# INVESTIGATION OF MOBILITY ON MOBILE COMMERCE ACCEPTANCE AND USAGE

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***ABSTRACT*:** The mobile commerce proceeds ahead at a greater speed in the present world. It implies any transaction with administrative value that is executed through mobile or wireless network. For advanced development and dissemination of mobile commerce acceptance, the most important entity is the fulfillment and consolation of a customer. In recent times, there is an increase in the use of smart phone based business applications in Hyderabad, Pakistan. It is the second largest business center in the Sindh province and the hub of rural community around its vicinity. Recently, the trend of mobile commerce has been increasing and business community in Hyderabad is taking interest to adopt, increase access and generate profits. There has been less research done to explore the factors effecting the acceptance of mobile commerce intention specifically in the cities like Hyderabad.
In this paper, a theoretical model has been designed on the basis of a classical TAM (Technology Acceptance Model), and acceptance and usage of mobile commerce is proposed.

***KEY WORDS***: *Extended Technology Acceptance Model, Mobile Commerce, Mobility*

## 1. INTRODUCTION

Many people think that the 80s is the era of personal computers. The 1990s was a decade of internet and mobile commerce. The occurrence of the 21st century is a symbol of the development of mobile computing and mobile commerce (X. Zheng et al., 2019). Mobile commerce refers to various currency transactions conducted over a mobile network. Broadly defined, mobile commerce, mobile networks and mobile devices are supported by applications and services. Mobile commerce brings huge market potential to businesses and consumers. On the other hand, the benefits of commitment have not been realized. The number of mobile applications and services accepted by the market is still limited. This is especially true in Pakistan. According to T. Almarabeh et al. (2018), worldwide sales of smart phone to end users in the first quarter of 2018 amounted to 349 million units, an increase of 6.11% over the same period in 2017. In addition, classical TAM model is based on the revised technology acceptance model proposed by Davis in 2003 that comprises the distinct features from mobile service, electronic business and information systems domain. The fundamental and critical factors were identified such as mobility from the literature and integrated in the revised proposed model. It was tested using Structural Equation Modeling with Partial Least Squares Techniques. Furthermore, the results revealed that mobility has a positive and significant effect on both PEOU (perceived ease of use) and PU (perceived usefulness) of intention to use mobile commerce. It enlarges our comprehension of the

application, implication, utility and usage of mobile commerce acceptance in Hyderabad region. Moreover, the findings of these studies help mobile commerce application developers to understand the user perspective towards mobile commerce. Smart phone sales accounted for 88% of total mobile phone sales in the first quarter of 2018. Smart phone always relate to the way people interact with each other and become a necessity in private and professional life (B. Peceli et al., 2018). According to market researchers, global mobile phone sales in 2018 will be more than quadruple from 219.7 million in 2015 to 781.3 million in 2017, and is expected to increase by almost 1 billion units by 2018, according to a study by market researchers (C. M. Chiu et al., 2014; C. C. Chen & Y. C. Lin, 2018; C. C. Chen & Y. C. Chang, 2018). According to M. Rehman et al. (2016), the telecommunications sector in Pakistan has developed over the past decades. In 2018, Pakistan employs more than 370 million customers and has a revenue of $53288.5 billion to rank sixth worldwide for mobile use. Pros and cons of the progressive effects of using mobile commerce, skillfulness, limited suitability quality, competing praise, rich information and diversity are well known. Therefore, many scholars and employers have said that mobile commerce is not just an extension of e-commerce. Mobile commerce has its own technology structure, new business model and value chains that bring new value to consumers. Therefore, mobile commerce research requires a new perspective and hypothesis framework consumer acceptance is the cornerstone of a successful business (W. T. Wang et al., 2019). Due to the unique characteristics of mobile commerce, we believe it is necessary to re-examine the traditional systems using information theory, and develop new frameworks and theoretical models that are more suitable for mobile commerce (Z. Kalinic et al., 2019). In addition, for successful new information mechanisms, consumer user acceptance is not extensive enough, while mobile technology and software are rapidly and widely developed for mobile commerce. Using mobile commerce to better understand consumer acceptance is then most necessary and important. Therefore, we accept the extended TAM, which includes different understanding of mobile commerce acceptance and use. This study establishes a model to empirically study the factors affecting the acceptance and use of mobile commerce in Pakistan.

## 2. RESEARCH BACKGROUND MODEL AND HYPOTHESIS

### *2.1. Extended TAM*

Since its inception, extended TAM has been seen as significant due to continued growth and progress in technology. As a result, a multitude of models have emerged to explain the challenge and offer detailed information on the effective use of technology (M. Sharif Abbasi et al., 2015; Z. A. S. Tami Al Zabi et al., 2016; F. H. Chandio et al., 2017). So F. H. Chandio et al. (2017) suggested that extended TAM remains one of the best models explaining the adoption of technology today. Basically, extended TAM is an extension of TRA as defined by F. H. Chandio et al. (2017). Expanding the extended TAM from the TAM model of Davis (F. D. Davis, 1989), PU and PEOU of technology is a direct or indirect factor that increases an individual's intention to use innovation. While PU refers to the extent to which a person believes that the use of particular technology/system will improve the performance of the results, PEOU refers to the extent to which one believes that the use of particular technology/system will require no effort (M. T. Jan et al., 2019). Extending TAM may help predict the use and acceptance of mobile commerce applications and services. M. T. Jan et al. (2019) used the

extended TAM model to study the issues affecting the valuation of mobile commerce acceptance and the factors that determine the use and acceptance of mobile commerce by customers. W. T. Wang et al. (2019) used the utility of M. T. Jan et al. (2019) and the ease of use of mobile commerce services to test the important of mobile acceptance. They found that the PU of mobile commerce acceptance services is the most effective factor influencing the decision to change new services, Many long-term TAM studies have produced complex results of the effects of PEOU on dependent variable. Based on past research, this study focuses on PU accepted by mobile commerce. As with previous extended TAM studies, the basic logic is that the more useful a mobile business is, the more satisfying the users of mobile commerce. This study is intended to try to further extend TAM by adding key elements such as mobility. You can predict the customer's attitude towards using the information system.

## 3. MOBILITY

The mobility of consumers is that the ability to access services widely while travelling is one of the most important features of mobile technology and is one of the major advantages of mobile commerce through e-commerce (B. Pecli at el., 2018). Compared to general electronic commerce, which usually relies on personal computers and wired internet connections, mobile commerce depends on mobile devices and wireless Internet access via mobile networks or Wi-Fi. The dimension of global and space mobility allows for real-time access to communication and service information because mobile technology is based on the increasing use of mobile lifestyle.

Of the modern generation, the movement of users is that the use of services, regardless of time and place, is becoming increasingly important for both users and service providers. B. Pecli at el. (2018) found that perceived mobility have a significant impact on PU and PEOU in a mobile commerce environment. B. Pecli at el. (2018) found significant differences between personal mobile aware ease of use and PU, and a positive relationship between mobile commerce acceptance and use. H. Yang and H. Lee (2018) found that in the early days of mobile commerce, mobility has a stronger impact on PEOU and PU. Therefore, we propose the assumptions in the following sections.

## 4. RESEARCH MODEL AND PROPOSED HYPOTHESIS

### *4.1. Revised Research Model*

Based on our relevant collected works analysis and assumptions, we have designed a new model to measure the antecedents of the intent of mobile commerce use. The research model is shown in Figure 1.

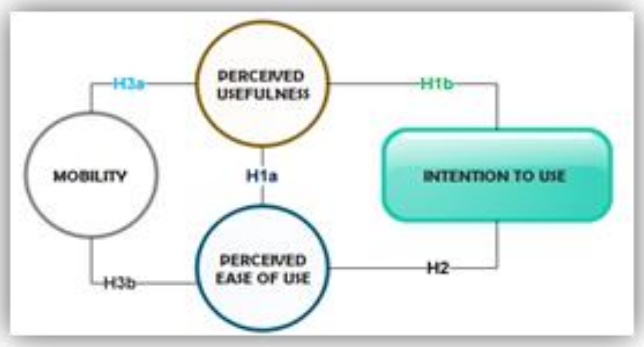


Figure 1: The Revised Model

## 5. RESEARCH HYPOTHESIS DEVELOPED FOR REVISED MODEL

The model contains four variables: mobility, PEOU, PU and the use of mobile commerce. The model examines the impact of PU and PEOU on mobile commerce usage. The following hypotheses are drawn for this study and presented in Table 1, while construct and definition are in Table 2.

Table 1: Hypothesis

| | |
|---|---|
| H1a | PU has a significantly and positively affects user's inertia with regard of mobile commerce. |
| H1b | PEOU has a significant and positively affects user's inertia with regard of mobile commerce. |
| H2 | PEOU has a significant and positively affects user's inertia with regard on PU. |
| H3a | Mobility has a significantly and positively affects user's inertia with regard on PEOU. |
| H3b | Mobility has a significant and positively affects user's inertia with regard on PU. |

Table 2: Constructs and Definitions

| Constructs | Definitions |
|---|---|
| PU | "Refers to the rate at which a person believes that using a particular system will improve his work performance." |
| PEOU | "It's related to a degree to which a person thinks that using a particular system would be free of efforts". |
| Mobility | "The extent to which the Mobility in mobile commerce is easy to use and easy to learn. The ability of mobility in mobile commerce to learn each user task properly." |

# 6. RESULTS AND DISCUSSION

## *6.1. Research Methods*

This research used a method to collect quantitative data from the questionnaire and analyzed using SPSS 23.0. Structural Equation modeling using Partial Least Square v.23.0 was used. This study applied a two-step SEM analysis. In the first step, the measurement model was evaluated by examining one dimension; effectiveness, and reliability of the potential construct using PLS. In next step, the structural model was tested, specifically, the hypothetical relationship between the potential structures of the proposed study model.

### *6.1.1. Instrument development & analysis*

Preliminary Analysis Data for this study were obtained from students using the questionnaire survey approach. After coding data into SPSS, reliability of the questionnaire was tested using Cronbach's alpha. This reliability statistics is the most widely applied test for checking internal consistency among instrument items (Hair et al., 2010; J. F. Hair et al., 2012; J. F. Hair et al., 2019). Results of Cronbach's alpha test are presented in Table 3. The criteria for Fornell as suggested by W. Reinartz et al. (2009) is that the square root of the AVE for each construct must be greater than the correlation. Results revealed that all the values of inter construct were higher than the threshold value i.e.>=0.7. This suggests that the instrument applied was reliable.

Table 3: Discriminate Inter-construct co relation and AVE

| CONSTRUCTS | SQRT OF AVE | M | IU | PEOU | PU |
|---|---|---|---|---|---|
| M | 0.865 | 1 | Nil | Nil | Nil |
| IU | 0.889 | 0.5789 | 1 | Nil | Nil |
| PEOU | 0.875 | 0.5833 | 0.6911 | 1 | Nil |
| PU | 0.856 | 0.5436 | 0.5986 | 0.5249 | 1 |

## *6.2. Structural equation modeling (SEM)*

In order to test the hypothesized model, this research applied advanced and sophisticated statistical approach known as SEM. SEM is the most widely applied technique in research that involves complex models, and tests relationships among its components concurrently (G. F. Khan et al., 2019). This research applied SEM technique in two phases. First phase consisted of measurement model while second phase involved structural model. The measurement model was used to test construct, convergent and discriminant validity. Table 4 presents the convergent validity matrices.

Table 4: Overall results

| FACTORS | AVE | CR | CA | GoF |
|---|---|---|---|---|
| M | 0.6287 | 0.8711 | 0.8029 | Nil |
| IU | 0.7905 | 0.9497 | 0.9337 | Nil |
| PEOU | 0.7648 | 0.942 | 0.9228 | Nil |
| PU | 0.7321 | 0.9425 | 0.9266 | Nil |
| | | | | 0.636767 |
| GOODNESS OF FIT INDEX | The formula is = $\sqrt{\overline{\mathbf{R^2} * \mathbf{average\ communality}}}$ | | | |

According to J. F. Hair et al. (2019), if construct reliability (CR) value of each construct is greater than 0.7 and average variance extracted AVE is above 0.5, the convergent validity of the constructs is established. As revealed in Table 4, both CR and AVE values are greater than the cut-off point. This confirms the convergent validity of the constructs incorporated in the model. Discriminant validity of the constructs was also established, as AVE extracted from each construct was higher than the corresponding inter constructs correlations. The current model GoF was 0.63 (63%), as mentioned in Table 4, which was moderately acceptable. Results of discriminant validity are shown in Table 5:

TABLE 5: Discriminate Inter-construct co relation and AVE

| | SQRTOFAVE | ID | IU | PEOU | PU |
|---|---|---|---|---|---|
| M | 0.793 | 1 | | | |
| IU | 0.889 | 0.5789 | 1 | | |
| PEOU | 0.875 | 0.5833 | 0.6911 | 1 | |
| PU | 0.856 | 0.5436 | 0.5986 | 0.5249 | 1 |

### *6.3. Hypothesis Testing*

All of the hypotheses, proposed in this study, were found to be strongly significant (Table 4). As mentioned earlier, hypotheses related to PU and PEOU were drawn from extended TAM. These hypotheses were also proven to be significant in this study, thus establishing external validity of the extended TAM model in new contextual setting intention to use.

For mobility, two hypotheses were proposed in the model. It was hypothesized that mobility would influence both PEOU and PU in intention to use of mobile commerce acceptance. Results suggested that mobility had shown strong impact in PEOU (i.e. C.R=0.811) at $p<0.001$ significant level. Similarly, PU of intention to use of mobile commerce acceptance was significantly influenced by mobility. These findings suggested that in order to increase intention to use of mobile commerce acceptance

and usage, engineers, designers and developers of the given system should focus on issues related to the mobility of the system.

## 7. CONCLUSION AND FUTURE WORKS

The results of this study has provided the proposed work utilized in previous prominent theories and models in the technology acceptance and usage research of domain called extended TAM. It suggests that theoretical model leads to factors which are affecting mobile commerce acceptance and usage. The factor is mobility. Moreover, the unique factor of mobility in extended TAM is added and tested. These unique features are PU and PEOU; such parameters suggest that the previous research also supports and confirms the present studies. The proposed revised model will be useful in understanding the acceptance and use of mobile commerce. The proposed revised model is still in theoretical phase and can be further evaluated empirically in the future.

## REFERENCES

Abdul Hasees, A. MD (2018). Higher education in the era of IR 4.0. New Straits Times Press (M) Berhad, 10 January 2018. [Online]. Retrieved October 28, 2019, from https://www.nst.com.my/education/2018/01/323591/higher-education-era-ir-40

Azhar Amanullah, A. Ab Aziz, F. N. Abd Hadi & J. Ibrahim (2015). Comparison of Business Model Canvas (BMC) Among the Three Consulting Companies. International Journal of Computer Science and Information Technology Research.

X. Zheng, J. Men, F. Yang, and X. Gong, “Understanding impulse buying in mobile commerce: An investigation into hedonic and utilitarian browsing,” Int. J. Inf. Manage., vol. 48, no. October 2018, pp. 151–160, 2019.

T. Almarabeh and Y. K. Majdalawi, “Cloud Computing of E-commerce,” Mod. Appl. Sci., vol. 13, no. 1, p. 27, 2018.

B. Peceli, G. Singler, Z. Theisz, C. Hegedus, Z. Szepessy, and P. Varga, “Integrated Infrastructure for Electro Mobility Powered by the Arrowhead Framework,” IEEE Access, vol. 6, pp. 73210–73222, 2018.

C. M. Chiu, E. T. G. Wang, Y. H. Fang, and H. Y. Huang, “Understanding customers’ repeat purchase intentions in B2C e-commerce: The roles of utilitarian value, hedonic value and perceived risk,” Inf. Syst. J., vol. 24, no. 1, pp. 85–114, 2014.

C. C. Chen and Y. C. Lin, “What drives live-stream usage intention? The perspectives of flow, entertainment, social interaction, and endorsement,” Telemat. Informatics, vol. 35, no. 1, pp. 293–303, 2018.

C. C. Chen and Y. C. Chang, “What drives purchase intention on Airbnb? Perspectives of consumer reviews, information quality, and media richness,” Telemat. Informatics, vol. 35, no. 5, pp. 1512–1523, 2018.

M. Rehman, M. M. Kamal, and V. Esichaikul, “Adoption of e-Government Services in Pakistan: A Comparative Study Between Online and Offline Users,” Inf. Syst. Manag., vol. 33, no. 3, pp. 248–267, 2016.

W. T. Wang, W. M. Ou, and W. Y. Chen, “The impact of inertia and user satisfaction on the continuance intentions to use mobile communication applications: A mobile

service quality perspective," Int. J. Inf. Manage., vol. 44, no. November 2018, pp. 178–193, 2019.

Z. Kalinic, V. Marinkovic, S. Molinillo, and F. Liébana-Cabanillas, "A multi-analytical approach to peer-to-peer mobile payment acceptance prediction," J. Retail. Consum. Serv., vol. 49, no. April, pp. 143–153, 2019.

M. Sharif Abbasi, A. Tarhini, M. Hassouna, and F. Shah, "Social, organizational. demography and individuals' technology acceptance behavior: A conceptual model," Eur. Sci. J., vol. 11, no. 9, pp. 1857–7881, 2015.

Z. A. S. Tami Al Zabi, Mohammad Malook rind, K. Al Enzi, "S u r j s s," Sindh Univ. Res. J. (Science Ser., vol. 48, no. 1, pp. 29–32, 2016.

F. H. Chandio, Z. Irani, A. M. Zeki, A. Shah, and S. C. Shah, "Online Banking Information Systems Acceptance: An Empirical Examination of System Characteristics and Web Security," Inf. Syst. Manag., vol. 34, no. 1, pp. 50–64, 2017.

F. D. Davis, "Perceived Usefulness, Perceived Ease of Use, and User Acceptance of Information Technology," MIS Q., vol. 13, no. 3, p. 319, 1989.

M. T. Jan, J. W. de Jager, A. M. Ameziane, and N. Sultan, "Applying Technology Acceptance Model to Investigate the Use of Smartphone Advertising in Malaysia," J. Econ. Behav. Stud., vol. 11, no. 1(J), p. 202, 2019.

H. Yang and H. Lee, "Exploring user acceptance of streaming media devices: an extended perspective of flow theory," Inf. Syst. E-bus. Manag., vol. 16, no. 1, pp. 1–27, 2018.

J. F. Hair, M. Sarstedt, C. M. Ringle, and J. A. Mena, "An assessment of the use of partial least squares structural equation modeling in marketing research," J. Acad. Mark. Sci., vol. 40, no. 3, pp. 414–433, 2012.

J. F. Hair, C. M. Ringle, S. P. Gudergan, A. Fischer, C. Nitzl, and C. Menictas, "Partial least squares structural equation modeling- based discrete choice modeling : an illustration in modeling retailer choice," Bus. Res., vol. 12, no. 1, pp. 115–142, 2019.

W. Reinartz, M. Haenlein, and J. Henseler, "An empirical comparison of the efficacy of covariance-based and variance-based SEM," Int. J. Res. Mark., vol. 26, no. 4, pp. 332–344, 2009.

G. F. Khan, M. Sarstedt, W. L. Shiau, J. F. Hair, C. M. Ringle, and M. P. Fritze, "Methodological research on partial least squares structural equation modeling (PLS-SEM): An analysis based on social network approaches," Internet Res., 2019.