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THE INFLUENCE OF M-COMMERCE SERVICE AND SYSTEM QUALITY DIMENSIONS ON OVERALL PERCEIVED SERVICE QUALITY

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ABSTRACT

Information Technology (IT) has an increasing importance and development in business life. Nowadays, businesses have been seeking to reach their customers through m-services especially m-commerce. The concern is to what extent this m-commerce system can satisfy the consumers' needs and contributes to the overall online purchasing development. This study aims to examine the effect of m-commerce service quality dimensions (website design, responsiveness, and trust), and system quality dimension (accessibility) on overall perceived service quality in m-commerce by customers. The data were collected from the Arab Open University in Jordan through a self-administered questionnaire, in order to test the hypotheses of the proposed model. 618 of questionnaires were used for analysis data, out of 870 distributed. The result of this study revealed that there are a significant effect of responsiveness and accessibility on overall perceived service quality. This study has some important implications for business practice and research.

Keywords:
Service quality, system quality, m-services, mobile commerce, overall perceived service quality.

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1. INTRODUCTION

Most businesses nowadays depend on Information Technology (IT) to manage their operations. With IT, it is easier and quicker to access the consumer and deliver what the consumer has ordered for or meet their needs (Alfawaer, Awni, & Al-Zoubi, 2011). Companies are increasingly turning to the Internet to market products and services. However, the effectiveness of such online

commerce systems depends on the degree of comfort that customers feel with the technology-based interactions between the customers and companies. Service in e-commerce is a function of how the online store facilitates efficient and effective shopping, purchasing and delivery of products and services.

Since e-commerce mostly depends on the availability of a wired network connection to the Internet, there is still a limitation to this service among customers and corporate professionals who are constantly on the move. In order to overcome such a limitation, there is an inclination to make use of wireless networking technologies which can provide potential commerce at anytime and anywhere. The move from wired to wireless services is a remarkable sign for the new millennium (Landers, 2002). From the literature, it is evident that evolving m-commerce service has many potential implications. According to Tiwari, Buse and Herstatt (2006), m-commerce, on the basis of the features make provision for additional value-added utility particularly. This study aims to examine the effect of m-commerce service quality dimensions (website design, responsiveness, and trust), and system quality dimension (accessibility) on overall perceived service quality (OPSQ) of m-commerce based on the perceptions of Arab Open University (AOU) students and employees.

2. LITERATURE REVIEW, THEORETICAL FRAMEWORK AND HYPOTHESES DEVELOPMENT

2.1. SERVICE QUALITY IN M-COMMERCE

Review of extant literature has shown that articles that measure the impact of Service Quality (SQ) in m-service are scarce. Many of the few that are however available only studied m-commerce SQ by examining the behavior of customers (Gerpott et al., 2001, Kim et al. 2004, Lim et al., 2006, Seth et al., 2005, Turel and Serenko 2006). For instance, Turel and Serenko (2006) while studying customer satisfaction in to m-services in Canada adapted the American Customer Satisfaction Model (ACSM) (Fornell et al., 1996). In their study, the authors defined perceived quality, which is also perceived SQ, as the served market's evaluation of service usage experience in the recent time after which personalization and service reliability were used for measurement (Turel and Serenko 2006).

Studies by Kim et al. (2004) recognized six service quality measures (Gerpott et al. 2001, Lee et al. 2001) such as pricing structure, call quality, mobile devices, convenient procedures, value added services and customer support. However, factors, such as convenient procedures, customer support and mobile devices were later removed because of items with low factor loadings using exploratory factor analysis. Consequently, SQ was measured by the remaining three factors (Kim et al. 2004). In the same vein, Lim et al., (2006) equally identified pricing plans, data services, customer service, network quality and billing systems as the five dimensions of consumers' perceived quality of m-services. These factors were confirmed through exploratory factor analysis (Lim et al., 2006). Furthermore, there are other studies that examined how SQ relates to various m-service applications (Kar et al., 2006, Rao and Minakakis 2003, Yun et al., 2005).

Chae et al., (2002) in the course of examining m-service information quality, extended a prior framework of information quality of Dey (2001) and Wang (1998) by incorporating the features

of m-commerce such as mobile context and devices. While measuring m-commerce information quality they came up with four dimensions which include connection quality that eventually influenced by responsiveness and stability, content quality as influenced by believability, objectivity, interaction quality, amount and contextual quality which were determined by navigation, structure, presentation, promptness and timeliness. Furthermore, the study maintained that the relationship between the four major dimensions of information quality and user satisfaction was moderated by a customer's intended goal (Chae et al., 2002). In another study, Kar et al. (2006) considered the unstable environment in which m-services were provided and adapted as the quality dimensions of e-services. The models of Kaynama and Black (2000) and Liljander et al. (2002) were developed using SERVQUAL for the purpose of aligning with the features of m-services. In these studies, user interface, responsiveness, reliability, customization and trust were identified as the five dimensions of SQ. Yun et al. (2005), in addition examined ring back tone, SMS, melody ring, background image service, gaming context based services, video on demand and multimedia message services as dimension of SQ in the context of mobile data services. The core quality attributes identified are: sound quality, play time, and image quality.

2.2. ISSUES AND BARRIERS RELATED TO THE M-COMMERCE DEVELOPMENT

According to E-paymentsMerchantInitiative (2011); Euromonitor (2011); Jahanshahi, Mirzaie, & Asadollahi (2011); and Goi & Ng (2011), there are many problems and obstacles in facing the development of m-commerce service. Some of these problems listed as follows:

(i) Consumers are concerned with privacy in using the mobile device for transactions;
(ii) Consumers are still not confident in using mobile devices to make payment. Since some personal data must be provided to enable the goods and services to be delivered, consumers feel reluctant to engage in on-line transactions;
(iii) Consumers do not trust the web merchant; and
(iv) Security is also a concern for consumers.

2.3. SERVICE QUALITY DIMENSIONS

2.3.1. WEBSITE DESIGN

Website design refers to the appearance of mobile portal and is consistent with the tangibility dimension in the SERVQUAL model. While Parasuraman et al., (1988) defined a tangible dimension as the physical appearance, such as facilities, equipment, and personnel, many researchers replaced this definition with the user website required for adapting to the e-service context (O'Cass & Carlson, 2012; Udo, Bagchi & Kirs, 2010; Loiacono et al., 2002; Wolfinbarger & Gilly, 2003; Lee & Lin, 2005; Aladwania & Palvia, 2002; Riel et al., 2001). Ghose and Dou (1998) argued that greater attractiveness of a website increases the level of user satisfaction. Website design is very important in the m-commerce service environment, because the website substitutes the role of customers' contact in the physical commercial companies. On the overview, website design is a vital factor that determines the customer-perceived mobile commerce SQ. It has significant and positive impacts on the customers' perceived SQ. The related hypothesis we intend to test is stated as follows:
H1: There will be a significant positive relationship between website design and overall customer perceived service quality.

2.3.2. RESPONSIVENESS

The second dimension is responsiveness which is similar to the responsiveness dimension in the SERVQUAL model. The SERVQUAL model (Parasuraman et al., 1988) defines responsiveness as employees' willingness in the provision of prompt service and dealing with consumer complaints. Wang (2003) stated that: "responsiveness" is a measure for the company's ability in supporting customers with the appropriate information when a problem occurs. It is also the mechanism that handles returns, and has the capacity of executing arrangement for online guarantees. Responding quickly to customers' request indicates that the company is customer-oriented. Subsequently, this can subdue the issue of uncertainty and thus increase the perceived convenience of customers (Gummerus et al., 2004; Wolfinbarger & Gilly, 2003). The corresponding hypothesis is:
H2: There will be a significant positive relationship between responsiveness and overall customer perceived service quality.

2.3.3. TRUST

According to Lynch and Lundquist (1996), e-service with much academic discourse surrounding the security, privacy, and confidence centers on Trust. This is similar to the assurance dimension in the SERVQUAL model. Kimery and McCard (2002) argued that "trust is the user's willingness to accept the vulnerability of an online transaction based on their positive expectations regarding future online provider behaviors". Reichheld and Schefter (2000) pointed out that trust is a significant antecedent of participation in online settings because of the increased ease with which online transaction can behave opportunistically. Based on this prior support, we propose the following:
H3: There will be a significant positive relationship between trust and overall customer perceived service quality.

2.4. SYSTEM QUALITY DIMENSION
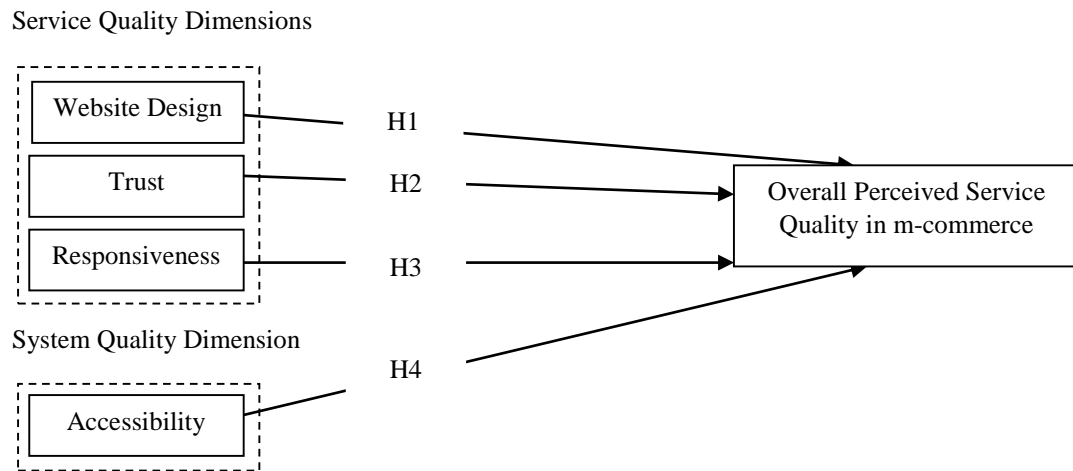
2.4.1. ACCESSIBILITY

In traditional marketing literature, speed of delivery is defined as the time it takes to actively perform the service (Dabholkar, 1996). Maister (1985) argued that if consumers perceive that service is delivered quickly, they are likely to evaluate the service more highly. In the e-services environment, speed of access may also be an important factor to lure users to a particular website (Cho & Park, 2001; Sohn, 2000).

However, accessibility in the m-commerce environment refers to the availability of the system, where and when the customers need to conduct any kind of commercial transactions. The potential benefit of using an m-commerce system cannot be successfully achieved without having reliable speedy online access, because customers expect the m-commerce services to be available on demand. M-commerce applications and services depend heavily on the underlying network support. Two of the most significant factors that influence the development and the quality of m-commerce services are the available bandwidth offered by the wireless networks as well as network coverage (Papanikolaou & Mavromoustakos, 2006; Siau, Lim, & Shen, 2001). Thereafter,

accessibility is one of the substantial dimensions of the mobile SQ, and has positive significant impacts on the customers' perceived SQ. Building upon this prior work, we propose hypothesis H4 as follows:

H4: There will be a significant positive relationship between accessibility and overall customer perceived service quality.

Figure 1: Proposed Research Framework

3. METHODOLOGY

3.1. RESEARCH GOAL

In this study, we aim to examine the effect of m-commerce service quality dimensions (website design, responsiveness, and trust), and system quality dimension (accessibility) on overall perceived service quality in m-commerce by customers. A structured questionnaire was used in order to gather the data to develop the mobile service quality scale.

3.2. SAMPLE AND DATA COLLECTION

In the current study, the sample of this study was the university students and employees. The data was collected via a self-administered questionnaire of AOU University. Previous studies revealed that mobile services are popular among young students and people (Kinnally et al., 2008). The questionnaire which is meant to measure the overall perceived service quality in m-commerce, was distributed to 870 targeted respondents, randomly selected from colleges of AOU University. Out of that number, 618 were returned and used for the analysis.

3.3. RESEARCH ANALYSIS AND RESULTS

PLS (partial least square) procedure which is Structural Equations Modeling SmartPLS 2.0 was used for the purpose of developing the reliability prior to the evaluation of the model and PLS is also used to test the hypotheses.

3.3.1. THE MEASUREMENT MODEL

The content validity and the construct validity were confirmed, in order to establish the goodness of measurement, as discussed below:

3.3.1.1. THE CONTENT VALIDITY

The content validity of a construct implies that all the items used to measure a construct should show high loadings on their respective constructs. This is as defined in the multivariate analysis literature. In other words, the measuring constructs must load higher comparing to other constructs in the same column and row. Therefore, following the suggestion of Hair et al., (2010) and Chin (1998), the factor loading should be used to evaluate the content validity. This implies that if some items have higher loadings on other constructs that the ones they belong to, these items will be candidates for deletion. Tables 1 and 2 showed that all the variables significantly loaded on their respective constructs and this confirmed that the measurement model used possesses the required content validity.

Table1: Loading and cross-loadings of the items

Constructs	Items	WEB	TRST	RESP	ACC	OPSQ
Website Design	WEB1	**0.574**	0.379	0.158	0.253	0.217
	WEB2	**0.630**	0.262	0.083	0.231	0.095
	WEB3	**0.804**	0.387	0.188	0.277	0.276
	WEB4	**0.783**	0.362	0.114	0.250	0.212
	WEB5	**0.717**	0.495	0.260	0.358	0.316
Trust	TRST1	0.332	**0.782**	0.167	0.351	0.255
	TRST2	0.288	**0.802**	0.159	0.460	0.316
	TRST3	0.355	**0.833**	0.272	0.386	0.331
	TRST4	0.355	**0.630**	0.356	0.321	0.324
	TRST5	0.463	**0.751**	0.337	0.366	0.314
	TRST6	0.327	**0.690**	0.247	0.391	0.199
Responsiveness	RESP1	0.412	0.478	**0.775**	0.279	0.334
	RESP2	0.289	0.510	**0.780**	0.342	0.312
	RESP3	0.361	0.450	**0.817**	0.317	0.297
	RESP4	0.370	0.255	**0.677**	0.242	0.257
Accessibility	ACC1	0.444	0.538	0.451	**0.766**	0.518
	ACC2	0.533	0.446	0.428	**0.814**	0.478
	ACC3	0.417	0.309	0.323	**0.691**	0.305
	ACC4	0.506	0.510	0.473	**0.762**	0.518
Overall Perceived Service Quality	OPSQ1	0.510	0.404	0.404	0.397	**0.760**
	OPSQ2	0.511	0.498	0.466	0.436	**0.797**
	OPSQ3	0.584	0.521	0.548	0.555	**0.828**
	OPSQ4	0.432	0.417	0.424	0.392	**0.605**

Table 2: T value results

Constructs	Items	Loadings	Standard Error	T Value	P Value
Website Design	WEB1	0.574	0.055	10.505	0.000
	WEB2	0.630	0.049	12.877	0.000
	WEB3	0.804	0.024	33.318	0.000
	WEB4	0.783	0.025	31.410	0.000
	WEB5	0.717	0.028	25.524	0.000
Trust	TRST1	0.782	0.020	39.028	0.000
	TRST2	0.802	0.019	42.128	0.000
	TRST3	0.833	0.017	48.798	0.000
	TRST4	0.630	0.035	18.029	0.000
	TRST5	0.751	0.022	33.976	0.000
	TRST6	0.690	0.031	22.447	0.000
Responsiveness	RESP1	0.775	0.021	36.481	0.000
	RESP2	0.780	0.019	41.218	0.000
	RESP3	0.817	0.016	52.177	0.000
	RESP4	0.677	0.032	21.243	0.000
Accessibility	ACC1	0.766	0.025	31.227	0.000
	ACC2	0.814	0.018	45.821	0.000
	ACC3	0.691	0.029	23.906	0.000
	ACC4	0.762	0.021	36.754	0.000
Overall Perceived Service Quality	OPSQ1	0.760	0.022	34.837	0.000
	OPSQ2	0.797	0.024	33.716	0.000
	OPSQ3	0.828	0.014	58.409	0.000
	OPSQ4	0.605	0.037	16.337	0.000

3.3.1.2. THE CONVERGENT VALIDITY

According to Bagozzi and Yi (1988) and Hair et al., (2010), the definition of convergent validity is to indicate the extent to which a set of items converges in measuring a particular construct. As shown in Table 3 below the composite reliability of each construct is at least 0.831 exceeding the cut off value of 0.7. Additionally, the values of average variance extracted (AVE) for each construct is at least 0.5 (Fornell & Larcker, 1981; Hair et al., 2010), and it is ranging from 0.500 to 0.583 illustrating a good level of construct validity related to the used measures (Barclay et al., 1995). The convergent validity of the remaining model is confirmed from these outcomes.

Table 3: Convergent validity analysis

Constructs	Items	Loadings	Cronbach's Alpha	CRa	AVEb
Website Design	WEB1	**0.574**	0.757	0.831	0.500
	WEB2	**0.630**			
	WEB3	**0.804**			
	WEB4	**0.783**			
	WEB5	**0.717**			
Trust	TRST1	**0.782**	0.844	0.885	0.564
	TRST2	**0.802**			
	TRST3	**0.833**			
	TRST4	**0.630**			
	TRST5	**0.751**			
	TRST6	**0.690**			
Responsiveness	RESP1	**0.775**	0.760	0.848	0.583
	RESP2	**0.780**			
	RESP3	**0.817**			
	RESP4	**0.677**			
Accessibility	ACC1	**0.766**	0.755	0.845	0.577
	ACC2	**0.814**			
	ACC3	**0.691**			
	ACC4	**0.762**			
Overall Perceived Service Quality	OPSQ1	**0.760**	0.738	0.837	0.566
	OPSQ2	**0.797**			
	OPSQ3	**0.828**			
	OPSQ4	**0.605**			

a: Composite Reliability: CR = ($\sum$ factor loading)2 /{($\sum$ factor loading)2) + $\sum$ (variance of error)}
b: Average Variance Extracted: AVE = ($\sum$ factor loading)2 / {$\sum$(factor loading)2 + $\sum$ variance of error)}

3.3.1.3. THE DISCRIMINATE VALIDITY

The definition of discriminate validity is the degree to which a set of items can distinguish a construct from other constructs. Thus, according to Compeau et al., (1999) if compared the shared variance of construct with the shared variance of other constructs is supposed to be greater value comparing to other construct. Fornell and Larcker (1981) suggested a criterion to examine the discriminant validity. As illustrated in Table 4, the square roots of AVE (average variance extracted) are being considered diagonal elements and the variable correlation is given below the diagonal elements. If the diagonal elements are being considered higher than the elements in other off diagonal in their related columns and rows then we can make the comparison and assume the discriminant validity. Furthermore, the results in the correlation matrix illustrated in Table 4 ensure that the discriminant validity is confirmed.

Table 4: The Discriminate Validity

Constructs	(1)WEB	(2)TRST	(3)RESP	(4)ACC	(5)OPSQ
1) Website Design	**0.707**				
2) Trust	0.546	**0.751**			
3) Responsiveness	0.241	0.334	**0.764**		
4) Accessibility	0.394	0.504	0.466	**0.760**	
5) Overall Perceived Service Quality	0.334	0.388	0.563	0.608	**0.752**

3.3.1.4. PREDICTIVE RELEVANCE OF THE MODEL

To gain the good assessing and predictive power of the proposed research model, R2 were used as well as the Cross-Validated redundancy. R2 is defined as a value that indicates the amount of variance in the endogenous variable that is explained by the exogenous variables. Table 5 showed that R2 value is 57.5 % of the overall perceived service quality and was explained by website design, trust, responsiveness, and accessibility dimensions. In this study, the results related to the quality of prediction of the model, as discussed in Table 5 revealed that the Cross Validated Communality related to overall perceived service quality (OPSQ) was 0.566. And the Cross Validated Redundancy value was 0.321. And the Cross Validated Communality value was 0.566. These values are more than zero indicating an adequate predictive validity of the model based on the criteria mentioned by Fornell and Cha (1994). These values are more than zero indicating an adequate predictive validity of the model based on the criteria mentioned by Fornell and Cha (1994).

Table 5: Prediction Relevance of the Model

Constructs	Variable Type	R Square	Cross-validated Redundancy	Cross-validated Communality
OPSQ	Endogenous	0.575	0.321	0.566

3.3.1.5. (GoF) GOODNESS OF FIT OF THE MODEL

Unlike CB-SEM, PLS-SEM has only one measure of goodness of fit which was defined to be the global fit measure by Tenenhaus et al. (2005). It is the geometric mean of the average variances extracted and the average R2 for the endogenous variables as given in the following formula:

$$GoF = \sqrt{(R^2 * AVE)}$$

Particularly, the GoF value of this model was found to be 0.657 which is considered large when compared to the baseline values suggested by Wetzels et al., (2009)[52] (small =0.1, medium =0.25, large =0.36). The results showed that the model goodness of fit measure based on the average variance explained is large which indicate an adequate level of global PLS model validity.

3.3.2. THE HYPOTHESIS TESTING

After establishing the measurement model, the next step was to test the hypotheses of the study by running PLS Bootstrapping in SmartPLS 2.0, the cases that were used for analysis in this study was 618.

Table 6: The Results of the Hypothesis Testing

No	Hypotheses	Path Coefficient	Standard Error (STERR)	T value	P value	Decision
1	WEB -> OPSQ	0.010	0.034	0.293	0.385	Not Supported
2	TRST -> OPSQ	0.003	0.033	0.100	0.460	Not Supported
3	RESP -> OPSQ	0.106***	0.041	2.573	0.005	Supported
4	ACC -> OPSQ	0.126***	0.046	2.724	0.003	Supported

As shown in Table 6 the website design (WEB) has a positive and does not have a significant effect on the overall perceived service quality (OPSQ) large of the 0.01 level of significance (β= 0.010, t= 0.293, p> 0.1). The results also show that trust (TRST) was has a positive and does not have significant effect on the overall perceived service quality (OPSQ) large of the 0.01 level of significance (β= 0.003, t= 0.100, p> 0.1). In addition, the results also show that responsiveness (RESP) has a positive and there are a significant effect on the overall perceived service quality (OPSQ) large of the 0.01 level of significance (β= 0.106, t= 2.573, p<0.01). Finally, the accessibility (ACC) has a positive and significant effect on the levels of the overall perceived service quality (OPSQ) at the 0.01 level of significance (β= 0.126, t= 2.724, p<0.01). Therefore, these results supported the hypotheses of the study H3, and H4 and the result does not support hypothesis H1, and H2 as reported in table 6 above.

4. DISCUSSION AND CONCLUSIONS

To examine the effect of m-commerce service quality dimensions (website design, responsiveness, and trust), and system quality dimension (accessibility) on overall perceived service quality in m-commerce by customers was the foremost purpose of the study. This research is important since it extends the SERVQUAL model which has many similarities with IS model being used to benchmark and compare several studies that have initially combined the two models. In addition, the importance of this study cannot be overrated as its benefits' cut across many stakeholders since it can be regarded as among the initial studies that delve into the factors that helps to capture the interest of customers towards using of mobile phone technology for the purpose of commercial transactions.

This research has brought to light many practical and theoretical issues of m-commerce service quality. Importantly, the research has discovered some possible and positive factors that make the pursuance of m-commerce service quality to be a worthy exercise. In this respect, therefore, this

research has therefore challenged the entire information system research to continue to investigate into those factors that can influence mobile commerce service quality by applying new applications that match background and preferences of users.

Future research could carry out similar studies with respect to OPSQ in developing countries because only a few attempts of such have been made. Additionally, a comparative study between developing and developed countries concerning OPSQ can be carried out. Moreover, this study used only questionnaire to collect data, other researchers can use qualitative method - in-depth interview – with a view of getting more suitable variables that could impact customers overall perceived m-commerce. This can be better achieved when the researcher builds a trusted relationship with them and speaks their language. The findings of this study might be of a great value to creating new knowledge, awareness and benefits that can be derived from using mobile transaction especially among customers and vendors. Creating such awareness will help to foster a better understanding and practices of m-commerce and would help in increasing the agility in power of purchasing of the customers and organizations business efficiency.

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