

## The Influence of Mobile Application Quality and Attributes on the Continuance Intention of Mobile Shopping

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**Abstract:** The main objective of this study is the measurement of the influence of user-perceived mobile application quality, and mobiles attributes on the continuance intention of mobile shopping mediated by perceived usefulness, perceived enjoyment and trust. A quantitative data collection method is applied to collect the suitable data, and Hierarchical Multiple Regression Analysis (HMRA) is used to test both study hypothesis and model. Results have revealed that user-perceived mobile application quality indeed affects the continuance intention of mobile shopping mediated by perceived usefulness, and trust. On the other hand, mobile attributes in fact do influence online shopping through mobile devices, and that is due to perceived usefulness and enjoyment. The study structure, model and findings add more values to both mobile shopping and continuous intention literature.

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### 1. Introduction

Revolution of the vast scientific progress in information systems and communications technology has been accelerating in a wide range of human activities, this massively facilitated communications, and sharing local expertise on an international scale; the world has indeed become a small village. Although the current concern about the quality of technology in the world has also contributed to the rapid growth in the number of mobile phones being used, Mobile shopping (m-shopping) is relatively new to the Jordanian market, it can be described to be in the infancy stage as it still has to be introduced to this market, and then possibly adopted (Yaseen and Zayed, 2010).

The intense development in both mobile, and internet technology allowed for the emergence of new generations of cutting edge phones that are compatible with the latest over the air internet technology such as 3G, 4G and WIMAX. This technological outbreak allowed users to use mobile devices to perform complex tasks that were previously only possible by using personal computers. Consequently, the recent generations of mobiles led to a transformation in mobile phones' role from a sole communication tool into a sophisticated device that can be used to perform numerous tasks, one of which is online shopping, and thus reshaping the entire m-commerce industry (Wong et al., 2012).

The major difference between mobile and Personal Computer (PC) online shopping is that the

former more convenient as it allows easy access to mobile internet at any place, and any time while the latter form constraints in this area (Clarke, 2001), hence customers are never restricted to a particular place or a specific time. On the same hand, the growing technology, the continuous enhancements of mobile devices and the tremendous advancement in features introduction have widely controlled the market and affected the online purchase intention (Rackspace, 2012).

Mobile applications are considered one of the main channels that enable customers to view updated displayed products and contact retailers without the need of physical presence. Moreover, Jiang et al. (2010) confirmed that mobile application developers and retailers can use the overall characteristics and techniques of mobile applications as external stimuli to influence customers' emotions, which in turn, drives the online purchasing behavior. Although it is essential, the dilemma in employing mobile shopping does not solely rest on having or not having mobile phones' internet connectivity, but it is also due to a couple of factors, one intangible factor can be characterized by how users perceive mobile application's quality, and the other tangible factor is about the attributes that exist in the mobile device itself. Therefore, it is important to measure each influential variable away from any bias in order to detect its impact accurately on mobile shopping continuance intention.

**2. Study Objectives and Hypotheses**

The aim of this study is to investigate the influence of both the quality of a mobile application and a mobile phone’s attributes on the mobile online purchasing process, as when the mobile application quality is highly perceived, it is more likely for a customer to go through with the purchase whereas if the quality is perceived as poor, this may lead to losing that customer (Liang and Lai, 2002). Mobile phones have the advantage of their ease of use and portability as they can be carried anywhere and anytime without being exposed to physical and geographical barriers (Wu and Wang, 2006). Continuance Intention is an exchangeable term with repurchase intention, and it is defined as an individual's willingness to continue conducting specific behavior (Fang et al., 2011). Definitely, customers' continuance intention to purchase from a specific mobile application will be seen as a competitive advantage, which will have a tremendous positive effect on profit (Tsai et al., 2007). Mobile attributes are also highlighted in this study, these can be classified into:

1. Instant connectivity which is defined as the level of convenience toward time, and places that one feels when they participate in m-shopping and accessibility of conforming and searching for information in the moment (Kim et al., 2007 and Ko et al., 2009).

2. Mobile features: today, mobile devices have features that are built in already in mobiles such as large display and zooming feature, size, weight, notification system and adjustable brightness and contrast (Avvannavar et al., 2008; Banister, 2010; ORACLE, 2011; Rackspace, 2012; RNIB, 2012).

Moreover, those dimensions present the first factors that customers notice or deal with at the initial phase of communicating with the mobile application, therefore, they present exogenous factors (Liao et al., 2006), these factors facilitate the forming of the first impression about the mobile application, which in turn, influence the other internal factors, such as: perceived enjoyment, perceived usefulness and trust, as these variables symbolize psychological factors. Taking all in mind, the following research model can be concluded, which consists of three main variable categories that affect the mobile shopping success equation:

**1-Independent Variables:**

- A. User-Perceived mobile application’s quality,
- B. Mobile features.

**2-Mediating Variables:**

- A. Perceived usefulness, B. Perceived enjoyment, C. Enhancing trust.

**3-Dependent Variables:** Continuance Intention of Mobile Shopping.

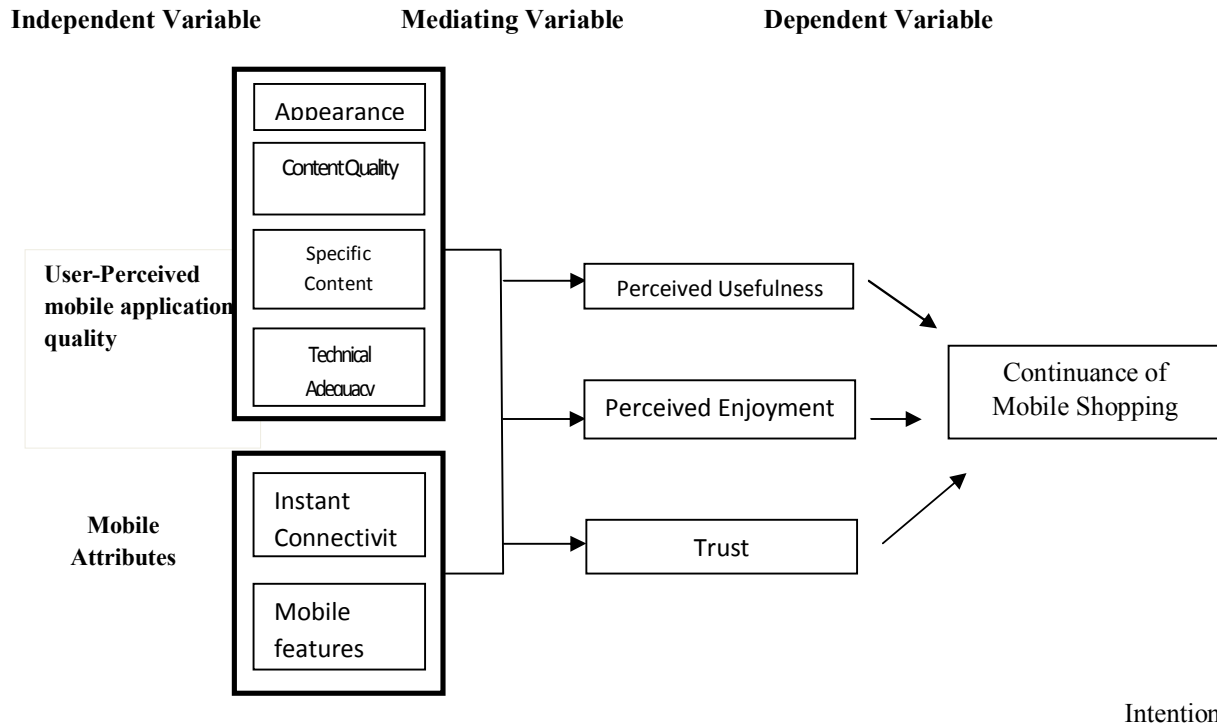


Figure (1): Research Theoretical Framework

### 3. The study tests the following hypotheses:

H01: There is no significant relationship between user-perceived mobile applications quality and the continuance intention of mobile shopping mediated by perceived usefulness.

H02: There is no significant relationship between user-perceived mobile applications quality and the continuance intention of mobile shopping mediated by perceived enjoyment.

H03: There is no significant relationship between user-perceived mobile applications quality and the continuance intention of mobile shopping mediated by trust.

H04: There is no significant relationship between mobile attributes and the continuance intention of mobile shopping mediated by perceived usefulness.

H05: There is no significant relationship between mobile attributes and the continuance intention of mobile shopping mediated by perceived enjoyment.

H06: There is no significant relationship between mobile attributes and the continuance intention of mobile shopping mediated by trust.

### 4. Literature Review

The Hashemite Kingdom of Jordan is one of the developing countries in the Middle East. Nowadays it is just starting to learn the massive influence of the cyber world and feel the need for using it to keep up with the world's knowledge and technology. A survey conducted by Arab Advisors Group (2012) found that 42% out of total mobile phone holders in Jordan use smartphones. Additionally, Arab Advisors Group (2012) argued that 24.4% of internet users in Jordan have used e-commerce in the year 2011 for trading, and bills payment purposes exceeding year 2010 by 9%, which reflects the rising attention towards the importance of involving internet in more life aspects. Moreover, several well-known, respected banks in Jordan are issuing internet shopping cards to provide customers with flexible and secure online shopping in a much easier and convenient way. For example: Arab Bank (Internet Shopping), Jordan Kuwait Bank (Visa Prepaid) and The Housing Bank for Trade and Finance (Iskan Online) have issued; these cards after realizing that there is a relatively good segment demanding such cards, thus providing further proof that Jordanian customers are already shopping online. Furthermore, Lin (2007) mentioned that the rate of new shopping mobile application's failure is really high which entice the mobile application developers to give attention of the mobile application characteristics that affect the user-perceived mobile application quality and the way of developing it. On the other hand, there are some features that are solely restricted to Smartphones (mobiles) alone which are ubiquity and instant connectivity which Kim, et al. (2007) and Lee and Park

(2006) found that it affects the continuous intention of mobile shopping positively and other negatively (Ko, et al., 2009). Mobile shopping (M-shopping) can be defined as the process of searching for products, either goods or services, through the mobile, and this process of action can continue without being restricted by time and place constraints (Shin and Shim, 2002; Wu and Wang, 2006).

The attention has been directed toward mobile shopping due to the realization of its interesting and exceptional characteristics, especially that the international market is close to reaching its saturation phase from the innovations of WI-FI connected laptops. Mobile phones are personalized, which means that they can be designed and customized in order to meet different needs for different market segments. Also, mobile phones have the advantage of their flexibility and ubiquity as they can be carried anywhere and anytime without being exposed to physical and geographical barriers (Wu and Wang, 2006; Yuan, and Cheng, 2004), making holding them much easier than carrying laptops. Thus, the above factors lead to the perception of mobile phone as an attractive tool to be used more frequently for online shopping and whenever the customers feel it is needed without considering the weight and the space restrictions.

### 5. Methodology

The population is unknown since it is not easy to determine the exact number of individuals who actually use mobile device for shopping. However, the researcher has reviewed several related studies to figure out the sample size. Different literature has discussed related topics to this paper, such as (Hung et al., 2012; Kim et al., 2012; Wen, et al., 2011) and discussing m-commerce specifically in Jordan: (Al Louzi and Iss, 2011; Altaher, 2012; Yaseen and Zayed, 2010) who used a sample size of approximately 250 individual. Therefore, the researcher has adopted the number 250 to be the sample size, which consisted primarily of people who has experienced online shopping using mobile devices in the Kingdom, and whose assessment for the efficiency of m-shopping in Jordan can outline the extent of the Jordanian market's tendency to use mobile devices for online shopping. In order to obtain the data, manual and online questionnaire were disseminated for the purpose of using the results in validating the conceptual model and hypothesis. The measure for the various variables constructs is adopted from an assortment of different literature, but has been developed and modified to adapt with the m-shopping context. The questionnaire used a five point Likert-scale to measure the dispersion of respondents' view of mobile shopping intention. The appendix table 1 shows the study items and the sources of the different variable constructs.

**6. Testing Hypotheses**

Hierarchical Multiple Regression Analysis is used to test the research six main hypotheses as these hypotheses contain mediating variables (Baron and Kenny, 1986). Four steps that are proposed by Baron and Kenny (1986) are conducted to test a one specific hypothesis which contains a mediating variable. The four steps contain several regression analyses and the significance of the coefficients and are fully used. The first step is completed by conducting simple regression analysis where the independent variable should be significantly related to the dependent variable. The second step is about conducting another simple regression analysis where the independent variable should be significantly related to the mediating variable. The third step contains yet another simple regression analysis where the mediating variable should be significantly related to dependent variable. The above three steps should yield significant results, because otherwise there would be no relationship that can be mediated. Finally, the last step is about conducting multiple linear regression analysis where if

the mediating variable is truly a mediating one, then the significant relationship between the independent and the dependent variables should be no longer significant. **Testing the first hypothesis:** the first three steps have revealed a significant relationship between the different variables leading to the application of the fourth step: the detailed results are outlined in Tables (1) and (2). The change in R square presented in Table (1) shows that the mediating variable explains 47% of the variance in the continuance intention whereas the independent variable does not add significantly to the variance explained since R square equals only 0.1%. Moreover, table (2) shows the relationship between the user-perceived mobile application quality and the continuance intention of mobile shopping is not longer significant as the sig. level is .574 which is more than 0.05 which is considered significant. Thus, null hypothesis should be rejected and the alternate verified; there is indeed a significant relationship between the user-perceived mobile application quality and the continuance intention of mobile shopping mediated by perceived usefulness.

Table (1) Results of regression analysis for the effect of the user-perceived mobile application quality upon the continuance intention of mobile shopping mediated by perceived usefulness

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.691	.477	.475	.50350	.477	230.727	1	253	.000
2	.691	.478	.473	.50418	.001	.318	1	252	.574

a. Predictors: (Constant), usefulness; b. Predictors: (Constant), usefulness, user-perceived mobile application quality

Table (2) Coefficients of the effect of the user-perceived mobile application quality upon the continuance intention of mobile shopping mediated by perceived usefulness

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.584	.163		9.709	.000
	Usefulness	.630	.041	.691	15.190	.000
2	(Constant)	1.494	.228		6.564	.000
	Usefulness	.622	.044	.683	14.310	.000
	User-perceived	.032	.057	.027	.564	.574

a. Dependent Variable: intention

**Testing the second hypothesis:** The first three steps also demonstrated significant relationship between the different variables leading to the application of the fourth step. The results are shown in Tables (3) and (4). As it is concluded from Table (3), the sig. level for the relationship between user-perceived mobile application

quality and the continuance intention of mobile shopping is less than .05 which is significant and that indicates that the enjoyment factor does not mediate the relationship from a statistical approach. Based on these steps the null hypothesis is accepted.

Table (3) Results of regression analysis of the effect of the user-perceived mobile application quality upon the continuance intention of mobile shopping mediated by perceived enjoyment

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.555a	.308	.305	.57911	.308	112.663	1	253	.000
2	.574b	.329	.324	.57123	.021	8.034	1	252	.005

a. Predictors: (Constant), enjoyment; b. Predictors: (Constant), enjoyment, user-perceived mobile application quality

Table (4) Coefficients of the effect of the user-perceived mobile application quality upon the continuance intention of mobile shopping mediated by perceived enjoyment

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.854	.207		8.963	.000
	Enjoyment	.556	.052	.555	10.614	.000
2	(Constant)	1.296	.283		4.570	.000
	Enjoyment	.533	.052	.532	10.190	.000
	user-perceived	.177	.062	.148	2.834	.005

a. Dependent Variable: intention

**Testing the third hypothesis:** The three steps also have shown the significance of the relationships and the results verify that, the results for the fourth step are presented in Tables (5) and (6). The R square change in table (5) shows that the mediating variable explains as high as 53.1% of the variance in the continuance intention whereas the independent variable does not add significantly to the variance explained since R square equals only .6%. Also, table (6) shows the insignificant relationship between the user-perceived mobile application quality and the continuance

intention of mobile shopping as the sig. level is 0.071. As Baron and Kenny (1986) stated that if the relationship between the independent variable and the dependent variable is not longer significant then it mediates the relationship. Accordingly, the null hypothesis should be rejected and the alternate hypothesis should be accepted; there is indeed a significant relationship between the user-perceived mobile application quality and the continuance intention of mobile shopping mediated by trust.

Table (5) Results of regression analysis of the effect of the user-perceived mobile application quality upon the continuance intention of mobile shopping mediated by trust

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.728a	.531	.529	.47697	.531	286.031	1	253	.000
2	.733b	.537	.533	.47484	.006	3.283	1	252	.071

a. Predictors: (Constant), Trust; b. Predictors: (Constant), Trust, User-perceived mobile application quality

Table (6) Coefficients of the effect of the user-perceived mobile application quality upon the continuance intention of mobile shopping mediated by trust

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	.747	.195		3.822	.000
	Trust	.818	.048	.728	16.912	.000
2	(Constant)	.475	.246		1.933	.054
	Trust	.799	.049	.712	16.216	.000
	User-perceived	.095	.052	.080	1.812	.071

a. Dependent Variable: intention

**Testing the fourth hypothesis:** Likewise the three steps show a significant relationship between the different variables so the fourth step is conducted, and the results are shown in the Tables (7) and (8). As shown in table (7) the change in the R square indicates that the mediating variable explains 47.7% of the variance in the continuance intention whereas the mobile attributes does not add significantly to the

variance explained since R square equals only 0.4%. in addition to, table (9) shows that the relationship between mobile attributes variable and the continuance intention of mobile shopping is not longer significant as its sig. level has reached 0.150 which indicates that the perceived usefulness mediates the relationship. Therefore it is concluded that the null hypothesis should be rejected.

Table (7) Results of regression analysis for the effect of mobile attributes upon the continuance intention of mobile shopping mediated by perceived usefulness

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.691a	.477	.475	.50350	.477	230.727	1	253	.000
2	.694b	.481	.477	.50242	.004	2.089	1	252	.150

a. Predictors: (Constant), usefulness; b. Predictors: (Constant), usefulness, mobile attributes

Table (8) Coefficients of the effect of the mobile attributes upon the continuance intention of mobile shopping mediated by perceived usefulness

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.584	.163		9.709	.000
	Usefulness	.630	.041	.691	15.190	.000
2	(Constant)	1.307	.252		5.194	.000
	Usefulness	.618	.042	.678	14.665	.000
	mobile attributes	.088	.061	.067	1.445	.150

a. Dependent Variable: intention

**Testing the Fifth hypothesis:** The results for the three steps show a significant relationship and the fourth step's results are listed in the below tables (9) and (10). According to the tables, the change in R square shows that the mediating variable explains 20.7% of the variance in the continuance intention whereas the independent variable does not add significantly to the variance explained since R square equals as high as

5.2%. Last but not least, table (10) shows that the perceived enjoyment mediates the relationship between the mobile attributes and the continuance intention of mobile shopping as from statistical approach the relationship between the mobile attributes and the continuance intention of mobile shopping is not longer significant as the sig. level is 0.056 and thus the alternate hypothesis is indeed verified.

Table (9) Results of regression analysis of the effect of the mobile attributes upon the continuance intention of mobile shopping mediated by perceived enjoyment

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.555a	.308	.305	.57911	.308	112.663	1	253	.000
2	.564b	.318	.313	.57607	.010	3.683	1	252	.056

a. Predictors: (Constant), enjoyment; b. Predictors: (Constant), enjoyment, Mobile attributes

Table (10) Coefficients of the effect of the mobile attributes upon the continuance intention of mobile shopping mediated by perceived enjoyment

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.854	.207		8.963	.000
	Enjoyment	.556	.052	.555	10.614	.000
2	(Constant)	1.434	.300		4.780	.000
	Enjoyment	.538	.053	.537	10.162	.000
	Mobile attributes	.133	.069	.101	1.919	.056

a. Dependent Variable: intention

**Testing the sixth hypothesis:** In step two, the sig level equals .050 which is not significant enough to carry on with the other steps; but to substantiate that, the fourth step has also been conducted and the results are shown in tables (11) and (12). It is clear in table (12) that the sig. level for relationship between the mobile attributes

and the continuance intention of mobile shopping is 0.012 which is considered significant and that means that the trust does not mediate this relationship as baron and Kenny (1986) stated. Accordingly, the null hypothesis should be verified.

Table (11) Results of regression analysis of the effect of the mobile attributes upon the continuance intention of mobile shopping mediated by trust

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.728a	.531	.529	.47697	.531	286.031	1	253	.000
2	.736b	.542	.539	.47195	.012	6.420	1	252	.012

a. Predictors: (Constant), Trust; b. Predictors: (Constant), Trust, Mobile attributes

Table (12) Coefficients of the effect of the mobile attributes upon the continuance intention of mobile shopping mediated by trust

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	.747	.195		3.822	.000
	Trust	.818	.048	.728	16.912	.000
2	(Constant)	.282	.267		1.059	.291
	Trust	.803	.048	.715	16.653	.000
	Mobile attributes	.143	.056	.109	2.534	.012

a. Dependent Variable: intention

**Discussion**

This research was able to conceptualize how user-perceived mobile application quality and mobile attributes affect perceived usefulness, perceived enjoyment, and trust and their corresponding role in affecting the continuance intention of m-shopping. The statistical analysis shows that there is a significant relationship between the user-perceived mobile application quality and the continuance intention of m-

shopping mediated by the perceived usefulness and this is supported by the studies of Liao et al. (2006). As for perceived enjoyment influence on the relationship between user-perceived mobile application quality and the continuance intention of m- shopping, the mediating variable has been studied according to the recommendations that had been claimed by Liao et al. (2006). The results concluded that there is no significant relationship mediated by the sample

responses. This might be related to the multiple sub sections of the user-perceived mobile application quality which consists of four parts including appearance, specific content, content quality and technical adequacy so the researcher opined that only a small number of questions are directed to the enjoyment part, and that is since the content quality, specific content and a big part of technical adequacy does not affect it directly. Moreover, based on the findings, there is a significant relationship between user-perceived mobile applications quality and the continuance intention of m-shopping mediated by trust which is coherent with what Liao et al. (2006) has concluded. Liao and his colloquies found that the user-perceived mobile application quality and trust in the web retailer positively affects users' continuance intention as users highly value the trustworthiness of the corporation that owns the mobile application in terms commitment, providing a good service, and protecting their personal information. In relation to investigating the fourth hypothesis, resulted positively showing that there is indeed a significant relationship between mobile attributes and the continuance intention of m-shopping mediated by perceived usefulness. The mobile attributes factor was one of the major elements of the research, after investigating this relationship, the researcher found out that there is a significant relationship between mobile attributes and the continuance intention of m-shopping mediated by perceived usefulness, in which the perceived usefulness is actually enhanced by good mobile attributes which lead people to repurchase online via their mobiles.

Results also show that there is a significant relationship between mobile attributes and the continuance intention of m-shopping mediated by perceived enjoyment since mobile attributes enhances the mobile online shopping experience itself. Besides the fact that perceived enjoyment while conducting a specific behavior affects the continuance of conducting a specific behavior, this was supported by Kim et al. (2007) and Wen et al. (2011) as they explained that the perceived enjoyment indeed affects the continuance intention. Last but not least, analysis show that there is no significant relationship between mobile attributes and the continuance intention of m-shopping mediated by trust and this can be attributed to the fact that mobile features such as zooming, size and weight is not directly linked to trust.

### Conclusion

Telecommunications companies, web developers, mobile producing companies in addition to retailers dealing in m-shopping should all integrate their efforts to enhance the m-shopping experience and make it as smooth as possible in order to encourage people to adopt and continue buying online through their mobile

devices. On the same hand, retail shops offering m-shopping service should consider the user-perceived mobile application quality as a one package and take into account each factor separately without neglecting any. On the other hand, the telecommunication companies should work on enhancing the their radio coverage and data transmission speed of the 3G network in all areas since this critically affects the m-shopping experience of customers as if their shopping transactions are almost interruptions-free, this would directly improve their trust and enjoyment in m-shopping and will add up to the subscribers to the 3G service benefiting both m-shopping applications' providers and telecommunications providers. Mobile production companies should concentrate on enhancing the mobile features that have an effect in the m-shopping process such as weight, size and screen display; these factors affect the easiness of m-shopping. Taken from another perspective, if customers found it is difficult to conduct m-shopping from their devices they might think about switching to other more developed mobile devices which affects the revenues of that mobile company directly.

In addition, marketers should focus on the benefits of m-shopping in their advertising campaigns, and on how to save time, and money and how to facilitate their purchasing process since this will encourage people to use m-shopping and motivate them to sustain this shopping behavior. In addition, all of the surveyed sample actually enjoy the experience of online shopping through their mobile devices and expressed that they have found it to be different and exciting. This implies that marketers should not only list the basic facts about online shopping but they should also focus on the emotional rewards reaped from m-shopping. Finally, trust should be enlightened by managers to their subordinates in order to concentrate on offering a good service that is consistent, committed and protects the personal information of the customer.

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## Appendix

Table (1): Variables' sources

<b>Study Items</b>	<b>Source (s) of Scale's Statement</b>
<b>User-perceived mobile application quality</b>	Liao et al. (2006)
<b>Instant Connectivity</b>	Ko et al. (2009)
<b>Mobile Features</b> (collected from different literature)	
Zoom feature	Banister (2010)
Big size relatively	Avvannavar et al.(2008), Rackspace (2012)
Notification system	Avvannavar et al.(2008), ORACLE (2011)
Adjusting brightness and contrast	RNIB (2012)
<b>Perceived usefulness</b>	Bigne-Alcaniz et al. (2008), Wangpipatwong et al. (2008)
<b>Perceived enjoyment</b>	Hassanein and Head (2005/06)
<b>Trust</b>	Gefen et al. (2003), Koufaris and Hampton-Sosa (2004).
<b>Continuance intention</b>	Fang et al. (2011), Liao et al. (2006).

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