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INVESTIGATING MATURITY OF MOBILE COMMERCE ADOPTION: A QUALITATIVE STUDY

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Abstract

Mobile commerce benefits both individuals and businesses. Many studies in the literature have investigated factors that influence the adoption of mobile commerce. However, there is a lack of empirical studies examining an individual's progression from simple mobile commerce activities such as browsing products to more sophisticated transactional activities such as buying and selling goods and services. In this study, we address this gap by developing a mobile commerce adoption maturity model for investigating mobile commerce progression in individuals. This model is based on multiple theories, such as Diffusion of Innovation (DOI), Technology Acceptance Model (TAM), Social Exchange Theory (SET), and Protection Motivation Theory (PMT). The model was examined using data from semi-structured interviews with 16 individuals who progressed in their mobile usage. This study extends research related to the adoption of mobile commerce by offering new insights on the concept of mobile commerce maturity and the dynamic impact of adoption factors. By empirically investigating the concept of mobile commerce adoption maturity, this study provides new explanations to understand mobile commerce in general and mobile commerce maturity in particular.

Keywords: **Mobile Commerce; Adoption; Maturity; Entrepreneurship**

INTRODUCTION

Mobile commerce refers to the use of mobile devices for communicating and conducting transactions through public and private networks [1]. As the definition suggests, mobile commerce includes communication activates such as browsing and communicating with sellers and transactional activities such as buying/selling products and services. Researchers have shown that communication activities facilitate and influence transactional activities [2,3] as they enable users to acquire more information about products/services which reduces individual's uncertainty of product/service purchasing [4].

Mobile commerce provides users with easy and timely access to information and opportunities to engage in online transactions, anywhere, at any time, offering ubiquity and increased accessibility than other means of commerce (e.g. electronic commerce) [5]. This increases efficiency for buyers, and revenue for sellers [6,7]. Mobile commerce revenue makes up 22% of digital commerce revenue [8].

Given the importance of mobile commerce, researchers have investigated factors that influence the adoption of mobile commerce by individuals [5,9-12]. However, these studies have investigated factors in an episodic (one-time) setting. They do not take into account that factors have a different influence on different mobile commerce adoption (product purchase versus stock brokerage) and this influence may change over time. This may be the reason why there are conflicting findings in the literature on the influence of factors on mobile commerce adoption. For example, some studies have reported a significant impact of perceived usefulness on mobile commerce adoption [13-15], while others have reported an insignificant impact [5,10,16-20]. In addition, these studies do not explain how individuals can progress in their mobile commerce usage, i.e. from basic users engaging in communication to advanced users engaging in transactional and financial tasks.

To address these gaps, we develop a mobile commerce maturity model that explains how individuals progress in using mobile commerce from basic use to more advanced use. The model is based on multiple theories - Technology Acceptance Model (TAM) [21,22], Diffusion of Innovation (DOI) [23], Protection Motivation Theory (PMT) [24,25], and Social Exchange Theory (SET) [26-30] to provide a more comprehensive understanding of mobile commerce adoption. The model's adoption factors that are derived from these theories and are investigated in this study are: ease of use, relative advantage, trust, security, compatibility, and subjective norm.

This research aims to answer the following questions:
1. How does a user progress from one level of maturity of mobile commerce adoption to another?

2. What factors influence the progression in mobile adoption maturity levels?

The paper proceeds as follows: the next section discusses the literature on mobile commerce adoption. This is followed by the theoretical background and the research method. The final section discusses the study's findings, contribution and implications.

Mobile Commerce Adoption: Literature

Studies investigating the adoption of mobile commerce have examined various adoption factors such as perceived ease of use, perceived usefulness, security, trust, subjective norm, and compatibility. Many of these studies have focused on only a few constructs/factors in their studies and have reported conflicting findings. For example, studies based on TAM have examined the influence of perceived usefulness and perceived ease of use on mobile commerce adoption. Some studies have reported a significant impact on mobile commerce adoption [13-15], while others have reported insignificant impact [5,10,16-20].

Mobile commerce users are part of a social environment that consistent of friends, peers, and family members. Many studies argue that social influence (subjective norm) is an important factor affecting individuals' adoption of mobile commerce [31-34]. Individuals may be influenced by the information they receive from the social environment which in turn shapes their confidence in our ability to use a technological system [31-35].

Mobile commerce is considered an innovation as it changes the way individuals engage in commerce related communication and transactional activities and provides flexibility and mobility to engage in mobile commerce activities anywhere anytime. Innovation features such as "compatibility" affect the adoption of mobile commerce. Individuals are more likely to adopt an innovation, like mobile commerce, when it is compatible and consistent with their values, beliefs, habits, experiences and most importantly fits within their lifestyle [36,37]. Various studies have found that compatibility is an essential factor that influences the adoption of mobile commerce by individuals [30,38-40].

Mobile commerce also differs from other forms of commerce in that communications and transactions are conducted through wireless networks. This increases individual's concerns of not only seller identity and reliability but also increases individual's fear of the safety of data transmission and storage especially for transaction activities that require providing personal and payment information [41]. Researchers have investigated trust and security related factors and found these factors to be significant for an individual's decision to adopt mobile commerce [5,24,38,42,43]. These factors are also more important in mobile commerce adoption than electronic commerce.

While most mobile commerce adoption studies have largely focused on the factors that affect individuals to adopt and start using mobile commerce, not many studies have focused on how these factors influence users to progress in using mobile commerce. This research proposes a mobile commerce maturity model using multiple theories to provide a comprehensive view on the factors that affect individuals' adoption of mobile commerce and how their usage progresses from basic use to advance use. The theories and variables used in this paper are discussed in the following section.

THEORETICAL BACKGROUND

Technology Acceptance Model (TAM)

TAM [13,14] is a commonly used theory to explain users' acceptance of Information Systems. Numerous empirical studies show that TAM is a robust theory used to study the adoption of a variety of information systems [44,45], including mobile commerce (e.g. [9,42,46,47]). TAM is derived from Fishbein and Ajzen's [48] Theory of Reasoned Action (TRA) and consists of: perceived ease of use, perceived usefulness, attitude towards use, behavioral intention, and actual system use. Perceived usefulness refers to the degree to which a person believes that using a particular system would enhance his or her job performance [13]. Perceived ease of use refers to the degree to which a person believes that using a particular system would be free of effort [13]. Attitude towards use is defined as the degree of evaluative effect that an individual associate with using the target system in his or her job [13]. Behavioral intention is defined as the extent to which an individual intends to perform a specific behavior [14]. Actual system use refers to how often the system is used by the user [13]. Perceived usefulness and perceived ease of use are regarded as the most important determinants of an individual's adoption decision [13,49].

Although TAM is considered one of the main theories that explains the adoption of new systems, it has been criticized for not including subjective norm [49,50]. Within IS research, subjective norm is formed from an individual's motivation to comply with what they believe others expect them to do [50]. This factor was found to have significant influence on the adoption of information systems [51-54]. Therefore, we also include subjective norm as an additional variable to investigate mobile commerce adoption. In this study, we use perceived ease of use, perceived usefulness, subjective norm and actual use to study the maturity of mobile commerce adoption. We have not considered intention to use as a variable, because we are interested in investigating the actual use of mobile commerce rather than the intention to use.

Diffusion of Innovation Theory (DOI)

The Diffusion of Innovation theory explains the pattern of adoption, and assists in

predicting users' readiness to adopt new technologies, as it enables understanding the conditions that will have an impact on new technology adoption. According to Rogers [36], an innovation can be a new idea, a practice, or a product. Diffusion can be explained as a process of communicating innovation through specific channels. The diffusion process consists of four elements: an innovation or a new technology, a social system, communication channels of the social system, and time [55]. DOI investigates diffusion using five innovation attributes: relative advantage, compatibility, complexity, observability, and trialability [15]. Relative advantage refers to the benefits of the innovation in comparison to users' past experiences. Compatibility refers to the degree to which an innovation is consistent with users' past experiences, needs, values, and users' desire. Complexity refers to whether the innovation is perceived as relatively difficult to use and understand. Trialability refers to whether the users are given the chance to use the innovation on a trial basis before making the adoption decision. Observability refers to the degree to which an innovation's results are visible to others [15].

DOI has been widely used by many researchers investigating the adoption of mobile commerce by individuals [10,53]. These researchers consider mobile commerce an innovative idea, as it has changed the traditional face-to-face way of commerce, giving users the flexibility of conducting transactions anywhere, at any time, using mobile devices. DOI's relative advantage, compatibility, and complexity were found to be significant in investigating the adoption of mobile commerce [10,38,41,56]. In this study, we use relative advantage, complexity, and compatibility to investigate the maturity of mobile commerce adoption. We have excluded Trailaiblity as users buy products/services on a voluntary basis and it is unlikely that a person will be given an option to buy products/services using his mobile device on trial basis. Observability has been excluded because it has been indirectly captured in the subjective norm construct. Users that use mobile commerce rely on feedback from their peers to assess the benefits of the system. It is unlike other technologies such as Automated Teller Machines (ATMs) where results may be visible to others.

Protection Motivation Theory (PMT)

PMT [16,17] provides explanations on individual's intention to engage in protective actions [57]. Researchers found that PMT is useful in predicting individual's computer security behaviors [57-59]. The theory has been used in information systems research to address the adoption of systems focusing on the security of these systems [58,60]. Security refers to the degree to which a person believes that using a system is risk free [61]. It becomes more important in the mobile commerce context, which is dependent on communication. Many researchers have investigated the impact of security on the adoption of mobile commerce by individuals [24,38]. Security was found to affect adoption of mobile commerce due to users' concerns about safety of data transmission and storage, anonymity and privacy, confidentiality, data integrity, authentication, and non-repudiation, especially given that the data was being transferred wirelessly, making its interception much easier

[41,62]. In our study, we use security as a variable that influences the maturity of mobile commerce adoption by individuals.

Social Exchange Theory (SET)

SET [18-22] provides insights into human social behavior in economic settings. The theory explains that exchange relations between two or more parties consist of transactions that involve the transfer of resources between these parties. SET focuses on the give-and-take social process and offers insights on the behavior of each actor contributing to the exchange. It explains that a person will invest resources into starting and maintaining a relationship only if he/she finds that the subjective benefits of engaging in that relationship are greater than the subjective costs. Trust is crucial in situations that involve transactional buyer-seller relationships, especially in situations that include an element of risk when interacting with an electronic vendor [28,63], such as electronic and mobile commerce. Trust is defined as a psychological state comprising the intention to accept vulnerability based upon positive expectations of the intentions or behavior of another [64].

Researchers have used SET to study the influence of trust on the adoption of online shopping, and found that users' trust is built through (1) users' belief that the vendor has nothing to gain by cheating (2) users' belief that there are safety mechanisms built into the online commerce medium and (3) has a typical interface that is (4) easy to use [63].

Mobile commerce is based on exchange between two parties, and thus, trust between these parties is important. Many studies investigating mobile commerce adoption found significant effects of trust [10,65-68]. Users' trust is associated with their trust in mobile technology (device and network, including service providers) and mobile vendors [69]. This study includes trust as a variable to investigate maturity of mobile commerce adoption by individuals.

Mobile Commerce Maturity Model

Based on the above discussion, this study proposes a maturity model for mobile commerce adoption by individuals integrating factors derived from TAM, DOI, PMT, and SET. Integrating factors from these theories provides a comprehensive view on the maturity of mobile commerce adoption by individuals. We use perceived ease of use, perceived usefulness, and actual use from TAM, and complexity and relative advantage from DOI. Researchers have found similarities between these factors, where perceived usefulness in TAM is similar to relative advantage in DOI, and perceived ease of use in TAM is similar to complexity in DOI [41]. Researchers like Moore and Benbasat [50] have used the phrase "ease of use" to represent "complexity". Thus, in the maturity model proposed by this study, we unify the factors and use the terms "relative advantage" and "ease of use" to investigate actual use of mobile commerce. The proposed maturity model also includes "trust", derived from

SET. Gafen and Karahanna [63] argue that trust in online commerce is as important as TAM's perceived ease of use and perceived usefulness. Furthermore, the maturity model includes "security", derived from PMT, as a construct that influences mobile commerce adoption maturity. Moreover, the model includes "subjective norm" as a construct that affects mobile commerce adoption. We also introduce two levels of mobile commerce use, namely communication and transaction levels to measure maturity.

The variables of the proposed mobile commerce maturity model are described below:

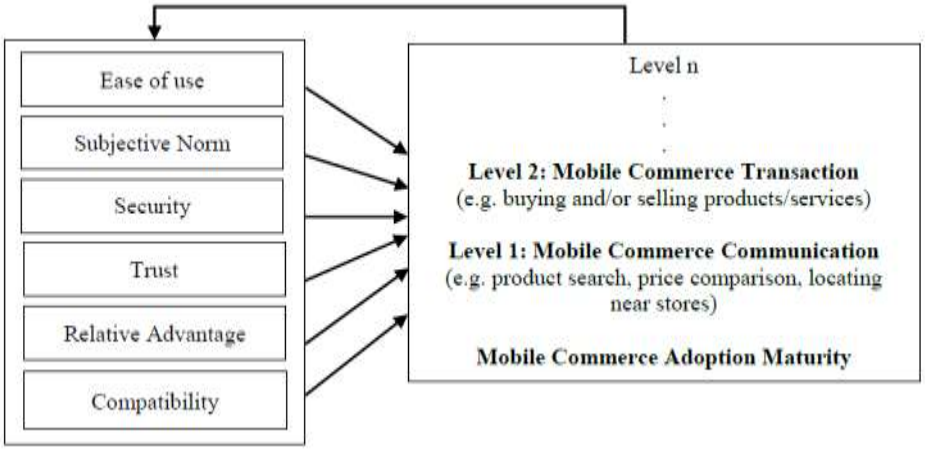
1. Trust: The degree to which an individual accepts vulnerability based on positive expectations of mobile commerce.
2. Ease of use: The degree to which a person believes that using mobile commerce would be free of effort.
3. Relative Advantage: The degree to which a person believes that using mobile commerce has more benefits compared to its cost.
4. Security: The degree to which a person believes that mobile commerce is protected and safe to use.
5. Compatibility: The degree to which mobile commerce is consistent with users' past experiences, needs, values and desire.
6. Subjective Norm: The person's perception that people who are important to him think that he should or should not use mobile commerce.
7. Mobile Commerce Communication level: The extent to which an individual uses his mobile device for browsing products and services and communicating with vendors.
8. Mobile Commerce Transaction level: The extent to which an individual uses his mobile device for buying/selling.

A maturity model describes progression for a particular object (process, capability, or an entity) [70]. Researchers have developed numerous maturity models to measure competency, capability and level of sophistication [71]. These models consist of multiple levels, where the initial level represents the lowest stage of maturity and the highest level represents total maturity [70,71]. The model (Figure 1) illustrates that the maturity level of mobile commerce adoption for an individual is compatible with the level of subjective norm, security, trust, relative advantage, compatibility, and ease of use of mobile commerce. The adoption of mobile commerce could further improve due to the improvement in these factors (arrows from mobile commerce adoption maturity to factors). This leads to moving to the next level of mobile commerce adoption maturity (arrows from factors to mobile commerce maturity adoption). For example, a user can be at a low maturity level (level 1-Mobile Commerce Transaction level), when he/she use his/her mobile device to communicate with vendors, search for products and compare prices. If the user continues to use mobile commerce, and benefits from this usage, it can positively influence his/her perception of ease of use, level of trust, social influence and so on

(shown by the arrow from mobile commerce adoption maturity to the factors). The user will then move to a more advanced level (level 2-Mobile Commerce Transaction level), where the user engages in advanced mobile commerce activities like buying/selling. This adoption can further modify the factors, which consequently lead to more advanced levels of mobile commerce adoption (Figure 1).

Figure 1 shows the mobile commerce adoption maturity model proposed in this study.

Figure 1: Mobile commerce adoption maturity model.



RESEARCH METHOD

A qualitative case study research strategy was employed to investigate the maturity in mobile commerce adoption. Data was collected through a series of semi-structured face-to-face interviews with mobile phone users, who were at the Mobile Commerce Transaction level. This enabled us to evaluate their progression in mobile commerce usage. Semi-structured interviews allow researchers to establish a dialogue with the participant for existing questions to be clarified and new ones to be improvised, based on participant's feedback. The interviews were undertaken with 16 participants, aged 21 to 32, who were mobile phones users based in the Kingdom of Bahrain (Table 1). The choice of young group of mobile phone users for our sample conforms to the emphasis in literature that young mobile phone users are the core target and main drivers of mobile commerce markets around the world [72]. Our mobile commerce maturity model formed the basis for developing the interview protocol. To achieve consistency, we use the interview protocol as a checklist to ensure that we cover the concepts of our research model. The interviews were carried out until the data saturation point was reached; where no new findings emerged from the interviews. With 16 participants we achieved this saturation point. Participants were asked to recall events when they first started using their mobile device for mobile commerce communication purposes and how the factors affected

their decisions. This helped in studying the impact of factors on the Mobile Commerce Communication level. They were then asked to recall events that led them to engage in more advanced mobile commerce activities such as buying/selling. This helped us to investigate the impact of factors on the Mobile Commerce Transaction level. We analyzed each factor based on the levels of maturity. Each interview lasted for about 45 to 60 minutes. The participants were interviewed twice. The first interview was held between March and April 2014, and the second interview was held in September 2015. After analyzing the data from the first set of interviews, second set of interviews were organized to clarify certain views and to ensure that the concepts were covered and accurately represented by the participants. The participants were given their transcripts to verify the information (Table 1).

Table 1: Profile of Participants.

Participant	**Gender**	**Age**	**Education**	**Years of using mobile commerce at the transactional level**	**Occupation**
A	Male	24	Bachelors	1 ½ Years	Fresh graduate
B	Male	23	Bachelors	3 Years	Master student
C	Male	26	Diploma	1 ½ Years	Employee
D	Female	22	Bachelors	3 Years	Entrepreneur
E	Male	25	Bachelors	1 + Years	Employee
F	Male	26	High School/Certifications	2 Years	Supervisor
G	Male	21	Bachelors	2 Years	Student
H	Male	26	Bachelors	2 Years	Employee
I	Male	27	Bachelors	1 Year	Employee
J	Female	27	Bachelors	5 Years	Manager
K	Male	32	Bachelors	8 Years	Employee
L	Male	30	Bachelors	7 Years	Supervisor
M	Female	29	Masters	5 Years	Employee
N	Male	21	Sophomore	3 Years	Student
O	Female	31	Bachelors	5 Years	Master student/employee
P	Female	25	Bachelors	3 Years	Master student

Findings

This section discusses findings from the interviews. We first discuss the influence of the adoption factors on the Mobile Commerce Communication level. This is followed

by a discussion of the influence of the Mobile Commerce Communication level on the factors, which results in achieving the Mobile Commerce Transaction level. We then discuss the influence of the Mobile Commerce Transaction level on the adoption factors.

Achieving Mobile Commerce Communication Level

Trust: All participants confirmed that trust is a precondition to using their mobile devices for mobile commerce communication. They emphasized that it is essential that their communications with vendors are not tracked nor recorded.

> "I like to browse for products or surf the net believing that my activities are kept private and no one is tracking me. I don't want the site or service to track my activities. Otherwise, I would be reluctant to use it" - Participant N.

Ease of use: All participants emphasized that they could use their mobile devices free from effort, which encouraged them to use these devices for browsing and communicating with the vendors. For example, a participant explains:

> "If it was not easy, I would not think of searching. I would have to go to my computer, instead" - Participant O.

Subjective norm: The data analysis shows that all participants were influenced and encouraged by their friends and family to use mobile devices for browsing and searching for products. The participants also clarified that they started using mobile phones for communication purposes, because people around them were also using them for these purposes. The following quote from a participant supports this view:

> "My friend showed me on his mobile phone how to compare prices. It gives others the impression that you are tech savvy" - Participant J.

Security: The data analysis indicates that participants would only use mobile commerce csommunication activities if they were confident that the connection and data transmission between them and vendors is secure. The following quote from a participant explains this view:

> "Security has an influence on me. Why would I search [for] a product at a website, if I was not confident that it was secure" - Participant D.

Relative Advantage

All participants confirmed that the advantages provided by mobile devices, such as convenience, ease of communication, and portability, encouraged them to use these devices for mobile commerce communication purposes. They clarified that these advantages outweighed the potential costs.

> "I use the device to communicate with sellers, to check hotel prices, tickets, cinema timings etc." - Participant N.

Compatibility

The data analysis shows that participants used mobile phones because these devices were consistent with their needs. The devices were mainly used for browsing and searching for information on desired products and services. The following quote explains this view:

> "I would use my phone for looking for products because I was doing this before using my computer. I had past experience. I definitely need to because it's much easier than starting a computer and wasting time" - Participant O.

Influence of Mobile Commerce Communication Maturity Level on Factors

Mobile commerce communication level increases level of trust: All participants had positive experiences using mobile devices for mobile commerce communication purposes. This increased their level of trust and confidence in mobile commerce activities. The following quote supports this view:

> "I would not have used my credit card or purchase a product, if I did not first browse and search, compare and read reviews about the seller and product. This helped me to gradually increase my trust"- Participant D.

Mobile commerce communication level improves perception of ease of use: Participants became more competent in using mobile commerce communication as they continued using their mobile phones for searching for products/services and communicating with vendors. Participants became more experienced in using mobile phones for communication purposed which also improved their perception on ease of use. The following quote supports this view:

> "Absolutely, if I hadn't used my mobile device for surfing, searching for products such as cameras, electronics. I don't' think it would be easy to simply make a purchase. You need that step before you move to transaction" - Participant G.

Mobile commerce communication level improves subjective norm: The use of mobile devices for mobile commerce communication had a positive effect on subjective norm. The more the participants used mobile devices for mobile commerce communication, the more they started encouraging their peers to use them for the same purpose. The participants argued that they wanted their friends to use the same means of communication with vendors. The following quote expresses this view:

> "I was pretty much influenced by the people who were using the mobile phones for communications and transactions" - Participant E.

> "After using my mobile phones for communications, I told my friends to do the same. I also influenced others" - Participant K.

Mobile commerce communication level influences user's perception of security: As users continued using their mobile devices to communicate with vendors and browse products/services, their perception of the security of mobile commerce communication improved. Participants became more confident that their connection with vendors is secure and so is the transmitted data.

> "My perception of security improved after searching and look for products. I would browse see reviews of the websites. Since browsing did give me security issues, naturally I was more confident in the purchase phase" - Participant G.

Mobile commerce communication level increases individual's perception of the relative advantage of mobile commerce: The data indicates that when participants used mobile phone for mobile commerce communication, their perceptions on the benefits and advantages of mobile devices improved. Participants recognized a number of benefits, such as ease of communication, convenience, collaboration, and reduction in cost of communication.

> "Communication increased my performance in terms of communicating with the people [sellers]. I could chat with them in real time and reply to them quickly. I definitely saw this as an extreme benefit and this did encourage me to buy and sell using mobile phones" - Participant D.

Mobile commerce communication level improves users' compatibility: All participants found that the positive experience of using mobile commerce communication encouraged them to continue using it and became part of their lifestyle and use. They emphasized that using mobile devices for mobile commerce communications has become an integral part of their values and social system. The following quotes explain this view:

> "I would say having used it [mobile commerce for communication], it has become the norm for me. I also try to show people that "Yes" this is the future, use it" - Participant C.

Achieving Mobile Commerce Transaction Level

Trust: The data indicates that a high level of trust is essential to the use of mobile devices for advanced and mature levels of mobile commerce such as engaging in transactional activities. All participants confirmed that for conducting transactions, trusting the technology and the vendor encouraged them to progress to engage in mobile commerce transaction activities.

> "Absolutely, trust is critical. I don't buy or use it unless I was confident that the application or seller was trustworthy" - Participant M.

Ease of use: Ease of use is an important factor in achieving mobile commerce transactional activities. All participants have indicated that the ease of use of mobile devices encouraged them to progress in using these devices for transactional activities. In addition, most of the participants clarified that if using mobile devices for transactional activities was not easy, they would have changes and used other means (e.g. personal computers) to conduct these transactions.

> "The more we used the mobile phones [for mobile commerce communication], the easier it became. Maybe, we just got used to it. That led us to using mobile phones for buying and paying our bills later on" - Participant B.

> "The only reason why we are conducting transactions using our mobile devices [buying cinema tickets] now is because it's easy. If it was not, I would be using the old-fashioned way. So, ease of use does play an important role in transactions" - Participant C.

> "If it seems difficult to perform, I would definitely just leave it and decide to see if there is a better way rather than mobile commerce" - Participant I.

Subjective norm: The data analysis shows that five (A, B, F, G, and J) out of 16 participants indicated that they were influenced and encouraged by their social group to use mobile devices to perform transactions. They were motivated when their friends shared their experiences with them.

> "A friend of mine got me started on the payment of my mobile bills through my mobile" - Participant B.

> "I saw people using mobile phones to pay their bills and how easy it was, I started using it as well" - Participant F.

The rest of the 11 participants (C, D, E, H, I, K, L, M, N, O, and P) reported that they used mobile commerce transactions without any influence from others. These participants clarified that they were the ones that influenced their friends and family. This shows that social roles that individuals take can determine the type and direction of impact between subjective norm and other factors in a research model.

> "I wasn't really influenced when it came to communication, but my friends definitely were from me. And for transactions, I was influenced, and I did influence other people too. So Yeah, if a thing is beneficial, sharing it would not cost" - Participant B.

> "I would definitely recommend everyone to use the mobile phones for communication and buying and selling as well. The more I have used It, the more I have trusted it and the more convenient I have found it is. And that is why, I would and do recommend this to people" - Participant G.

Security: The data analysis shows that participants require a minimum level of security to perform mobile commerce transactions using mobile devices. Participants reported that the link between them and vendors should be tamper proof.

> "Transactions had to be secure, and it was only when I believed that it was secure then I moved forward with it" – Participant F.

> "We are dealing with money here, it is very important that we actually get to feel secure" - Participant J.

Relative Advantage

Relative advantage is another important factor that influences participants in engaging in mobile commerce transaction activities like making payments or buying products online. Participants argued that using mobile phones for transactional activities was convenient and saved them time and effort. This has been expressed across all interviews:

> "Today mobile devices are the biggest facilitators to me in my life, I use them in almost everything such as E-banking, bookings and more" - Participant A.

> "One of the reasons that encouraged me to keep using mobile commerce was because it saved me a lot of time and efforts. Affording credit cards and smartphones was not expensive anymore and in fact, it provided me with double the advantages compared to costs" - Participant B.

> "Yes, it was an important factor. I could pay my bills without standing in the queue, I could transfer money etc. I saved costs on my time and my fuel" -

Participant C.

Mobile phones are fast becoming a collective representation of former technologies. For example, a mobile phone, nowadays, can hold the features of a personal computer, a television, a radio, and a telephone, all grouped together in a single device. Therefore, in the future, the question about competitive advantage could change from comparing mobile phones to older technologies, to comparing them with other mobile devices, unless a new technology comes along to make mobile phones obsolete.

Compatibility

The data analysis indicates that all participants require a high level of compatibility to be able to use mobile devices for purchases. All the participants argue that using mobile commerce for transactions was an indication of the type of their lifestyle. They explained that using mobile devices for buying and selling would make them feel that they were up to date with technology and are with the current trends. They also reported that this is how they want to feel and to be perceived by others. The following quote explains this view:

> "Yes it has to be compatible with my lifestyle and my values. I'd like to feel that I'm up to date with the technology. I like to be able to use my mobile device for buying airline tickets or getting applications from the app store" - Participant O.

INFLUENCE OF TRANSACTIONAL LEVEL OF MOBILE COMMERCE ON FACTORS

Mobile Commerce Transaction level influences Trust

The data indicates that all participants who made a purchase using their mobile devices have increased trust in mobile commerce, and are advancing their use to more sophisticated transactions. The following quote supports this view:

> "When I found that it actually worked, it increased my confidence in mobile transactions and I started to trust it" - Participant A.

All participants believe that their trust in vendors increased after completing transactions successfully. This shows that the successful initial use of mobile commerce increases participant trust towards continued usage.

Using Mobile Commerce Made Transactions Easier

The participants suggest that their initial use of mobile commerce for transactional activities made it simpler for them to engage in these activities again. They obtained

the necessary experience to transact *again without exerting effort.*

> "Now transactions must have been easy in order for us to use them. This was a factor, and after a few transactions, I found that the process was relatively easy. This encouraged me" - Participant C.

> "Once I went through the process and found that it was easy, I started using mobile phones for buying and selling things more and more" - Participant G.

Mobile Commerce Transaction Level Improves Subjective Norm

The empirical evidence indicates that using mobile commerce transactions improved subjective norm. After using mobile devices for transactions, participants influenced others by talking about their experiences, and showing their peers how to use mobile devices for the same purposes. This effect of "I try-I tell" led to a growing social influence.

> "My friend showed me how to go to the App store and make a purchase. Then I showed the same process to my other friends. We influence each other. It's both ways" - Participant B.

> "It was peer pressure that led me to use more communication using the mobile phones. And when it came to transactions, I was the one who influenced my surroundings" - Participant D.

Mobile Commerce Transaction level Increases Perception of Security

With more successful transactions, the participants became confident about the security of mobile commerce, and therefore, willing to continue using transactions, and probably even advance to using other transactional activities.

> "When I did start using the mobile phones for transactions, I had to feel secure. And transactions did also make me feel secure as well. That's why I still use it" - Participant C.

> "I felt the transactions were secure and that allowed me to use it more often" - Participant E.

Mobile Commerce Transaction level Increases Relative Advantage

The participants confirmed that undertaking mobile commerce transactions enabled them to identify advantages such as finding better deals for products they wished to purchase and thus making monetary savings.

> "Using the mobile phones for mobile commerce communication was cheaper

> and affordable. And this did encourage us to move towards buying and selling using mobile phones as well since I knew it would be cost saving" - Participant D.

Using Mobile Commerce Increased the Compatibility of Users

The data analysis shows that as participants continued using mobile commerce for transactional activities, they became more dependent on their devices for these purposes and it became more compatible with their values and lifestyle. Participants clarified that they do not consider using other means to conduct mobile commerce transactions because using mobile commerce is consistent with their needs and lifestyle.

> "Definitely, I feel after making purchases online, it has become a stronger part of my lifestyle. I don't think I'll bother going to the computer if I have my mobile device. That would not be cool"- Participant F.

DISCUSSION AND CONCLUSIONS

This research has examined individual's progression in mobile commerce usage from simple use to more sophisticated use. To achieve this, we developed a mobile commerce maturity model that draws on multiple theories, namely TAM, DOI, SET, and PMT, and employs the most acknowledged mobile commerce adoption factors in the literature: ease of use, relative advantage, trust, security, compatibility, and subjective norm. The model defined two levels of maturity, Mobile Commerce Communication level and Mobile Commerce Transaction level. In the Mobile Commerce Communication level, individuals used mobile devices for basic activities to communicate with vendors and browse products and services. In the Mobile Commerce Transaction level, individuals used mobile devices for more advanced activities such as buying/selling. We differentiated these two maturity levels to show how the adoption factors could influence the level of mobile commerce adoption and how the level of mobile commerce could influence these factors to progress to more advanced mobile commerce adoption levels.

The findings show that the factors, trust, security, subjective norm, relative advantage, compatibility, and ease of use had an influence on individuals' adoption of mobile commerce communication. The successful use of mobile devices for mobile commerce communications had a positive impact on the adoption factors which in turn encouraged individuals to progress to more advanced mobile commerce activities such as buying/selling thus, moving individuals to a more advanced level of mobile commerce adoption, Mobile Commerce Transaction level. Likewise, individual's successful use of mobile commerce for transactions has a positive influence on the adoption factors which results in more advanced mobile commerce maturity levels, and so on.

The findings also show that the adoption factors were necessary to achieve the levels of mobile commerce adoption. For example, when participants started using mobile commerce for communication, “trust” was a major determinant to their adoption as they were encouraged to use mobile commerce for communication activities because they trusted the technology/seller. The positive experience of using mobile commerce for communication increased the participants’ trust and motivated them to use their mobile devises for more advanced activities such as buying products. The same applies to “security”, participants only used mobile commerce communication when they were confident that the link between them and sellers is secured and so are their interactions. The positive experience and the sense of security motivated participants to use their mobile devises for transactional activities. Moreover, the “ease of use” of the technology and mobile commerce for communication was found essential to the adoption of mobile commerce for communication purposes. Participants were encouraged to use mobile commerce for communication because they were familiar with using mobile devices in general and for communication in particular. As participants continued using mobile commerce for communication, they became more competent in using mobile device, which encouraged them to progress to mobile commerce transactional activities. Furthermore, “relative advantage” was found essential in both maturity levels. Participants used their mobile devices for mobile commerce communication activities because they found that these devices provide them with advantages such as convenience, ease of communication, and portability. As participants continued using mobile commerce communication, they found that this way of communication also allows collaboration with sellers and reduces the cost of communication. These advantages encouraged participants to progress in using mobile commerce for transactions and helped participants to save time and effort and even find better deals. “Compatibility” was also essential in the Mobile Commerce Communication level as well as the Mobile Commerce Transaction level. The compatibility of mobile devices with participants’ needs encouraged them to use these devices for mobile commerce communication. The use of the devices for communication with sellers soon became part of their lifestyle and compatible with their needs. This encouraged participants to progress to mobile commerce transactional activities.

As for “subjective norm”, the findings show that the influence of this factor varied in the Mobile Commerce Communication level than the Mobile Commerce Transaction level. When participants started using mobile commerce for communication, people around them who also used mobile commerce influenced them. As participants continued using mobile commerce communication, some were encouraged by people around them to use mobile commerce for transactional activities while others progressed without any influence from their social group. These participants were self-motivated to progress in mobile commerce adoption. The findings also show that role of some participants changed as a result of adoption, from being influenced by others to influencing and encouraging others to adopt mobile commerce.

Although prior research has also found that trust [10,65-68], subjective norm [51-54],

security [24,38], compatibility [30,38-40], and ease of use and relative advantage [11,24,25] influence the adoption of mobile commerce by individuals, these studies have primarily focused on the initial adoption of mobile commerce and neglected the progression of adoption from basic use to advanced use, which is discussed in this paper. Our findings show that the level of influence of these factors was higher as users move in the levels of maturity (from communication level to transactional level). In addition, our findings suggest that adoption factors not only influence individuals in the adoption of mobile commerce, but are also influenced by the adoption through which an individual progress in mobile commerce adoption from simple use to advance use.

Our findings extend research related to the adoption of mobile commerce by offering an explanation on the factors that affect individual's progression of mobile commerce usage. This research also contributes to the existing literature by explaining the relationship between mobile commerce adoption factors and the progression of individual's use of mobile commerce. It provides new insights on the concept of mobile commerce maturity and the dynamic impact of adoption factors. By empirically investigating the concept of mobile commerce adoption maturity, this study provides a novel way to understand mobile commerce in general and mobile commerce maturity in particular.

Our findings should be interpreted in light of the limitations of this work. First, the findings show that the role of users in influencing or being influenced in mobile commerce adoption changed as they progressed in their usage. Many of them were first being influenced to adopt mobile commerce but then these users started influencing others. This aspect of changes in behavior and role of social norms has not been sufficiently examined in this study. Future research could examine how individual's roles change in the process of adoption and under what circumstance they move from influencers to being influenced by others and vice versa. Second, while the age group of the participants in this study is in the range of users of mobile commerce adoption, they were all from the same country, Kingdom of Bahrain. This may affect the generalizability of the findings as to whether culture had an influence on individual's adoption of mobile commerce for communication and transactional activities. Future studies could investigate the maturity of individual's adoption of mobile commerce in other countries/cultures and reflect on whether culture has an influence on the progression of mobile commerce adoption. Third, in this study, we examined positive perceptions of users using mobile commerce. User's perceptions may be neutral or even negative due to difficulties that they may experience, which could negatively affect mobile commerce use. This could cause user to regress to lower maturity levels or cause non-adoption. Future research could examine negative perceptions of users and how this affects their adoption of mobile commerce. Fourth, this study lacks reflection on selling activities in the transaction level as we have investigated maturity from the buyer's perceptive. Future research could investigate the perspective of both buyers and sellers. This provides a more comprehensive view on the factors that influence individuals to engage in selling

activities and whether these differ from the factors that affect them to engage in buying activities.

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