Understanding Factors That Influence Consumer Intention to Use Mobile Money Services: An Application of UTAUT2 With Perceived Risk and Trust

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Abstract
Mobile money is an attractive alternative that has boomed in recent times due to the advancement in mobile and telecommunication technology. Although there are copious benefits of such a great mobile technology, the adoption rate is far from expectations. This study examines the factors that predict users’ behavioral intention (BI) to adopt and use mobile money. The study adopts the unified theory of acceptance and usage of technology as a reference and builds an extended model by taking into account “perceived risk” and “trust.” Data collected from 373 mobile money users in Ghana via a questionnaire survey were analyzed using the structural equation modeling approach. The findings reveal that performance expectancy, effort expectancy, social influence, habit, price value, perceived risk, and trust substantially affect users’ BI. However, facilitating conditions and hedonic motivation showed no pertinent effect on users’ BI. Implications for both theory and practice are also discussed.

Keywords
mobile money, users’ behavioral intention, use behavior, UTAUT2, Ghana

Introduction
Mobile technology has become very indispensable as it offers platforms for enhancing social and economic development (Baganzi & Lau, 2017) and also gives access to applications that tackle social challenges confronted by vulnerable individuals and allows innovations (Kikulwe et al., 2014; Tiwari et al., 2006). According to GSMA Intelligence, mobile adoption has increased swiftly in West Africa in recent years. This rapid growth is due to the expansion of cellular networks to underserved populations as well as the rising affordability of mobile devices’ costs and services. For instance, the unique subscribers in West Africa at the end of 2016 stood at 172 million, accounting for 320 million mobile connections. Furthermore, the overall subscriber penetration reached 49%, slightly higher than the 47% penetration rate across the wider Sub-Saharan Africa region (GSMA, 2017). In Ghana, the total number of mobile subscriptions reached 37.1 million at the end of July 2017, representing a penetration rate of 130.35% in that month (NCA, 2017). These numbers are expected to grow because of the expansion of mobile networks and services provided by telecommunication operators across the continent (Narteh et al., 2017). Mobile money (MM), which is one of such new technology-enabled services, allows users to utilize mobile phones to perform financial transactions (Abor et al., 2018).

MM is a product that permits customers to utilize text messages to store value in an account accessible by the handset, convert cash in and out of the store value account, and transfer value among users (Aker & Mbiti, 2010; Narteh et al., 2017). MM is increasingly utilized to transfer money to family and friends, pay for goods and services, and store monetary value safely in Ghana (Osei-Assibey, 2015). More importantly, MM has become an essential means of payment for the underserved and those who are not banked in Ghana. According to the Bank of Ghana (2017), registered MM accounts across the MM service providers were 23.9 million.

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in 2017, up from 19.7 million in 2016. Meanwhile, the total volume of MM transactions in 2017 was GHS1,564,563, from 550,218,427 in 2016. In terms of value, it reached GHS155.8b (US$34.7b) in 2017, from GHS78.5b (US$18.4b) in 2016. This surge in MM usage seems to suggest acceptance of the service, which has been lauded by many experts and stakeholders in the banking and formal financial sector. Furthermore, this rise appears to signify the relevance of MM in deepening financial inclusion in Ghana (Narteh et al., 2017).

Despite these encouraging figures in MM account registration, the reality appears quite different as the number of active accounts seems to suggest apparent consumer hesitancy toward MM adoption. That is, there is a considerable difference between the number of registered MM accounts and the number of active MM accounts. For example, as mentioned above, while the number of registered MM accounts in Ghana stood at about 23.9 million in 2017, there were only about 11.1 million active MM account users during the same period (Bank of Ghana, 2017). Thus, the actual figures suggest a high level of inactivity among registered users, thereby raising the question of why consumers are inactive in using MM services. This observation appears to confirm the assertion that “mobile money is still far from being widespread” (Kiconco et al., 2018, pp. 2). Therefore, there is a need to have a clear understanding of the crucial factors that influence users’ intention to adopt and use MM.

Prior studies suggest a set of potentially relevant factors that influence consumer intention to adopt MM (e.g., Aker & Wilson, 2013; Narteh et al., 2017; Osei-Assibey, 2015; Tobbin & Kuwornu, 2011). These studies mostly conducted via classic models such as the “technology acceptance model (TAM)” (Davis, 1989), the “unified theory of acceptance and use of technology (UTAUT)” (Venkatesh et al., 2003), and the “innovation diffusion theory (IDT)” (Rogers, 1983) have enhanced our knowledge and understanding regarding MM services adoption. However, these models have been criticized for many reasons. For instance, some researchers argue that TAM is too simplistic and does not completely expound individuals’ understanding of behavioral intention (BI) to adopt new technologies (Boateng et al., 2016; Taylor & Todd, 1995). Furthermore, TAM’s adoption was “based on work purposes with the individual employee of the organization” (Ooi & Tan, 2016, p. 34). In this sense, the cost is generally absorbed by the organization and the acceptance of the technology is mandatory. UTAUT has also been criticized because the model is based on organizational settings and built chiefly based on the adoption of technology among employees (Ooi & Tan, 2016; Venkatesh et al., 2012). Scholars argue that technology acceptance outside the work environment varies on various dimensions, including differences in kinds of tasks and complexity of interactions (Brown et al., 2006; Ooi & Tan, 2016). So, these models have limits in clarifying mobile technology adoption like MM because it is voluntarily adopted and primarily for personal purposes by individuals in a non-organizational environment. The cost involved in using MM is also mainly borne by individuals and so the acceptance decision is not only based on utilitarian reasons. Moreover, in the MM context, the “potential adopters” are actual mobile users and simply not technology users with decisions primarily centralized from the individual perspective. On this basis, this study intends to bridge the literature gap by adopting an alternative model that combines individual, technological, and environmental constructs to comprehend the intentions to adopt MM. Thus, the study uses the theory of acceptance and use of technology (UTAUT2) by Venkatesh et al. (2012), which garners strength as it takes into account acceptance and use of technology models are technology-specific and so it is critical to ponder other constructs that are linked to technology adoption. Therefore, trust is considered vital. Moreover, trust is a critical construct that is closely connected to financial transactions. Furthermore, trust becomes extremely essential when it is associated with monetary value and even more vital when the transactions are done through a wireless network (Qasim & Abu-Shanab, 2016). Given that MM involves financial transactions that are mobile phone-based among consumers, trust is considered vital. Moreover, trust has proven to be a salient predictor of intention to adopt technology in previous works (Loh et al., 2020; Narteh et al., 2017; Ooi & Tan, 2016). Likewise, based on the claim that there exists high uncertainty relating to mobile devices because people fear the loss or theft of these devices and the information they contain (Arcand et al., 2017; Hanafizadeh et al., 2014), we present and integrate PR with UTAUT2 in this study, which is vital in developing economy setting like Ghana.

Our model goes beyond the recent work of Eneizan et al. (2019) carried out in the area of mobile marketing, in that it proposes and validates new causal paths between the main antecedents of BI (EE → PE, Trust → EE, Trust → PR) to better understand BI and adoption of technology (i.e., MM) in an under-researched setting (i.e., Ghana, Africa). This demonstrates a noteworthy contribution to the extension of the theoretical perspective of UTAUT2. Technology adoption (e.g., m-banking, MM) in Africa, including Ghana, is still in its infancy stage (Owusu-Kweteng et al., 2018) and has attracted little research attention. Therefore, this study provides new insights into a very important context but is disregarded as worthy of research regarding consumers’ intentions and adoption of technology. Also, unlike the work of Eneizan et al. (2019) which only focuses on customers’ BI
to adopt mobile marketing, our model focuses on both customers’ BI and Use behavior of MM. Thus, our study further validates the relationship between BI and Use behavior of MM (BI → Use behavior). Thus, our model offers a more inclusive explanation to attempt to comprehend the salient factors that affect consumers’ BI as well as Use behavior.

This study may help service providers to appreciate the salient factors that influence users or customers and design fitting strategies and actions to draw customers to use this service. Furthermore, the research will also assist service providers to identify and comprehend the success factors that will drum in confidence among customers to adopt and use MM services in their day-to-day transactions. The study proceeds as follows. The next section presents the literature review, followed by the research hypotheses and research method. Data analysis and results are presented next, followed by a discussion of the results and their implications. The final section focuses on the limitations and future research and conclusion.

**Literature Review**

**Mobile Money**

MM is a service for transferring money that is mobile phone-based and involves a mobile network operator acting as an e-money service provider (Baganzi & Lau, 2017; Kiconco et al., 2018; Upadhyay & Jahanian, 2016). Thus, physical cash is given to an accredited MM agent who transfers the virtual equivalent to the client’s phone wallet. This virtual cash, in turn, can be utilized to pay for goods and services, be transferred to other users, or again be converted back into physical cash on visiting an agent. Consequently, MM services fast-track the swiftness of money transfers as funds move in electronic form in place of the physical form (Morawczynski, 2009). The mobile network operators, who provide the platform where the system is run, get a specified percentage of every transaction as fees (Yeboah-Asiamah et al., 2018). According to GSMA (2016), there were more than half a billion registered MM accounts worldwide as of the end of 2016, and that MM is now available in two thirds of low and middle-income countries through 277 service providers.

**Past Studies on Mobile Money**

A review of the relevant literature indicates that a handful of studies have explored some of the factors that may affect MM adoption by consumers via different theories and models. Baganzi and Lau (2017) show that MM users in Uganda depend on MM services providers’ structural soundness and their ability to deliver MM services with little PR. Specifically, the authors find that performance expectancy (PE), PR, and structural assurance play a significant role in influencing the BI to adopt MM. In another study, Mugambe (2017) reports that BI to adopt MM by customers of micro, small, and medium enterprises is influenced by habit, facilitating conditions (FCs), and social influence (SI). Furthermore, Kiconco et al. (2018) assert that mobile phone skills affect individuals’ ability to utilize MM. Thus, a fundamental knowledge of how a mobile phone is used can make a considerable difference in an individual’s ability to utilize MM (Kiconco et al., 2018; Wyche & Steinfield, 2016). Focusing on Ghana, Tobbin and Kuwornu (2011) suggest that perceived ease of use and perceived usefulness are the most significant determinants of BI to utilize MM. Other constructs, including perceived trust, PR, and trialability were also established to influence BI. Another research by Aker and Wilson (2013) also suggests that the decision to utilize MM often depends on the use of the members of one’s social network. Osei-Assibey, (2015) also examined the determinants of the BI of MM adoption among indigenous money collectors (susu). The study reveals that among the Susu collectors, relative advantage, PR, education level, and the age of the collector are statistically significant in influencing the BI of MM services adoption. What is more, empirical research by Narteh et al. (2017) recently found that perceived ease of use, perceived usefulness, perceived trust and perceived cost of use strongly influence MM service use. The authors also reveal that SI has a significant impact on BI. All the above studies offer some of the possible predictors of users’ BI to adopt and use MM.

**Unified theory of acceptance and use of technology**

Originally, the UTAUT offered by Venkatesh et al. (2003) had four main constructs that are direct predictors of intention and consequently use behavior. They include PE, effort expectancy (EE), SI, and FCs. The model offered an innovative understanding of technology adoption by bringing together multiple theoretical standpoints. The model also involved dynamic influences by including moderating variables such as gender, age, experience, and voluntariness of use that strengthened its explanatory powers (Ooi & Tan, 2016; Qasim & Abu-Shanab, 2016). UTAUT “explained around 56% of the variance in behavioral intention to use technology and 40% of the variance in technology use” (Tandon et al., 2016, p. 421). The model has been tested empirically and proven superior to other models (Tandon et al., 2016; Venkatesh et al., 2003).

Given the number of technological applications, devices, and services that are aimed at consumers in the present day, it became crucial to investigate and understand the influential factors that drive consumers into adopting and utilizing new technologies (Stofega & Llamas, 2009). In response to this, Venkatesh et al. (2012) introduced UTAUT2. The authors added three new variables: namely, “habit,” “price value” (PV), and “hedonic motivation” (HM) to the original UTAUT, and further indicated that the addition of these new constructs could expand the frontiers of theoretical knowledge of UTAUT2. Besides, individual differences such as gender, age, and experience were posited to moderate their
influence on BI and use behavior. The extension provided in the UTAUT2, compared with the original UTAUT, produced a significant enhancement in variance explained in BI (i.e., 56% to 74%) and Use behavior (i.e., 40% to 52%; Tandon et al., 2016). Several scholars have made attempts to investigate UTAUT2 in new settings and new cultural milieus. For example, the model has been used in mobile banking (Owusu-Kwateng et al., 2018), online shopping (Tandon et al., 2016), and mobile marketing (Eneizan et al., 2019). Nonetheless, it has rarely been applied to study mobile technology such as MM. So, to close the gap in the MM literature, this article applies the UTAUT2 as a reference model to investigate MM adoption. Moreover, to have predictive explanations, we endeavor to extend the UTAUT2 by adding trust and PR as direct drivers of BI while we exclude the three moderators. Also, we examine the interrelationships between the newly added constructs and some of the UTAUT2 constructs. As explained in the “Introduction” section, trust and PR are important in mobile settings, hence their addition to the model. The conceptual model for this study is shown in Figure 1.

**Hypotheses Development**

**PE**

PE is defined as the degree to which technology will provide benefits to consumers in performing certain activities (Venkatesh et al., 2012). Thus, it suggests user perception of performance enhancement as a result of utilizing technology. It is similar to the perceived usefulness of TAM and the relative advantage of IDT, according to Venkatesh et al. (2003). In a mobile payment context, it can also be explained as the degree to which consumers believe that MM will enhance their transactions (Tobbin, 2010). Consequently, it reflects consumers’ perception of performance enhancement by utilizing MM services, including convenience payment, fast response, and service effectiveness. Tobbin & Kuwornu (2011) assert that the intention to use MM will rise if the confidence in its usefulness also increases. Furthermore, according to Narteh et al. (2017), people exploit the use of MM because they find it useful. Many scholars (e.g., Tan & Lau, 2016; Zhou et al., 2010) have uncovered PE as one of the relevant predictors of users’ BI. Thus, we propose that:

**Hypothesis 1 (H1):** PE has a positive influence on users’ BI to adopt MM.

**EE**

EE is explained as the degree of ease from efforts as a result of utilizing new technology (Venkatesh et al., 2003). This construct is similar to the perceived ease of use of the TAM and the complexity of IDT, according to Venkatesh et al. (2003). EE, in this context, thus, reflects user perception of how much effort is required or how difficult it is to use MM.
Venkatesh et al. (2003) reveal that EE positively affects PE. When users feel that new technology is easy to use and does not need much effort, they will have high anticipation toward acquiring the expected performance (Zhou et al., 2010). This suggests that to use any technology, little effort should be required by the user (Liu & Li, 2010; Narteh et al., 2017). This effort can be physical and mental (Davis, 1993; Taylor & Todd, 1995). As regards MM, EE involves how easy it is to register for the services, ease of use of the payment method, and the minimum steps required to make payments or receive money. Furthermore, the availability of MM transfer agents and how reachable the service is on mobile phones or mobile devices with the necessary qualities and software will increase ease of use. Hence, we posit the following:

**Hypothesis 2 (H2):** EE has a positive influence on users’ BI to adopt MM.

**Hypothesis 3 (H3):** EE has a positive influence on PE.

**SI**

SI, according to Venkatesh et al. (2003), is the importance users or consumers attach to the opinion of close relations to utilize a specific innovation. SI is parallel to the subjective norm of theory of reasoned action (Venkatesh et al., 2003). SI reflects the impact of environmental factors such as the opinions of a user’s relatives, friends, and superiors on user behavior (Baptista & Oliveira, 2015; Zhou et al., 2010). In the MM context, it reflects the beliefs individuals have concerning the expectations of others as well as the individuals’ motivation to observe these expectations. Thus, it is an individual’s belief in respect of whether significant others such as family and friends think he or she should have a MM account. So, the degree to which the individual is prepared to submit to these beliefs would have a substantial effect on the adoption of the MM (Narteh et al., 2017). Also, Tan and Teo (2000) observed that important references such as the adopter’s family, friends, and colleagues or peers may all influence the adoption decision. The decision to utilize MM often depends on the usage of the members of an individual’s social network (Aker & Wilson, 2013). Hence:

**Hypothesis 4 (H4):** SI has a positive influence on users’ BI to adopt MM.

**FCs**

FC reflects consumers’ assurance of the availability of facilities and support systems to utilize new technologies (Martins et al., 2014; Venkatesh et al., 2003). It is similar to perceived behavioral control of the theory of planned behavior (Zhou et al., 2010). FC indicates the availability of, and accessibility to, resources that encourage the adoption of a particular behavior. They provide consumers with a sense of psychological control that in turn, influences their willingness to adopt a particular behavior (Nel et al., 2012). MM requires users or consumers to have specific basic skills such as how to operate and use mobile phones, how to send and receive text messages (Kiconco et al., 2018; Kiconco et al., 2020). Furthermore, users require FCs such as a working mobile service connection and MM transfer agents. Also, users bear usage costs such as transaction fees when using MM services. If users do not have these required operational skills and financial resources, they will not adopt MM. Therefore, we hypothesize:

**Hypothesis 5 (H5):** FC has a positive influence on users’ BI to adopt MM.

**HM**

HM denotes the pleasure or joy that one obtains from using technology (Brown & Venkatesh, 2005). This perceived enjoyment concept is understood to affect consumer’s acceptance and use of innovation directly in information system research (Thong et al., 2006; Van der Heijden, 2004). Also, HM has been identified as a critical determinant of technology acceptance and use, in the consumer context (Brown & Venkatesh, 2005; Childers et al., 2001). Similarly, the fun or pleasure obtained from using new technology (e.g., MM) plays a significant role in improving users’ BI (Alalwan et al., 2015). Indeed, Arcand et al. (2017) explained that mobile devices are primarily associated with enjoyment. Thus, with MM services mainly undertaken via mobile phones or devices we expect HM to influence users’ BI to use MM. Accordingly, it is proposed that:

**Hypothesis 6 (H6):** HM has a positive influence on users’ BI to adopt MM.

**PV**

PV is defined as an individual’s cognitive tradeoff analysis between the perceived benefits of certain innovative services (e.g., MM) and the monetary cost for using them (Dodds et al., 1991; Venkatesh et al., 2012). The way price and cost are structured considerably influences consumers’ technology use. In other words, with a more significant positive level of PV, consumers will be more motivated to adopt new technology. Thus, utilizing technology should be perceived as more beneficial and useful than the monetary cost involved by consumers (Venkatesh et al., 2012; Alalwan et al., 2017). Indeed, in the MM context, customers are most likely to adopt MM if the cost/price is acceptable (Luarn & Lin, 2005; Tobbin, 2012). Thus, in situations where the PV of using MM is perceived to be higher than the monetary cost, there is a greater inclination for users or individuals to adopt the service. Hence, we posit that:
Hypothesis 7 (H7): PV has a positive influence on users’ BI to adopt MM.

Habit

According to Limayem et al. (2007), habit reflects the automating behavior from initial learning to regular use of technology. Habit affects technology use about its prior use (Kim & Malhotra, 2005) toward behavior intention. In other words, habit refers to the degree to which an individual does a particular behavior automatically and continually grounded on knowledge and experience obtained over time (Alalwan et al., 2015). Indeed, previous experience and habits tend to become an unconscious factor that can considerably prevent users’ readiness to learn new approaches as they are apt to depend on expertise when deciding the place of using cognitive reasoning (Venkatesh et al., 2016; Zhang et al., 2017). Thus, prior research has documented habit as one of the leading hurdles to individuals’ new technology adoption as it considerably influences consumers’ preferences and intentions (Moorthy et al., 2017). As prior use, habit is a significant predictor of future adoption and use of technology (Kim & Malhotra, 2005). Following these findings, we expect habit to be a significant predictor of users’ BI and Use behavior of MM. Thus, we propose that:

Hypothesis 8 (H8): Habit has a positive influence on users’ BI to adopt MM.
Hypothesis 9 (H9): Habit has a positive influence on Use behavior.

PR

According to Malaquias and Hwang (2016), consumer acceptance of mobile technologies is influenced by security concerns and the likelihood of hacking customers’ mobile phones. PR refers to users’ degree of anticipated uncertainty related to the consequence of using a particular technology (Tan & Lau, 2016). The perception of the potential risk exposure of users is when their self-contained information is known to others (Featherman & Pavlou, 2003; Narteh et al., 2017). Studies show that a high level of PR and uncertainty is mostly related to mobile devices since individuals fear the loss or theft of these devices and the information they contain (Arcand et al., 2017; Hanafizadaeh et al., 2014). When customers sense any likely losses that could arise as a result of the uncertainties of utilizing MM, their risk perception will upsurge. The anticipated losses may involve any unfavorable results to customers, for example, financial loss, the violation of privacy, displeasure with performance, psychological concern, time waiting, and long queues (Baganzi & Lau, 2017; Narteh et al., 2017). The perception of likely risk exposure of MM customers is a potential hindrance to the adoption and use of the service. So, we hypothesize that:

Hypothesis 10 (H10): PR has a negative influence on users’ BI to adopt MM.

Trust

MM’s environment, like all business transactions, necessitates an element of trust. Thus, to become a sustainable unit of doing business, MM should prevail over user distrust (Tobbin, 2010). Accordingly, this study expects building individual trust is indispensable as it tends to reduce consumers’ fears and uncertainties, thus decreasing the decision intricacy and boosting adoption intentions (Koksal, 2016; Luo et al., 2010). Therefore, the perceived confidence and guarantee consumers have in the MM service that the service is free from fraudsters and hackers will have a critical impact on the adoption and use of the service. Indeed, studies show that trust is a critical predictor of users’ intentions to utilize any technology (Loh et al., 2020; Narteh et al., 2017; Tobbin, 2010). Hence, we expect trust to significantly affect users’ intentions to adopt MM. Moreover, Wang and Lin (2016) argued that trust is an important factor that reduces users’ PR of transactions. In this sense, trust is considered as a mechanism for lowering PR in MM. Besides, in line with the extant literature, we argue that trust will influence EE based on the notion that trust eases the need to understand, control, and monitor the situation, enabling the use of the tool for the user with less effort (Munoz-Leiva et al., 2017). Research by Pavlou (2003) found that trust positively affects the ease of use, a construct that is similar to EE, according to Venkatesh et al. (2003). Thus, we propose that:

Hypothesis 11 (H11): Trust has a negative influence on PR.
Hypothesis 12 (H12): Trust has a positive influence on EE.
Hypothesis 13 (H13): Trust has a positive influence on users’ BI to adopt MM.

BI

BI is defined as users’ perceived possibility to utilize something in a particular situation (IOM, 2002). Indeed, knowledge concerning a new system, its operations, benefits qualities, and other individuals’ opinions in respect of this new system are critical issues that influence users’ BI to adopt or not to adopt the new system and use (Wang et al., 2006). Prior studies indicate that technology use is generally initiated by users’ BI and evaluations (Hong et al., 2008; Venkatesh et al., 2003, 2012). Accordingly, this study expects that the actual adoption of MM could be mainly predicted by
the users’ readiness to adopt such a system. Thus, it is hypothesized that:

**Hypothesis 14 (H14):** Users’ BI has a positive influence on Use behavior.

## Research Methodology

### Sample and Data Collection

A pre-test of the questionnaire was first done with 10 professionals from the Telecom companies who offer MM services to ascertain the face and content validity of the survey questionnaire (Leong et al., 2015). We then carried out a pilot test with 55 university students who are MM users to assess the questionnaire in terms of wording, clarity, relevance, and time spent (Leong et al., 2015). The pilot test revealed no major challenges in terms of wording, clarity, and relevance. The questionnaire was deemed simple to comprehend and fill and only needed a few slight changes which we duly performed. Moreover, Cronbach’s alpha was checked for all the items in the questionnaire, and the results showed values that were higher than .70 as suggested by Nunnally (1978). Finally, a self-administered questionnaire was used to gather the needed data via a convenience sample of 403 Ghanaian MM users from five cities: Accra, Kumasi, Takoradi, Kofooridua, and Sunyani. The population of the study included all MM users in Ghana. These cities were chosen not only as a result of their population size but also due to the fact most of the MM service providers are located in these cities. A convenient sample was engaged due to resource and time constraints. However, this approach is in line with the technique employed by Wu and Wang (2005) Alalwan et al. (2016, 2018). The data collection was conducted within 4 weeks by two researchers. Out of the 403 questionnaires that were distributed to the respondents we approached at the various service centers in the selected cities, 30 questionnaires were excluded as they were incomplete. The descriptive statistics indicate that males comprised 52.3% of the responses, whereas 47.7% were females. The full descriptive statistics of the demographic data of the respondents are provided in Table 1.

### Measures

To ascertain and preserve content validity, all the items were adapted from the existing literature (Straub et al., 2004; Zhou et al., 2010), and were modified to suit the study’s context. Our conceptual model comprises 11 constructs, each of which was gauged with multiple items. The measurement items were gauged using a 7-point Likert-type scale ranging from 1, strongly disagree, to 7, strongly agree. The appendix provides a list of measurement items and their sources.

### Data Analysis and Results

Based on Churchill (1979), measurement scale validation begins with conducting confirmatory factor analysis (CFA). Next, we employed structural equation modeling to evaluate the measurement model (Figure 1 and Table 2). AMOS was utilized to carry out the CFA with maximum likelihood estimation while following Anderson and

| Variable Category | Frequency | % |
|-------------------|-----------|---|
| **Gender** Male | 195 | 52.3 |
| Female | 178 | 47.7 |
| **Age (years)** Below 25 | 87 | 23.3 |
| 26–35 | 134 | 36.0 |
| 36–45 | 109 | 29.2 |
| 46–56 | 25 | 6.7 |
| 57 and above | 18 | 4.8 |
| **Level of education** Junior high school | 11 | 2.9 |
| Vocational/Senior high school | 76 | 20.4 |
| Higher national diploma | 92 | 24.7 |
| University degree | 128 | 34.3 |
| Postgraduate degree | 66 | 17.7 |
| **Mobile money use experience (years)** Below 1 | 33 | 8.8 |
| 1–2 | 78 | 20.9 |
| 3–4 | 105 | 28.2 |
| 5 and above | 157 | 42.1 |
| **Monthly income (GH¢)** Below 500 | 9 | 2.4 |
| 500–999 | 95 | 25.5 |
| 1,000–1,499 | 120 | 32.2 |
| 1,500–1,999 | 112 | 30.0 |
| 2,000 and above | 37 | 9.9 |
Gerbing’s (1988) suggested two-stage approach. This approach adopted in this paper is in line with other prior works (e.g., Alalwan et al., 2017; Malaquias & Hwang, 2016; Zhou et al., 2010).

Measurement Model

The overall model provides a satisfactory fit to the data and the fit indices were found to be within their recommended values: $\chi^2/df < 3$, comparative fit index (CFI), goodness of fit index (GFI), and normed fit index (NFI) > 0.90; adjusted goodness of fit index (AGFI) > 0.80; and root mean square error of approximation (RMSEA) < 0.08. That is $\chi^2/df = 1.321$, CFI = 0.960, GFI = 0.90, NFI = 0.930, AGFI = 0.912, and RMSEA = 0.061 (Anderson & Gerbing, 1988; Hair et al., 2010).

Table 2. Reliability and Validity of the Constructs.

| Construct                  | Items | Factor loading | Cronbach’s alpha | Composite reliability | Average variance extracted |
|----------------------------|-------|----------------|-------------------|-----------------------|----------------------------|
| Performance expectancy     | PE1   | 0.73           | .85               | .86                   | 0.61                       |
|                            | PE2   | 0.84           |                   |                       |                            |
|                            | PE3   | 0.80           |                   |                       |                            |
|                            | PE4   | 0.76           |                   |                       |                            |
| Effort expectancy          | EE1   | 0.80           | .82               | .84                   | 0.64                       |
|                            | EE2   | 0.74           |                   |                       |                            |
|                            | EE3   | 0.86           |                   |                       |                            |
| Social influence           | SI1   | 0.76           | .86               | .86                   | 0.68                       |
|                            | SI2   | 0.89           |                   |                       |                            |
|                            | SI3   | 0.82           |                   |                       |                            |
| Facilitating conditions    | FC1   | 0.71           | .84               | .87                   | 0.63                       |
|                            | FC2   | 0.86           |                   |                       |                            |
|                            | FC3   | 0.77           |                   |                       |                            |
|                            | FC4   | 0.84           |                   |                       |                            |
| Hedonic motivation         | HM1   | 0.85           | .87               | .88                   | 0.71                       |
|                            | HM2   | 0.88           |                   |                       |                            |
|                            | HM2   | 0.79           |                   |                       |                            |
| Habit                      | HB1   | 0.78           | .79               | .81                   | 0.59                       |
|                            | HB2   | 0.73           |                   |                       |                            |
|                            | HB3   | 0.80           |                   |                       |                            |
| Price value                | PV1   | 0.79           | .83               | .87                   | 0.69                       |
|                            | PV2   | 0.82           |                   |                       |                            |
|                            | PV3   | 0.88           |                   |                       |                            |
| Perceived risk             | PR1   | 0.86           | .85               | .86                   | 0.67                       |
|                            | PR2   | 0.79           |                   |                       |                            |
|                            | PR3   | 0.81           |                   |                       |                            |
| Trust                      | TR1   | 0.78           | .82               | .82                   | 0.60                       |
|                            | TR2   | 0.75           |                   |                       |                            |
|                            | TR3   | 0.81           |                   |                       |                            |
| Behavioral intention       | BI1   | 0.84           | .83               | .85                   | 0.66                       |
|                            | BI2   | 0.77           |                   |                       |                            |
|                            | BI3   | 0.82           |                   |                       |                            |
| Use behavior               | UB1   | 0.80           | .79               | .82                   | 0.61                       |
|                            | UB2   | 0.71           |                   |                       |                            |
|                            | UB3   | 0.82           |                   |                       |                            |

Reliability and Convergent Validity

The factor loadings (shown in Table 2) for all the items were higher than .50, thus satisfying the convergent validity criteria (Byrne, 2016). To gauge the internal consistency of the constructs, Cronbach’s alpha was utilized, and the values for all the constructs were satisfactory. They all exceeded the cut-off point of .70, ranging from .79 to .87, thus providing support for internal consistency (Nunnally, 1978). Also, the composite reliability values should be above .70 (Fornell & Larcker, 1981; Hair et al., 2010). In this study, the CR scores ranged from .81 and .88, signifying adequate construct’s internal consistency. Besides, as shown in Table 2, the AVE of the constructs ranged from .59 to .71, which are all greater than the recommended value of .50 (Fornell & Larcker, 1981; Hair et al., 2010).
Discriminant Validity

As regard discriminant validity, we examined it in our study by utilizing the procedure suggested by Fornell and Larcker (1981). It is examined by comparing the squared root of the AVEs of each construct with its corresponding correlations. As indicated in Table 3, the results support discriminant validity as the squared root of the AVEs of each variable is higher than the inter construct correlations.

Common Method Bias

As the self-administered questionnaire was collected based on the single survey technique, the suggestion by Delerue and Lejeune (2010) and Wong et al. (2015) was followed in evaluating CMB. In this approach, the total variance explained for the sole factor is to be below 50% to indicate that there are no CMB issues. The result from Harman’s sole factor analysis based on the extraction approach of principal axis factoring showed that the sole factor explains only 36.245%, suggesting that CMB is not a problem in this study. Also, CMB is not anticipated when correlations are not extremely high, for instance, lesser than 0.90 (Pavlou et al., 2007). As proof of CMB not being a challenge in this paper, the correlation matrix (see Table 3) shows no presence of overly big correlation estimates in our data.

Structural Model

The study’s proposed hypotheses (see Figure 2 and Table 4) were examined via AMOS with maximum likelihood
estimation. The structural model showed satisfactory fit of the model to the data as the fit indices were all above their recommended values: $\chi^2/df = 2.272$, CFI = 0.902, GFI = 0.920, NFI = 0.918, and RMSEA = 0.053 (Hair et al., 2010). Table 4 presents fitness indices. The $R^2$ for users’ BI and use behavior were 59.6% and 78.3%, respectively.

### Analysis of the Structural Model

Given the adequate fit of the model to the data, the estimated path coefficients of the structural model were then examined to evaluate the hypotheses. The examination of the structural model should explore the path and significance of causal relationships between latent variables (Lou et al., 2000; Lu & Tobbin and Kuwornu, 2011) that the extent to which an individual believes that utilizing a specific system would improve his or her job performance or life will influence their BI to use it. With this assertion, if users discover that MM carries a likely improvement for their performance and transactions, they are more likely to adopt it.

Also, the result significantly supports H2, which posits that EE has a positive impact on users’ BI to adopt MM. This finding is in support of prior works (e.g., Martins et al., 2014; Mutlu & Der, 2017; Tan & Lau, 2016). Thus, the finding suggests that individuals are more likely to have a higher intention to adopt and use MM if they perceive that the use of this new technology (MM services) is not challenging, that is, if little effort is needed to use it. Moreover, this result has affirmed that if the system is easy to use, this will lead to the ability to support consumers’ adoption of MM. Similarly, the result confirms H3, showing that EE exhibits a significant positive impact on PE. This finding is consistent with the conclusion reached by other studies in another context, including mobile payment (Koenig-Lewis et al., 2015) in France, mobile social networking sites (Wong et al., 2015a) in Malaysia, and in wearable payment context in Malaysia (Lee et al., 2020) where customers would adopt new technology if it enhances their performance. This finding also supports the assertion by Tobbin and Kuwornu (2011) and Narteh et al. (2017) that the extent to which an individual believes that utilizing a specific system would improve his or her job performance or life will influence their BI to use it.

### Discussion

Our study demonstrates that PE is the strongest driver of users’ BI to adopt MM, which does agree with H1. This result agrees with other mobile technology studies such as mobile payment (Koenig-Lewis et al., 2015) in France, mobile social networking sites (Wong et al., 2015a) in Malaysia, and in wearable payment context in Malaysia (Lee et al., 2020) where customers would adopt new technology if it enhances their performance. This finding also supports the assertion by Tobbin and Kuwornu (2011) and Narteh et al. (2017) that the extent to which an individual believes that utilizing a specific system would improve his or her job performance or life will influence their BI to use it. With this assertion, if users discover that MM carries a likely improvement for their performance and transactions, they are more likely to adopt it.

#### Table 4. Results of Hypothesis Testing.

| Hypothesis | $\beta$ | t-value | p-value | Result |
|------------|---------|---------|---------|--------|
| H1: PE $\to$ BI | .32 | 7.93 | <.001 | Yes |
| H2: EE $\to$ BI | .28 | 5.32 | <.001 | Yes |
| H3: EE $\to$ PE | .49 | 10.01 | <.001 | Yes |
| H4: SI $\to$ BI | .17 | 4.56 | <.001 | Yes |
| H5: FC $\to$ BI | .09 | 1.24 | .189 | No |
| H6: HM $\to$ BI | .06 | 1.13 | .326 | No |
| H7: PV $\to$ BI | .14 | 2.93 | <.005 | Yes |
| H8: HB $\to$ BI | .22 | 4.85 | <.001 | Yes |
| H9: HB $\to$ Use Behavior | .25 | 5.02 | <.001 | Yes |
| H10: PR $\to$ BI | -.15 | 2.48 | <.005 | Yes |
| H11: TR $\to$ PR | -.12 | 2.19 | <.005 | Yes |
| H12: TR $\to$ EE | .34 | 7.99 | <.001 | Yes |
| H13: TR $\to$ BI | .16 | 3.87 | <.002 | Yes |
| H14: BI $\to$ Use Behavior | .31 | 7.76 | <.001 | Yes |

Note. PE = performance expectancy; EE = effort expectancy; SI = social influence; FC = facilitating conditions; HM = hedonic motivation; PV = price value; HB = habit; PR = perceived risk; TR = trust; BI = behavioral intention.
This outcome shows that when users feel that new technology is easy to use and does not need much effort, they will have high anticipation toward acquiring the expected performance. Furthermore, this result can be interpreted that the more comfortable and more intuitive technology is perceived to be, the more positive the assessment of its usefulness.

Furthermore, the result shows that SI is a pertinent predictor of users’ BI to adopt MM which approves H4. The result provides support for prior studies (e.g., Aker & Wilson, 2013; Narteh et al., 2017; Tan & Lau, 2016; Zhou et al., 2010), which reported that SI enhances consumers’ BI. Likewise, this finding is in accord with other mobile studies such as mobile tourism shopping, mobile payment, mobile marketing, and mobile banking in other countries, including Malaysia, France, Jordan, and Zimbabwe (Eneizan et al., 2019; Koenig-Lewis et al., 2015; Makanyeza, 2017; Tan & Ooi, 2018). This finding suggests that the more individuals value the advice from others (e.g., their friends, peers, and colleagues) and perhaps their opinion leaders, the more likely they will accept MM.

The effect of FC on users’ BI to adopt MM was not significant which rejects H5. This result implies that the possibility of using MM services does not necessarily depend on the availability of facilities and support systems. The insignificant impact of FC on users’ BI to accept MM may be caused by the fact that the facilities and support systems (e.g., working mobile service connection and mobile transfer agents) and specific skills (e.g., how to operate a mobile phone) required to use the service are readily available to users and neither foster nor hinder the behavior. This finding contradicts the result found in other mobile works done on mobile advertising in Malaysia (Wong et al., 2015b), mobile banking in Pakistan (Afshan & Sharif, 2016), mobile marketing in Jordan (Eneizan et al., 2019), and MM in Uganda (Mugambe, 2017) which established that FC substantially influences users’ BI. However, the finding agrees with other studies in mobile tourism shopping and mobile banking (Makanyeza, 2017; Owusu-Kwarteng et al., 2018; Tan & Ooi, 2018) that also revealed that FC does not enrich consumers’ BI to use new technologies.

Likewise, our study did not find any relationship between HM and users’ intentions (BI) thereby not supporting H6. This finding contradicts claims by other works that HM is a crucial determinant of technology acceptance and use (e.g., Brown & Venkatesh, 2005; Childers et al., 2001). This finding implies that the participants in this study seem not to be interested in the joy or pleasure that are likely to be obtained from using MM services in formulating their intentions to adopt and use the service. The lack of significance could also be due to the specific features of the technology being examined. Thus, while users may find MM useful, they appear not to find it fun. However, our finding reinforces the conclusion by some researchers in past mobile studies for messaging applications, MM, and banking that HM is not a salient predictor of users’ BI (Mugambe, 2017; Mutlu & Der, 2017; Owusu-Kwarteng et al., 2018).

Furthermore, our study highlights that PV plays a pertinent role in driving users’ BI to adopt MM. The result confirms H7 and is consistent with the claim that the cost of utilizing a technology and pricing structure significantly predict users’ intentions (BI) to technology use (Owusu-Kwarteng et al., 2018; Venkatesh et al., 2012). Thus, the findings imply that PV issues are looked at by users in their decision to establish whether they will choose to adopt and utilize MM or not. The result corresponds with past works by Venkatesh et al. (2012), Alalwan et al. (2017), and Owusu-Kwarteng et al. (2018), which emphasized the significance of PV in consumer decision-making regarding technology use. The result also confirms the findings of a mobile marketing study conducted by Eneizan et al. (2019) in Jordan. This means that by increasing the extent of benefits and utilities perceived in utilizing MM concerning the financial cost paid to use such services, consumers are more likely to be driven to adopt MM.

Regarding habit, our study indicates that it is a salient predictor of users’ BI, which allows us to accept H8. This finding concurs with studies by Hew et al. (2015) in the context of mobile application and Eneizan et al. (2019) in the mobile marketing context which established that habit is a significant driver of users’ BI. Also, habit has been documented to be a relevant predictor of users’ intentions (BI) in the MM context. This result infers that increased experience in use leads to habitual technology use. Furthermore, the finding is in support of the results reported by Venkatesh et al. (2012), Mutlu and Der (2017), and Owusu-Kwarteng et al. (2018). Likewise, habit showed a direct impact on Use behavior, confirming H9. This implies that the degree of using MM gets to the peak level among users who have hitherto formulated habitual behavior regarding such technology. This finding offers support to previous mobile research, including mobile banking (Owusu-Kwarteng et al., 2018).

Confirming the anticipation of H10, PR shows a substantial negative effect on users’ BI to accept MM. The finding demonstrates that PR can reduce individuals’ intentions to adopt MM. Furthermore, the finding implies that users are concerned about the exposures or vulnerabilities they face while utilizing the service. Our result corroborates the research conducted by Baganzi and Lau (2017) in the MM context, which highlighted that PR negatively affects users’ BI to adopt MM. Besides, this finding also coincides with other prior mobile studies in mobile banking (Luo et al., 2010; Tan & Lau, 2016), mobile tourism shopping (Tan & Ooi, 2018), and mobile marketing Eneizan et al. (2019). However, our finding contradicts the research conducted by Ooi and Tan (2016) on smartphone credit cards in Malaysia where PR was found to have no significant impact on users’ BI. In this context, the degree to which an individual considers that the use of MM will carry no security or privacy threats may be more relevant in his or her decision to adopt and use MM. Thus, the perception of likely risk exposure of MM users is a potential hindrance to the adoption and use of the service.

Agreeing with H13, trust had a significant influence on users’ BI to adopt MM. This finding corresponds with the
result of a previous study on smartphone credit cards in Malaysia (Ooi & Tan, 2016). Thus, the result further supports the claim that trust is a critical factor that drives users’ intentions to utilize any technology (Narteh et al., 2017; Owusu-Kwветeng et al., 2018) and at the same time agrees with the argument that the whole financial system is based on trust (Narteh et al., 2017). Furthermore, H11 was confirmed, suggesting that trust does affect PR. What this means is that convincing trust MM users have in the MM services providers can reduce the uncertainties and risk they anticipate in adopting and using the service. This finding aligns with a previous study on MM carried out in Uganda (Baganzi & Lau, 2017) and also other mobile studies like mobile banking apps (Munoz-Leiva et al., 2017) in Spain. Also, we validated H12 because the result uncovered that trust substantially affects EE, and confirms previous research’s findings (Munoz-Leiva et al., 2017; Pavlou, 2003). Thus, trust reduces the need to understand, control, and monitor the situation, thereby facilitating the use of MM without much effort.

Finally, previous research uncovered that users’ BI is a predictor of Use behavior (Alalwan et al., 2017; Martins et al., 2014; Mutlu & Der, 2017; Owusu-Kwветeng et al., 2018). These works correspond with our research whereby users’ BI showed a relevant effect on Use behavior, supporting H14. This implies that MM users are more likely to utilize the service if they had the intention to utilize it. Hence, the actual adoption of MM services is significantly predicted by the users’ readiness to adopt such a system. Moreover, our finding corroborates the views of existing literature that technology use is primarily originated by users’ intentions and evaluations (Hong et al., 2008; Venkatesh et al., 2012).

Implications

Theoretical Implications

From a theoretical view, the study extends the existing research on MM adoption which has mainly focused on TAM and IDT constructs and hardly examined the role of critical constructs such as habit, HM, and PV in driving MM adoption. The study attempted to bridge the gap in the MM literature by adopting a more comprehensive model that integrates individual, technological, and environmental constructs (Nwagwu & Akeem, 2013) in a developing economy context. So, we now have an enhanced and broader understanding of the critical factors that either drive or hamper MM adoption. This research also contributes by extending the UTAUT2 with PR and trust. The two new constructs were incorporated as in the mobile environment these constructs are extremely critical and are salient predictors of consumers’ BI (Narteh et al., 2017; Ooi & Tan, 2016; Tandon et al., 2016). The article reveals that the extended UTAUT2 is applicable in the investigation of MM adoption. Therefore, future studies should pay attention to these constructs since we believe that including them in future mobile technology models will provide richer insights. Furthermore, the study empirically validates the applicability of UTAUT2 in a new mobile technology context (MM) and a different setting (Ghana), thus responding to calls for the testing of the UTAUT2 in different economies and with different technologies (Venkatesh et al., 2012). Moreover, the study further establishes new relationships due to the addition of the two new constructs (i.e., PR and trust) that are not present in UTAUT2 in MM context. These new paths involve EE $\rightarrow$ PE, Trust $\rightarrow$ EE, Trust $\rightarrow$ PR, PR $\rightarrow$ users’ BI, and Trust $\rightarrow$ users’ BI. This offers new insights regarding consumers’ intentions and the use of technology.

Managerial Implications

Understanding users’ BI in accepting MM is valuable to the stakeholders in the financial services arena, particularly the MM service providers. The findings demonstrate that PE has the most substantial influence on users’ BI, and is followed closely by EE. Furthermore, the result shows that EE significantly affects PE. What this means is that users attach considerable significance to the degree to which MM may be useful and meet their specific needs, and easy to use or requires less effort to use. So, managers of MM service providers should focus on enriching the usefulness and ease of use of the service such that adoption and use of it may be achieved more efficaciously. MM service providers could also enhance users’ BI and use of this innovative technology by communicating the substantial benefits of MM via reliable and effective marketing strategies and increased user public education. At the same time, MM providers should take steps to make the service simple to use, thereby reducing EE and boosting the PE of users.

Similarly, the findings demonstrate that SI plays a critical role in driving users’ BI to accept MM. Therefore, the service providers need to identify early users and stimulate their usage of MM so that they can serve as a reference to facilitate broad acceptance in the future. Also, the finding implies that PV issues are looked at by users in their decision to adopt MM or not. As a result, there is the need for MM service providers to enhance PV by convincing users that employing this mobile technology (e.g., MM) will offer them a better quality of life, save them time, cost, and effort which makes utilizing the service more valuable with the cost paid in this regard. Moreover, special price rebates or utilizing these services for free could be an effective alternative strategy in adding to PV; this could increase users’ adoption intention.

Finally, PR was uncovered as a relevant determinant of MM users’ BI. Consequently, MM service providers need to eradicate security concerns by designing a sound service platform with useful security features and practices put in place to lower users’ risk exposure of users if not to eradicate all. What’s more, customers’ data and transactions should be safeguarded from hackers and third parties who might contact clients for commercial purposes. Other tactics that could be more helpful in easing PR include a money-back surety policy in the case of fraud (Gan et al., 2006; Martins et al., 2014; Narteh et al., 2017). As trust was found to be a pertinent predictor of
users’ BI, EE, and PR, we propose that MM providers should concentrate on building trust to facilitate and fast-track the use of MM. This can be done by implementing technological structures, for example, third-party security certificates during and after MM transactions. The MM service providers should consider this aspect from the initial stages and make sure that every client trusts in the services being offered to them. This could be effectively achieved by communicating customer protection policies and statements of guarantees by all the mobile MM providers, merchants, and partnering banks in their marketing campaigns to stimulate early trust in MM.

Limitation and Future Research

The study involves a relatively small sample of Ghanaian MM users, which restricts the generalizability of the findings. Therefore, future research can enrich the conclusions reached in this study by integrating a similar research model with a bigger sample size or replicate the proposed model using different mobile technologies (e.g., mobile payments, mobile advertising, and online mobile travel services). Moreover, our study is limited to a Ghanaian sample. It would be productive and interesting to test whether the results hold in other developing countries, including the Philippines, Tanzania, South Africa, Uganda, Nigeria, and Kenya, where similar technology exists. In doing so, the generalization of the outcomes shown here could be tested. Also, not all the hypotheses in this study received confirmation. Future research could consider other variables such as attitude to investigate users’ intentions to adopt MM. Furthermore, future research could also look at the moderating variables (e.g., age, gender, education, and experience) to gain more understanding of users’ BI and use behavior of MM.

Conclusion

The paper sought to explore the salient factors that influence users’ BI and use behavior of MM. Our study adopted UTAUT2 as a reference model and extend it with two important constructs namely, PR and trust to predict users’ BI and use behavior of MM. Using a sample of Ghanaian MM users, our study uncovered that PE, EE, SI, habit, PV, PR, and trust are relevant predictors of users’ intention (BI) to adopt MM. Use behavior was also found to be affected by users’ intentions (BI). We also find significant interrelationships among some of the constructs. Our study, however, did not find any support for FC and HM. The findings of this study will help stakeholders, particularly MM service providers, merchants, and policymakers in crafting strategies that will enhance the adoption of MM. This paper will also stimulate further study in this area.

Appendix

Measurement Scale.

| Construct             | Item                                                                 | Measurement                                                                 | References                      |
|----------------------|----------------------------------------------------------------------|-----------------------------------------------------------------------------|---------------------------------|
| Performance          | PE1 Using mobile money services increase my productivity             | Venkatesh et al. (2003, 2012), Baganzi & Lau (2017), Alalwan et al. (2017) |
| expectancy           | PE2 Using mobile money services aid me to complete tasks swiftly     |                                                                            |                                 |
|                      | PE3 I find mobile money services useful in my day-to-day life         |                                                                            |                                 |
|                      | PE4 Using mobile services increase my chance of completing tasks that are important to me |                                                                            |                                 |
| Effort expectancy    | EE1 I find mobile money services easy to use                          | Venkatesh et al. (2003), Zhou et al. (2010)                                 |
|                      | EE2 Learning how to use mobile money services is easy for me           |                                                                            |                                 |
|                      | EE3 Skillfully using mobile money services is easy for me             |                                                                            |                                 |
| Social influence     | SI1 People who influence my behavior think that I should use mobile money services | Venkatesh et al. (2012), Alalwan et al. (2017)                                |
|                      | SI2 People who are important to me think that I should use mobile money services |                                                                            |                                 |
|                      | SI3 The people whose opinions that I value think that I should use mobile money services |                                                                            |                                 |
| Facilitating conditions | FC1 I have the necessary resources to utilize mobile money services | Venkatesh et al. (2003), Zhou et al. (2010)                                 |
|                      | FC2 I have the required knowledge to use mobile money services         |                                                                            |                                 |
|                      | FC3 If I have difficulty using mobile money services, there will be professionals or others to help me |                                                                            |                                 |
| Hedonic motivation   | HM1 Using mobile money services is fun                                | Kim et al. (2005), Venkatesh et al. (2012)                                  |
|                      | HM2 Using mobile money services is enjoyable                         |                                                                            |                                 |
|                      | HM3 Using mobile money services is entertaining                        |                                                                            |                                 |
| Habit                | HB1 The use of mobile money services has become a habit for me         | Venkatesh et al. (2012)                                                    |
|                      | HB2 I am addicted to using mobile money services                      |                                                                            |                                 |
|                      | HB3 I must use mobile money services                                  |                                                                            |                                 |

(continued)
Appendix. (continued)

| Construct            | Item                                                                 | Measurement                                                                 | References                             |
|----------------------|----------------------------------------------------------------------|----------------------------------------------------------------------------|----------------------------------------|
| Price value          | PV1                                                                | Mobile money service is reasonably priced                                  | Dodds et al. (1999), Venkatesh et al. (2012) |
|                      | PV2                                                                | Mobile money service is good value for money                               |                                        |
|                      | PV3                                                                | At the current price, mobile money services offer good value               |                                        |
| Perceived risk       | PR1                                                                | Using mobile money services subject my mobile wallet to potential fraud     | Featherman & Pavlou (2003)             |
|                      | PR2                                                                | I think using mobile money services subject my mobile wallet to financial risk |                                        |
|                      | PR3                                                                | I think mobile money services might not work well and will create problems for me |                                        |
| Trust                | TR1                                                                | I trust in mobile money services                                           | Gefen et al. (2003)                   |
|                      | TR2                                                                | I believe that mobile money service is trustworthy                          |                                        |
|                      | TR3                                                                | I trust that mobile money service providers are honest and keep their promises to users |                                        |
| Behavioral intention | BI1                                                                | I intend to continue using mobile money services in the future             | Venkatesh et al. (2012)               |
|                      | BI2                                                                | I will always try to use mobile money services in my day-to-day life.      |                                        |
|                      | BI3                                                                | I plan to continue to use mobile money services frequently                |                                        |
| Use behavior         | UB1                                                                | I often use mobile money service to payment                                 | Püschel et al. (2010), Zhou et al. (2010), Alalwan et al. (2017) |
|                      | UB2                                                                | I often use mobile money service to transfer and remit money               |                                        |
|                      | UB3                                                                | I often use mobile money service to pay my bills                           |                                        |

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