

The Power of Antecedent Factors of Service, System, and Information Quality and Their Effects on M-Commerce Consumer Perceiving Quality

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The main purpose of this research is to enhance new knowledge for a better understanding of the most powerful dimensions of the m-commerce quality that influences consumer perception, developing theories based on existing and previous literature on m-commerce quality for online shopping purposes. This research concentrates more on the three-dimensions of the e-service quality framework that better predict consumer behaviour on responding to SQ afforded by e-services. The outcome is assumed to increase awareness about the various country cultures in return for the diverse relevance of e-service quality characteristics. Data was collected after distribution of a survey to 386 staff and students at Jordan University (JU), customers were utilised to examine the study framework using SEM-PLS. The analysis outcomes revealed that two dimensions of information and system quality, namely content adequacy, and perceived website innovativeness respectively had a significant influence on customer perceived quality. Meanwhile, the dimension of service quality perceived risk has no significant effect related to customer perceived quality. Indeed, overall m-service quality is statistically associated significantly with customer behaviour. An additional investigation must take into consideration a diversity of product and service segments and/or other businesses to determine whether the measurement goes fairly well. In another business setting, the measurement may be required to be modified. Research in the future

might also utilise various methodologies, for instance, interviews, focus groups, and observations.

Key words: *CPQ, Content adequacy, Perceived website innovativeness, Perceived risk, Service quality, e-SERVQUAL, E-business, and M-commerce.*

JEL Classification: L15, L81, L84, L86, N7, Q55, O32, O33,

Introduction

With the accelerated growth of information technology (IT), wireless telecommunications technology has performed numerous enhancements. For instance, the coverage of the wireless networks reached to more than 70% of the city, rural, and mountain areas in Jordan, the signal is stabler, moreover, wireless network processing capabilities are more efficacious. Concurrently with decreasing mobile device costs and the development of mobile device functionality, the before-mentioned technological advancements afford a great foundation for the growth of mobile commerce (m-commerce). From a consumer's viewpoint, a portable device is not only a tool for talking to others but additionally might be a tool for doing business and accomplishing e-commerce. Based on that, today the mobile carriers' develop strategies to focus on how to shift from the conventional telecommunications service to m-commerce service, which can add value to the body of business. According to DeLone and McLean (2003), several researchers analysing customer behaviour in e-commerce have investigated the impacts of e-commerce service quality by using scales from the service quality literature, for instance, the SERVQUAL scale. SQ is evenly essential in the m-commerce environment, moreover, m-commerce providers have to assess their service quality if they are looking to evaluate their service quality and the fundamental drivers for service quality development (Ali, Bakar, & Omar, 2016; Ali, Omar, & Bakar, 2016). Based on that, it is very crucial to investigate service quality in the m-commerce field (Rita, Oliveira & Farisa, 2019). This study examined the effect of information and system quality via testing the influence of content adequacy and perceived website innovativeness consecutively, furthermore, studying the effect of service quality through perceived risk on consumer perceived service quality.

Problem Statement

According to the International Telecommunications Union (ITU, 2018), mobile subscriptions in the United States of America (USA) totalled 422 million, in the European Union (EU) 570 million, and in Africa 742 million, at the end of 2013. In another sense, the average mobile diffusion rate for the USA is 129.01 %, EU 130.04 %, and Africa 77.08 %. The MENA region also features some of the most penetrated mobile businesses around the world. By the

end of 2018, nearly half of the 25 countries in the region had unique subscriber penetration rates of 70% or more. In that context, the global percentage at the end of the same period was 66% (Gsm, 2019). Accordingly, the ordinary mobile penetration rate for the Middle East will exceed the 100% mark in 2020: by the end of 2018, it is expected to rise from 97.7% in 2019 to 107.09% in 2022 (ITU, 2018). In Jordan, mobile subscribers make up 87.62 % of the country's population of eight million. It can be affirmed that up to half the planet's inhabitants own mobiles. Specifically, in Jordan, mobile phones present a major significant role more even than the internet (Pewresearch, 2019). Importantly, the role of m-service providers not only affords the basic services that customers require, but also enable them to develop their service quality. Nonetheless, there is a scarcity of studies on measuring m-commerce quality, which is crucial to enable m-service providers to develop and determine their service quality. Hence, to measure it, the researcher needs to study and take into consideration the factors that influence m-commerce quality and the relationship between these factors. So, this study will fill the gap in the area of m-service quality.

Research Questions

In this study, we attempt to clarify the following questions:

1. Is there a relationship between content adequacy and CPQ?
2. Is there any relationship between perceived website innovativeness and CPQ?
3. Is there any relationship between perceived risk and CPQ?

Research Objectives

Consequently, this research will recognise the influence of (information, system, and service) quality dimension respectively on CPQ. Thus, we have formulated the subsequent objectives:

1. To distinguish any kind of relationship between content adequacy and CPQ.
2. To examine any kind of relationship between perceived website innovativeness and CPQ.
3. To measure any kind of relationship between perceived risk and CPQ.

Definition of Key Terms

The summary of key terms related to the research constructs in Table 1 is as follows:

Table 1: Key Terms Definitions

Constructs	The Meaning
<i>Content Adequacy</i>	“is the amount of the information completeness that helps the learner’s thought of the services and materials afforded by service providers” (Salameh & Hassan, 2015).
<i>Perceived Website Innovativeness</i>	“is the degree to which innovated, marketable products are new to the firm or market” (O’Cass & Carlson, 2012).
<i>Perceived Risk</i>	“one of the major barriers to online shopping and thus major e-business firms have taken steps to address risk concerns with security technologies, awareness campaigns, and assurance policy statements” (Udo, Bagchi & Kirs, 2010).
<i>Consumer Perceived Quality</i>	“The overall customer perceptions, judgments and evaluations of the quality of service obtained from a virtual marketplace” (Udo, Bagchi & Kirs, 2010)

Literature Review

The Features of M-Commerce Services

According to Siau *et al.*, (2001) and Tiwari, Buse and Herstatt (2008), there are various specific features of m-commerce including WAP. These features are unavailable in traditional e-commerce. These are as follows:

- a) Ubiquity: this feature explains how mobile technology enables the user to access information from virtually anywhere. The presence of the user within the cellular network area is the assumption that the technology works with.
- b) Personalisation: in m-commerce, the information is particularly customised in alignment with the mobile users’ needs because the capacity of the mobile hardware and software’s memory is very limited.
- c) Flexibility: m-commerce offers flexibility to its users. The mobile users enjoy the flexibility to conduct transactions and send and receive messages even while the user is involved in the engagement of other activities. Travelling or working is a good example of this instance.
- d) Dissemination: the local retailers, from whom the information originates, can use the wireless networks of m-commerce in the delivery of various promotional offers to the WAP users that are available within their cellular broadcast area.
- e) Immediacy: the possibility of real-time availing service is closely related to ubiquity. This remains an attractive feature for services of time-critical term that demand fast reactions. A good example of this is stock market information.
- f) Localisation: technologies use in location positioning, like the Global Positioning System (GPS), giving the companies the offer of goods and services to their user in specificity to

his/her present location. Therefore, GPS thus caters for the needs of the consumers and their localised content and services of interest.

- g) Instant connectivity: the advent of the General Packet Radio Service (GPRS) has been the technological support that allows mobile devices their connectivity to the internet. GPRS joins mobile phones to the network, allowing users to dial-up conveniently, and makes boot processes unnecessary.
- h) Pro-active functionality: the ability of m-commerce allows it to be open, immediate, local and personal, creating new opportunities for business. Users have the opportunity of choosing the products and services that they are previously aware of. The Short Message Service (SMS) is for sending text messages to customers, with the assurance that the relevant information is promptly given to the user at the right place and time.
- i) Simple authentication procedure: the functionality of mobile devices is aided by an electronic chip component, known as Subscriber Identity Module (SIM). The network operator registers the SIM, and makes the owner unambiguously identifiable. The user uses the SIM with an individual Personal Identification Number (PIN).

Despite the great features offered by m-commerce, few studies have focused on service quality in m-commerce, Thus, it is evident by reading previous literature on m-commerce, that there is more need to focus on that field of study and how to measure the factors affecting customer perception of the service quality offered by m-commerce.

The Implication of M-Commerce Services Literature Analysis on Research

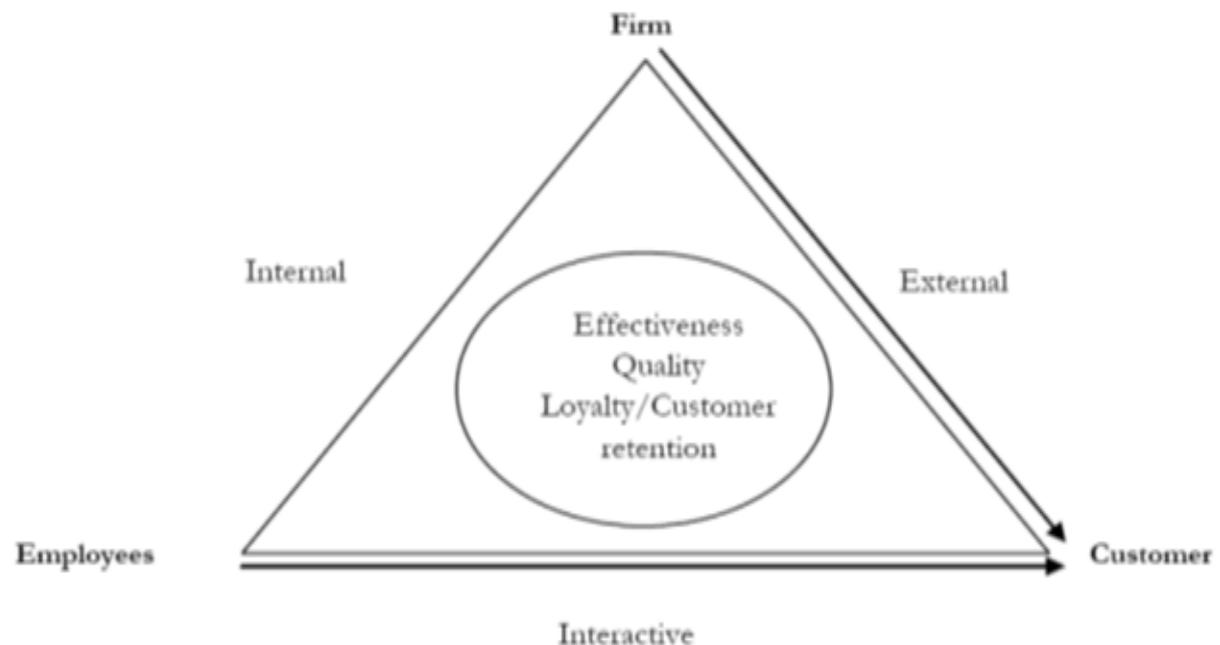
From the literature, there is evidence that e-commerce depends a lot on the availability of a wired network connection to the internet and there is still a limitation to this service among customers and corporate professionals who are constantly on the move. However, there is also strong evidence that m-commerce can overcome such a limitation by offering potential benefits in the field of business. These benefits include the ease of accessibility and availability of the m-commerce service from anywhere and at any time. The outcome of the literature review has encouraged the researcher to think of practical implications of the m-commerce service, since the new millennium has witnessed a remarkable move from wired to wireless services (Lu, Zhang & Wang, 2009). The following section addresses the trends of m-commerce services in many sectors.

The Service Perspective

Examining forms, the traditional marketing gains the attraction of the customers (Gronroos, 2007). With regard to the present-day market in respect to the idea of service perspective, a firm cannot solely rely on its physical product if it aims to achieve effectiveness (Gronroos, 2007). Notably, customers only consume services provided to them by the product, and not

physical products. The core product must be integrated with support services to form a combined service offering; capable of competing with the competitors' offerings. This relates to customer management with a considerable stress on customer retention. This act forms the traditional marketing that gains the attraction of the customers (Gronroos, 2007). The marketing activities that are involved in their respective capacities are illustrated in Figure 1.

Figure 1. *The Service Marketing Triangle*



Source: Adapted from Gronroos (2007).

By focusing on the customer, two marketing approaches are involved. Firstly is the external marketing. This type of marketing exists between the firm and the customer, with involvement of activities that characterise traditional marketing. Examples are: advertising and promotional campaigns using various channels (Gronroos, 2007). This is part of the process to attract customer offerings (Kotler & Keller, 2006). Gronroos (2007 p.61) explained this as: 'making promises'. Interactive marketing happens between the front-line employees and the customer, thus affecting the experiences of the customers. Consequently, the customer relationship is built with the aim of ensuring the business and customer loyalty/retention return (Gronroos, 2007).

Development of Theoretical Model

To learn and build the m-commerce SQ, from theoretical sides, it will be built by sub-dimensions and dimensions, taking into consideration that mobile services might be deemed a sub-group of electronic services. The sub-dimensions of three main dimensions

(information, system, and service) that will be chosen by this research are content adequacy, perceived risk, and perceived website invasiveness, respectively. The selection of these sub-dimensions is because they seem to have affected the consumer's overall attitude about m-commerce SQ, which affects the formation of his/her attitude towards those services in the future; thus, the overall SQ will be prepared by three main dimensions of service quality; service quality, information quality and system quality, sequentially, as illustrated next.

- a) Service quality - consumers' perspective developed by overall evaluation and long-term performance of an m-commerce system. The SQ dimension is measured by using one sub-dimension: perceived risk.
- b) Information quality - consumers' judgment of assessing the quality of the information displayed on mobile (sites or even applications). The IQ dimension is measured by one sub-dimension: content adequacy.
- c) System quality - this refers to consumers' attitudes towards the performance of a mobile; whether sites or applications in information delivery and retrieval. The main dimension of SQ will be measured by one sub-dimension, perceived website innovativeness.

Service Quality Dimension

Perceived Risk

Perceived risk, from the e-consumers point of view, is one of the major obstacles to online purchasing, hence the main m-commerce firms have attempted to address the related risk with assurance policy statements, security technologies and awareness campaigns (Chang et al., 2005; Liao & Cheung, 2002; Lopez-Nicolas & Molina- Castillo, 2008; Shih, 2004). Perceived risk is often further defined by terms such as (psychological, privacy, personal, technological, and economic) risk (Liebermann & Stashevsky, 2002; Ring & Ven, 1994; Zhang & Prybutok, 2005). The failure of the system is part of perceived risk and is often connected with a loss.

Much previous research has been conducted to determine the effect of online shopping. Examining various factors, some studies determined significant negative influences while other studies found no impact at all. The findings from previous empirical studies showed that organisations can increase their overall performance by quality service (Ali, Bakar, & Omar, 2016; Ali, Omar, & Bakar, 2016) whereas, Udo, Bagchi, and Kirs (2010) found no significant relationship between perceived risk, and web service quality (WSQ), Nonetheless, additional research is required to investigate the effect of perceived risk on how e-consumers perceive web SQ (Udo, Bagchi & Kirs, 2010).

Information Quality Dimension

Content Adequacy

Scientists in the field of traditional computing environments have built some known models to assess IQ, as this research determines the level of IS success. Delone and McLean (1992) found criteria to measure the success of IS by two main dimensions, IQ and SQ. Delone and McLean (1992) shed light on the importance of the accuracy of information.

Some researchers also highlighted three determinants of consumer satisfaction: content, accuracy, and timeliness (Doll & Torkzadeh 1988; Doll, Xia & Torkzadeh 1994). The dimensions implied in the previous two studies and others, for instance, (Aladwani & Palvia 2002; Belcher et al., 2000; Bitner et al., 2000; Koller 2001; Shemwell & Yavas 1999; Loiacono et al., 2002; Udo, Bagchi & Kirs, 2010; Kaisara and Pather, 2011) found that information quality dimensions could be classified into content usefulness and content adequacy. The findings from previous empirical studies showed that organisations can increase their overall performance by information quality (Ali, Bakar, & Omar, 2016; Ali, Omar, & Bakar, 2016).

Content adequacy refers to the amount of complete information in sites. Mobile sites have to provide sufficient information to help consumers understand the services and products offered. Furthermore, consumers are in the market for additional services such as university information, hyperlinks to related sites, expert advice, research reports, promotion information, and contacts.

System Quality Dimension

Perceived Website Innovativeness

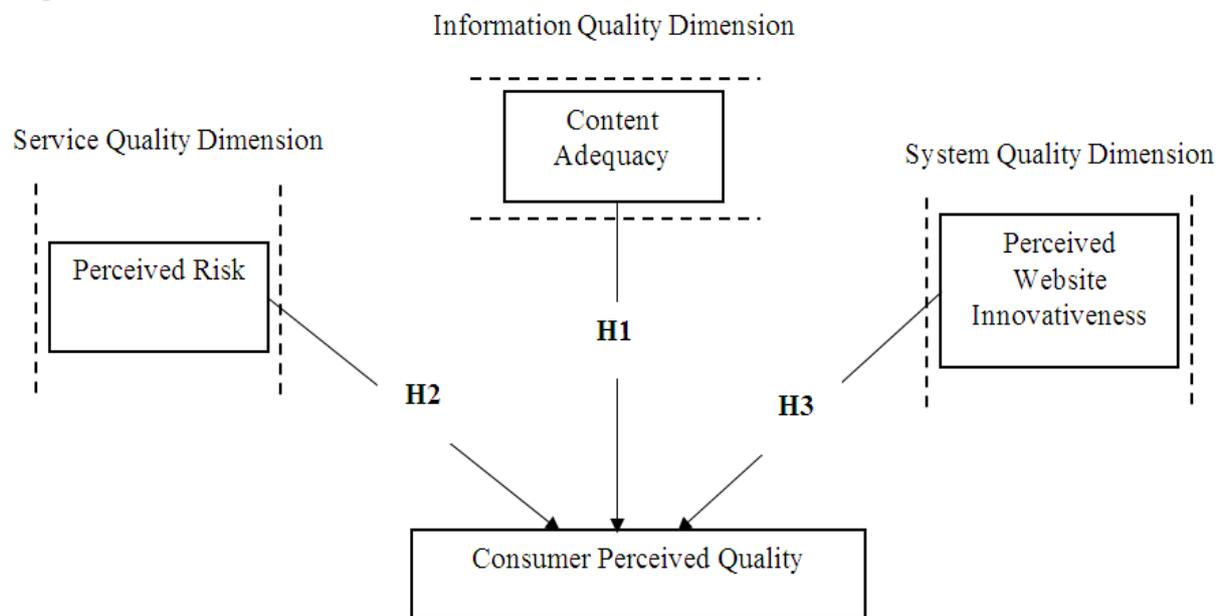
The definition of system quality indicates the consumers' attitudes towards the performances offered by mobiles (sites and application) in information delivery and retrieval. Various instruments have been formulated as a result of IS to measure system quality. Amongst them, perceived website innovativeness has been considered as the most commonly used factor in measuring the success of IS. In the context of mobile portals, researchers have classified system quality factors, for instance, perceived website innovativeness, (Lin and Hsieh, 2011; O'Cass & Carlson, 2012). In this research, the researchers studied the above dimension and developed a research model that classifies the dimension into perceived website innovativeness attributes.

The dimension used for measuring system quality is perceived website innovativeness. Earlier offline branding research has revealed that, based upon their perception of brands, customers react to the service or product via responses, for instance, may approach/or avoid buying it, identifying they like/dislike it, or they finding it useful/or even useless (Bloch, 1995; Mono, 1997). According to Brodie, Whittome and Brush (2009), brand relationships rising from customers' perceptions of the consumption practices are observed to affect cognitive evaluations of SQ.

SQ is defined as referring to a global understanding correlating to the supremacy of service, where customers measure attributes or characteristics (Parasuraman, Zeithaml & Berry, 1985). Understanding SQ, as perceived by consumers, is not merely a crucial performance outcome of the service experience but also its role as an important factor in affecting customer satisfaction and loyalty as determinants of firm performance (Cronin, Brady & Hult, 2000). The findings from previous empirical studies showed that organisations can increase their overall performance by system quality (Ali, Bakar, & Omar, 2016; Ali, Omar, & Bakar, 2016). From this point of view, the researchers clarify that once a consumer makes an assessment to the service offered by the website provider that is perceived to be innovative; the customer will then be more likely to assess the website to have achieved a quality e-service.

Figure 2 represents the research model for m-service quality in the context of online purchasing. The researchers adapted the framework drawn below from extensive reviews of previous research, for instance, content adequacy adapted from (Udo, Bagchi & Kirs, 2010; Kaisara and Pather, 2011), moreover, perceived website innovativeness adapted from (O'Cass & Carlson, 2012), and the last dimension perceived risk was adapted from (Udo, Bagchi & Kirs, 2010).

Figure 2. *Research Model*



Methodology

Sample Procedure

The researchers obtained Jordanian consumer evaluations of m-commerce to collect the necessary data to examine the previous theoretical model (H1 to H3). The questionnaire was distributed by hand to Jordanian University (JU) students. The researcher randomly selected the students who participated. The selected respondents were given the questionnaires face to face and the researchers gave each respondent 20 minutes to finish answering and then collected them back from each one. A survey instrument administration met two objectives; first, assisting respondents in any difficulty regarding the questions given to them ensured that the survey instrument was easy to complete and return without increasing the burden on respondents; second, then the data collected might be simply conveyed to SEM-PLS software that was used for analysis purposes without needing to add more data entry (O’Cass & Carlson, 2012). From that survey, 386 responses from customers were collected through a variety of m-commerce knowledge and experiences.

Analysis of Data and Finding Results

For improving the reliability, in this research, SEM-PLS 3.0 was utilised. Partial least square was employed to examine the hypotheses of this research as well.

Measuring Model

To increase the strength of the instrument the measurement items were:

- 1) Construct validity.
- 2) Content validity was completed, as we mentioned as follows:

The Validity of Content

In this research, construct validity means that all the construct measures utilised must reveal a big level of loadings in their respective constructs. Preceding research described the multivariate analysis like that, where the measuring constructs must have a large load compared to the other constructs in the same column and row. Consequently, factor loading has to be utilised to assess content validity (Hair, Black, Babin & Anderson, 2010; Chin, 1998). As we observed in the following tables (2, 3) all factors were loaded positively on their respective constructs, which has proved the needed content validity in the measuring model.

Table 2: *Cross Loadings of the Items*

Constructs	Items	COA	PWI	PRK	CPQ
Content Adequacy	COA1	0.762	0.280	0.249	0.322
	COA2	0.725	0.504	0.212	0.467
	COA3	0.766	0.206	0.349	0.459
	COA4	0.842	0.394	0.160	0.458
	COA5	0.764	0.490	0.225	0.563
Perceived Website Innovativeness	PWI1	0.372	0.732	0.242	0.401
	PWI2	0.450	0.823	0.208	0.531
	PWI3	0.239	0.839	0.129	0.275
Perceived Risk	PRK1	0.225	0.166	0.840	0.085
	PRK 2	0.131	0.180	0.843	0.134
	PRK 3	0.204	0.122	0.822	0.169
	PRK 4	0.054	0.140	0.885	0.026
Consumer Perceived Quality	CPQ1	0.445	0.473	0.253	0.860
	CPQ 2	0.528	0.526	0.148	0.766
	CPQ 3	0.562	0.330	0.065	0.832
	CPQ 4	0.335	0.320	0.184	0.732

Table 3: *Significance Level of Factor Loadings*

Constructs	Items	Loadings	Standard Error (STERR)	T Value	P Value
Content Adequacy	COA1	0.881	0.032	35.700	0.000
	COA2	0.833	0.025	52.110	0.000
	COA3	0.755	0.015	44.280	0.000
	COA4	0.830	0.027	50.578	0.000
	COA5	0.722	0.040	22.115	0.000
Perceived Website Innovativeness	PWI1	0.840	0.013	51.758	0.000
	PWI2	0.889	0.025	50.326	0.000
	PWI3	0.820	0.019	62.562	0.000
Perceived Risk	PRK1	0.840	0.139	6.186	0.000
	PRK 2	0.866	0.130	6.326	0.000
	PRK 3	0.843	0.209	4.048	0.000
	PRK 4	0.823	0.132	6.553	0.000
Consumer Perceived Quality	CPQ1	0.750	0.024	31.837	0.000
	CPQ 2	0.780	0.029	34.716	0.000
	CPQ 3	0.842	0.012	55.409	0.000
	CPQ 4	0.639	0.038	17.337	0.000

Convergent Validity of Theoretical Constructs

Previous practitioners defined convergent validity as a high indication of the extent to which a group of items meets in measuring a particular construct (Bagozzi & Yi, 1988; Hair et al., 2010). Composite reliability must exceed the cut off value which is $CR > 0.7$ as we mention the values in Table 4 as follows, in this research the least value of CR for all variables exceeds 0.837 which means that CR for that study is applicable. Furthermore, Fornell and Larcker (1981) and Hair et al., (2010) found the average variance extracted (AVE) value must be more than 0.5, the value of AVE ranged among 0.566 to 0.738 which means a great level of construct validity correlated to the adopted measures (Barclay, Higgins & Thompson, 1995).

Table 4: *The Analysis of Convergent Validity*

Constructs	Items	Loading	Cronbachs Alpha	Composite Reliability (CR) ^a	AVE ^b
Content Adequacy	COA1	0.881	0.828	0.882	0.633
	COA2	0.833			
	COA3	0.755			
	COA4	0.830			
	COA5	0.722			
Perceived Website Innovativeness	PWI1	0.840	0.830	0.827	0.744
	PWI2	0.889			
	PWI3	0.820			
Perceived Risk	PRK1	0.840	0.840	0.912	0.676
	PRK 2	0.866			
	PRK 3	0.843			
	PRK 4	0.823			
Consumer Perceived Quality	CPQ1	0.750	0.748	0.847	0.556
	CPQ 2	0.780			
	CPQ 3	0.842			
	CPQ 4	0.639			

Hypotheses Testing

In this research, a measurement model was developed, and the bootstrapping technique was used in SEM-PLS 3.0 to test hypotheses. In addition to that, 386 completed questionnaires were utilised for analysis purposes.

Table 5: *Hypotheses Testing Results*

No.	Hypotheses	Path Coefficient	Standard Error (STERR)	T value	P value	Decision
1	COA -> CPQ	0.173***	0.062	3.699	0.005	Supported
2	PWI -> CPQ	0.132***	0.048	3.459	0.001	Supported
3	PRK -> CPQ	-0.046	0.061	1.165	0.178	Not Supported

Conclusion and Implications

The increasing importance and influence of technology-enabled service practices in the economy nowadays have produced a significant interest from academia, government, and industry all over the world. The main contribution of this research is to provide m-commerce practitioners and researchers with unique insights to consider an essential construction of perceived website-service innovativeness (and its influences) when formulating customer reactions and relationships in an m-commerce context. All of these matters are of strategic significance, given that an underlying characteristic of most thriving service companies is a continuous focus on the consumer, where most strategies take into consideration service improvement, quality, and innovation, and their effect on the perspective of consumer's (O'Cass & Carlson, 2012). Based on the previous discussions, this research is different in that it examines a set of beforehand untested relationships in the context of m-commerce. And therefore, this study provides a growing understanding of m-commerce using experiences that can be utilised as a base to achieve better m-service brand-building strategies and even stronger designs.

Many research implications might be obtained from this study. The findings of this research show that the SERVQUAL model might be used to enhance the results of e-services quality in some countries, especially Jordan and others. We have to take into account the limitation of the research results. For example, the implementation of perceived website innovativeness structure in the SERVQUAL model is pretty clear from the results of the research, which consequently recommends the necessity to investigate other potential constructs that might give more strength in explaining online behaviour in developing countries. Secondly, the expanded SERVQUAL model applied in this research might also be utilised in another online behaviour instance as m-government or even m-learning.

Current research highlights the importance of three dimensions of (information, system, service) quality respectively in determining the CPQ setting. It is extremely important to know that perceived website innovativeness has a substantial influence on consumers towards CPQ. Finally, from this point of view, hence, m-commerce providers might utilise the results of this research to enhance the relationship with their consumers by making information up to date and more attractive, which helps the consumers to make better decisions during the buying process.

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Appendix
Measurement Items

1.0 This section is aimed at understanding the <u>Content Adequacy</u> of mobile commerce (m-commerce) service.					
1. The m-commerce provides complete content.	1	2	3	4	5
2. The m-commerce provides sufficient content.	1	2	3	4	5
3. The m-commerce provides comprehensive content compared to other systems.	1	2	3	4	5
4. The m-commerce provides complete service description.	1	2	3	4	5
5. The m-commerce provides detailed contact information.	1	2	3	4	5

2.0 This section is aimed at understanding the <u>Perceived Website Innovativeness</u> of mobile commerce (m-commerce) service.					
1. The m-commerce offers unique features for customers that are different from existing m-commerce.	1	2	3	4	5
2. The m-commerce is highly innovative.	1	2	3	4	5
3. The m-commerce has innovative features.	1	2	3	4	5

3.0 This section is aimed at understanding the <u>Perceived Risk</u> of mobile commerce (m-commerce) service.					
1. I worry about credit card information being stolen	1	2	3	4	5
2. I worry about the product quality on the Internet	1	2	3	4	5
3. I worry about safe transaction online	1	2	3	4	5
4. I worry about how my personal information might be used when I buy online	1	2	3	4	5

4.0 This section is aimed at understanding the <u>Consumer Perceived Quality</u> of mobile commerce (m-commerce) service.					
1. Overall, the services provided by m-commerce have excellent quality.	1	2	3	4	5
2. The service quality provided by m-commerce matches my expectations.	1	2	3	4	5
3. The m-commerce delivers superior service in every way.	1	2	3	4	5
4. The m-commerce offers a very competitive service.	1	2	3	4	5