceived autonomy are adopted from Rezvani *et al.* (2017). An instance of perceived competence is “I feel I can complete my transaction using my m-banking,” the perceived autonomy is “I feel I can make choice and autonomy when using the m-banking” and the perceived relatedness is “I feel using m-banking makes me feeling closer to the bank.” Measuring the m-banking post adoption, the perceived usefulness is adopted from Nikou and Economides (2017), satisfaction is from Chung and Lee (2016) and continuance usage intention is adopted from Abbas and Hamdy (2015). The perceived usefulness, satisfaction and continuance intention are measured by three, four and four items, respectively. An example item of three of them is “m-banking is useful in helping my daily financial requirements,” “Overall, I feel satisfied using my m-banking” and “I want

No.	Measurement	Constructs	Items	LF	CA	CR	AVE
1	The m-banking can address all my problems when transacting using the application.	Service quality (SQ)	ENQ1	0.804	0.879	0.908	0.623
2	The m-banking provider provides all the information I need when transacting using the m-banking.		ENQ2	0.875			
3	The m-banking provider provides all the information related to the transaction using the application in time.		ENQ3	0.84			
4	The m-banking provider provides all the information related to the transaction I need.		ENQ4	0.861			
5	I feel secure transaction using m-banking.		INQ1	0.855			
6	I feel my credentials can be secured when using m-banking.		INQ2	0.873			
7	The m-banking gives the impression that it keeps promises and commitments.		INQ4	0.903			
8	I believe that m-banking can accommodate by best interest.		INQ5	0.798			
9	I am very happy with the service provided by the m-banking to its customers.		OUQ1	0.928			
10	I am happy with the service provided by the m-banking to its customers.		OUQ2	0.921			
11	I feel I can make choice and autonomy when using the m-banking.	Perceived autonomy (AUT)	AUT1	0.81	0.764	0.853	0.659
12	I feel stress when using the m-banking.		AUT2	0.75			
13	The m-banking I use gives me various interesting features.		AUT3	0.843			
14	I feel I can complete my transaction using my m-banking.	Perceived competence (PC)	PC1	0.794	0.766	0.865	0.681
15	I feel fluent in using my m-banking.		PC2	0.846			
16	I can be able to master the m-banking.		PC3	0.796			
17	I feel using m-banking gives me opportunities to get closer to the bank.	Perceived relatedness (REL)	REL1	0.874	0.921	0.932	0.82
18	I feel using m-banking makes me feeling close to the bank.		REL2	0.918			
19	I feel using m-banking makes me connected to the bank.		REL3	0.898			
20	Using m-banking improves my effective transactions.	Perceived usefulness (PU)	PU1	0.883	0.862	0.915	0.781
21	M-banking is useful in helping my daily financial requirements.		PU2	0.87			
22	Using the m-banking helps me to be more productive in my transactions.		PU3	0.895			
23	Overall, I feel satisfied using my m-banking.	Satisfaction (SAT)	SAT1	0.823	0.865	0.908	0.712
24	Overall, I feel happy using my m-banking.		SAT2	0.879			
25	Deciding to use m-banking makes me feel happy.		SAT3	0.797			
26	I am grateful that I decide using the m-banking.		SAT4	0.83			
27	I will continuously use services offered by m-banking.	Continuance intention (COI)	COI1	0.86	0.779	0.864	0.68
28	I want to retain my m-banking usage.		COI2	0.866			
29	I will recommend others to use m-banking.		COI4	0.725			

Table 2. Values of loading factors, Cronbach's alpha, composite reliability and average variance extracted of the constructs and the measurement items

to retain my m-banking usage” for the perceived usefulness, satisfaction and continuance intention, respectively.

5. Data analysis and result

5.1 Measurement model evaluation

As earlier mentioned, the measurement model evaluation is the first of two stages in the data analysis. It is also known as the outer model evaluation. It is aimed to ensure that the measurement items composing the proposed model describing the latent constructs are valid and reliable (Gallagher and Brown, 2013). As this is a reflective measurement model the CFA is used. CFA is used once the hypotheses are explicitly stated (Gallagher and Brown, 2013). The evaluation is begun by examining the loading factor (LF). This is as shown in Table 2.

As shown in Table 2, LF are generally accepted if the value is greater than 0.7 (Hair et al., 2014). The LF above 0.7 indicates that the construct explains more than 50% indicator’s variance demonstrating that the indicator exhibits a satisfactory degree of reliability (Sarstedt et al., 2017). In Table 2, therefore, all the measurement items with the LFs that are lower than the threshold are excluded. They are ENQ5-7, INQ3, OUQ3-4, REL4, PC4, AUT4, PU4 and COI3. In the measurement model evaluation, the first criterion to be measured is the internal consistency reliability of the constructs. Both Cronbach’s alpha (CA) and composite reliability (CR) values are used for this measurement. CA is generally the lower bound while CR is the upper bound. All the CA and CR values representing the internal consistency reliability are higher than 0.7, which are considered satisfactory. The next criterion to be measured is convergent validity, that is, to the extent to which a construct converges in its indicators by explaining the item variance (Sarstedt et al., 2017). In other words, this particular evaluation demonstrates to what extent an indicator is correlated to other indicators under the same construct. This particular validation is assessed by the average variance extracted (AVE) across all measurement items of a particular construct. The acceptable threshold for AVE is 0.5 or higher (Astrachan et al., 2014). As shown in Table 2, all the AVE values of all constructs are higher than 0.5, which are considered satisfactory.

Once the reliability and convergent validity have been successfully established and support the reflective measured constructs, the next criterion is to perform discriminant validity evaluation. The aim of this is to assess to what extent a construct is empirically distinct from other constructs. Particularly, this is aimed to show to what extent a construct correlates with other constructs and how distinctly the indicators represent only this single construct (Astrachan et al., 2014). In other words, the discriminant validity is aimed to measure that each of the constructs is unique and therefore each of them is used to represent a phenomenon that other constructs do not. Table 3 presents the discriminant validity evaluation. In the construct level, discriminant validity is evaluated by comparing square

	COI	AUT	PC	REL	PU	SAT	SQ
COI	0.825						
AUT	0.594	0.812					
PC	0.508	0.455	0.825				
REL	0.233	0.290	0.111	0.905			
PU	0.652	0.534	0.485	0.175	0.884		
SAT	0.643	0.600	0.509	0.242	0.594	0.844	
SQ	0.593	0.555	0.492	0.295	0.405	0.618	0.789

Table 3.
Discriminant validity
of the construct level

root of AVE value of a construct with its construct's correlations and towards other constructs. This is based on the Fornell-Larcker criterion (Hair *et al.*, 2017). In Table 3, the square root of AVE for each construct is greater than that particular construct's correlations and other constructs. This result indicates that discriminant validity is well established. As the measurement model evaluation provides support for the measurement quality, the structural model evaluation can be further proceeded. We show the discriminant validity in construct level in Table 3.

5.2 Structural model evaluation

Once we have confirmed that the construct measures are valid and reliable, the next step addresses the structural model evaluation. However, prior to proceeding this evaluation, we need to first assess the potential collinearity of the structural model. This is aimed to ensure that there is no high correlation between the constructs of the proposed model (Hair *et al.*, 2017). In other words, the information represented by the indicators might be redundant in the high collinearity which might cause the indicator to be not significant (Hair *et al.*, 2017). Therefore, assessing this is important prior to evaluating the structural model. The collinearity issue is measured by using the variance inflation factor (VIF). A related constructs value with the VIF is equal or higher than (\geq) 5 and/or equal or lower than (\leq) 0.2 demonstrating that they have collinearity issue. In this research, inner VIF value is drawn in Table 4. As in Table 4 the VIF values of the related constructs are shown in a permissible range; therefore, it can be proceed to the structural model evaluation.

The structural model evaluation is presented in Table 5. The table essentially lay outs the proposed hypotheses and whether they are accepted or rejected. In this research, the structural model evaluation is carried out using the two-tailed test with the significance level p -value that is equal or less than 5% (this means that t -statistic values should be or higher than 1.96) for the hypotheses to be accepted (Hair *et al.*, 2017). In Table 5, however, we also show the p -values of 1% and 10% representing the t -statistic values of 2.58 and 1.65, respectively. This is aimed to show the stricter and the looser significant values of the relationships in the structural model evaluation. As can be seen from the table, out of 13 developed hypotheses, two of them are rejected and 11 are accepted. $H7$ and $H8$ are rejected as the significant levels of both are lower than the threshold (the p -values for both are higher than 5% or their t -statistic values are lower than 1.96). The model of the evaluated hypotheses is finally presented in Figure 2. As drawn in the figure, the relationships between the perceived relatedness towards satisfaction and perceived usefulness are sketched in the dashed lines, meaning they are rejected as both are not statistically related.

Figure 2 depicts that compared to satisfaction, perceived usefulness has the strongest effect on continuance intention (path coefficients of perceived usefulness and satisfaction are 0.417 and 0.396, respectively). Figure 2 also shows that the effect on the satisfaction alone,

	COI	AUT	PC	REL	PU	SAT	SQ
COI							
AUT					1.361	1.802	
PC					1.262	1.549	
REL					1.093	1.133	
PU	1.546					1.565	
SAT	1.546						
SQ		1.000	1.000	1.000		1.676	

Table 4.
Inner VIF values

Table 5.
Path coefficient
evaluation

Hypotheses	T-statistics	P-values	Remark
H1 Service quality → Perceived competence	10.5	0***	Accepted
H2 Service quality → Perceived relatedness	6.176	0***	Accepted
H3 Service quality → Perceived autonomy	13.181	0***	Accepted
H4 Service quality → Satisfaction	4.346	0***	Accepted
H5 Perceived competence → Satisfaction	2.231	0.026**	Accepted
H6 Perceived competence → Perceived usefulness	5.212	0***	Accepted
H7 Perceived relatedness → Satisfaction	0.258	0.796	Rejected
H8 Perceived relatedness → Perceived usefulness	0.595	0.552	Rejected
H9 Perceived autonomy → Satisfaction	3.522	0***	Accepted
H10 Perceived autonomy → Perceived usefulness	6.908	0***	Accepted
H11 Perceived usefulness → Satisfaction	5.081	0***	Accepted
H12 Satisfaction → Continuance intention	6.445	0***	Accepted
H13 Perceived usefulness → Continuance intention	6.503	0***	Accepted

Notes: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

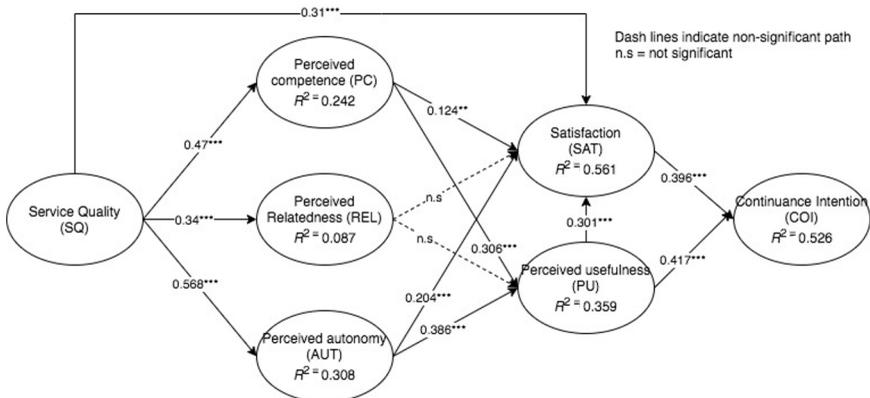


Figure 2.
Research model
evaluated

the service quality has the strongest one followed by perceived usefulness, perceived autonomy and perceived competence with the path coefficients of them are 0.310, 0.301, 0.204 and 0.124, respectively. In other words, although service quality, perceived competence, perceived autonomy and perceived usefulness have statistically a significant effect on the satisfaction, the service quality has the most significant effect to it. It can also be seen from Figure 2 that the relationship to the perceived usefulness, the perceived autonomy has the strongest effect with the path coefficient of 0.386 compared to the perceived competence to it with its path coefficient of 0.306. And the service quality has the strongest influence on the perceived autonomy compared to the perceived competence and perceived relatedness with the coefficient of three of them in a row 0.568, 0.470 and 0.340.

We also show the coefficient of determination (R^2) of the dependent variables in Figure 2. This is essentially the coefficient that indicates the variance in a dependent (endogenous) construct described by all of the independent (exogenous) constructs linked to it (Hair et al., 2017). In other words, this particular coefficient can be seen as the ability of all exogenous constructs in explaining the variance of the endogenous ones. The coefficient value

demonstrates a predictive power of the structural model path relationships and an indication as how best the model matches with the data obtained. R^2 value ranges from 0 to 1. High R^2 values indicate that the values of the dependent constructs can be highly predicted. R^2 values of 0.25, 0.50 and 0.75 are considered weak, moderate and substantial, respectively, on predictive power (Hair *et al.*, 2017).

As in Figure 2, the coefficient of determination of the constructs of continuance intention, satisfaction and perceived usefulness are in a row 0.526, 0.561 and 0.359, respectively. This means that while the first two constructs are considered to have a substantial predictive power of 52.6% and 56.1%, respectively, of the variance of each of them, the third one demonstrates to have a moderately predictive power of 35.9% of its variance. In other words, the satisfaction can be explained substantially by 56.1% of the service quality, perceived usefulness, perceived competence and perceived autonomy (perceived relatedness has no significant effect to satisfaction). This applies to continuance intention and perceived usefulness. In a similar vein, the coefficient of determinations of perceived competence, perceived relatedness and perceived autonomy are in a row 0.242, 0.087 and 0.308, respectively indicating that 24.2%, 8.7% and 30.8%, respectively, of the variances of each of them are influenced by the single construct, that is, service quality. Although the service quality comprises the environment quality, interaction quality and outcome quality, however, are viewed in general as a service quality in this research. In addition, although the coefficient of determination of perceived relatedness is only 0.087 describing that its only predictor, the service quality factor has only 8.7% the predictive power to it; however, statistically it has no significant effect to the satisfaction and perceived usefulness. Thus, this factor is omitted from the discussion.

6. Conclusion and discussion

6.1 Discussion of general findings

The proliferation of mobile technology has increased the urgency of m-banking usage as it offers efficiency, usability and convenient. It can be used to process financial transaction privately, anywhere and anytime (Shankar *et al.*, 2020). On the one hand, it does not necessarily mean that those who already adopted it will always perceive its benefits. There are factors determining its continuance usage intention. However, on the other hand, for the bank, accelerating the m-banking adopting as well as retaining its existing users guarantee the success in a competitive and dynamic business environment in the banking sector (Shankar *et al.*, 2020). One of the most relevant ways to ensure this is by improving the service quality to its users. The results of this study reveal that multiple benefits positively influence the attitude towards m-banking service which, in turn, affect the continuance intention to use the m-banking services.

First, satisfaction and perceived usefulness factors demonstrate to have a positive impact directly towards the m-banking continuance usage. Because the users perceive that the m-banking is useful for them, they are more likely to have attitude to continue the m-banking usage. The perceived usefulness also contributes to influence the users' satisfaction. In other words, once the users are satisfied with the service quality provided by the m-banking, it influences directly on the continuance m-banking usage. This implies that for the m-banking early adopters, for them to retain their m-banking usage, they will seek the usefulness of the technology. They examine that during the m-banking usage, it has been significantly improving their financial tasks and helping them to be more productive. The m-banking technology equipped with a significant service quality materialised as the representations of the interaction, the environment and the outcome qualities will be the key determinants for them to continue their m-banking usages. Once they are satisfied with the service qualities

provided by the bank provider, they are most likely to retain their usage. Thus, for the user, they will examine whether these qualities are part of their m-banking usage.

Second, another predictor for foreseeing whether the existing users would like to sustain their m-banking usage is by perceiving their intrinsic motivation. Unlike extrinsic motivation in which users will adopt or retain their usage to a particular technology because of the rewards or punishment they will get, intrinsic motivation indicates that the users become aware by themselves of the technology usefulness that help them to be more productive in their financial activities. They see that technology improves their productivity and let them to be more effective and efficient in these activities. These awareness are influenced through the service quality provided during their early usage of the m-banking. They can see that the m-banking equipped with the useful and relevant service qualities meet their needs which in turn making them satisfied to that technology. These awareness are perceived in improving the users' motivation to continue the m-banking usage. This is in line with the previous scholars, for instance, [Rahi and Ghani \(2019a\)](#), that the service quality has a significant effect on the users' satisfaction which can lead to improve their intrinsic motivation to retain their m-banking usage. In this research, this particular motivation is measured using the perceived competence, relatedness and autonomy recognised by the users. Their relations to the satisfaction and perceived usefulness inform that once the users perceive that during their usage they feel competence, relatedness and autonomy in their decisions that are related to their financial activities, then they are more than likely to continue their usage of the m-banking. Our findings confirm that the satisfaction and the perceived usefulness are influenced by both the perceived competence and the autonomy, but the perceived relatedness. This implies that the service quality indeed improves the users' intrinsic motivation to continue use the m-banking. However, the service quality only significantly influences the perceived competence and autonomy. These results support the pervious one ([Rezvani et al., 2017](#)) that the perceived relatedness has no significant effect statistically on the users' motivation.

Third, these results generally inform and improve our understanding of the relation between service quality and the SDT at improving the continuance usage intention of the m-banking application. Although the context of the research is in Indonesia, compared to the previous ones, for instance, investigating the continuance usage intention of m-banking in India ([Kumar et al., 2018](#)) or the continuance usage intention of an IS in Malaysia ([Rezvani et al., 2017](#)) or in here ([Rahi and Ghani, 2019a](#)) that examining the internet banking continuance usage in Pakistan, or however, the results of this study supports those ones in that the service quality significantly influences the intrinsic motivation to the continuance usage intention of the m-banking.

6.2 Theoretical implications

Theoretical implications of this research are fourfold. First, this study contributes to the growing body of knowledge about the literatures of the continuance usage intention of the m-banking. Taking into account the benefits and its role in the competitive advantage of banking services, investigating the continuance usage intention of m-banking has been a continuous concern in the IS research ([Mandari et al., 2020](#); [Handarkho, 2020](#); [Foroughi et al., 2019](#); [Yuan et al., 2019](#); [Sharma and Sharma, 2019](#); [Kumar et al., 2018](#); [Rezvani et al., 2017](#); [Arcand et al., 2017](#)). Their aims are clearly to scrutinise the antecedents contributing to retain as many as the early adopter of the m-banking to be the loyal customers for a long-term competitive benefit. Majority of these scholars portray the continuance intention based on the post-adoption model of IS continuance, ECT ([Bhattacharjee, 2001](#)). Essentially, not only in the m-banking, the ECT has also been used to examine the IS post-adoption in

various fields: internet banking (Yuan *et al.*, 2019; Rahi and Ghani, 2019b, 2019a), m-payment system (Singh, 2020) and in other fields (Cheng, 2020; Yang *et al.*, 2019).

Although other scholars also attempt to demystifying the continuance usage intention of an IS based on other models, for instance, by combining the ECT with unified theory of acceptance and use of technology (Singh, 2020), with D&M IS success model (Rahi and Ghani, 2019a), using social impact theory and trust transfer (Handarkho, 2020; Sharma and Sharma, 2019); however, one thing in common of them is that the vast majority of them recognise that the perceived usefulness and satisfaction are the most prominent factors perceived by customers that contribute to IS continuance intention (Asnakew, 2020; Sharma and Sharma, 2019; Yuan *et al.*, 2019). This is because once the customers perceive that the m-banking is useful and effective to assist their bank-related activities, they are satisfied with the m-banking. Withstanding these, this study reveals that the customers are more likely to continue their usage intention of the m-banking. Our research contributes to this knowledge domain by reiterating this in the different socio-demographic context and the antecedents towards the perceived usefulness and satisfaction. In particular, our research shows that the perceived usefulness and satisfaction effect directly the continuance usage intention significantly and both factors have a substantial predictive power, 52.6%, towards the continuance intention. In addition, we also demonstrate that the perceived usefulness influences indirectly the continuance usage intention through the satisfaction.

Second, in this research we successfully introduce the SDT to be contributed to the m-banking post-adoption factors. The findings show that while perceived relatedness of the SDT has no significant influence to the perceived usefulness and satisfaction factors, the perceived competence and perceived autonomy contribute substantially to both factors directly. This means the m-banking is built in a way that it can create environment in which the customers perceive they can be able to process their banking-related activities using the product completely and autonomously. As shown in Figure 2, statistically, both antecedents of the SDT significantly influence the perceived usefulness and satisfaction and they both also contribute to the high and moderate predictive power to satisfaction and perceived usefulness, respectively, with the coefficients of determination in a row 56.1% and 35.9%.

This result contributes to the existing literature of the post-adoption m-banking as in the previous works, trust factor is seen as the primarily one determining the continuance usage intention (Sharma and Sharma, 2019; Yuan *et al.*, 2019; Yu *et al.*, 2018). This is apparently not surprising as using banking services is a personalised activity of individuals. It is about customers' credential, privacy and deposit information transferred using mobile phone over the public network at the same time. Therefore, it needs trust factor perceived by the customers that the product guarantees the risk and privacy of individuals. Once it is trustworthy, the satisfaction perceived by the customers will be increased naturally. In this research, we argue that for the customers to continue using the m-banking, it should be triggered based on their intrinsic motivations. In other words, the customers should be self-motivated. Thus, all the benefits and features of the m-banking will be realised and understood to be internalised by customers to retain their usage of the m-banking. SDT is then used in this study to portray the degree of the customers' motivation in perceiving the m-banking for them to continue using it.

Third, essentially introducing the SDT as the antecedent of the IS post-adoption has also been the concern of these scholars (Rahi and Ghani, 2019b; Kumar *et al.*, 2018; Rezvani *et al.*, 2017). However, what distinguishes our study than the others is that we view the SDT is the antecedent to both the satisfaction and perceived usefulness while in these researches (Rahi and Ghani, 2019b; Kumar *et al.*, 2018), they assume that the SDT directly effect the continuance usage intention of an IS. Our view in the context of the relationship between the

SDT and ECT aligns with the one of [Rezvani et al. \(2017\)](#). However, the DST in [Rezvani et al. \(2017\)](#) is extended by adding a factor of perceived external regulation, which is seen as reward or punishment that influence the motivation perceived by existing customers to retain the use of the m-banking. In addition, while their research reveals that the perceived autonomy and the perceived relatedness have no significant effect on the satisfaction, in our research, the perceived relatedness is the only factor that is not significant statistically to both perceived usefulness and satisfaction. These results discrepancies can be understood as [Rezvani et al. \(2017\)](#) aim to investigate the continuance usage intention of an IS implementation while our research aims to examine the SDT in the m-banking field. Thus, our research indeed contributes to the m-banking domain by understanding the antecedents towards the continuance intention of the application.

Fourth, the service quality as the predictor to SDT as presented in our research has also been the concern in various researches ([Shankar et al., 2020](#); [Sharma and Sharma, 2019](#); [Arcand et al., 2017](#); [Lien et al., 2017](#); [Abbas and Hamdy, 2015](#)). In our research, we see that service quality as the antecedents to the SDT is simply because the service quality of the m-banking determines the perceptions of the individuals retain the use of the application. The m-banking environment created with a good quality service will allow existing customers to be loyal to the m-banking. They might also satisfy to the application because of the service provided. As earlier explained, our view is that for the customers to envision that they are competence, related and autonomous in using the m-banking for their banking-related activities, then the application should be built in a way it can be effective for them. So, they can be able to internalise these to be self-motivated to keep using the m-banking. In this research, these hypotheses are validated in which the service quality influence substantially the three constructs of the SDT and the satisfaction. Although the service quality can only explain 8.7% of the variance in perceived relatedness however statistically it influences it significantly. In addition to these, our result shows that the service quality is statistically significant to the SDT and the customers' satisfaction in using the m-banking. That the service quality and the SDT can substantially explain 56.1% of the satisfaction.

6.3 Managerial implications

The research aims to investigate the continuance usage intention of the m-banking. Particularly, the result contributes to improve the understanding of the banking industries of the predictive factors: service quality and the SDT that can influence significantly to retain the m-banking customers. In Indonesia, as more and more individuals adopt the m-banking for paying the bill, topping up the e-wallet, e-commerce transactions, money transfer and so forth, comprehending the predictive factors is crucial as these significantly determine the likelihood the application is used continuously. For the bank as the providers, this is about the competitive advantage *per se*. Thus, for promoting and encouraging the continuance usage of the m-banking, the providers need to thoroughly understand the aspects in which the m-banking usage can be optimised for the customers obtaining the maximum perceive benefits. The result of this research concurs with the previous researches that the satisfaction and perceived usefulness are the primary factors that significantly contribute to the continuance usage intention of the m-banking. This means that for the m-banking providers, equipping and facilitating the product with the services that meet the customers' needs the most so as to improve the perceived usefulness and satisfaction are crucial. We demonstrate these both perceptions can be achieved by creating an environment of m-banking under which customers can be self-motivated to use it.

In this research, the perceived competence and perceived autonomy by the m-banking customers are shown to have a substantial influence statistically to the perceived usefulness

and the satisfaction. This means that practically for the m-banking providers, sustained improving the m-banking product and its related-service under which the existing customers will retain their usage of it are among the ways to increase the perceived competence and perceived autonomy to the customers. As earlier elaborated, while the perceived competence is heavily related to the customers' abilities to perform banking-related tasks, the perceived autonomy is primarily related to the enjoyment perceived by customers during their engagements as they can freely opt for the banking-related activities they aim for. Thus, in this context, the m-banking providers can, for instance, initiate a collaboration with as many merchants and organisations/institutions as possible in which both of them are related in the context of the customers are related too in the context of payment. As described previously that the m-banking is needed the most for helping the customers accomplishing their financial related-activities, for instance, paying the bill of monthly internet broadband subscription, water bill, mortgages, annual car tax and so on.

Thus, allowing the customers to pay all these commitments through the m-banking can increase the competence perceived by them. As the customers can also independently complete these activities using services provided by the m-banking, it effects the perceived autonomy significantly. Thus, developing as many payment gateways as possible between the bank and other parties to allow the customers to pay their commitments directly is required. For instance, almost all banking these days provide the m-banking application, not all of them have developed a payment gateway that encourages the customers to pay their commitment using the m-banking. This might discourage the continuance intention of the product as they have not options for their needs.

Essentially, equipping the m-banking with as various and better services as possible is highly related to the service quality *per se*. Thus, it is not an overly idea that the service quality factor is assumed as the predictor for the SDT at the first place. In other words, for the providers, improving the service quality of the m-banking will increase the perceived competence and perceived autonomy. The service quality also demonstrates to have a direct influence on the satisfaction. In our evaluated model, the service quality is composed of the environment quality (this is related to the product quality *per se*, for instance, design and security), interaction quality (this is related to the quality service provided by the bank once the customers are having difficulties during their engagements with the m-banking) and outcome quality (this describes the outcome experienced by the customers in their interactions with the m-banking). As our evaluation shows that these factors significantly contribute to the SDT, improving them will lead to the increasing the perceived competence and perceived autonomy in using the m-banking. To this end, this increases the continuance usage intention of using the m-banking.

For the providers, for instance, improving the interface of the m-banking application that allows the customers with average bandwidth is among the improvement that can be managed. Particularly in Indonesia, although the internet penetration is one of the highest in the world (United Nations, 2020), it is not evenly distributed across all areas. Therefore, sophisticated m-banking that requires a high-speed bandwidth will hinder it to be continuance used by the customers (this could be also because in many cases in the big cities in Indonesia, some areas could be more populated than other. This might lead to the bottle neck of the telecommunication network of the more populated areas). Thus, in this research, the most effective way that can be managed is ensuring that the m-banking can be used smoothly in a low-bandwidth environment. In the service quality, these factors essentially are related to the environment and outcome qualities. As for improving the interaction quality, the providers can pursue it by, for instance, providing the m-banking customer case for 7 × 24 h per week directly in the application itself. Thus, if there is an issue in using the

m-banking, the interaction between the customers and the customer service occurs in the application environment (not using other communication channel, e.g. email, phone, etc.). By equipping a better, more complete and lighter interface of the m-banking, it effects the perceived competence as the customers are able to process their banking activities using the application and the perceived autonomy as the customers can be able to fully accomplish their financial tasks.

6.4 Conclusion, limitations and future research directions

This study sets out to enhance our understanding about the continuance usage intention of the m-banking in Indonesia context. It introduces the service quality and SDT factors to evaluate it. The evaluation shows that out of 13 hypotheses, only two of them are rejected. They both are the relations from the perceived relatedness of the SDT to the perceived usefulness and satisfaction. In other words, the perceived relatedness shows no significant effect statistically to the continuance usage intention of the m-banking. On the other hand, from the IS post-adoption theory (Bhattacharjee, 2001), the evaluation demonstrates that satisfaction and perceived usefulness factors to have a significant effect to the continuance usage intention of the m-banking. This supports the previous findings of the m-banking continuance intention with its different predictor from the satisfaction and perceived usefulness, for instance, Singh (2020), Mandari *et al.* (2020); Ho *et al.* (2020), Yuan *et al.* (2019); and Foroughi *et al.* (2019).

Notwithstanding these, several limitations are worth noting from this study which we take and formulate them to shed more light of the future research directions in this particular domain. First, although the findings are in line and support the previous researches in that the satisfaction and perceived usefulness are the main factors to determine the continuance usage intention of the m-banking, its coefficient of determination (R^2) reflects that the variance of it can be further investigated. This, for instance, can be approached from combining other factors that determine the continuance intention [for instance: trust, attitude, self-efficacy, channel preference, external regulation (Singh, 2020; Mandari *et al.*, 2020; Handarkho, 2020; Asnakew, 2020; Yuan *et al.*, 2019; Rahi and Ghani, 2019a; Foroughi *et al.*, 2019)]. The aim is to understand more completely the factors that influence the continuance usage intention. For the providers, this paves the way for them to be more competitive in the banking business by using the m-banking.

Second, as this research portrays the continuance usage intention of m-banking in Indonesia, the result might be different if undertaken in other countries. This is about the issue of generalisation of the theoretical model used in this research. In other words, as this study aims to comprehend the continuance usage intention of the m-banking, it is required for this study to be conducted in other socio-demographic contexts for the purpose of generalisation. For instance, although this study shows that the relationships from the perceived relatedness are not significant statistically to the perceived usefulness and satisfaction, whereas in the previous one (Rezvani *et al.*, 2017), it is not significant only for the relation between the perceived relatedness and the satisfaction. Although both of these studies are in the different domain issues, this shows that the SDT might potentially produce different results in investigating the continuance intention once it is applied in different context and issue.

Third, in Indonesia, the banks themselves are categorised as private and state-owned. Most of us use more than one m-banking applications simply because we have more than one account from these banks. In our study, our focus is to understand the continuance usage intention of the m-bank from the customers regardless the number of the bank account customers have and bank types. Thus, specifying the *locus* of the domain problem is

definitely the flagship of our future research direction. This with the aim to better understand the continuance usage intention of m-bank from a specific bank type which might contribute a better decision-making for enhancing the competitive advantage of the bank.

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