



Understanding the Factors Influencing Mobile Commerce Adoption by Traders in Developing Countries: Evidence from Ghana

Mercy Kwofie and Joseph Kwame Adjei^(✉)

School of Technology, Ghana Institute of Management
and Public Administration, Accra, Ghana

Mercy.kwofie@st.gimpa.edu.gh, jadjei@gimpa.edu.gh

Abstract. The proliferation of wireless communication networks and relative reduction in cost of mobile devices have contributed to exponential growth in mobile device usage, and mobile commerce (m-commerce). Increasingly, mobile devices are being used in various ways by traders. This study analysed the factors that influence m-commerce adoption by traders and the role of Gender in mobile device adoption. The work extends the User Acceptance and Use of Information Technology (UTAUT2) model by highlighting the role of Trust. This study took place in one of the biggest markets in Ghana which is a hub for sale and distribution of agricultural and farm produce. The study analysed responses to a survey of two hundred and fifteen (215) traders using regression analysis. It was discovered that gender has moderating effect on Performance Expectancy, Facilitating Conditions, Habit, Price Value, and Trust and therefore, confirming the need for extension of the UTAUT2 model in relation to the study of adoption and use of m-commerce.

Keywords: UTAUT2 · Micro trading · m-commerce · Adoption · Gender

1 Introduction

The proliferation of wireless communication technology coupled with the increasing number of mobile devices, are contributing to the increasing use of mobile devices for many human endeavor and emergence of mobile mediated commercial activities. A recent study revealed a worldwide mobile penetration rate of 68% with 5.135 billion unique mobile users (Kemp 2018). The same study showed that, unique mobile user penetration rate in Ghana is about 67% (Kemp 2018). The popularity of smart mobile devices, and mobile operating systems like android and Apple IOS are major factors accounting for growth in m-commerce (Chang et al. 2014). Such demand for mobile applications for business transactions and other social interactions are projected to grow (Chang et al. 2014).

It has been observed that the inherent characteristics of mobile technology, including; personalization, flexibility, mobility offers greater potential for businesses harness emerging market opportunities efficiently (Alfahl et al. 2012; Boateng et al. 2014). M-commerce has therefore, emerged as a major enabler of many commercial

transactions (Laudon and Traver 2016). Yoo (2010) observed that mobile technologies and wireless connectivity are unavoidable and irresistible in many commercial transactions. Notwithstanding the enormous potentials that m-commerce brings, developing countries like Ghana have not been able to fully realise such potentials (Chimaobi 2014; Sey 2011). According to Laudon and Traver (2016), m-commerce adoption is an evolving issue hence, needs constant updates to the knowledge and the needed skills of the researchers to study and assist businesses or organizations and individuals to take advantage of the potentials it brings to them.

It is however important to investigate the factors that influence adoption of m-commerce from a developing country perspective. We adopt the UTAUT2 model by combining the effects of trust as an additional construct and the effects of Gender serving as a moderating variable. The use of a quantitative techniques to identify the key factors that influences intention to adopt m-commerce for trading activities is a major methodological contribution. The study also contributes theoretically by providing a model that extends the existing technology acceptance models with new construct. Finally, the study will also help m-commerce service providers to clearly appreciate the key factors that influence the m-commerce adoption.

2 Overview of Mobile Commerce Adoption

Many researchers have observed an increasing number of micro trading enterprises in many developing giving the limited options of income generation in the formal sector ((Abor and Quartey 2010), Dzogbede (2014)). Micro trading activities are witnessed as engine of growth and poverty reduction (Anwar 2015; Boateng et al. 2014). Previous studies have shown that adoption of Information Technology (IT) by micro enterprises usually contribute to faster growth (Good and Qureshi 2009; Packalén 2010; Anwar 2015). M-commerce adoption has the potential to lower transaction cost in terms of communication challenges among parties involved in trading activities (Laudon and Traver 2016). M-commerce involves the use of mobile devices including mobile phones, mobile computers and tablets (Dwivedi et al. 2014; Yang 2005). Höglér and Stucky (2006) observed that the concept of mobility makes m-commerce a medium for reaching and serving the needs of many potential customers. For the purpose of this study, m-commerce is seen as the adoption of mobile devices connected through telecommunication network for trading activities.

A research work conducted by Donner (2008) depicted an increase in profit in the usage of mobile phones for trading activities by micro traders. Boateng et al. (2014) researched into the impact of using mobile phones by farmers and fishermen on the trading activities and discovered that m-commerce assisted in cost reduction for fishermen and farmers and has improved the relationship between the business partners. The usage of mobile devices for micro trading activities was discovered to have increased contact between customers and clients better than any other type of communication which was clearly shown in a research survey conducted by (Esselaar et al. 2007). Mobile phones are being transformed from a single voice communication device to robust communication device which can provide text messages, voice and video messaging, entertainment functions, financial instrument for trading and others, as a

result of m-commerce. Its usage in the banking sector enables users to transfer money between Bank accounts and payment of bills (Tobbin 2012). Even in our electoral politics, mobile technologies can be used to monitor and capture incidences before, during and after election. Mobile devices together with the advancement of telecommunication are new technologies which would create new opportunities for businesses. And this would help create more jobs and this computerisation would proceed to bring down the cost of goods and service in production and to cut down cost while increase revenue. Technological advancement is improving which make businesses to strive with no due time to market for products and services which can bring about keen competition with its accompanying advantages. Many argue that advances in communication technology play a vital role in promoting transparency, liquidity, and efficiency in capital markets (Boadi et al. 2007). With the increasing use of mobile devices, a lot of businesses in Ghana today are using mobile phones to transact businesses. This has given them a new way of thinking by embracing technology in the world of business.

As users globally accept mobile technology in its varied states, m-commerce transactions are estimated to flourish based on mobile devices which serve as the best medium for customers to receive immediate feedback in the form of short messages tailored to user's needs (Bigne et al. 2005). The penetration of these technologies in the developed countries has affected every sphere of their daily lives positively (Boateng et al. 2014). This rapid growth in m-commerce application is significant for both enterprises and consumers (Wu and Wang 2005). Based on theoretical framework used, a lot of researchers have recommended to include individual characteristics into a research model either as dependent variable or independent variable to the study of the affective, cognitive or Behavioural Intentions of individuals to adopt a technology. Emerging literature from developing countries provide several examples of innovative application of ICTs to support micro trading enterprises. For instance, farmers in Bangladesh have been using mobile phones to monitor market prices of vegetables, rice and other farm produce (Kshetri and Dholakia 2002). The authors also reported that farmers in remote areas of Cote d'Ivoire use mobile phones to track the hourly fluctuations in cocoa and coffee prices. These examples and many others provide the opportunity to assess the extent of mobile commerce adoption in Ghana. M-commerce is seen as a means of conducting business transactions through mobile telecommunication network by using a communication, information and mobile devices such as Personal Digital Assistant (PDA), mobile phones, android phones to mention by a few (Chong et al. 2014). Kalakota and Marcia (2001) posit that the success of m-commerce depends on mobile infrastructure and devices, applications and experiences, and relationships and supply chain which run in a wireless environment. Because of the ubiquitous features of the various mobile devices, m-commerce offers consumers the opportunity to access information 24/7 and this is as the result of the continuous growth of mobile devices. Boateng et al. (2014) view m-commerce as the combination of time, location and personalization. However, other researchers group the above features as currency, immediacy, instant connectivity and identification but all could be equated into time, location and personalization (Boateng et al. 2014).

In other words, commerce is not only a transaction, but also involves the provision of services and information. Mobile devices possess varied characteristics through

which different applications, purposes and services are secured as m-commerce is seen as an evolving arena which deals with applications, portable devices, and other functionalities. While most of the initial e-commerce applications could be adapted to run in wireless environment, m-commerce also deals with a lot of current applications which is enabled by wireless infrastructure (Laudon and Traver 2016). It is seen as an effective tool for rendering e-commerce to end-users irrespective of the time and location. In striving for competitive advantage, most companies offer m-commerce alongside e-commerce (Alfahl et al. 2012).

3 Theoretical Background

There has been numerous Technology acceptance and use research (Dwivedi et al. 2011; Williams et al. 2009) and so, Goodhue (2007) opine that these research have reached the maturity stage hence must be moved outside its confines and should pay attention to current growing need of businesses. Consequently, by increasing the explanatory power of UTAUT model, a lot of researchers have amended the model based on the research work in question (Dwivedi et al. 2017a, b; Goodhue 2007; Rana et al. 2016; 2017; Williams et al. 2015). Venkatesh et al. (2012) proposed UTAUT2 by modifying UTAUT to a consumer context. The authors added three new constructs to the UTAUT model and they are: Hedonic Motivation, Price Value and Habit. UTAUT2 maintain the constructs and definition of Performance Expectancy, Effort Expectancy, Social Influence and Facilitating Condition in UTAUT in a consumer use context and so Performance Expectancy, Effort Expectancy, Social Influence, Facilitating Condition, Hedonic Motivation, Price Value, Habit influence the Behavioural Intent to adopt a technology (Venkatesh et al. 2012). In other words, the Behavioural Intent to adopt a technology to ascertain individuals' actual usage of a technology. Age, gender, and experience are moderating factors that influence these constructs on Behavioural Intent and the use of a technology (Venkatesh et al. 2012).

Venkatesh et al. (2012) defined Hedonic Motivation as an enjoyment or fun resultant from using a technology which is key in the determination of technology acceptance and use behaviour. Hedonic motivation captured as Perceived Playfulness (Tamilmani et al. 2019) as an additional construct to UTAUT of the study conducted by Alwahaishi and Snášel (2013), it came out that Facilitating Conditions, Perceived Value, Performance Expectancy, Effort Expectancy, Social Influence among other variables are the factors affecting end-users adoption of Information and Communication Technology (ICT).

Habit is defined by Limayem et al. (2007) as the degree to which people tend to perform behaviour spontaneously through learning and Kim and Malhotra, (2005) explain Habit as initial behaviour. The above explanations differentiate habits in two distinct ways: that is, an initial behaviour and as an automatic behaviour. Celik (2016) integrated Habit into UTAUT to increase the explanatory power of the model and it was noticed that Habit affects Behavioural Intention to use a technology. However,

Ajzen and Fishbein (2005), posit that response from earlier experiences will affect numerous beliefs and also affect forthcoming behavioural performance. A detailed discussion on use of habit construct has been provided by Tamilmani et al. (2018a).

Price Value according to Venkatesh et al. (2012) is a distinction between the organizational use context and consumer use context because the users normally incur the cost of a technology. Unlike in an organization, employees do not have to bear the cost of a technology. The authors also opine that the commitment of using a technology coupled with financial commitment have significant impact on ones' technology use. Price Value in this research work means traders' perception of the gains to be derived in adopting m-commerce and financial commitment born by the trader (Dodds and Monroe, 1991; Tamilmani et al. 2018b; Venkatesh et al. 2012). When a trader anticipates that the gains are more than the financial commitments of using a technology, the Price Value is positive or else it is negative. The results of research work of Alkhuzaizan and Love (2012) stated that Cost, Trust and Performance Expectancy significantly predict users' intention to use a technology.

Besides the addition of three constructs to UTAUT, there is a change of the Facilitating Condition direct relationship with technology use to Behavioural Intention because in a consumer context, facilitations available to each consumer depend on applications, mobile devices and others of which the difference can be very significant among the individual consumers while in the organizational context, the Facilitating Conditions such as training, are made available by the organization but not the individual employees (Venkatesh et al. 2012). Facilitating Condition is moderated by age, gender and experience. Moreover, voluntariness is not included into the UTAUT2 based on the fact that individual consumers are not under any institutional directive to adopt a technology (Venkatesh et al. 2012). Based on the above discourse, UTAUT2 is qualified as a technology acceptance model needed to investigate the factors that affect the traders' intention to adopt m-commerce and to analyse whether Gender moderates those factors. Hence, this study adopted it as a base of the conceptual framework of the study.

In order to make the UTAUT2 more appropriate for this study, an external factor (Trust) was introduced to the constructs of the UTAUT2 model. Previous researchers had acknowledged the importance of Trust in m-commerce adoption (Chong et al. 2014; Slade and Williams 2013; Slade et al. 2015a, b; Wei et al. 2009). For example, Trust was among other variables to influence consumers in Malaysia and China to adopt m-commerce. Venkatesh et al. (2012) suggested that future work should examine other major factors vital to different research context. A number of constructs used within the context of m-commerce can be corresponded with UTAUT2's constructs. Since m-commerce is in the infancy stage in development countries like Ghana, Trust would play a key role to affect consumers' Behavioural Intention to adopt m-commerce (Chong et al. 2014).

Table 1. Definition of constructs of this study

Factors	Type	Factor measurement definitions for this study	Items	References
Performance Expectancy (PE)	Independent, 5 point-Likert scale	The extent to which a trader perceives that adopting m-commerce will improve his or her performance	3	Venkatesh et al. (2012) Venkatesh et al. (2003)
Effort Expectancy (EE)	Independent, 5 point-Likert scale	The extent to which a trader perceives that adopting m-commerce is easy	3	Venkatesh et al. (2012) Venkatesh et al. (2003)
Social Influence (SI)	Independent, 5 point-Likert scale	The degree to which a trader believes that people who matter to him or her believes he or she should adopt m-commerce	3	Venkatesh et al. (2012) Venkatesh et al. (2003)
Facilitating Condition (FC)	Independent, 5 point-Likert scale	The degree to which a trader believes that the necessary help and facilities are available to him or her to adopt m-commerce	3	Venkatesh et al. (2012) Venkatesh et al. (2003)
Hedonic Motivation (HM)	Independent, 5 point-Likert scale	The extent to which a trader experiences enjoyment and pleasure from adopting m-commerce	3	Venkatesh et al. (2012)
Price Value (PV)	Independent, 5 point-Likert scale	The degree of a traders' perception of the benefits to be derived in adopting m-commerce and the financial commitment to be borne by him or her	3	Venkatesh et al. (2012) Dodds et al. (1991)
Habit (HT)	Independent, 5 point-Likert scale	The extent to which a trader believes that adopting m-commerce is automatic	3	Venkatesh et al. (2012) (Limayem et al. 2007)
Trust (T)	Independent, 5 point-Likert scale	The extent to which the traders are confident and willing to adopt m-commerce	3	Venkatesh et al. (2012) (Chong et al. 2014)
Behavioural Intentions (BI)	Dependent, 5 point-Likert scale	The extent of a trader's willingness to use and continue to adopt m-commerce	3	Venkatesh et al. (2012)

Source: Author's construct

It is very vital to emphasise the definition of constructs which depict how they are measured through empirical studies. This is because the constructs from the conceptual framework were adopted from initial studies to suit the context of this study (m-commerce adoption). Table 1 above exhibits the definition of the constructs as used in this research with its related references to the reviewed literature.

3.1 Performance Expectancy

Effort Expectancy is one of the important factors proven in initial studies on the technology adoption, Perceived usefulness of a technology such as mobile credit card was found to have a positive effect on Behavioural Intentions to use mobile credit card (Tan et al. 2014). Also, Performance Expectancy was proven to have considerable effect on the consumers' intent in the use of m-commerce (Chong et al. 2014; Wei et al. 2009), mobile internet (Venkatesh et al. 2012), mobile payment system (Slade et al. 2013) to mention but a few. Therefore, it is believed that PE will impact users' intent to adopt m-commerce. Thus, the ensuing hypothesis is proposed:

H1: Performance Expectancy significantly influence Behavioural Intention to adopt mobile commerce in Ghana.

3.2 Effort Expectancy

Earlier research supports that latent variables linked to EE was significant in determining a person's desire to adopt a new technology (Venkatesh et al. 2012; Wei et al. 2009). M-commerce presents users with various opportunities such as not being limited to a particular physical locations. Mobile devices are portable and easy to use when compared to handling a notebook for the various micro trading activities. Effort Expectancy is one of the vital factors in prior studies on the technology adoption, where Perceived Ease of Use in adopting a technology influence significantly the Behavioural Intention of several technologies such as: mobile credit card (Tan et al. 2014); mobile commerce (Chong et al. 2014; mobile payment (Slade et al. 2013; Slade et al. 2015a, b) and others. Thus, the ensuing hypothesis is proposed:

H2: Effort Expectancy has significant influence on Behavioural Intention to adopt m-commerce in Ghana.

3.3 Social Influence

M-commerce is a technology which is not compulsory, because the users have the free option to adopt it or not. SI was significant in affecting the Behavioural Intention to adopt m-commerce in the study of (Chong et al. 2014). The authors also found out that SI was among the salient factors that affect users' intent to use m-commerce in Malaysia. In the research work of Jaradat and Rababaa (2013), the results showed that users adoption of mobile commerce services could be anticipated from the individuals' desire in its usage which were propelled by Performance Expectancy, Effort Expectancy and Social Influence. The research further depicted that among fore-mentioned factors, Social Influence was the highest predictor that directly influenced the users' decision to adopt m-commerce services. Thus, the ensuing hypothesis is proposed:

H3: Social Influence has significant influence on Behavioural Intention to adopt m-commerce in Ghana.

3.4 Facilitating Conditions

Shao and Siponen (2011) posit that, Facilitating Condition in Information System studies principally refers to education, direction, structures, and practical support needed to operate a system, and when these facilities are not considered, it can either improve or impede IT use. The submission is well supported by (Seppo et al. 2011; Venkatesh et al. 2003) that, Facilitating Conditions have direct influence on Behavioural Intention to use a technology. Practical verification showed that when individuals who adopt a technology are given assistance in varied ways, they would be motivated to use a system (Alwahaishi and Snášel 2013). Thus, the ensuing hypothesis is proposed:

H4: Facilitating Condition significantly affect Behavioural Intention to adopt m-commerce in Ghana.

3.5 Hedonic Motivation

Venkatesh et al. (2012) explained in the context of their study that Hedonic Motivation has direct effect against Behavioural Intention. Furthermore, if the users are entertained through the adoption of a technology, they adore it, which affect their Behavioural Intention to continue to adopt an information system (Venkatesh et al. 2012). A lot of studies have confirmed that in a consumer perspective, Hedonic Motivation is a good predictor in technology acceptance and use (Raman and Don 2013; Harsono and Suryana 2014). Thus, the ensuing hypothesis is proposed:

H6: Hedonic Motivation significantly affect Behavioural Intention to adopt m-commerce in Ghana.

3.6 Price Value

According to Wei et al. (2009), cost could be a basis for users to accept or reject the adoption of a technology. The authors opine that cost of the device, internet, and other applications constitute the costs normally born by individuals who adopt m-commerce. Venkatesh et al. (2012) also posit that the financial commitment and other charges associated with the usage of a technology can affect users' technology adoption decisions. Therefore, if the gains in adopting a technology is more than the financial commitment, then consumers are likely to use that particular technology else it may hinder them to successfully adopt it. Thus, the ensuing hypothesis is proposed:

H6: Price Value significantly affect Behavioural Intention to adopt m-commerce in Ghana.

3.7 Habit

According to Venkatesh et al. (2012) when experience gained in adopting a particular technology increases, the individuals begin to yearn to use the technology automatically. When actions n carried out in the past frequently, the subsequent behaviour becomes habitual which helps to forecast future behaviour of an individual. For

example, the results of the research done by Venkatesh et al. (2012) and Pahlila et al. (2011) depicted that Habit had considerable effect on Behavioural Intention to use a technology. Therefore, once the users adopt m-commerce, it becomes a habitual which influences their adoption decisions. Thus, the ensuing hypothesis is proposed:

H7: Habit significantly affect Behavioural Intention to adopt m-commerce in Ghana.

3.8 Trust

Trust has to do with one's decision to agree on those who provide m-commerce services, vendors' condition or services. However, an option is normally considered after adopting the varied features of providers which include security confidence in the service delivery (Chong et al. 2014). Chong et al. (2012) modified the TAM model to study about m-commerce adoption in China. Among the other factors, Trust was the highest predictor of m-commerce adoption behaviour. When risk is considered as a major factor in taking a decision, Trust is seen as an important indicator of users' adoption behaviour.

Telecommunication networks have its own challenges such as limitation in bandwidth, inconsistent networks assurance functionality and vulnerability in data transmission over the network (Laudon and Traver 2016). It should be noted that, Trust is a vital issue in m-commerce adoption during the elementary stages of technology acceptance and use. When there is disappointing performances of the wireless communication system, users doubt the ability to deliver on promises. Personalized handling of goods, services and money, face-to-face interactions are missing in m-commerce.

In the context of m-commerce, because it is still in its infancy stage in most of the developing countries like Ghana, there are numerous means of payment systems, formalities in regulating policies, rules and procedures and global acceptable standards that are supposed to be streamlined because Trust is one of the principal factors for user acceptance and vital to achieve success in m-commerce adoption. Siau and Shen (2003) posit that Trust should be one of the cardinal variables to be considered during m-commerce studies especially in m-commerce service delivery. Therefore, the researcher proposed that:

H8: Trust significantly affect Behavioural Intention to adopt m-commerce in Ghana.

One moderating variable (Gender) was introduced to the eight factors of the conceptual framework to answer the second research question (Are the effects of these adoption factors on the intention of traders to adopt m-commerce moderated by Gender?). This moderating factor contributed in assessing the strength of the relationships between the independent and the dependent variables according to the inherent features of the users (Baron and Kenny 1986). Venkatesh et al. (2012) hypothesised that when Gender is considered as a moderating variable, it plays a vital part to establish the relationship between the inner factors of the UTAUT2 framework. Thus, Gender has a moderating effect on the relationship between the constructs of the UTAUT2 model. Furtherance to the numerous researches which echoed that Gender

has significant impact where a technology is used and implemented in the business perspective. Especially it was revealed in the study of Boateng et al. (2014) that, there was increasing influx of women into the field of micro trading activities in developing countries and it was clear that women were dominating in the field of micro trading activities despite the numerous challenges hindering their growth. Wei et al. (2009) established that demographic features of users should be considered in forecasting users' adoption behaviour.

The effect of Performance Expectancy was skewed in favour of men (Venkatesh et al. 2000), whilst Effort Expectancy and Social Influence were also skewed in favour of women in technology acceptance and use (Cheng et al. 2006). It could be envisaged that performance is a major concern to males when it comes to technology acceptance and use. On the other hand, females consider ease of use and recommendations made by peers and other people they perceive to be important to them. It was seen in the research of He and Freeman (2010) that men show more enthusiasm in exploring technology features and feel more comfortable with technology. In other words, different Gender gives a different impact on the use of any information system either being compelled by policies or having chosen the technology willingly. It was further explained that Gender difference in computer anxiety will be reduced as time goes on because of ubiquitous computing of our daily life. Following the assertion made by Tan and Teo (2000) that most of the studies also revealed inconclusive results in using Gender as a moderator and so the moderating effect of Gender requires further investigation.

The hypotheses associated to the mediating effects of Gender are as follows:

- H9: Performance Expectancy significantly affect Behavioural Intention to adopt m-commerce is moderated by Gender.
- H10: Effort Expectancy significantly affect Behavioural Intention to adopt m-commerce is moderated by Gender.
- H11: Social Influence significantly affect Behavioural Intention to adopt m-commerce is moderated by Gender.
- H12: Facilitating Condition significantly affect Behavioural Intention to adopt m-commerce is moderated by Gender.
- H13: Hedonic Motivation significantly affect Behavioural Intention to adopt m-commerce is moderated by Gender
- H14: Price Value significantly affect Behavioural Intention to adopt m-commerce is moderated by Gender.
- H15: Habit significantly affect Behavioural Intention to adopt m-commerce is moderated by Gender.
- H16: Trust significantly affect Behavioural Intention to adopt m-commerce is moderated by Gender.

The model adopted for the study is exhibited in Fig. 1 below.

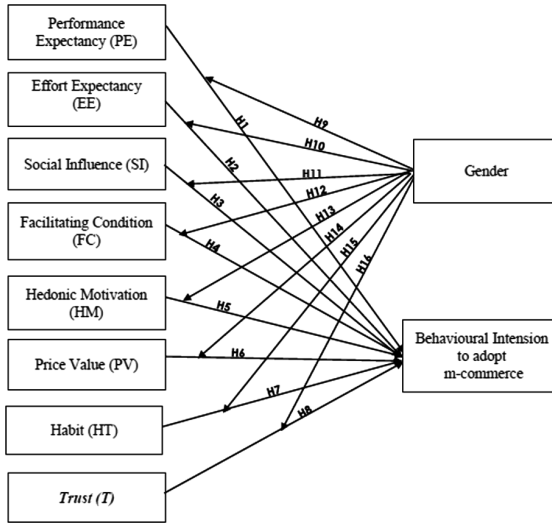


Fig. 1. Proposed research model (adapted from Venkatesh et al. 2012)

4 Methodology

The significance of this section to the entire study is to describe the methodology used in conducting the study by critically looking at the objectives set. This stage is very important because it is the pivot of the study and if not carried out assiduously, else the whole study might not be justifiable (Klein and Myers 1999). The approach adopted is highly dependent on the objectives set. That is, there is no single approach to the entire work. This study was handled by bringing all the main components of the study together in a comprehensive manner to address the issues under investigation.

This research population is limited to traders in the Techiman market in the Bono East Region of Ghana. This market is amongst the largest markets in Ghana. The market is not only serving as a converging point for interest groups from other countries like Burkina Faso, Togo, Mali, Ivory Coast or Niger but also attract farm produce from most nearby farming jurisdictions in the country. The market activities in Ghana tend to resonate to other nearby countries connected to Ghana through trade. Taken a closer look at other countries, the researchers envisaged the effect of m-commerce adoption on the small scale enterprises in Ghana would have likely larger influence.

According to a book written by Alreck and Settle (1985), it was indicated that sample size of about 200 to 1000 respondents is appropriate for a population of 10,000 or more. This informed this study by selecting a sample size of 215 which the above submission strongly supports based on the fact that the sample frame as already indicated could not be ascertained. The researchers went to the area of interest which was the Techiman Market.

Data collection method adopted was based on the exiting literature to ensure validity of research instrument. The development of the instrument was also based on

the guidelines suggested by Information Systems literature (e.g. Gao and Deng 2012). Most measurement issues were picked from existing measures and modified to fit the current circumstances of the study.

A questionnaire was structured to reflect the framework presented in Fig. 1. It was designed to be clear and simple to complete. The interviewees of this research were asked to specify their observations of the modified UTAUT2 framework which involved the following constructs: Effort Expectancy, Effort Expectancy, Facilitating condition, Social Influence, Price Value, Hedonic Motivation, Habit and Trust to adopt mobile commerce for their micro trading activities which were obtained by adapting a five point likert scale from 1 to 5 continuum with its associated weights as: 1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree and 5 = Strongly agree. The researchers seek results that can strengthen the validity of the theoretical framework (Fig. 1). The questionnaire was used to solicit the survey participants' opinions on the focal constructs of the research to help meet the purpose and objectives of the research, and also to come out with the research issues in the study.

The data gathered were coded and analysed by the use of Statistical Package for Social Science (SPSS). In line with other studies, related items were grouped together to ensure reliability and validity of the model (Tan et al. 2014; Venkatesh et al. 2012). Descriptive analysis used frequency and percentage to examine the profile of the respondents. Also, any discrepancies of assumptions underlying the chosen statistical technique were addressed.

Multiple regressions was then done in order to validate the hypotheses that were established in the previous section (Foon and Fah 2011). This was done to answer the two research questions. Firstly, the regression was done to identify factors that influenced the intention to adopt m-commerce. Secondly, regression was done on the factors and the moderating factor (Gender) to determine their significance. The margin of error for this study was 0.05. Thus, the confidence level was 95%.

The traders were assured by the researchers of the confidentiality of the information they gave because the study was for academic purpose.

5 Findings

5.1 Respondents' Profile and Characteristics

Two hundred and fifteen (215) valid questionnaires were completed by the traders. Twenty three (23%) of respondents were males while the remaining (77%) constitute females. (18.50%) of the respondents were within the ages of 18–26. The sample quota allocation made room for various age category however, most were skewed towards 38–48 years. Majority (48%) of the respondents interviewed were Junior High School graduates, Tertiary graduates constitute (14%) and (14%) of the respondents never attended school.

Table 2. Average income of respondents per day

Average income (GhC)	Frequency	Percentages
Less than 50	157	73.0
50–100	45	20.9
Above 100	13	6.1
Total	215	100

The Table 2 above shows that, out of the (215) respondents that were included in the sample, (73.0%) of them made an average income less than GhC50.00, (20.9%) were within GhC50.00- GhC100.00 and the remaining (6.1%) made above GhC100.00 daily.

Table 3. Adoption experience of respondents

Duration	Frequency	Percentages
3–6 months	68	31.6
7–12 months	74	34.4
2–3 years	44	20.5
Above 3 years	29	13.5
Total	215	100

The Table 3 above shows that, out of the of the (215) respondents that were included in the sample, (31.6%) of respondents indicated that they had adopted m-commerce within 3–6 months, (34.4%) indicated 7–12 months, (20.5%) indicated 2–3 years and the remaining (13.5%) indicated above 3 years. Majority of the respondents in the survey had adopted m-commerce within one year, which shows that m-commerce adoption is relatively a new trend in Ghana.

Table 4. Residence of respondents

Country	Frequency	Percentages
Ghana	200	93.02
Burkina Faso	8	3.72
Togo	4	1.86
Ivory Coast	2	0.86
Niger	1	0.47
Total	215	100

The Table 4 above shows that, out of the of the (215) respondents that were included in the sample, (93.02%) of respondents indicated that they were residence in

Ghana, (3.72%) indicated Burkina Faso, (1.86%) indicated Togo, (0.86%) indicated Ivory Coast and the remaining (0.47%) indicated Niger.

6 Inferential Analysis

According to Cresswel (2009), reliability refers to as the consistency and stability of results. In order to achieve a solid reliability, this study is based on a well-discussed theory (modified UTAUT2). Cronbach's alpha was used in this study to evaluate the internal consistency of the scale measurement and the research variables. The results presented in Table 5 suggested that all the measures in this study ranged from 0.602 to 0.845 were reliable as recommended by (Hair et al. 2003).

Table 5. Regression coefficients

Variable	S. E	Beta	T	P-value
Performance Expectancy (PE)	0.114	0.432	0.316	<0.05
Effort Expectancy (EE)	0.102	0.204	1.221	<0.05
Social Influence (SI)	0.036	0.036	1.421	>0.05
Facilitating Condition (FC)	0.011	0.256	0.421	<0.05
Hedonic Motivation (HM)	0.064	0.016	0.336	>0.05
Price Value (PV)	0.031	0.167	0.256	<0.05
Habit (HT)	0.204	0.138	1.042	<0.05
Trust (T)	0.108	0.034	0.368	<0.05
PE _x Gender	0.106	0.135	0.223	<0.05
EE _x Gender	0.143	0.302	1.431	>0.05
SI _x Gender	0.109	0.112	3.056	>0.05
FC _x Gender	0.511	-0.240	-0.169	<0.05
HM _x Gender	0.065	0.072	0.046	>0.05
PV _x Gender	0.131	-0.261	-0.122	<0.05
HT _x Gender	0.104	0.156	1.001	<0.05
T _x Gender	0.204	-0.333	-0.442	<0.05

Dependent variable: Use Behaviour; Sig: 0.05; S.E: Standard Error; B: Beta Coefficient; T: Test Statistic

The results as shown below reveals a relatively high Cronbach alpha which indicate that the selected factors are consistent in explaining the adoption of mobile commerce for micro trading activities by traders in Ghana. The individual variables showed a Cronbach alpha greater than 0.6 with an overall Cronbach alpha of 0.887.

The coefficient table indicates that the independent variables and their influence to the model fitting. Their coefficients and significance are seen in Standard Beta column and Sig respectively in the table discussed.

Table 6. Reliability test

Factors	Cronbach’s alpha	Items
Performance Expectancy (PE)	0.794	3
Effort Expectancy (EE)	0.683	3
Social Influence (SI)	0.774	3
Facilitating Condition (FC)	0.845	3
Behavioral Intentions (BI)	0.740	3
Hedonic Motivation (HM)	0.765	3
Price Value (PV)	0.791	3
Habit (HT)	0.602	3
Trust (T)	0.641	3
Overall	0.887	27

Source: Field Survey, 2018

6.1 Pearson Correlation Analysis

Convergent validity and discriminant validity are assessed by Pearson correlation analysis.

Multicollinearity has to do with highly correlated independent variables in a multiple framework and it emerges where the coefficients between the independent variables are moderate or too high (Pallant and Tennant 2007). By subjecting this study into multicollinearity, it is evident that it does not suffer from Multicollinearity because the independent variables were less than 0.7 (Pallant and Tennant 2007). Pearson Correlation Analysis was performed to check for the presence of linear relationship between the independent and the dependent variable. It is a measure of the association between two variables, where one indicates direct positive association, zero (0) indicates no association, and -1 exhibits negative association between the variables under consideration.

The results as presented in the Table 7 below revealed that the Pearson Correlation Coefficient Analysis for all of the independent variables have a relationship with the

Table 7. Pearson correlation coefficients analysis results

Variable	PE	EE	SI	FC	HM	PV	HT	T	BI
PE	1.000								
EE	.534	1.000							
SI	.432	.433	1.000						
FC	.602	.699	.266	1.000					
HM	.467	.370	.357	.426	1.000				
PV	.107	.456	.107	.566	.458	1.000			
HT	.623	.521	.023	.354	.391	.543	1.000		
T	.489	.466	.435	.598	.663	.621	.543	1.000	
BI	.678	.438	.378	.625	.566	.542	.647	.578	1.000

Source: Field Survey, 2018

dependent variable, as the value of the correlation is greater than 0. The results therefore reveal the existence of linear relationship between the dependent and the independent variables and permits the use of multiple linear regression analysis. Again, the positive coefficient in all the cases depict a positive relationship between the independent variables and the dependent variable (Table 5).

Table 8. Summary of results of hypotheses testing

Hypothesis	Result
H1: <i>Performance expectancy significantly affect the Behavioural Intention to adopt m-commerce in Ghana</i>	Accepted
H2: <i>Effort expectancy significantly affect the Behavioural Intention to adopt m-commerce in Ghana</i>	Accepted
H3: <i>Social influence significantly affect the Behavioural Intention to adopt m-commerce in Ghana</i>	Rejected
H4: <i>Facilitating condition significantly affect the behavioural Intention to adopt m-commerce in Ghana</i>	Accepted
H5: <i>Hedonic motivation significantly affect the Behavioural Intention to adopt m-commerce in Ghana</i>	Rejected
H6: <i>Price value significantly affect the Behavioural Intention to adopt m-commerce in Ghana</i>	Accepted
H7: <i>Habit significantly affect the Behavioural Intention to adopt m-commerce in Ghana</i>	Accepted
H8: <i>Trust significantly affect the Behavioural Intention to adopt m-commerce in Ghana</i>	Accepted
H9: <i>Performance Expectancy significantly affect Behavioural Intention to adopt m-commerce is moderated by Gender</i>	Accepted
H10: <i>Effort Expectancy significantly affect Behavioural Intention to adopt m-commerce is moderated by Gender</i>	Rejected
H11: <i>Social Influence significantly affect Behavioural Intention to adopt m-commerce is moderated by Gender</i>	Rejected
H12: <i>Facilitating Condition significantly affect Behavioural Intention to adopt m-commerce is moderated by Gender</i>	Accepted
H13: <i>Hedonic Motivation significantly affect Behavioural Intention to adopt m-commerce is moderated by Gender</i>	Rejected
H14: <i>Price Value significantly affect Behavioural Intention to adopt m-commerce is moderated by Gender</i>	Accepted
H15: <i>Habit significantly affect Behavioural Intention to adopt m-commerce is moderated by Gender</i>	Accepted
H16: <i>Trust significantly affect Behavioural Intention to adopt m-commerce is moderated by Gender</i>	Accepted

7 Discussions

7.1 Effort Expectancy

Effort Expectancy was found to be statistically significant to Intention to Use, implying that the traders' decision to accept m-commerce is affected by EE. This finding is consistent with previous technology adoption studies (Chong 2013; Venkatesh et al. 2012; Davis et al. 1989). It should however be noted that the analysis of this study revealed a contrary disposition of the work done by Wei et al. (2009), which discovered that there is no significant relationship between the Perceived Ease of Use of m-commerce and consumer intention to use m-commerce. Also, Effort Expectancy was not found to have a significant influence on undergraduate students' intention to use mobile learning through the discovery of the research work of (Yang 2013). Based on the results of this study, the features and the functions of the various mobile devices should be easier to use by the traders so as to encourage them to adopt m-commerce for their micro trading activities.

7.2 Social Influence

The analysis of this research revealed that Social Influence does not affect the Behavioural Intention of the traders to adopt m-commerce. Surprisingly, Social Influence has been discovered in prior research as vital and influential indicator of technology adoption. The findings from the study indicates that social ties might not influence BI of the traders either to use or not to use m-commerce. Also, m-commerce adoption is not well embraced in developing countries and so, most people the traders perceive important, might not be using m-commerce hence, the users would not be able to be influenced significantly by them. The above assertion is not in supportive of the study conducted by Chong et al. (2014) which depicted that SI plays an important role in predicting m-commerce adoption in China and Malaysia. The authors further suggested that consumers are more likely to be influenced by trends, social media, and peers when it comes to adopting m-commerce.

7.3 Facilitating Condition

A growing number of studies suggest that FC plays an essential role in the actual usage behaviour of technology (Venkatesh et al. (2003) and the discovery of this study confirms the aforementioned analysis in the context of m-commerce adoption. Facilitating condition has largely affected the behavioural intention of the traders to accept m-commerce. This follows that the traders' see FC as vital to have the reasonable support whilst adopting m-commerce. This means that the more they get the support, the more they will be willing and able to adopt m-commerce.

7.4 Hedonic Motivation

The analysis of this research reveals that Hedonic Motivation does not influence the Behavioural Intention of the traders to adopt m-commerce. This is consistent with the

study done by (Harsono and Suryana 2014). This revelation is not in line with prior research work conducted by (Xu 2014; Venkatesh et al. 2012). However from the analysis of this research, it could be deduced that the traders do not depend on how entertaining and enjoyable the features and the functions of m-commerce are before they adopt m-commerce.

7.5 Price Value

Price Value has been indicated to have a stronger effect on Behavioural Intention to adopt m-commerce. This is in conformity with the work done by Venkatesh et al. (2012) and Alkhunaizan and Love (2012). Wei et al. (2009) also posit that cost is one of the cardinal challenges that influence m-commerce adoption in Malaysia which is the situation in Ghana as well according to the findings of this study. This juxtapose that exorbitant prices would negatively influence one's intention to accept m-commerce services. Majority of the people in the study indicated that they would accept m-commerce if they envisage the price is relatively low and that they could afford it.

7.6 Habit

Habit is also seen as a significant factor affecting traders' Behavioural Intention to adopt m-commerce in this study. The analysis of this study revealed that there is direct relationship to the work done by (Venkatesh et al. 2012). Similar result was ascertained when Hew et al. (2015) conducted a study in technology acceptance in the area of mobile applications, and indicated that Habit is one of the most vital variables that influence the intention to adopt mobile services. Also, currently in Ghana, almost everyone uses a mobile device. And it has become important means of communication that can not be done away with. This would make it easy to adopt m-commerce in everyday activities especially in micro trading. It could be suggested that due to the individual's prior adoption of m-commerce because of its importance, one would continue to use the service. When adoption of m-commerce becomes inelastic, it would increase one's interest to continue adopting the technology (Venkatesh et al. 2012). In lieu to mobile commerce acceptance, Habit influences Behavioural Intentions to adopt m-commerce.

7.7 Trust

This research found out that Trust is a major function in m-commerce acceptance by Ghanaians. The analysis of data exhibit that when the people want high level of security and privacy, Trust is the option to consider. It is observed that the traders in the Techiman market rarely follow an option where physical contact is elusive. The findings are in line with the work conducted by Alkhunaizan and Love (2012) which also views Trust as a salient factor in technology adoption. According to Chong et al. (2012) who further contributed to the TAM framework in their work in m-commerce acceptance in China, Trust was a major factor that affected the intention to adopt m-commerce with a path coefficient of 0.315 and a p-value of <0.001. This is consistent with suggestions made by Laudon and Traver (2016) whereby most developing

countries hardly take the risk than those in developed countries. M-commerce is not a well-developed technology among the traders in the Techiman market which means more attention is needed to develop their interest in order to adopt the technology. Qingfei et al. (2008) opine that user acceptance include both acceptance of technology and the acceptance of m-commerce service providers. In view of the above assertion, Trust is seen by Siau and Shen (2003) as: Trust of a technology and Trust of m-commerce service providers. Moreover, m-commerce is not well embraced by the people in developing countries, so systems should be put in place to solidify the Trust of the traders to adopt m-commerce.

7.8 Adoption Factors with Moderating Variables

Gender moderated the following adoption factors: Performance Expectancy, Facilitating Condition, Price Value, Habit and Trust. However, it did not have moderating effect on the following adoption factors: Effort Expectancy, Social Influence and Hedonic Motivation. The disparity in the findings could be explained by the environment in which the studies were carried out. Indeed, the study of Venkatesh et al. (2012) was carried out in the area of Mobile Internet Technology which adopted online internet survey but in the market environment, the situation may be different in terms of the traders' experience with the technology, and the attention that they pay to the opinions of their peers.

7.9 Implication for Research

In terms of research, this study contributes to the body of knowledge in m-commerce adoption by applying the UTAUT2 model in an African perspective. Thus, this study is one of the forefront studies extending the applicability of UTAUT2 by examining new technologies (m-commerce) in a new context (micro trading activities) in a developing country (Ghana).

7.10 Implication for Practice

The study contributes to practice by drawing to the attention of interested parties and other stakeholders to specific factors that either enable or hinder traders' adoption of m-commerce. They can use these findings to develop strategies to align traders' expectations with technology used for their trading activities.

7.11 Implication for Policy

In terms of policy, it is understood that creating a conducive ICT environment will positively influence the adoption of m-commerce.

7.12 Limitations and Future Research Directions

In addition, this study was limited to only the Techiman market, so future studies should be carried out using more than a single market to provide for comparison and

testing of findings. This was to allow for easy access to respondents and data that the researcher needed to gather for the study. Moreover, m-commerce is not a well-developed technology among the traders in the Techiman market (Table 3) which means more attention to develop their interest in order to adopt the technology by making the features of the mobile devices very simple to use.

8 Conclusion

The purpose of this research was to assess the factors that affect traders to adopt m-commerce in Ghana. The study has shown that PE, EE, FC, PV, HT and T influence the traders' BI to adopt m-commerce for their micro trading activities in Ghana. However, SI and HM did not influence the traders' intention to adopt m-commerce. Interestingly, Gender moderated PE, FC, PV, HT and T but SI, EE and HM did not have a moderating impact on the traders' BI to adopt m-commerce. In all, Performance Expectancy was the strongest determinant among the adoption factors in this study. Trust as an external construct introduced by the researcher to the UTAUT2 model, has been justified to have an impact in determining the traders' Behavioural Intention to adopt m-commerce. Based on the above development, the objectives for this study have been duly achieved.

References

- Abor, J., Quartey, P.: Issues in SME development in Ghana and South Africa. *Int. Res. J. Finance Econ.* **39**(39), 215–228 (2010). ISSN 1450-2887
- Ajzen, I., Fishbein, M.: *The Influence of Attitudes on Behavior*, January 2005
- Alfahl, H., Sanzogni, L., Houghton, L.: Mobile commerce adoption in organizations: a literature review and future research directions. *J. Electron. Commer. Organ.* **10**(2), 61–78 (2012). <https://doi.org/10.4018/jeco.2012040104>
- Alkhunaizan, A., Love, S.: What drives mobile commerce? An empirical evaluation of the revised UTAUT model. *Int. J. Manag. Market. Acad.* **2**(1), 82–99 (2012)
- Alreck, P.L., Settle, R.B.: *The survey research handbook* (III) (1985)
- Alwahaishi, S., Snášel, V.: Consumers' acceptance and use of information and communications technology: a UTAUT and flow based theoretical model. *J. Technol. Manag. Innov.* © **8**(2), 61–73 (2013)
- Anwar, M.: Mobile phones and the livelihoods of Indonesian micro-entrepreneurs: evidence of capability expansion. In: *Pacific Asia Conference on Information Systems* (2015). <http://aisel.aisnet.org/pacis2015/61>
- Baron, R.M., Kenny, D.A.: The moderator-mediator variable distinction in social the moderator-mediator variable distinction in social psychological research: conceptual, strategic, and statistical considerations. *J. Pers. Soc. Psychol.* **51**(6), 1173–1182 (1986)
- Bigne, E., Ruiz, C., Sanz, S.: The impact of internet user shopping patterns and demographics on consumer mobile buying behaviour. *J. Electron. Commer. Res.* **6**(3), 193–209. <http://www.csulb.edu/journals/jecr/issues/20053/paper3.pdf>
- Boadi, R.A., Boateng, R., Hinson, R., Opoku, R.A.: Preliminary insights into M-commerce adoption in Ghana. *Inf. Dev.* **23**(4), 253–265 (2007). <https://doi.org/10.1177/0266666907084761>

- Boateng, R., Hinson, R., Galadima, R., Olumide, L.: Preliminary insights into the influence of mobile phones in micro-trading activities of market women in Nigeria. *Inf. Dev.* **30**(1), 32–50 (2014). <https://doi.org/10.1177/0266666912473765>
- Celik H.: Customer online shopping anxiety within the Unified Theory of Acceptance and Use Technology (UTAUT) framework. *APJML* **28**,2 278 Received 9 May 2015 Revised 14 August 2015 9 September 2015 Accepted 15 September 2015 Customer Online Shopping Anxiety within the Unified Theory of Acceptance and Use Technology (UTAUT) Framework Hakan Celik Department of Marketing, Bileci, 28 No. 2, 278–307 (2016). <https://doi.org/10.1108/APJML-05-2015-0077>
- Chang, J.M., Williams, J., Hurburg, G.: Mobile Commerce. *IEEE*, 14–15 June 2014 (2014). <http://searchmobilecomputing.techtarget.com/definition/m-commerce>
- Cheng, T.C.E., Lam, D.Y.C., Yeung, A.C.L.: Adoption of internet banking: an empirical study in Hong Kong. *Decis. Support Syst.* **42**(3), 1558–1572 (2006). <https://doi.org/10.1016/j.dss.2006.01.002>
- Chong, A.Y.-L., Ooi, K.-B., Bao, H.: Computers in human behavior: an empirical analysis of the determinants of 3G adoption in China. *Comput. Hum. Behav.* **28**(2), 360–369 (2012)
- Chong, A.Y., Chan, F.T.S., Ooi, K.: Predicting consumer decisions to adopt mobile commerce: cross country empirical examination between China and Malaysia. *Decis. Support Syst.* **53**(1), 34–43 (2014). <https://doi.org/10.1016/j.dss.2011.12.001>
- Donner, J.: Research approaches to mobile use in the developing world: a review of the literature. *Inf. Soc.* **24**(3) (2008). <https://doi.org/10.1080/01972240802019970>
- Dwivedi, Y.K., Wade, M.R., Schneberger, S.L. (eds.): *Information systems theory: explaining and predicting our digital society*, vol. 1. Springer, Heidelberg (2011). <https://doi.org/10.1007/978-1-4419-6108-2>
- Dwivedi, Y.K., Tamilmani, K., Williams, M.D., Lal, B.: Adoption of M-commerce: examining factors affecting intention and behaviour of Indian consumers. *Int. J. Indian Cul. Bus. Manag.* **8**(3), 345–360 (2014)
- Dwivedi, Y.K., Rana, N.P., Janssen, M., Lal, B., Williams, M.D., Clement, M.: An empirical validation of a unified model of electronic government adoption (UMEGA). *Gov. Inf. Q.* **34** (2), 211–230 (2017)
- Dwivedi, Y.K., Rana, N.P., Jeyaraj, A., Clement, M., Williams, M.D.: Re-examining the unified theory of acceptance and use of technology (UTAUT): towards a revised theoretical model. *Inf. Syst. Front.* 1–16 (2017b). <https://doi.org/10.1007/s10796-017-9774-y>
- Esselaar, S., Stork, C., Ndiwalana, A., Deen-Swarrray, M.: ICT usage and its impact on profitability of SMEs in 13 African countries. In: *14 African Universities and Research Institutions Working on ICT Policy and Regulation*. ©, vol. 4, no. 1, pp. 87–100 (2007)
- Foon, S., Fah, B.C.Y.: Internet banking adoption in Kuala Lumpur: an application of UTAUT model. *Int. J. Bus. Manag.* **6**(4), 161 (2011)
- Gao, T., Deng, Y.: A study on users' acceptance behavior to mobile e-books application based on UTAUT model, pp. 376–379. *IEEE* (2012)
- Good, T., Qureshi, S.: Investigating the effects of micro-enterprise access and use of ICTs through a capability lens: implications for global development. In: *Second Annual SIG GlobDev Workshop*, pp. 1–28 (2009)
- Goodhue, D.L.: Consumer acceptance and use of information technology: adding consumption theory to UTAUT2. *J. Assoc. Inf. Syst.* **8**(4), 219–222 (2007)
- Hair, J., Babin, B., Money, A., Samouel, P.: *Essentials of Business Research Methods* (2003)
- He, J., Freeman, L.: Are men more technology-oriented than women? The role of gender on the development of general computer self-efficacy of college students. *J. Inf. Syst. Educ.* **21**(2), 203–213 (2010)

- Klein, H.K., Myers, M.D.: A set of principles for conducting and evaluating interpretive field studies in information systems. *MIS Q.* **23**(1), 67–94 (1999)
- Hew, J.-J., Lee, V.-H., Ooi, K.-B., Wei, J.: What catalyses mobile apps usage intention: an empirical analysis. *Emeraldinsight* **115**(7), 1269–1291 (2015)
- Höglger, T., Stucky, W.: Exploring the critical success factors for mobile commerce. In: 2006 International Conference on Mobile Business, November 2015, p. 40 (2006). <https://doi.org/10.1109/ICMB.2006.15>
- Harsono, I.L.D., Suryana, L.A.: Factors affecting the use behavior of social media using UTAUT 2 model. In: Proceedings of the First Asia-Pacific Conference on Global Business, Economics, Finance and Social Sciences, 1–3 August (2014)
- Jaradat, M.R.M., Al Rababaa, M.S.: Assessing key factor that influence on the acceptance of mobile commerce based on modified UTAUT. *Int. J. Bus. Manag.* **8**(23), 102–112 (2013). <https://doi.org/10.5539/ijbm.v8n23p102>
- Kalakota, R., Robinson, M.: *M-Business: The Race to Mobility* (2001)
- Khan, A., Woosley, J.M.: Comparison of contemporary technology acceptance models and evaluation of the best fit for health industry organizations. *Int. J. Comput. Sci. Eng. Technol.* **1**(11), 709–717 (2011)
- Kim, S.S., Malhotra, N.K.: A longitudinal model of continued IS use: an integrative view of four mechanisms underlying postadoption phenomena. *Manag. Sci.* **51**(5), 741–755 (2005). <https://doi.org/10.1287/mnsc.1040.0326>
- Kshetri, N., Dholakia, N.: Determinants of the global diffusion of B2B e-commerce. *Electron. Markets* **12**(2), 1–10 (2002). <https://doi.org/10.1080/10196780252844562>
- Laudon, K.C., Traver, G.C.: *E-Commerce: Business. Technology. Society*, 12 edn (2016)
- Limayem, M., Hirt, S.G., Cheung, C.M.K.: How habit limits the predictive power of intention: the case study of information systems continuance. *MIS Q.* **31**, 705–737 (2007)
- Pahnla, S., Sipeon, M., Zheng, X.: Integrating habit into UTAUT: the Chinese eBay case. *Pac. Asia J. Assoc. Inf. Syst.* **3**(2), 1–30 (2011)
- Pallant, J.F., Tennant, A.: An introduction to the Rasch measurement model: an example using the Hospital Anxiety and Depression Scale (HADS). *Br. J. Clin. Psychol.* **46**(1), 1–18 (2007). <https://doi.org/10.1348/014466506X96931>
- Raman, A., Don, Y.: Preservice teachers' acceptance of learning management software: an application of the UTAUT2 model. *Int. Educ. Stud.* **6**(7), 157–164 (2013). <https://doi.org/10.5539/ies.v6n7p157>
- Rana, N.P., Dwivedi, Y.K., Lal, B., Williams, M.D., Clement, M.: Citizens' adoption of an electronic government system: towards a unified view. *Inf. Syst. Front.* **19**(3), 549–568 (2017)
- Rana, N.P., Dwivedi, Y.K., Williams, M.D., Weerakkody, V.: Adoption of online public grievance redressal system in India: toward developing a unified view. *Comput. Hum. Behav.* **59**, 265–282 (2016)
- Saunders, M., Lewis, P., Thornhill, A.: *Research Methods for Business Students*. Business, vol. 5 (2009). <https://doi.org/10.1017/CBO9781107415324.004>
- Sey, A.: “We use it different, different”: making sense of trends in mobile phone use in Ghana. *New Media Soc.* **13**, 375–390 (2011). <https://doi.org/10.1177/1461444810393907>
- Shao, X., Siponen, M.: Consumer acceptance and use of information technology: Adding consumption theory to UTAUT2. In: Proceedings of SIGSVC Workshop. Sprouts: Working Papers on Information Systems, vol. 11, no. 157, pp. 11–157 (2011)
- Siau, K., Shen, Z.: Building customer trust in mobile commerce. *Commun. ACM* **46**(4), 91–94 (2003). <https://doi.org/10.1145/641205.641211>
- Slade, E., Williams, M., Dwivedi, Y.: Extending UTAUT2 to explore consumer adoption of mobile payments. In: UK Academy for Information Systems Conference Proceedings, p. 36 (2013)

- Slade, E.L., Dwivedi, Y.K., Piercy, N.C., Williams, M.D.: Modeling consumers' adoption intentions of remote mobile payments in the United Kingdom: extending UTAUT with innovativeness, risk, and trust. *Psychol. Market.* **32**(8), 860–873 (2015a)
- Slade, E., Williams, M., Dwivedi, Y., Piercy, N.: Exploring consumer adoption of proximity mobile payments. *J. Strateg. Market.* **23**(3), 209–223 (2015b)
- Tan, G.W.H., Ooi, K.B., Chong, S.C., Hew, T.S.: NFC mobile credit card: the next frontier of mobile payment? *Telematics Inform.* **31**(2), 292–307 (2014). <https://doi.org/10.1016/j.tele.2013.06.002>
- Tan, M., Teo, T.S.H.: Factors influencing the adoption of internet banking. *J. Assoc. Inf. Syst.* **1**(1), 1–44 (2000). <https://doi.org/10.1016/j.elerap.2008.11.006>
- Tamilmani, K., Rana, N.P., Prakasam, N., Dwivedi, Y.K.: The battle of Brain vs. Heart: a literature review and meta-analysis of “hedonic motivation” use in UTAUT2. *Int. J. Inf. Manag.* **46**, 222–235 (2019)
- Tamilmani, K., Rana, N.P., Dwivedi, Y.K.: Use of ‘Habit’ is not a habit in understanding individual technology adoption: a review of UTAUT2 based empirical studies. In: Elbanna, A., Dwivedi, Y., Bunker, D., Wastell, D. (eds.) *TDIT 2018*, vol. 533, pp. 277–294. Springer, Cham (2018a). https://doi.org/10.1007/978-3-030-04315-5_19
- Tamilmani, K., Rana, N.P., Dwivedi, Y.K., Sahu, G.P., Roderick, S.: Exploring the role of ‘Price Value’ for understanding consumer adoption of technology: a review and metaanalysis of UTAUT2 based empirical studies. In: *Twenty-Second Pacific Asia Conference on Information Systems*, Japan (2018b)
- Tobbin, P.: Towards a model of adoption in mobile banking by the unbanked: a qualitative study. *Emeraldinsight* **14**(5), 74–88 (2012). <https://doi.org/10.1108/14636691211256313>
- Venkatesh, V., Thong, J.Y.L., Xu, X.: Consumer acceptance and use of information technology: extending the unified theory of acceptance and use of technology. *MIS Q.* **36**(1), 157–178 (2012). <https://doi.org/10.1111/j.1540-4560.1981.tb02627.x>
- Venkatesh, V., Davis, F.D.: A theoretical extension of the technology acceptance model: four longitudinal field studies. *JSTOR* **46**(2), 186–204 (2000a)
- Venkatesh, V., Morris, M.G.D., Davis, G.B., Davis, F.D.: User acceptance of information technology: toward a unified view. *MIS Q.* **27**(3), 425–478 (2003). <https://doi.org/10.2307/30036540>
- Wei, T.T., Marthandan, G., Chong, A.Y.-L., Ooi, K.-B., Arumugam, S.: What drives Malaysian m-commerce adoption? An empirical analysis. *Ind. Manag. Data Syst.* **109**(3), 370–388 (2009). <https://doi.org/10.1108/02635570910939399>
- Dodds, W.B., Monroe, K.B., Grewal, D.: Effects of price, brand, and store information on buyers' product evaluations. *J. Market. Res.* **18**(307–319) (1991)
- Williams, M.D., Rana, N.P., Dwivedi, Y.K.: The unified theory of acceptance and use of technology (UTAUT): a literature review. *J. Enterprise Inf. Manag.* **28**(3), 443–488 (2015)
- Williams, M.D., Dwivedi, Y.K., Lal, B., Schwarz, A.: Contemporary trends and issues in IT adoption and diffusion research. *J. Inf. Technol.* **24**(1), 1–10 (2009)
- Wu, J.H., Wang, S.C.: What drives mobile commerce? An empirical evaluation of the revised technology acceptance model. *Inf. Manag.* **42**(5), 719–729 (2005). <https://doi.org/10.1016/j.im.2004.07.001>
- Xu, X.: Understanding users' continued use of online games : an application of UTAUT2 in social network games. In: *The Sixth International Conferences on Advances in Multimedia*, pp. 58–65 (2014)
- Yang, C.K.: Exploring factors affecting the adoption of mobile commerce in Singapore. *Telematics Inform.* **22**(3), 257–277 (2005). <https://doi.org/10.1016/j.tele.2004.11.003>

- Yang, S.: Understanding undergraduate students' adoption of mobile learning model: a perspective of the extended UTAUT2. *J. Convergence Inf. Technol. (JCIT)* **8**(10), 969–979 (2013). <https://doi.org/10.4156/jcit.vol8.issue10.118>
- Yoo, Y.: Computing in everyday life: a call for research on experiential computing. *MIS Q.* **34**(2), 213–231 (2010)