Evaluating M-Commerce Systems Success: Measurement and Validation of the DeLone and McLean Model of IS Success in Arabic Society (GCC Case Study)

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Abstract

This study focused on testing and verifying the 2003 DeLone and McLean Model (otherwise known as the Information System Success [ISS] Model), which represents the achievement of success in electronic systems, including smartphone commercial applications. Previous studies indicated that the DeLone and McLean Model has not been validated experimentally in the context of m-commerce, as there exist some differences between m-commerce and e-commerce. Moreover, the ISS model, for the m-commerce field, has been highly debated in terms of constructs such as perceived usefulness and IS use. These constructs create discrepancies in the acceptance of the ISS Model for the m-commerce field, especially in communities that have different technological requirements than other global communities. Previous studies focusing on the relationship between culture and electronic systems indicated that there are differences in the communities' requirements that will directly affect the success of those electronic systems in Arabic communities. According to previous studies, there are verification shortages in the ISS model used to evaluate the success of m-commerce systems. The ISS model consists of six dimensions, which are system quality, information quality, service quality, user satisfaction, intention to use, and net benefit. The structural equation modelling technique was applied to the data for this model, which was collected by questionnaire. Responses were gathered from 803 actual users of online purchasing systems from three Arabic Gulf countries (171 from Qatar, 246 from the United Arab Emirates [UAE], and 386 from Saudi Arabia [KSA]). According to empirical evidence on the intention to use construct, which in turn is affected significantly by system quality and information quality constructs, reusing m-commerce applications is associated with quality of systems and information requirements in commercial applications. The results of this study on Arabic society will be beneficial for many future studies, such as ones determining the target characteristics of Arabic technology users and, especially, what features can be added to increase the level of satisfaction with m-commerce applications. This paper contributes several important implications to the field and discusses the additions and limitations that should be addressed in future studies.

Keywords

GCC, m-commerce, commercial application, Information System Success Model, DeLone & Mclean Model

1. Introduction

Online purchasing through smartphone applications represents one of the basic stages of keeping abreast of present-era developments in electronic systems. The spread of online purchasing, smartphone devices, and commercial applications has played a fundamental role in the spread of mobile commerce (m-commerce) (Niranjanamurthy & Kavyashree, 2013). Different types of electronic commerce (e-commerce) exist based on their unique structures and requirements, so all of these types should be studied as separate units, and their individual requirements should be examined closely to assist in crystallising these requirements in an integrated system (Wang, 2008). The culture of a community is one of the basic factors in the acceptance of electronic systems, so it is important to take this into account when trying to get communities to accept commercial applications (Al-Gahtani et al., 2007).

This study focuses on testing and validating the DeLone and McLean model of m-commerce, known as the DeLone and McLean Information Systems Success (ISS) Model. One of the main concerns of this model is verifying the possibility of the success of electronic systems in the smartphone commercial application field, which further represents the achievement of success in e-commerce systems (Petter et al., 2013). Previous studies indicate that the DeLone and McLean model has not been validated experimentally in the m-commerce context because some differences exist between m-commerce and e-commerce, especially in communities that show differences in the requirements for accepting e-commerce and m-commerce systems (Wang et al., 2011). Furthermore, the studies indicate the incompetence-related aspects of validation that have appeared in the m-commerce field to deal with a multi-dimensional model of success for evaluating the success of m-commerce systems (Petter et al., 2013). This study focuses on the validation of the model of success of m-commerce through several indicators that are tested and verified in this study.

The DeLone and McLean ISS Model consists of six dimensions: Systems Quality, Information Quality, Service Quality, User Satisfaction, Intention to Use and Net Benefits (DeLone & McLean, 2003). The process of the validation of this model includes using many statistical tests and techniques of structural equation modelling to check the possibility of using this model in Arabic societies, which have many different requirements for accepting electronic systems compared to other societies (Würtz, 2005). There are a variety of reasons for the unique requirements of Arabic societies, with the most important one being their cultural heritage and religious aspects. In addition, these communities want to use automated electronic systems but lack the experience needed to successfully complete operations associated with m-commerce systems (AlGhamdi et al., 2015; Bahaddad et al., 2015). Since online purchasing via smartphones in Arab societies continues to grow in popularity in the current decade, the importance of this study is great, particularly in Arabic Gulf Cooperation Council (GCC) countries (eMarketer, 2015), in which the ISS model will be validated and used in specific communities.

A questionnaire was used as a research method tool in this study, and three countries of the GCC were selected. Formal statistical reports indicate an increase of using m-commerce through smartphones in these countries, with more than 70% of the total population using m-commerce (eMarketer, 2015). Thus, re-testing the ISS model according to the visions of specific communities represents a new experimental study in the aspects of verifying m-commerce systems. This study focused on testing and validating the DeLone and McLean model, and the study samples were analysed through several statistical tests. This paper includes a discussion of the indicators of acceptance levels in this study and many of the positive effects that appeared. It concludes with the contributions of the research and presents the constraints that can be addressed for future studies.

2. Literature Review

The ISS Model or IS Success model is one of the most prominent in the Information Systems (IS) field for measuring electronic framework performance and defining the basic criteria that will be helpful in achieving this task (Petter et al., 2008). In this study, one of the most important research questions is determining consumers' requirements for accepting a commercial smart phone application that is influenced by Arabic culture and purchasing by using ISS model. There are some significant information about the ISS model should be presented in from previous study such as ISS model definition, and the aspects that are tested through this framework. Also, it identifies indicators that are evaluated and measured by the ISS model. Because the ISS model would be an appropriate framework to measure or predict relative success, it is used to test and validate the ISS model for commercial smart phone applications to be more accurate and users in the GCC.

2.1 ISS Model Definition and Overview

Many empirical studies have been undertaken (DeLone & McLean, 1992; Pitt et al., 1995; Seddon, 1997) to develop and improve the ISS model and provide a logical chain of developments to get to the current version of the ISS model. This study working to develop and improve as appeared the improvement in ISS Model between 1992 and 2003. The following sections cover the DeLone and McLean models between 1992 and 2003 as well as other models which were during this period.

2.1.1 The DeLone & McLean (1992) Model

The ISS Model was designed by DeLone and McLean in 1992. The authors reviewed various measurements of success models published between 1981 and 1987, and determined their interrelationships. They identified six fundamental determinants: System Quality, Information Quality, Is Use, User Satisfaction, Individual Impact and Organisational Impact (See Figure 1). This Figure represents the first version of the ISS Model. It focuses on two important aspects for understanding and dealing with success. First, it provides a schema for classifying the multitude of ISS measures that have been mentioned in the literature. Second, it proposes a model of temporal and causal interdependence among the categories (Seddon, 1997; Wang, 2008).

The early attempts to describe the success of information systems have been problematic because of the complex nature of the relationships among the variables, which are interconnected and multidimensional at this stage. To address this issue, DeLone and McLean (1992) designed a model that was compatible with the requirements and challenges of the period. The six dimensions are not independent measures of success but interrelated variables and should be tested extensively for verification in the various fields of science (DeLone & McLean, 1992).
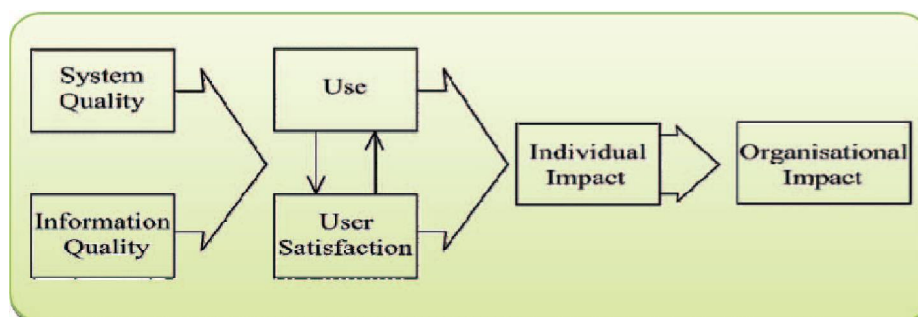

Figure 1. DeLone and McLean's ISS Model—Version 1

Source: DeLone and McLean, 1992.

Many researchers have reviewed the model and have made recommendations that have been considered in developing and modifying ISS. One proposal concerns service quality, which has become one of the dimension tools in marketing literature over the past decade. An example is the SERVQUAL service quality standard, which is used to measure the quality of service of Information Technology (IT) (Long & McMellon, 2004). Additionally, many researchers have proposed modifications to revise or expand the scope of the model. Some researchers' modifications have aimed to evaluate the success of a specific framework such as Knowledge Management (Jennex & Olfman, 2002; Kulkarni et al., 2007) or E-business (DeLone & McLean, 2004; Molla & Licker, 2001; Zhu & Kraemer, 2005). Furthermore, in the amendments presented by Seddon (1997), he mentions that the ISS Model is confusing and vague. Thus, he suggests further clarification of the model, even though the changes introduced are complex and would lead to reducing its impact (Ballantine et al., 1996). Therefore, further reviewing and developing of the DeLone and McLean model in this research can be made to ensure the building of a modernized model with the majority of previous suggestions for its improvement taken into account in order for it to be more applicable and accurate in corresponding to the developments and requirements of the modern era in M-commerce systems.

A review of previous studies reveals that two main aspects of IS make the greatest contribution to our understanding of what makes a successful IS model. First, a successful model provides a classification system for many indicators which have been addressed in previous studies. Secondly, the model proposes temporal and causal interdependencies between the categories (Seddon, 1997; McGill et al., 2003; Rai et al., 2002; Wang, 2008).

2.1.2 The Seddon (1997) Model

The ISS model that was revised by Seddon (1997) focused on process and causality in the DeLone & McLean—1992 model, and provided the potential for confusion and reduction in its evaluation of the model. Thus, it would be helpful to identify three different variations on DeLone and McLean's model, reflecting on each interpretation of the meaning of using an information system, as follows:

1) The process of the ISS model is to describe the sequence of events relating to the company Information system.

2) The Consumers behaviours that should be protected as a result of ISS Model adopting.

3) The Seddon Model, based on DeLone & McLean's model, is potentially significant in three different ways:

A) Influence in the process leading to individual and organisational impact. As individual influence is linked to user satisfaction about a system, that would be reflected in the organizational impact in the model of success, since both individual and organizational influence starting from using the Information Electronic System such as e-commerce and M-commerce.

B) Dependent variables which are individual and organisational impact serve as the contrast in the model for the future of IS Use. The Use IS construct is used to describe user behaviour; it is not for measure of success. The main purpose of the DeLone & McLean's model is to correlate the measurement constructs for success, and therefore; this means it does not represent correctly the IS Use in DeLone & McLean's model. This leads to considering using the IS Use construct for describing user behaviour, which has no place in the DeLone & McLean's model.
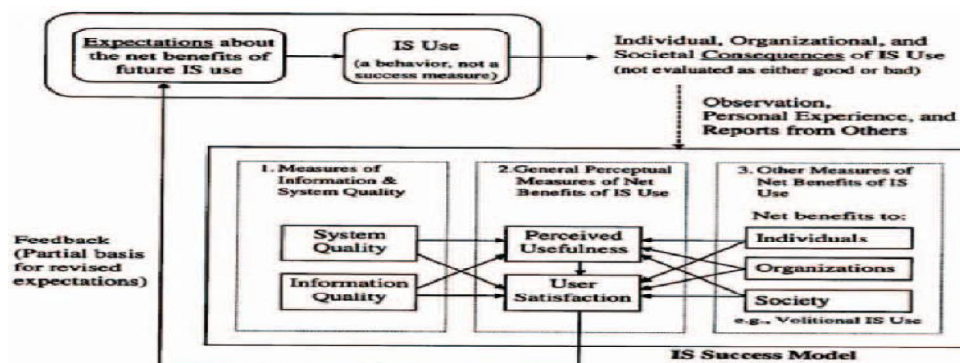
Figure 2. Seddon Model (1997)

Source: Seddon, 1997.

C) The IS Use variables work as proxies for the benefit of use (Seddon, 1997). This mean when the electronic systems were failures, the failure not because contain the potential for useable, but because these systems did not present the required benefits that to be used for optimal use such as helping the users to do more or better work in the same time. In some previous studies, researchers considered the relation between benefits and IS Use are often positive relationship, because the time that is spent on the system equivalent to and the benefits that are provided.

Accordingly, the DeLone and McLeanISS model—1992 and the Seddon Model—1997 are proposed some suggestions that collectively focus on variations in relationships between categorised groups (Seddon, 1997; DeLone & McLean, 1992). These models propose to highlight the consumers' behaviours that manifest as successful results of the ISS model. The Seddon model includes three features of success (see Figure 2):

1) Replacing "**Use**" Construct in the DeLone and McLean—1992 model with "**usefulness**", and keeping the Quality Information and Quality System constructs that were part of the original DeLone and McLean model—1992.

2) The general sensory measurements of net benefits when using of electronic systems, which are employed to adds the system importance as new variable in the DeLone and McLean—1992 model. The variable is added to help and explain the differences between the users' perceptions of the net benefit from one side and the user satisfaction on the other side of the interaction.

3) Causality, which was conceived in a two-way fashion in DeLone and McLean—1992 model, has been replaced with a one-way conception. The Seddon model of the relationship between usefulness and user satisfaction as a causal relationship has enabled users to assert that usefulness causes user satisfaction, but that the reverse is not true (Seddon, 1997; Wu & Wang, 2005).

The Seddon Model—1997 shows that IS Use is a behaviour rather than a measure of success, and therefore it incorporated the term "usefulness", which is like the "Perceptual" scale that is used to measure many IS benefits. For application of the ISS model in the context of both its elective and compulsory aspects, Rai and others (2002) noted that the DeLone & McLean—1992 and Seddon—1997 models demonstrated experimental and theoretical success in pre-elective contexts in IS Use. Also, these models could be used more effectively in many contexts to design models with logical proportionality between the models' proposals and data collected for this purpose (Rai et al., 2002; Seddon, 1997).

2.1.3 The Updated DeLone & McLean (2003) Model

In 2003, an update of the ISS model that DeLone & McLean developed appeared (see Figure 3). The update focused on adopting the changes that emerged later in information systems, such as the enormous development of the e-commerce field (Ho et al., 2009; Marti & Charles, 2013; Petter et al., 2008). The updated model focuses on a combination of successful measurements and evaluates consumer behavior requirements in one model. Therefore, some constructs were added to achieve this goal in the DeLone and McLean—1992, Seddon and Pitt models, which makes the models more complex but eliminates the shortages of the previous models (DeLone & McLean, 1992; DeLone & McLean, 2003; Pitt et al., 1995; Seddon, 1997). The second DeLone and McLean model was proposed to add a service-quality construct, and it was suggested to combine the individual- and organisational-impact constructs to form a net-benefit construct (DeLone & McLean, 2003; Wang, 2008).
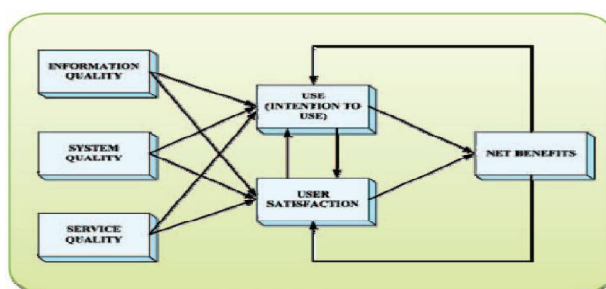

Figure 3. DeLone & McLean's ISS Model—Version 2
Source: Petter, DeLone and McLean, 2004.

In addition, it was proposed to add a new construct—intention to use—as an alternative for the IS-use construct; it focuses on the measurement of the success of m-commerce systems by measuring the periodic rate of using this systems (DeLone & McLean, 2003; Petter et al., 2008; Rai et al., 2002; Wang et al., 2006). The new constructs in the ISS model have been tested in a number of experimental studies (Petter et al., 2008; Petter et al., 2013; Rai et al., 2002).

Due to the existence of relationships among the updated constructs in the ISS model, it is necessary to study these interrelationships in the m-commerce field, which includes the relationships among consumers and sellers, decision-support systems in online purchasing and implementing m-commerce transactions (DeLone & McLean, 2003; DeLone & McLean, 2004; Petter et al., 2008). Testing these relationships helps with re-testing the hypotheses of the theoretical model in many diverse fields, such as m-commerce via smartphone commercial applications, which will help with measuring the target audience's acceptance level with regard to online purchasing in smartphone commercial applications. The DeLone and McLean model consists of six constructs that can be defined as follows:

1) Quality Systems (QS) focuses on the indicators that should be included in m-commerce applications according to the fundamental requirements of electronic systems. These requirements include, for example, ease of use, system flexibility, system reliability and the possibility of learning. These requirements can be evaluated based on m-commerce applications (Gable et al., 2008; Petter et al., 2008). This construct can be measured by the following indicators:

▪   The M-commerce application system is easy to use.

▪   The M-commerce application system is able to adapt to customer requirements, such as usability, availability and response time.

2) Quality Information (IQ) focuses on the output quality of the information that is important to include in commercial smartphone applications, such as reports and information presented, as well as

the accuracy and shortening of this information. This information helps to increase user confidence with dealing with commercial electronic systems. Thus, it can be helpful to reuse it in the future regularly (Gable et al., 2008; Petter et al., 2008). This construct can be measured by the following indicators:

- The M-commerce application system provides the precise information needed by the consumer.
- The information content meets your needs.
- The output is reliable.
- The M-commerce application system provides up-to-date information.
- The M-commerce application system provides understandable information.

3) Service Quality (SQ) includes features related to technical support for smartphone application users, such as timely response, reliability, accuracy and technical competence (Gable et al., 2008; Petter et al., 2008; Pitt et al., 1995). This construct can be measured by the following indicators:

- When you have a problem, the M-commerce application system has the appropriate facilities and shows a sincere interest in solving it.
- The M-commerce application system is always willing to help you.
- You should feel safe in your transactions with the M-commerce application system in terms of security and privacy protection.
- The M-commerce application system has the knowledge to answer your questions.
- The M-commerce application system gives you individual attention.
- The M-commerce application system understands your specific needs.

4) Intention to Use (IU) measures the target audience's rate of the utilization of smartphone commercial applications. The main goal of this construct is to improve access to use information and the implementation of business transactions electronically in the satisfy level. Intention to use represents the level of user satisfaction, which leads a user to utilise the same system again regularly and be willing to deal with commercial applications that contain a minimal number of basic requirements (DeLone & McLean, 2003). This construct can be measured by the following indicators:

- You intend to use any M-commerce application.
- You will reuse the M-commerce applications in the future.
- You will use the M-commerce applications frequently in the future.

5) User Satisfaction (US) focuses on the level of satisfaction with the information on and the method of using smartphone commercial application systems (Ives et al., 1983). This study focused on consumer satisfaction with smartphone commercial applications. This construct can be measured by the following indicators:

- You are satisfied with the M-commerce application system.
- The M-commerce application system is of high quality.
- The M-commerce application system has met your expectations.

6) Net Benefits (NB) is related to benefits and values that reflect positively on the individual, community, or organisation. These benefits include, for example, improving the decision-making process in online purchasing, reducing costs, enhancing market efficiency, increasing sales, improving productivity and increasing profits (DeLone & McLean, 2003). This construct can be measured by the following indicators:

- The product/service of the M-commerce application system is a good value for the money.
- The price of the product/service of the M-commerce application system is acceptable.
- The time spent in the M-commerce application system is appropriate.

▪   The M-commerce application system facilities will be extended to your online shopping, thus increasing your purchases.

The practical adoption of the DeLone and McLean model depends mainly on the organisational context because the quality standards in the IS context focus on setting standards for every construct of ISS (Gable et al., 2008). Therefore, ISS constructs contain specific measurements based on the purpose and objective of a particular system that will be evaluated. This study, which focused on validating the ISS in smartphone commercial applications, required the identification of specific measurements and indicators for achieving model validation and success in the m-commerce field. This context is different from those of other field environments (Petter et al., 2008; Petter et al., 2013).

2.2 *Challenges and Difficulties Facing the Updated DeLone and McLean's Model*

There are some difficulties facing the DeLone and McLean's—2003 model when adopted in the e-commerce field. The main three challenges can be summarised as follows:

▪   Firstly, the DeLone and McLean's updated model cannot determine e-commerce specifications and success measurements for systems that work for this purpose (Petter et al., 2008; Ghobakhloo et al., 2016). The DeLone & McLean—2003 model is a general model for electronic systems. If the objective is to design a successful model that works in the e-commerce field, then certain difficulties are faced with this model. For example, the definition of net benefits measurement in this model is very broad (Petter et al., 2008; Wang, 2008). The "Net Benefit" Construct in the DeLone & McLean—2003 model incorporates three issues that might be addressed to describe the concept as useful. Specifically, these three issues are: what aspects can be described as benefits? who are these benefits for? and what level of analysis of these benefits can be attained through using the model constructs? As a result, when using the DeLone & McLean—2003 model, the researchers need a clear definition of the stakeholders to determine the net benefits for each stakeholder group and identify ways to measure these benefits (DeLone & McLean, 2003; DeLone & McLean, 2004; DeLone & McLean, 2016; Wang, 2008).

▪   Secondly, the consideration with the DeLone & McLean Model—2003 is the re-formulation of the Seddon model from 1997, which integrates the ISS model and behavioural success of Intention to Use in one model, dramatically increasing the complexity of the model (Chen & Cheng, 2009; DeLone & McLean, 2003; Rai et al., 2002; Seddon, 1997). To put it simply, adding the dimension Systems Use/Intention to Use to DeLone & McLean—2003 model is still important for presenting the complementary aspects of success in the model. However, when using the Systems Use/Intention to Use dimension in DeLone & McLean—2003, it appears that no compromise related to the element of Perceived Usefulness is available between this model and the Seddon—1997 model (Gable et al., 2008; Petter et al., 2008; Rai et al., 2002; Wang, 2008; Wu & Wang, 2006). Perceived Usefulness in the Seddon model is related to two main aspects in the DeLone & McLean—2003 model, Net Benefit and Systems Intention to Use (DeLone & McLean, 2003; DeLone & McLean, 2004). These two aspects appear in the DeLone & McLean—2003 model to measure consumer behaviour; while in the Seddon—1997 model, the Perceived Usefulness is used to measure the perceived benefits for consumers and how they are convinced to make purchases (DeLone & McLean, 2003; Seddon, 1997; Wu & Wang, 2005). Thus, more research is needed to combine the two models in order to optimise the Perceived Usefulness construct and the IS successful dimensions in previous studies to enrich the theoretical perspective in these models.

▪   Thirdly, the DeLone & McLean model has not been validated experimentally yet in an e-commerce, M-commerce environment, and B2B (Ghobakhloo et al., 2016; Petter et al., 2008; Wang, 2008). The previous researchers that used the DeLone and McLean model focused on Management

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Information Systems (MIS) and marketing as well as on the nomologicalstructure of DeLone & McLean model. It is not consist to contain an integrated sequence in many aspects such as the Quality requirements, Value, Satisfaction, and Loyalty chain. These aspects are important for completing an acceptable relationship between the customer and the commercial electronic system (DeLone & McLean, 2004; Iivari, 2005; Lin & Wang, 2006; Parasuraman & Grewal, 2000; Petter et al., 2008; Varnali & Toker, 2010; Zeithaml, 1988). Some studies indicated that there is challenge when evaluating the ISS model especially in the factors that lead the ISS and determine the measurement scales to evaluate the model and help practitioners and researchers to designed and improve appropriate measurement practice (DeLone & McLean. 2016). Therefore, it is important to continue to test the model, particularly in the e-commerce and M-commerce context (Petter et al., 2008; Gable et al., 2008). From this side, this research deals with the challenges and difficulties facing the DeLone & McLean model—2003 that have been previously identified. Through this process, a model can be developed and validated in the e-commerce field to ensure its consistent success.

2.2.1 The Scope of Net Benefits in the M-Commerce ISS Model

According to studies that have focused on the Seddon—1997 and DeLone and McLean—2003 models, the Net Benefits construct can be considered as measure of success in the ISS model (DeLone & McLean, 2003; Seddon, 1997). Seddon suggested two constructs, Perceived Usefulness and User Satisfaction, to measure the level of user perception of the benefits of using an information system, (Seddon, 1997; Wang, 2008; Wu & Wang, 2005; Wu & Wang, 2006; Petter et al., 2008). Beyond this, the DeLone and McLean—2003 model aims to measure the degree of success through three dimensions: User Satisfaction, Intention to Use, and Net Benefits. These dimensions usually constitute the broader measurements of success which are Perceptual and Quality measures (DeLone & McLean, 2016; Heinze et al., 2017; Wang, 2008).

Both User Satisfaction and Intention to Use focus on aspects similar to Net Benefits in the DeLone and McLean—2003 model (Petter et al., 2008). Furthermore, the aspects that were proposed by DeLone and McLean with respect to the Net Benefits construct are somewhat similar to User Satisfaction and Intention to Use (Wang, 2008). For example, e-Loyalty which is related to the customer making repeated purchases, can be used to measure user satisfaction, as well as the time spent to browse a commercial site; or it can be used to perform System Use measures, which are related indirectly to Net Benefits measures because the benefit and feature that appeared in the application, lead the clients to use the application frequently (Heinze et al., 2017; Varnali & Toker, 2010; Wang et al., 2006). This means that User Satisfaction and System Use/Intention to Use in the DeLone and McLean model represents some of the standards related to Net Benefits (DeLone & McLean, 2003; Gable et al., 2008; Ghobakhloo et al., 2016; Petter et al., 2008).

Consequently, the Seddon—1997 and DeLone & McLean—2003 can be integrated to emphasise that User Satisfaction and Intention to Use are Net Benefits in the context of e-commerce and M-commerce (DeLone & McLean, 2003; Seddon, 1997). The Net Benefits in DeLone & McLean—2003 model might be used to measure other Net Benefits which are User Satisfaction, Perceived Usefulness, and Intention to Use which can be developed and modified according to the fundamental research objectives.

2.2.2 Net Benefits vs. Perceived Value

Figure 3 presents the DeLone and McLean—1992 model, which consists of six constructs. There are two impacts constructs which are Individual and Organisational Impact (DeLone & McLean, 1992). The Individual and Organisational Impact are likely to be close to User Satisfaction and Net Benefit in

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DeLone and McLean—2003. However, the expected benefits of the ISS model should have a wider range of elements related to Net Benefits than Perceived Usefulness (DeLone & McLean, 1992; DeLone & McLean, 2016; Seddon, 1997; Rai et al., 2002). For example, the Seddon Model would consider as a net benefit certain elements related to how computers provide some appropriate facilities and programs such as word processors and calculators, even if users aren't satisfied with computer performance in the case of the computer being old (Ghobakhloo et al., 2016; Seddon, 1997; Wang, 2008). Therefore, the weighted value of User Satisfaction should be higher than the weighted value of Usefulness (Seddon, 1997). Furthermore, research into more reliable ways to measure net benefits and related constructs such as perceived usefulness and user satisfaction should be continued (Ghobakhloo et al., 2016;Wu & Wang, 2006).

During the last two decades, many studies have focused on the role of customer behaviour to explain loyalty towards a brand name and repeat purchases of same-brand items (Chen & Cheng, 2009; DeLone & McLean, 2003; DeLone & McLean, 2016; Varnali & Toker, 2010; Wang et al., 2011). Usually, a quality-method value is believed by consumers that main effective reason for making decision to purchase online or not (Ghobakhloo et al., 2016; Monroe, 1990). Some researchers believe that the actual product is conceived as being more than it actually is when incorporating evaluations of after-sales interactions and high-quality customer service (DeLone & McLean, 2003; Petter et al., 2008). This causes variations in the perceived value of products for the consumers think about their purchasing products features or the online purchasing process. To sum up the range of potential beliefs, some e-purchasing practices link benefit with quality only; others believe that after-sales service is important; while still others believe in the offers and promotions created by the seller, in which monetary or service value is provided to the consumer (DeLone & McLean, 2016; Wang, 2008; Wang et al., 2011).

Each of these elements impacts the ultimate Perceived Value. This value can include a comparison between the quality and moral value of the products (with "moral value" referring to after-sales service that leads to user satisfaction and intent to purchase from the same company or items of the same brand). Perceived Value is an integral part of the Net Benefit, which is considered key to user satisfaction and repeat purchases (Gable et al., 2008; Ghobakhloo et al., 2016; Monroe, 1990; Wang et al., 2011; Wu & Wang, 2006). In this study, Net Benefit is one of the basic pillars of mobile e-commerce system benefits. The most comprehensive benefits would include organizational and traditional benefits. Both theoretical and empirical research offers evidence of the importance of Customer Satisfaction and Intention to Use as being of significant value and therefore an important element of a ISS model in M-commerce systems (Petter et al., 2013). Understanding of the Net Benefit dimension should therefore reflect its status as a knowledge construct aspect of an ISS model (DeLone & McLean, 2004; DeLone & McLean, 2016; Wang et al., 2011), with the User Satisfaction and the Intention to Use causing variations in Net Benefit (Wang et al., 2006). These constructs present in their entirety, benefits of an M-commerce system to ascertain customers' evaluation of M-commerce. These evaluations cannot otherwise be measured before use of the model (Harris et al., 2005; Heinze et al., 2017). Measuring the level of benefits in an M-commerce system is necessary to build many structures within a model, including User Satisfaction and Intention to Use; the level of knowledge and satisfaction is generally greater after cases in which the model is used.

2.2.3 The Scope of Intention to Use

To develop an adequate explanation for the Intention to Use construct in the DeLone and McLean—2003 model, the Intention to Use measurement may be feasible in some fields (DeLone &

McLean, 2016; Prasad et al., 2010). The explanation of reuse varies from one community to another. Some studies have indicated that, for many industries, the cost of retaining customers should not exceed 10% of the cost to gain new customers (Ahmad et al., 2015). Therefore, measuring the Intention to Use construct should be more accurate for measuring the success of information systems in general and M-commerce systems in particular. This represents one of the basic constructs of the DeLone and McLean e-commerce model (DeLone & McLean, 2003; Petter et al., 2008). This perspective argues that Intention to Use is a measure of success in M-commerce and represents one of the links of User Satisfaction and Net Benefit as shown in the model (see Figure 3). In fact, this construct is one of the basic measures of customer loyalty in the marketing field (DeLone & McLean, 2004; DeLone & McLean, 2016; Petter et al., 2013; Varnali & Toker, 2010). Through previous studies, Intention to Use is metrics indicate positive characteristics of the target audience in the case of customers using M-commerce systems; the intent successfully marks those who wish to continually purchase from the same firms using smartphone apps (Gable et al., 2008; Ghobakhloo et al., 2016; Heinze et al., 2017; Wang, 2008).

2.3 The Model Research Framework Hypotheses

The relationships between the constructs that are tested in this research can be divided into theoretical and experimental. The theoretical relationships, which are called the customer behaviours, contain the constructs User Satisfaction, Intention to Use, and Net Benefits. The experimental relationship constructs which are called the practical customer requirements, are separated into SQ, IQ and SQU. The hypothesis that focuses on the experimental relationship is related to commercial applications indicators that focus on the practical side in this research. Many previous marketing studies have indicated that SQ, IQ and SQU lead to US and thus regular return shopping (Aladwani, 2002; Al-adaileh, 2009; Davis, 1989; Eid, 2011; IVES et al., 1983; Lam et al., 2004; Wang et al., 2011). This part of the study will focus on the following three hypotheses:

H1. The SQ constructs' indicators will have a positive effect on US with the use of smartphone M-commerce applications.

H2. The IQ constructs' indicators will have a positive effect on US with the use of smartphone M-commerce applications.

H3. The SQU constructs' indicators will have a positive effect on US with the use of smartphone M-commerce applications.

Many previous studies focused on Intention to Use, which results from quality systems that directly motivate consumers to purchase from the same M-commerce system multiple times (Caruana & Fenech, 2005; Eid, 2011; Hossain & Hossain, 2011; Parasuraman & Grewal, 2000). In addition, other studies have suggested that Net Benefits also contribute to increased customer loyalty (DeLone & McLean, 2003; Parasuraman & Grewal, 2000; Petter et al., 2008; Pitt et al., 1995; Wang et al., 2006). Anderson and Srinivasan noted that customers obtaining a low level of benefits from one shopping experience online will tend to switch to other competitive companies to increase their benefit (2003). This directly reduces customer loyalty and degrades the intention to use a site to purchase more goods (Anderson & Srinivasan, 2003; Wahab et al., 2011). Therefore, connecting the quality constructs and consumer behaviour is important and leads to consistent advances in the correlation between the value of consumer loyalty and the electronic systems in general, and M-commerce applications in particular (Ahmed et al., 2013; Amin et al., 2014; Bai et al., 2008; Caruana & Fenech, 2005; Varnali & Toker, 2010; Lin & Wang, 2006; Zeithaml, 1988). Also, Parasuraman and Grewal saw that quality, as seen from the perspective of loyalty, still requires further research.

This part of the study focuses on the following hypotheses:

H4. The SQ constructs' indicators will have a positive effect on IU with the use of smartphone M-commerce applications.

H5. The IQ constructs' indicators will have a positive effect on IU with the use of smartphone M-commerce applications.

H6. The SQU constructs' indicators will have a positive effect on IU with the use of smartphone M-commerce applications.

US and IU are heavily influenced by constructs such as SQ, IQ, SQU and NB obtained by the user from another site (DeLone & McLean, 2003; Petter et al., 2008). NB represents the building of a knowledge base which is an important aspect of what the user would be getting when dealing with new technologies, similar to companies' benefits from providing new technical methods for displaying products electronically. Thus, there is mutual benefit for these two parties; therefore, these parties experience mutual benefit (DeLone & McLean, 2003; Seddon, 1997; Rai et al., 2002). However, User Satisfaction and Intention to Use are assessments of emotional response (Amin et al., 2014; Davis, 1989). Electronic systems in M-commerce indicate that the benefit for the seller comes after customer satisfaction, when his or her response is frequent online purchases in the future (Anderson & Sullivan, 2003; Wang et al., 2011). Research has also focused on Net Benefit as one result of US and IU (Caruana & Fenech, 2005; Lam et al., 2004; Legner, 2011; Wang et al., 2011; Yang et al., 2004). From this, the following hypotheses can be developed:

H7. The US indicators will have a positive effect on NB with the use of M-commerce applications in smartphones.

H8. The IU indicators will have a positive effect on NB with the use of M-commerce applications in smartphones.

The DeLone & McLean—2003 model indicates that the positive use of electronic systems leads to greater user satisfaction. Similarly, increasing user satisfaction leads to increases in frequency of use and in intention to use (Ahmed et al., 2013; Bernroider, 2008; Eid, 2011; Wang & Liao, 2007). With their purpose being to simplify the close relationship between US and IU and NB, H7, H8, and H9 suggest that increased user satisfaction is the reason IU occurs, leading to increased use, increased NB, and increased US (Dai & Palvia, 2009; Lam et al., 2004; Legner, 2011; Pitt et al., 1995; Wang & Tang, 2003; Wang et al., 2011). Furthermore, the importance of User Satisfaction and Intention to Use arises from a marketing standpoint, in the fact that the marketing standpoint is an emotional, user-experience parameter whether to buy again in the future. Much depends, then, on the Intention to Use construct (Bagozzi, 1992; Bai et al., 2008; Chang et al., 2015; Lee et al., 2014). Behavioral variables such as intent to re-use and word-of-mouth recommendations are among the basic means by which consumers express satisfaction and confidence in electronic systems (Wang, 2008). Additionally, customers who are dissatisfied with current sales are more likely to comply with the policies of new competitors, even if they differ from their previous online commerce experiences. Satisfied customers, who have made previous online purchases will express satisfactory behaviour (Anderson & Srinivasan 2003; Chen & Cheng, 2009; Wang et al., 2011). These concepts led to the following hypothesis:

H9. The US indicators will have a positive effect on the IU with use of smartphone M-commerce applications.
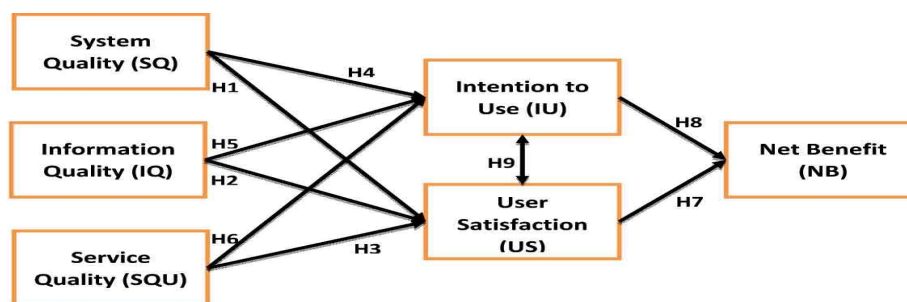
Figure 4. The ISS Model Hypothesis

Complementing to previous hypotheses that are tested twice which are test combined samples to determine the validity of ISS model in GCC communities and then testing the samples separately to ensure the applicability of the ISS model in the larger community.

3. Methodology

The research tool that was used in this study was a questionnaire because it was a suitable tool for the target audience. Also, the Positivist Paradigm approach was used to design the research questions. In the study, it was appropriate to identify key questions by using the Likert Scale, so questions on m-commerce were identified to ask participants about their opinions about it. The model questions involved 23 indicators (Creswell, 2008; Sekaran, 2003).

Several electronic means have been used to distribute the questionnaire to the largest possible number of participants via snowball technique, which distributes the questionnaire via a large number of e-invitations to reach target participants. The online invitation was sent to the largest possible segment of people in many governmental organization such as universities and government agencies and request them to send to e-invitation to their customers. Also, the e-invitation was sent via people who are interested to M-commerce applications through social networking sites and mobile applications, forums and mailing groups. Also, social media played a prominent role in this process. The main effective channel is the email group. A summary of the means used is presented in the following section.

Some conditional questions were included to ensure that the participants were appropriate for the study based on the study's requirements. These three questions dealt with the participants' experience in m-commerce, whether the participants were residents of or living in the GCC and whether the participants had completed online transactions through a variety of online purchasing channels (Wuensch, 2005). A total of 803 completed responses were obtained from all GCC countries. The sample size was calculated according to the population and the level of confidence (95%) as well as the margin of error (7.5%).

4. Analysis

This section aims to measure and support the basic components of the ISS theoretical model. These components are measured using many statistical tools, which represent the model constants. Therefore, in the beginning of this section the overall reliability of each of the constructs and the indicators are assessed separately and Exploratory Factor Analysis (EFA) is conducted to detect the structures and measure the weight and factor loading of each indicator in its construct. This will help construct the indicator constructs later. The EFA output is tested and confirmed by Confirmatory Factor Analysis (CFA) to ensure that the constructs are refined and provide enough support to evaluate the ISS Model.

More details and an explanation are provided below.

4.1 Respondent Profiles

The demographic questions were presented to determine whether a participant segment represented a survey sample adequately. Participants were classified according to five basic demographic characteristics, namely Country (UAE, Qatar or KSA), Gender (Male or Female), Level of Education (below Bachelor, Bachelor, Master, PhD), Age, and Type of online buying activities. The Demographic information about the respondents is summarised in appendix A.

4.2 Screening of Outliers and Common Method Bias

Outliers can be defined as extreme cases, which are distinctly different from other cases in the data; thus they may affect the attitude of the mean and SD. Therefore it is important to examine the data responses to determine these cases and isolate them from the data (Hair et al., 2010; Tabachnick & Fidell, 2007). In this study, this concept was dealt with to detect severe deviations in the study's indicators, so the values of all elements were recalculated to find standardized z-scores. Any absolute result with a value between + 3.29, when the p value < 0.01, is acceptable. Moreover, the outliers' cases rate in the data should not exceed 1.99% of the total number of responses (Tabachnick & Fidell, 2007). In this study, 22 responses have been excluded that had a number of outliers of more than 10% of the values that were recorded in the entire case. As a result, the percentage of outliers in the acceptable responses was reduced from 3% to about 1%. This number is not excessive compared to the recommendations. Moreover, to ensure that outliers did not show significant deformation in the data, the mean and the 5% trimmed mean of each indicator were examined. The 5% trimmed mean values can be calculated by first sorting all the mean values, then discarding 5% of both the smallest and largest values in all data within each indicator, and then computing the mean of the remaining values (Pallant, 2005). The acceptable difference between the mean and 5% trimmed mean (Δ mean) values should be no more than -0.2 (Pallant, 2005). In this study, all Δ mean values were relatively small, ranging between -0.01 and -0.11 (see Appendix B). These results indicated that the outliers' detection has not appeared to be an issue for the data sets. As a result, the outliers' examinations of data detected outliers that could not be processed, so these cases were excluded, and the number of responses for further statistical analyses became 386 in KSA, 171 in Qatar and 246 in UAE.

4.3 Reliability Scale

The reliability scale is defined as the method that measures a particular instrument in the same way, at the same time, under the same conditions, and in the same project. The results can be valid and beneficial if the steps used to take the measurement are reliable (Pallant, 2005). In this study, a questionnaire was used to measure the ISS Model constructs. These components were used to create successful requirements for a special model for commercial mobile applications in smartphone devices in order to ensure that the measurement scales consistently and accurately captured the meaning of the constructs. A reliability test was conducted to assess the internal consistency between the total results and the results from the groups from each country, separately. The indicators of each construct were also evaluated and have their own results.

Table 1. Cronbach's Alphas of Measurement Scales for Each Construct and Each Country

Name of construct	No of Items	KSA	Qatar	UAE	ALL	Validity
SQ	2	0.705	0.703	0.725	0.727	0.870
IQ	5	0.632	0.751	0.679	0.715	0.846
SQU	6	0.634	0.655	0.667	0.626	0.791

IU	3	0.607	0.654	0.600	0.620	0.787
US	3	0.780	0.733	0.754	0.764	0.874
NB	4	0.601	0.619	0.616	0.617	0.785

Kline (2005) noted the importance of consistency in the participants' answers, which is known as Factor Internal Consistency or Cronbach's alpha coefficient. It is the most common measure of internal consistency (Kline, 2005). A Cronbach's alpha coefficient of 0.60 or above is acceptable as an indicator of internal consistency and it represents the minimum degree of internal consistency between the indicators in the constructs (Hair et al., 2010; Pallant, 2005). The internal consistency scale of the 6 constructs of indicators is shown in Table 1 which represents the 23 indicators proposed in the ISS model. The Cronbach's alpha coefficient values for the KSA sample was 0.660, UAE sample was 0.674, and the Qatar sample was 0.686. The Cronbach's alpha coefficient values of all the scales ranged between 0.601 and 0.764 for each construct in each country, which indicates good internal consistency and reliability for this sample.

4.4 Item-Total Correlations

The item-total correlation refers to the correlations between the variables, resulting in a composite of all the indicators that measure the internal consistency coefficient for the formation of a construct (Hair et al., 2010). If all the indicators share a common core composition, the correlations between the variables are close and that helps in the construction of the entire model. Therefore, these indicators should be highly correlated (Koufteros, 1999). Additionally, this measurement scale helps eliminate the garbage indicators, and it also helps prevent unnecessary indicators before determining the factors that will be relied upon to validate the model (Hair et al., 2010). The perfect item-total correlation result is an indicator value greater than 0.3 (Koufteros, 1999; Pallant, 2005).

The item-total correlation indicators are calculated using SPSS software. The results of less than 0.3 are excluded, and the results of more than 0.3 are entered into the following statistical tests (Koufteros, 1999; Pallant, 2005). Thus, the results for all indicators of value less than 0.3 are excluded which are, IQ02 = 0.234, SQU02 = 0.275, SQU03 = 0.278, SQU06 = 0.276 and NB04 = 0.224. In contrast, the indicators that get 0.3 or more Using the SPSS softwareare keep them in the constructs of this study.

4.5 EFA of the ISS Indicators

Table 2 present the indicators in this study that showed an EFA value higher than 0.5, which are the best indicators because both the scree plot and the Eigen value suggested items that fell naturally into the minimum number of factor solutions in each construct.

Three constructs showed cohesion between the indicators, but some of the indicators were eliminated due to the reliability test results. Those construct s are: IQ, SQU and NB. The IQ construct focuses on the quality of the information used to create commercial smartphone applications, such as reports, and the information presented. The internal consistency test results showed that these indicators had sufficient cohesion in relation to the remaining indicators, after excluding IQ01. The values of the indicators ranged between 0.575 and 0.776. The SQU construct includes the technical support features that should be provided to users for smartphone applications. Three indicators were excluded based on the internal consistency test results. The value of the construct loading for those indicators ranged between 0.713 and 0.784 and those values represent the highest values of the construct loading in the study constructs in the EFA test. Finally, in the NB construct, which is concerned with whether the benefits reflect positively on the individual or community or organizations, the NB04 was excluded due

to the lack of internal consistency; moreover, the results of the remaining indicators ranged between 0.662 and 0.819.

Table 2. EFA of the Indicators of ISS Model

No. Code	Component					
	1	2	3	4	5	6
SQ01	.313	.057	.621	.055	-.073	.026
SQ02	.090	.049	.866	.012	.093	-.014
IQ03	.755	.072	.122	-.132	.027	.034
IQ04	.776	.112	.129	.081	.016	-.014
IQ05	.682	.157	.193	.124	.065	-.083
SQU02	.072	.032	-.072	.742	.000	.024
SQU04	-.014	.062	.202	.713	.021	.004
SQU05	.065	.007	-.035	.784	.089	-.032
IU01	.062	-.061	-.064	.157	.684	.002
IU02	.026	-.006	-.018	-.001	.806	-.013
IU03	-.035	.039	.117	-.043	.749	.033
US01	.301	.752	.022	.025	-.066	.028
US02	.130	.834	.069	-.009	.081	-.002
US03	.082	.818	.060	.090	-.052	.000
NB01	.020	-.028	.030	-.033	-.049	.819
NB02	.093	-.007	-.004	.018	-.066	.763
NB03	-.058	.050	-.002	.009	.128	.662
Eigen value	3.544	1.869	1.726	1.678	1.530	1.117
% Variance	20.654	10.937	10.586	9.934	9.154	6.877
Cumulative Variance explained	**20.654**	**31.591**	**42.177**	**52.111**	**61.265**	**68.142**

The initial result of the EFA test showed that the SQ constructs focus on the System Quality characteristics that should be included in mobile commercial applications, depending on the fundamental requirements of online systems, and The SQ construct indicators were shown to be cohesive exactly as expected. Moreover, the indicators in the IU construct, which focuses on measuring the re-use level of mobile business applications in smartphones in the future, showed significant cohesion as expected. The US construct, which concentrates on the level of satisfaction of the information received and the method used in commercial mobile application systems in smartphones, was shown to have consistency between the indicators, as expected.

4.6 CFA of the ISS Indicators

This approach is begun by determining the measurement model specifications and assessing their accuracy. The measurement model in CFA presents the relationships between the variables, which helps in measuring the constructs that cannot be measured directly (Hair et al., 2010). The measurement model was evaluated using CFA tests, which are very similar to the tests that were described in the previous chapter. Additionally, the reliability of the model was evaluated using a more accurate measure, known as **Composite Reliability (CR)** and **Average Variance Extracted (AVE)**. The CR is more accurate than Cronbach's alpha and it's a part of SEM tools. The CR refers to the degree to which the value of a minimum of two variables in a construct can be measured against a

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specific construct (Hair et al., 2010; Koufteros, 1999). If the degree level of the CR is high, all the indicators are statistically significant and have the same measure as the construct (Hair et al., 2010; Fornell & Larcker, 1981). The CR value is acceptable if it is equal to or above 0.60, and the AVE should be equal to or greater than 0.50 (Bagozzi, 1992). In addition, if the correlation between the constructs in the same construct is less than the square root of the AVE for the relationship between different constructs in the same group, it is proof of discriminant validity (Fornell & Larcker, 1981). The AVE should be calculated for each of the constructs in the measurement model. This part of the values was calculated manually because the AMOS & SPSS software do not contain the tools needed to calculate the CR and AVE electronically.

4.7 Measurement Model Results

The information in table 3 indicates the relationship between the constructs in the search form. The results are presented that shows the correlation between the constructs in which the square root of the average values is greater than the other correlation constructs is in the same group. In addition, the AVE values were around 0.5. All of the CR values ranged between 0.6153–0.6775. The largest value for the squared multiple correlations was 0.664, while the smallest value was 0.476. Furthermore, the AVE values ranged between 0.7203–0.5970. Thus, the discriminant validity of the used indicators is sufficient for the requirements for a model for commercial mobile applications in smartphones.

This study aimed to test and validate the ISS model to determine the value of entire output to be fitted for all study samples when taken together. The t-value, which is of critical value, should be used to demon strateconvergentvalidity results of the constructs. It is a parameter to estimate the parameter from its notional value and its standard error. In this study, the t-value in the same constructs ranged between 8.273 and 4.743, which means it is in the measurement average (Hair et al., 2010). The t-values of the ISS constructs ranged between 4.255 and 8.273. This means that all of the constructs had a significant correlation and they met the minimum t-value, which is greater than 1.96. The result of Cronbach's alpha, composite reliability and AVE test indicate that the measurement model for the requirements for the commercial mobile applications in smartphones has a large convergent validity. In addition, the correlation coefficient between each pair of constructs was less than 0.850, which indicates that the discriminant validity of the scale was sufficient (Kline, 2005). The discriminant validity was checked using the AVE test, which compares the square root of the AVE for each of the constructs to determine if it is greater than the correlation coefficient between all the other cross links in the model. This indicates that each of the constructs is closely related to the group instead of to the other constructs (Fornell & Larcker, 1981). The square roots of the AVE numbers are shown in light blue in Table 4. The indicators are the link value estimates at the level of 0.01 (2-tailed).

The largest factor loading corresponds with the highest critical value. This is evidence that the variables were measured represent the basic structures in the model (Bollen, 1989). Hair et al.'s (2006) guidelines indicate that the factor loading value must be greater than 0.5. However, t-values or critical value represent sufficient proof of the validity of the convergence values (convergent validity). In addition, the reliability of the variables should be sufficient, which can be determined by the R^2 value or Squared Multiple Correlation (SMC). The R^2 value should be greater than 0.5 in order to prove the existence of acceptable reliability (Koufteros, 1999; Bollen, 1989). Therefore, the R^2 test has been conducted several times in this study, after excluding the values that were less than 0.5, in order to improve the indicators so they would meet the sufficient level for R^2 values. This testing improved the indicators for all of the constructs of the model. However, discriminant validity provides evidence that the construction is unique and it does not pick up any of the phenomena from the other constructs

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(Kline, 2005). According to Klein, discriminant validity can be assessed by the correlation coefficient between each pair of variables. If the value of the correlation coefficient is very high (higher than 0.850), then the converged variables in the same group should be coupled with one variable (Tabachnick & Fidell, 2007). In this study, the correlation coefficients between the variables in the constructs were below 0.560 and 0.506, and all of them were less than 0.850; thus, this finding helps to support the validity of this differentiation of the constructs (Kline, 2005) (See summary of measurement indicators Criteria in Tables 3 & 4).

Table 3. Correlation Matrix and Discriminant Validity of the Measurement Model

The relationship or path	US	SQ	IQ	SQU	IU	NB	Mean	SD
US	**0.832**						4.636	0.577
SQ	0.228	**0.815**					4.457	0.719
IQ	0.472	0.542	**0.775**				4.554	0.631
SQU	0.428	0.092	0.179	**0.773**			4.447	0.683
IU	0.213	0.363	0.283	0.239	**0.849**		4.102	0.744
NB	0.215	0.048	0.315	0.132	0.324	**0.795**	3.996	1.016

Table 4. The ISS Model Constructs Results

Construct	Factor extracted	Estimate	Cronbach's alpha	Standardized factor loading	Squared multiple correlations	Composite Reliability values (CR) (>0.6)	AVE (>0.5)	Critical Ratio or (t-value) (>1.96)	R^2
System Quality – SQ									
SQ01	0.621	1.000		0.535	0.586				.573
SQ02	0.866	1.627	0.727	0.746	0.558	0.6153	0.6923	5.254	.619
Information Quality – IQ									
IQ03	0.691	.905		0.598	0.558				.501
IQ04	0.776	1.000	0.715	0.693	0.480	0.6702	0.6650	4.743	.565
IQ05	0.682	.897		0.704	0.495				.495
Service Quality – SQU									
SQU02	0.742	.785		0.574	0.531				.547
SQU04	0.713	.647	0.626	0.531	0.482	0.6775	0.6003	6.581	.517
SQU05	0.784	1.000		0.696	0.495				.523
Intention to Use – IU									
IU01	0.684	.875		0.514	0.564				.553
IU02	0.806	1.302	0.620	0.710	0.503	0.6741	0.5970	8.273	.518
IU03	0.749	1.000		0.567	0.522				.521
User Satisfaction – US									
US01	0.752	1.005		0.722	0.521				.505
US02	0.834	1.175	0.764	0.748	0.560	0.6500	0.7203	7.481	.596
US03	0.818	1.000		0.691	0.478				.497
Net Benefits – NB									

NB01	0.819	1.126		0.808	0.644				.644
NB02	0.763	1.445	0.617	0.573	0.532	0.6312	0.6327	5.508	.532
NB03	0.662	1.000		0.517	0.476				.476

The overall goodness-of-fit was examined separately for each construct as mentioned in the previous section. The same exam was also conducted for all of the constructs, together, and the results are presented in Table 5. The findings show the model-fit indices as well as the recommended value. As presented in Table 5, all of the standard model fitting numbers exceeded the requirements for the model fit indices and the level of acceptance, which is similar to the results shown in the path coefficient structure model. Therefore, after ensuring the correlation between the model's constructs for all of the study samples, taken together, the modelling fit indicators were in the acceptable level for the entire model.

The results in Table 5 show separated sample display the model fit values based on several of the study samples. The results do not show a large difference in the modelling fit appropriate to several different communities.

Table 5. Conceptual Measurement Model Results for Each of the Research Samples

Estimate indices	Recommended Value	All samples	KSA	Qatar	UAE		References
X²/df	≤ 3.00	2.95	3.229	2.982	2.908		(Hair et al., 2010;Kline,2005)
GFI	≥ 0.9	0.948	0.915	0.856		0.892	
TLI	≥ 0.9	0.922	0.892	0.853		0.887	
NFI	≥ 0.9	0.909	0.854	0.769		0.825	
CFI	≥ 0.9	0.936	0.911	0.878		0.907	(Hair et al., 2010)
IFI	≥ 0.9	0.936	0.913	0.882		0.909	
AGFI	≥ 0.8	0.93	0.887	0.809		0.856	
RMR	≤ 0.8	0.027	0.02	0.034	0.029		(Kline, 2005; Tabachnick &
RMSEA	≤ 0.8	0.048	0.056	0.067	0.06		Fidell, 2007)

The hypotheses that were tested again according to each study sample, separately, to ensure that the model could be applied in more than one community with slightly different characteristics in each society from others. The results of the hypotheses according to the demographic moderator are summarized in Table 6.

Table 6. The Main Measurements of Path Coefficients of the ISS Hypothesis for all Samples Together and Separated Study Samples

Hypothesis No.	Construct – Code	All together N=799				KSA, N= 386				Qatar, N= 171				Emirate, N= 246				Testing Result
		Estimate	t-value	P	States	Estimate	t-value	P	States	Estimate	t-value	P	States	Estimate	t-value	P	States	
H1	SQ → IU	0.363	5.254	**	P	.148	2.911	***	P	.289	5.009	***	P	.253	4.132	***	P	Supported
H2	SQ → US	0.228	4.743	***	P	.172	2.476	***	P	.321	4.486	***	P	.196	3.165	**	P	Supported

H3	IQ → IU	0.283	6.581	**	P	.145	2.859	**	P	.099	7.050	***	P	.290	4.798	***	P	Supported
H4	IQ → US	0.472	8.273	***	P	.381	4.836	***	P	.448	3.492	***	P	.456	8.090	***	P	Supported
H5	SQU → IU	0.239	7.481	**	P	.371	7.797	***	P	.369	5.246	***	P	.333	5.579	***	P	Supported
H6	SQU → US	0.428	5.508	**	P	.233	3.390	**	P	.424	6.189	***	P	.265	4.343	***	P	Supported
H7	US → IU	0.213	4.255	**	P	.286	5.976	**	P	.414	6.015	***	P	.351	6.004	**	P	Supported
H8	IU → NB	0.324	6.472	**	P	.360	7.484	***	P	.397	5.299	***	P	.377	6.305	***	P	Supported
H9	US → NB	0.215	5.307	**	P	.127	2.646	**	P	.412	5.834	***	P	.166	2.783	**	P	Supported

$*p < 0.1$; $**p < 0.05$; $***p < 0.001$. t-value (recommended value >1.96).

5. Discussion

This part is covered the indicators under the ISS model, which was presented previously. The indicators are covered to increase the level of acceptance by target audience of smartphone commercial application to ensure the success of the purchasing via commercial application. It included 17 indicators which are SQ has 2 indicators, IQ has 3, SQU has 3, IS has 3, US has 3, and NB has 3. More details in the following parts.

5.1 The System Quality Requirements Construct

The main SQ construct identifies the characteristics that should be included generally in smartphone commercial applications according to the basic requirements of electronic systems established in previous studies (Amin et al., 2014; Noh & Lee, 2015). Four examples of these elements are: ease of use, system flexibility, system reliability, and possibility of learning. These indicators can be considered as measuring that which cannot be measured traditionally or in the same manner as the rest of the indicators. The availability of these indicators will be helpful for increasing the level of acceptance among study communities for commercial applications (Wang, 2008; Noh & Lee, 2015). Furthermore, The SQ construct will help provide an environment that can be relied upon to measure the other indicators of constructs in this study. This construct contains two indicators that focus on the importance of ease to use and of applications that are able to meet customer requirements.

▪ **The importance of ease of use in M-commerce applications – SQ01**

When focusing on the development of commercial smartphone applications, one key parameter is ease of use and whether an expert or someone with previous knowledge of smartphones is necessary for working with during online purchases (Lee & Chen, 2014; Lu et al., 2015; Noh & Lee, 2015). Therefore, ease of use should mean features that adequately enable users who are not experts, to use phones and disseminate their uptake. 92.6% of the sample (average of all 3 countries) agreed with the importance of this indicator (KSA, 94.3%; UAE, 92.7%; Qatar, 90.7%); the gender split was 92.7% (men) and 92.2% (women). 93% of those with bachelor's degrees and above asserted that being able to use smartphones for online applications without expertise in the use of the phone, was also ideal; instead, just having some experience previously with e-commerce should be adequate.

- **Smartphone commercial applications are able to meet customer requirements, including basic requirements for shopping – SQ02**

Design elements, presentation of required information, and well-organised information in different parts of the application for the purpose of meeting customer requirements are important for a smartphone application to be widely accepted (Chen, 2015; Lu et al., 2015; Noh & Lee, 2015; Wang, 2008). For KSA, UAE, and Qatar, the percentages that agree with this concept are 92%, 96% and 77%, respectively. The difference in percentages is attributable to the fact that different communities have different ideas about what meeting their expectations is. The societies of KSA and UAE perceive whether the full requirements that they wish to use in online purchasing are available in commercial applications (Alkhunaizan & Love, 2014; Almehairi & Bhatti, 2014; Alwahaishi & Amine, 2014), while Qatar society considers the availability of key aspects of the application but not available yet without considering complementary aspects that nay be seen in the next versions (Khan et al., 2015; Talib & Faisal, 2015). This is helping to spread M-commerce in communities where the applications can be issued in sequential versions to complement each other; but in KSA and UAE they require the application to be integrated which are represent one of important indicators to increase the compatibility of smartphone application.

5.2 The information Quality Requirements Construct

The IQ construct focuses on the importance of the output quality for information created on smartphone commercial applications, including reports and information displayed, accuracy, and shortening of information. These aspects of the construct help increase users' confidence in commercial electronic systems and promote future use (Amin et al., 2014; Lee & Chen, 2014; Noh & Lee, 2015; Wang, 2008). The IQ construct is contained three indicators which are the importance of data being presented correctly and accurately and thus being trustworthy; the importance of the availability of updates to the information and other materials in the applications; and the importance of understandable information.

- **Data is presented correctly and accurately and is therefore trustworthy – IQ03**

Ensuring data correctness and accuracy correlated significantly with IQ indicators. If the information content of the displayed data is not accurate, the information cannot be relied upon to attract new customers and cannot be considered as assurance data, affecting consumer confidence for commercial smartphone applications (Suki & Suki, 2014; Lee & Chen, 2014; Noh & Lee, 2015). Therefore, the importance of informational content helps provide the basic rule to attract customers and increase their confidence in the M-commerce field (Amin et al., 2014; Lee & Chung, 2009; Wang, 2008). 90.8% of the participants in this study assert the importance of this indicator. The feeling about the importance of accuracy, attraction, and assurance cannot be built in a short period of time but rather is an inevitable result of meeting related various long-term requirements. Thus, these indicators help in building standards of information quality (Noh & Lee, 2015).

- **The importance of providing periodical updates to information and materials presented in M-commerce applications – IQ04**

Providing regular updates of the information and materials required for the application is important. The content of these updates was previously discussed in the IQ constructs. Many attractive updates can be provided to customers regularly via social networks (Hasan & Abuelrub, 2011; Sohaib & Kang, 2013). This means that the data update does not depend on the information and illustration aspects of the application only, but also on updating information related to the products offered, including how to communicate with customers and inform them about new products, promotions, and exhibits in order to

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stay up to date with company deals (Alba et al., 2013; Suki & Suki, 2014; Alkhunaizan & Love, 2014). All of these things might be helpful in assisting with customers' loyalty in the future. 94.3% of the KSA sample, 96.5% of the sample from Qatar, and 92% of UAE sample see the importance of updating the information for all information quality indicators that are beneficial for building the quality of information and other fundamental sub-constructs associated with it.

▪ **The importance of providing understandable information in the application – IQ05**

The criteria by which information is considered to be understandable is that it needs to be free of spelling and language mistakes, to be clearly worded, and to be described in such a way that it doesn't have more than one meaning or any ambiguity, but helps in the choosing of products that are displayed quickly and easily (AlSuwaidan & Mirza, 2014; Noh & Lee, 2015). Furthermore, the information related to the company's security and privacy policies needs to be clear and non-conflicting, helping to reduce the rates of customer complaints. A high percentage of participants agreed with the importance of this indicator (96% across the samples).

5.3 The Service Quality Requirements Construct

Service Quality includes technical support from both the technical perspective and the customer needs perspective. These perspectives include rapid response, reliability, accuracy, and technical competence (Amin et al., 2014; Basu, 2007; Gupta & Lakshmi, 2014). All of these services are of interest to companies that are dealing with online trading through smartphone applications. This part focuses on three indicators: the importance of M-commerce applications always being ready to provide support to their customers; responding to customer questions professionally; and the importance of showing special attention to individual cases, giving them enough care to augment customers' feelings that their requests are being paid attention to and will be completed at the agreed time.

▪ **The M-commerce applications should always be ready to help their customers – SQU02**

It is important for smartphone commercial applications to provide all requirements needed by customers during the online shopping process. These requirements are already covered in some previous constructs in this chapter (Alotaibi, 2013; Hasan & Abuelrub, 2011). For instance, it has already been discussed that it is important to take advantage of communication channels with customers regularly to provide user feedback, which can significantly help in determining elements that consumers require (Alba et al., 2013; AlGhaith et al., 2010). Customers do not require features that don't relate to what they need to do, but conversely all possibilities should be explored to help them adopt the applications (Alqahtani et al., 2014; Gupta & Lakshmi, 2014). 90.63% of participants believed in the importance of this indicator; therefore, the importance of considering the level of services provided to customers should be ready to support any aspect of customers' needs is high.

▪ **Providing the ability and knowledge to answer customer questions professionally – SQU04**

Customer questions can be answered, but the level of satisfaction is not necessarily known without follow-up (Cui et al., 2014; Ho et al., 2009). Follow-up could include the client being asked what their view about the answer to the question was, and whether the answer covered their question. Follow-up could also include the transmission of a text message on a mobile phone to request an evaluation score from 1 to 10 to evaluate service level (this could also be done via a telephone call); or a service evaluation provided by the application if the service is provided via chat. Furthermore, additional and different evaluation mechanisms that can assess the level of service professionalism could be provided to customers (Alotaibi, 2013; Cui et al., 2014; Wang, 2008). The results of this indicator noted that 93.5% of participants in all agreed with the importance of this aspect, meaning that the ability to answer customers' questions professionally is important from two main angles. Firstly, service level evaluation

needs to be performed in general to determine participants' viewpoints concerning whether their questions were answered adequately. Secondly, it is important to improve the capabilities of the technical support team to provide a list of existing issues and their solutions so that these solutions do not take more time than necessary (Alba et al., 2013; LaMalfa, 2007). Thus, a professional process to answer customer questions will be created for the solution of customers' problems, helping to build the service quality that is provided to customers using smartphone applications.

▪ **The importance of providing customers with high-level individualised care through M-commerce applications – SQU05**

Providing individual attention to every customer and ensuring documentation of these cases is helpful to technical support departments for investigating and analysing the parts of the system that regularly report major problems (Harrison et al., 2013; Cui et al., 2014). Additionally, the Ability to be able to document any relevant information perfectly and utilise this information during the analytical process is also required (Harrison et al., 2013; Cui et al., 2014). These measures are beneficial to solving personal problems and giving them actual weight so they will not be ignored over time (Wang, 2008). Individual attention might also help in supporting firstly, specific customer needs, such as providing speakers of other languages with real-time interpreters who speak their language and secondly, other features determined by the characteristics of the target audience. 89% of participants in this study perceive the importance of this indicator. Despite the percentage of this indicator being less than that of the other two indicators, it is notable that many participants believe that quality is related to the number of requests received versus the number resolved; that is, the quality of the resolutions has not been adequately considered (Cui et al., 2014). Therefore, the numbers of customers convinced of the importance of individualised care through M-commerce applications may drop slightly if the definition were to be revised, in spite of the clear importance of this indicator and how it converges with other indicators in the SQU construct.

5.4 Intention to Use Requirements Construct

The Intention to Use Construct represents one important aspect of ISS model constructs for dealing with customers through online purchases from commercial smartphone applications. The importance of IU construct arises because the consumers have reasonable satisfaction from previous operations, which let them to return and use online purchasing again through M-commerce method (Noh & Lee, 2015). Furthermore, good service of companies plays a significant role in giving their customers adequate motivation to use their application frequently as well as use other applications that cover the same field or similar activities (Hasan & Abuelrub, 2011; Wang, 2008). In general, customers with commercial applications want to use other applications that have similar features and capabilities (Bahaddad *et al.*, 2014). The IU construct has three indicators with significant correlations with three other constructs SQ, IQ, and SQU.

▪ **Intention to Use any smartphone commercial applications that contain basic requirements for shopping and purchasing electronically – IU01**

This indicator focuses on the importance of the availability of basic requirements in commercial applications that are needed by customers regularly. This requires that a good reputation be built for an application through word of mouth, which is built through previous customers' opinions (word of mouth) or through advertising about discounts or promotions to customers who complete purchasing processes through smartphone commercial applications (Amin et al., 2014; Chen, 2015; Lee et al., 2014). The importance of this aspect is agreed upon by 84.7% of all participating in these study samples. Prior use of and confidence in the customer side are important for motivating consumers to

expand their online purchasing method usages (Hung et al., 2012; Lee et al., 2014). Furthermore, the availability of fundamental requirements encourages many customers to use an application during its first trial, assisting companies in obtaining feedback about their applications and about what the most important aspects of the applications are both the good and the bad (Lee et al., 2014). The first impressions of using M-commerce applications by customer could help companies to rectify the applications' issues in the right time.

▪ **The re-use of M-commerce applications in the future – IU02**

This indicator measure people's willingness to use various purchasing online in the future. There are two main key points that assist to increase the level of intention to use when using the M-commerce Applications which are: the availability of basic requirements for commercial applications and increasing consumers' awareness of the benefits of online purchasing, such as low prices and saving time and effort (Dingra, 2008; Hung et al., 2012; Wang, 2008), Therefore, participants in this study see the importance of providing commercial applications with some features that are not provided with online website purchases or through physical purchases. The percentages of participants agreeing with the importance of this indicator were 82.2% in KSA, 78.3% in Qatar, and 82.1% in UAE. These percentages are close together and many of the participants believe that loyalty and Intention to Use are built with time (Hung et al., 2012; Wahab et al., 2011). However, the consumers see loyalty building as not being of major importance for a large segment of the study societies, but rather want to use it if they obtain benefits in the future, when a variety of promotions and new products are available through the company's smartphone applications (Alba et al., 2013; Li & Suomi, 2009; Lin & Wang, 2006).

▪ **Re-use of M-commerce applications regularly in the future – IU03**

Many customers do not want to make quick promises to come back to the same application and buy in the future, as one of the most important characteristics in communities is to search personally for advantages of products and compare these features before making final decisions to buy or not (Bahaddad et al., 2014; Hung et al., 2012; Wang, 2008). Not surprisingly, the number of participants from each part of the sample who agreed with this statement was a little low: 73.5% for KSA, 69% for Qatar, and 83% for UAE. This is confirmed by previous studies showing that if customers did not find a good way to communicate with companies electronically, they generally decided to switch to using the websites and applications of other companies (AlGhamdi et al., 2015; Bahaddad et al., 2014). Therefore, commercial applications that do not meet basic requirements apparently don't want customer traffic in the future, unless they find extra additional benefits that can attract them in the future (Suki & Suki, 2014; Wahab et al., 2011).

The IU construct focuses on indicators related to the intent to repurchase from a given smartphone application. The participants' samples are divided into three groups. The first group sees the importance of using smartphones' commercial application if the basic requirements are available. This segment wants to build loyalty with these applications, which is a wide range of participants in this study. The second group represents a medium "retention" rate; these consumers believe that the Intention to Use is relevant to the application if appropriate products are present (depending on the product price or the time to delivery). The audience in this group intends to use the commercial applications without specifying any specific application. The third group is seeking basic requirements in the application to build loyalty in the future towards a specific application or set of applications, but that loyalty does not exist yet (that is, the audience in this group have not yet found the application that is the target of their loyalty).   This segment is not wide and represents a low level of belief in the importance of the entire concept.

5.5 User satisfaction Requirements Construct

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Customer satisfaction levels represent a key aspect of any electronic system success, and thus it is important to set up basic, established steps for the acceptance of an online purchase system by a target audience (Hasan & Abuelrub, 2011; Noh & Lee, 2015; Wang, 2008). This construct focuses on finding out what level of customer satisfaction it is important to maintain, and correlates significantly with constructs including SQ, IQ and SQU. This construct contained three indicators: the importance of customer satisfaction for the use of commercial applications in smartphones; methods that would be helpful for delivery of customer feedback to interested parties within a company; and finally, the importance of matching the capabilities of smartphone commercial applications with user expectations.

- **The importance of user satisfaction for customers who use smartphone commercial applications – US01**

Studying consumer satisfaction with smartphone commercial applications helps to measure the consumer level of acceptance (Noh & Lee, 2015; Wang, 2008). The commercial applications should have everything the customer needs through their basic requirements. Therefore, communication channels with customers to measure their satisfaction level are very important, as are the other aspects that have been studied (many of which have been discussed previously). 95.3% of KSA sample, 96.5% of the Qatar sample, and 94.3% of UAE sample agreed with the importance of this indicator. Furthermore, customer satisfaction is revealed through many different communication channels with customers after the actual online purchase takes place. Most problems can generally be solved through various online communication channels, periodic customer satisfaction questionnaires, and so forth. Customers can also be motivated through special gifts or promotions that provide them directly with answers to their questions (Basu, 2007; Lee et al., 2014; Lu et al., 2015).

- **Provide helpful ways to direct customers' feedback to the right person in the case of dissatisfaction with a specific part of the application–US02**

Using the available communication tools in the smart phone application is important to deliver customer feedback to the correct parties who can make a decision about it (Chen, 2015). This indicator focuses on potential deficiencies in smartphone applications and will help a lot to improve these deficiencies and imbalances. Furthermore, the target audience will be more ready to accept the quality of the applications if their voices can reach the party that can make things better (Basu, 2007; Khan et al., 2015). The percentage of participants who saw the importance of this indicator in this study was 95.9% (averaged across all three samples). This means, in cases where customers are dissatisfied with a specific part of the program, it is important to take into account ways of helping the delivery of customers' feedback to the concerned parties with the technical know-how to fix the issue.

- **The M-commerce application system has met with user expectations – US03**

A mismatch between user expectations and the potential of smartphone commercial applications is an important indicator that can help companies bolster customer satisfaction and make sure their applications work in the future (Wang, 2008; Zahra et al., 2013). Therefore, the importance of this feature is providing right opportunity to take customers opinions in order to improve the quality of the commercial applications to be at the level of target audience expectations. High rates of participants (96.1% in KSA, 97.7% in Qatar, and 95.5% in UAE) agree with the importance of this indicator. The high proportion of agreement confirms the importance of understanding the requirements of smartphone commercial applications by customers, and this information can be used to develop commercial applications and increase customer satisfaction (Alqahtani et al., 2014).

5.6 Net Benefit Requirements Construct

Many net benefits accrue to individuals, organisations, and society at large when people are able to use commercial smartphone applications for a wide variety of everyday tasks. These benefits include the improvement of decision making with respect to online purchases, cost reductions, enhanced market efficiency, increased sales, improved productivity, and increased profits (Dingra, 2008; Rämänen et al., 2011; Schejter et al., 2010). This construct focuses on determining participants' views about the importance of indicators that have a significant correlation with both IU and US from among the earlier constructs. The NB construct contains three indicators: the value of products and services sold through smartphone applications is equivalent to the true value of these products and services; the price displayed for products and services in commercial applications is an acceptable price for the those who wish to purchase through a commercial application; and the time for purchase through electronic channels (including the time it takes to use the smartphone to make the purchase) up to delivery of the product is acceptable.

▪ **Services and products sold through smartphone applications represent good value and reflect the true value of the products/services – NB01**

Purchasing products through e-commerce does not use the same process as does traditional store based shopping. Some differences include the shipping process from one region to another; the fact that an online good is not stored and exhibited in a storefront; labour and wages (for those who work in the stores) are not applicable, although some staff is required to operate the physical shops which are not included in the online shopping which is called the administrative fees such as electricity, phone costs, government fees, and so forth (Niranjanamurthy & Kavyashree, 2013). Most of these costs should be reduced with the use of online shopping channels, which should provide an extra incentive for customers and ensure transition to electronic channels (AlGamdi et al., 2015; Bahaddad et al., 2014; Niranjanamurthy & Kavyashree, 2013). The drawback with online shopping is that the customer needs to wait several days to receive the product; online sales therefore do have some downsides. Accordingly, reducing product and service cost is a vital part of success with online shopping (Niranjanamurthy & Kavyashree, 2013). 75.3% of the study sample agreed with the importance of this indicator. One reason for this low percentage is that many of the commercial companies with online shops also have physical stores within the GCC geographical area. Many of these companies believe that online shopping channels are additional channels to increase their profit and do not have to be an extra burden. Hence, many websites for companies with physical stores try to sell the goods at the same price (Bahaddad et al., 2015; McWherter & Gowell, 2012; Niranjanamurthy & Kavyashree, 2013) through both means. In that circumstance, the online purchasing is not a good deal, since it does not price in the negative elements of online shopping (for example, that you do not get the product for several days). These companies (many in GCC region) do not accept the concept that the target audience will not engage in e-commerce unless there is a 20% to 25% discount on the normal price or attract consumers to get free shipping for their products (Bahaddad et al., 2015; Bose & Sugumaran, 2006; pixelovely, n.d.). Trying to use different experience with revising prices may allow individuals to purchase more readily through online channels, as they can reduce their costs that way.

▪ **The price of the product and service on the M-commerce application system is generally acceptable – NB02**

Offered price in e-commerce represents one of the big challenges for sellers because they are often attracted to the concept of a good profit without additional cost. However, such commerce actually has special requirements that change what counts as an acceptable price (McWherter & Gowell, 2012; Niranjanamurthy & Kavyashree, 2013); from the perspective of the study participants, often the prices

are not acceptable to the extent that they lead to purchases, as the proportion of agreement for this indicator is only 71.1%. Reconsideration of the expected profit ratio for online sales channels is very important in order to help persuade consumers to use this approach as one of the new solutions that provides a wide variety of consumer benefits. In other words, once consumers become aware of a pricing advantage, they also become aware of other potential advantages related to e-commerce (AlGamdi et al., 2015; Niranjanamurthy & Kavyashree, 2013).

▪ **The time spent in the M-commerce application system is appropriate – NB03**

Customers will only use mobile sales platforms on smartphones frequently if doing so leads to timely sales interactions. An average of 74.71% of the participants saw the importance of being able to complete the online purchasing process through commercial applications in a reasonable time (Noh & Lee, 2015; Wang, 2008; Zahra et al., 2013). Information provided by the application must be quickly readable and understandable (Zahra et al., 2013). Additionally, the images and videos should be displayed in a professional manner, and downloads should be of high quality. Therefore, it is important to implement an online purchasing time similar to what is available on websites (Dingra, 2008; Li & Suomi, 2009; Rämänen et al., 2011). Reducing this time in order to provide an appropriate means of finding their target audiences is also one of the challenges for companies that operate in the development of commercial applications in smartphones (Alwahaishi & Amine, 2014).

5.7 Summary of ISS Model Requirements

The summary shows similarities between various segments of ISS constructs the study, but there are some differences between other indicators in certain groups. Initially, the indicator number SQ02 presented a difference in the Qatar sample from the rest of the other samples. It focused on the importance of commercial applications in meeting customer requirements. Additionally, there was a difference between the study samples in the index IQ03, which focused on the consumer's feelings of trust in the information displayed. The results in this indicator had a varied ratio of approval as to the importance of the indicator. In the KSA, the ratio was 97.40%, while in Qatar it was 90.10%, and in UAE 84.90%. Therefore, the seller and relevant ministries such as Ministry of Commerce seek to provide information that engenders trust in this style of shopping in the beginning. Furthermore, the results showed some differences in the indicator IU03, which focused on the re-use of M-commerce applications regularly in the future. The level of acceptance in the study samples varied with new technologies because of the basic requirements needed by the target audience for these applications. Finally, the indicator NB03—time spent on online purchasing through commercial applications in smartphones was at an acceptable level. This indicator was more important in Qatari society than in other samples. The other indicators showed similarities in the results, which might be helpful for building similar commercial applications in most of GCC societies. The exceptions were the indicators described at the end of each set of the four main previous constructs, which represented part of the ISS model.

The NB construct attempts to determine the benefits conferred by commercial smartphone applications. These benefits stem from US and IU and can be deduced by figuring out the importance of the NB aspect of commercial application systems in particular (DeLone & McLean, 1992; DeLone & McLean, 2004; Seddon, 1997). The correlation between US and NB is different across the study samples. This difference leads to differences in NB for any segment of the study; that is, net benefits are different from one community to another, one generation to another, and from one decade to another, depending on technical developments year over year (Parasuraman & Grewal; 2000). Many previous studies indicate that the concept of 'benefit' could be limited to the changing material value or quality of the

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product (Zeithaml, 1988; Monroe, 1990), while others assert that benefit refers to product quality only (Zeithaml, 1988). Still other research correlates benefit with after-sales service and adds this to the perceived value of a product by arguing that perceived value cannot be computed without quantifying in some way the actual consumer experience during purchase (Wang, 2008; Wu & Wang, 2006).

6. Implication

The value added, which represents one of the main pillars in previous research on electronic shopping systems, should be determined by identifying the basic requirements for acceptance of M-commerce, which stems from systems, information and service quality requirements (DeLone and McLean, 2004; Petter et al., 2013; Wang et al., 2006). These requirements represent the customer knowledge side of satisfaction; value added enriches quality for customers, which is the appropriate way to establish the importance of the consumer online shopping experience through smartphone commercial applications (Kuan, 2008; Zhou, 2011; Chen & Chang; 2009). US and IU a system represent the emotional side of customer satisfaction, which is important for M-commerce success systems in the future (Wang, 2008; Petter et al., 2013). The results of this study noted that people who use electronic commerce systems constantly perceive the value added, which is part of the NB construct, which is a strategic valuable dimension (Hung et al., 2012; Legner, 2011). Additionally, ease of using adds comfort to use of an electronic commercial system, which is fundamental to customer and behaviour requirements. The consumer requirements are measured by the perceived benefits of qualities requirements, while consumer behaviours are measure by US variables, which represent the emotional situation. Both sides of customer satisfaction (knowledge and emotional) represent important requirements for attracting the target audience to try M-commerce, which leads to the cognitive assessments that occur prior to emotional responses (Bagozzi, 1992; Chen & Cheng, 2009; Petter et al., 2013; Wang, 2008; Wu & Wang, 2006; Zhou, 2011). In addition, US and value added are complementary constructs that come after saturating the cognitive side with knowledge to make a decision (Hasan & Abuelrub, 2010; Liang et al., 2011, Wang, 2008). The regular use of mediators between the knowledge and emotional sides of customer satisfaction regarding electronic shopping systems toward reuse intentions, would be helpful for developing the appropriate reaction by application developers to the belief the knowledge importance (Caruana & Fenech, 2005; Liang et al., 2011; Lin & Wang et al., 2006).

As mentioned previously, the proposed model of ISS commercial systems contains the knowledge side, which is built on diverse quality requirements (Davis, 1989; Deng et al., 2010; Kuan et al., 2008; Petter et al., 2013; Venkatesh et al., 2003; Zhou, 2011). Therefore, the belief in value added in regard to commercial applications is represented in the quality requirements that meet actual customer needs (Kuan et al., 2008; Zhou, 2011). Attitudes appear as consequences of customers' behaviour and are added when evaluating electronic systems (Khalil, 2014; Petter et al., 2008; Zhou, 2011). Therefore, habits and behaviours are essential aspects that help determine user satisfaction and build loyalty with interested companies to encourage adoption of commercial electronic systems (Chang et al., 2015; Hung et al., 2012; Lee et al., 2007; Petter et al., 2013; Wang, 2008). Once target populations are identified, the appropriate loyalty can be designed and built as required. The relationship in many traditional business contexts focuses on four basic parameters: quality requirements, value added, user satisfaction and building loyalty (Lin & Wang, 2006; Wang, 2008). These are used to implement business oriented to specific segments of communities to study behaviours and understand the requirements needed to maintain and expand the target segment in the future (Chen & Cheng, 2009; Lam et al., 2004).

In the DeLone & McLean model, the service quality requirements represent one basic criterion to measure the level of success in electronic systems, of which electronic shopping systems are a part. In this study, the results of the SQU requirements greatly affected the IU through value added, which is a significant aspect of gaining US. The importance of this part, through providing appropriate tools to maintain relations with companies' customers via a variety of means to communicate or loyalty programs, which represent the main value added in SQU requirements part. Thus, in the future research it might be good to investigate sacrifice the gain and profits for increase the level of customer satisfactory as fundamental criterion of the user satisfaction requirement for success in dealing with the acceptance of smartphones commercial applications.

Growing development in electronic systems for the conduction of e-commerce and growth of IS Success and acceptance of various models in commercial applications has been a good way to understand the various dimensions of net benefits and other outcomes of these approaches; this is particularly true of GCC states, which have shown a growing interest in smartphone devices (eMarketer, 2015b). It has also increased online business in these countries in the past decade to appropriate levels that will create strategies for improving incomplete success variables that effect GCC societies in particular (Alpen Capital, 2011; Hu et al., 2010).

7. Limitations and Future Study

The ISS model is a relatively new model in M-commerce research. Its results and effects on different types of e-commerce in previous studies targeted many consumer groups around the world and in the GCC region. This study was conducted in three countries of the GCC: KSA, Qatar and UAE. Thus, the results of this study are limited to the GCC characteristics because of the convergence between these countries in their overall tradition aspects and their preservation level of religious values. However, it would be interesting in future research to prepare a similar study to validate the model in different cultural contexts of Arabic communities, because the ratification of diverse cultures and using a large sample collected in a variety places, would help the circulation of the proposed model in various Arabic communities.

The cumulative visions of previous studies support the determination of the NB for its importance in many aspects of this study such as the benefits belong the consumer, companies, and products (Legner, 2011; Petter et al., 2013; Wang et al., 2006). Thus, identifying the standards of the NB might lead to knowing the specific NB sought in various types of M-commerce systems. Determining NB requires critical thinking and empirical research, especially on those factors that vary from one community to another.

This was a preliminary study of an ISS model in M-commerce, which focused on one side of the stakeholders, the customer. M-commerce system success models can be developed using other stakeholders and levels of analysis to increase accuracy and validate the framework properly in the results of future research. Thus, every empirical study has limitations. Therefore, future studies in this field should identify the indicators of successful commercial smartphone applications by using Delone and Mclean's ISS model in other settings and for other populations.

8. Conclusion

This study focused on the verification of the DeLone and Mclean model for ISS in the m-commerce field, which represents the achievement of success in online commerce systems. It concentrated on identifying the shortages and difficulties of previous successful models that have been applied over the

past two decades. These models had many positive and negative aspects and thus were re-examined. Validating the current ISS model was important in this study. Furthermore, the indicators in this study received emphasis to measure the model's success based on the target audience's requirements. This study is the beginning of many future studies in Arabic societies that would be helpful for increasing the outputs of many of future studies. For example, future studies could deal with testing and determining the characteristics of Arabic individuals who are doing online shopping via smartphone commercial applications. Studies could also focus on what practical functions can be added to commercial applications to increase the chance of success of commercial applications in special communities. In conclusion, this paper has emphasised the importance of focusing on the discussions, contributions, and limitations that can be addressed in extensive studies in the future.

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Appendix A

Frequencies of Demographic Variables

	KSA		Qatar		UAE	
Category of Participants	No.	%	No.	%	No.	%
All participating	386	100%	171	100%	246	100%
Q1. Gender						
Male	225	58.3	101	59.06	135	54.9
Female	161	41.7	70	40.94	111	45.1
Q2. Age group						
From 15 - Under 20	28	7.25	5	2.92	2	0.81
From 20 - Under 30	95	24.61	41	23.98	65	26.42
From 30 - Under 40	190	49.22	90	52.63	110	44.72
From 40 - Under 50	43	11.14	20	11.70	53	21.54
From 50 - Under 60	16	4.15	9	5.26	12	4.88
More than 60	5	1.30	3	1.75	1	0.41
Missing	28	7.25	5	2.92	3	1
Q3. Current Educational level						
PhD	78	20.21	27	15.79	32	13.01

Master	122	31.61	61	35.67	83	33.74
Bachelor	135	34.97	71	41.52	94	38.21
Diploma	18	4.66	-	-	12	4.88
High School	20	5.18	6	3.51	19	7.72
Missing	13	3.37	6	3.51	6	2.44
Q4. *Do you use the mobile phone for online purchasing*						
Yes	328	84.97	153	89.47	226	91.87
No	44	11.40	13	7.60	16	6.50
Missing	14	3.63	5	2.92	4	1.63
Q5. *How regularly do you purchase online*						
Less than once a month	193	50.00	91	53.22	133	54.07
1-2 a month	111	28.76	47	27.49	64	26.02
1-2 a fortnight	21	5.44	9	5.26	16	6.50
1-2 a week	11	2.85	3	1.75	14	5.69
Daily	32	8.29	15	8.77	17	6.91
Missing	18	4.66	6	3.51	2	0.81

Appendix B

Descriptive Statistics of All Indicators

Descriptive Statistics of System Quality Indicators Construct															
	KSA					Qater					UAE				
VD	Mean	Mean 5%	Δ Mean*	SD	SE	Mean	Mean 5%	Δ Mean*	SD	SE	Mean	Mean 5%	Δ Mean*	SD	SE
SQ01	4.5492	4.616	-0.07	0.62	0.03	4.3743	4.4224	-0.05	0.67	0.05	4.3862	4.4517	-0.07	0.69	0.04
SQ02	4.601	4.6765	-0.08	0.66	0.03	4.0292	4.0650	-0.04	0.79	0.06	4.5569	4.6174	-0.06	0.60	0.04

Descriptive Statistics of Information Quality Indicators Construct

IQ01	4.7409	4.7965	-0.06	0.50	0.03	4.6667	4.6982	-0.03	0.50	0.04	4.6911	4.7891	-0.10	0.63	0.04
IQ02	4.6036	4.6526	-0.05	0.55	0.03	4.3216	4.3769	-0.06	0.74	0.06	4.6179	4.6807	-0.06	0.57	0.04
IQ03	4.8031	4.8656	-0.06	0.46	0.02	4.4094	4.4613	-0.05	0.68	0.05	4.2724	4.3388	-0.07	0.79	0.05
IQ04	4.6244	4.711	-0.09	0.65	0.03	4.4444	4.4773	-0.03	0.56	0.04	4.4512	4.5059	-0.05	0.65	0.04
IQ05	4.6762	4.7418	-0.07	0.56	0.03	4.4912	4.5227	-0.03	0.56	0.04	4.4675	4.5194	-0.05	0.60	0.04

Descriptive Statistics of Service Quality Indicators Construct

SQU01	4.63	4.72	-0.0	0.66	0.03	4.56	4.64	-0.0	0.70	0.05	4.77	4.82	-0.0	0.47	0.03

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	73	54	9			73	33	8			24	52	5		
SQU02	4.3005	4.3425	-0.04	0.64	0.03	4.4795	4.5393	-0.06	0.66	0.05	4.5488	4.6188	-0.07	0.71	0.05
SQU03	4.6762	4.7571	-0.08	0.60	0.03	4.7895	4.8606	-0.07	0.49	0.04	4.4553	4.5194	-0.06	0.69	0.04
SQU04	4.7024	4.6269	0.08	0.60	0.03	4.4211	4.5068	-0.09	0.77	0.06	4.7520	4.8356	-0.08	0.54	0.03
SQU05	4.2073	4.2504	-0.04	0.69	0.03	4.2807	4.3314	-0.05	0.76	0.06	4.4756	4.5736	-0.10	0.76	0.05
SQU06	4.2824	4.3195	-0.04	0.65	0.03	4.4035	4.4483	-0.04	0.67	0.05	4.2520	4.3297	-0.08	0.81	0.05

Descriptive Statistics of Intention to Use Indicators Construct

IU01	4.0725	4.1036	-0.03	0.69	0.04	4.2281	4.2729	-0.04	0.76	0.06	4.3374	4.3839	-0.05	0.74	0.05
IU02	4.0777	4.1065	-0.03	0.71	0.04	4.0936	4.1595	-0.07	0.87	0.07	4.1341	4.1716	-0.04	0.76	0.05
IU03	3.956	3.9568	0.00	0.71	0.04	3.8889	3.8765	0.01	0.71	0.05	4.2114	4.2620	-0.05	0.78	0.05

Descriptive Statistics of User Satisfaction Indicators Construct

US01	4.6373	4.7044	-0.07	0.57	0.03	4.6842	4.7437	-0.06	0.54	0.04	4.5854	4.6504	-0.07	0.60	0.04
US02	4.6114	4.6813	-0.07	0.59	0.03	4.6316	4.6787	-0.05	0.55	0.04	4.5650	4.6414	-0.08	0.63	0.04
US03	4.6813	4.7476	-0.07	0.55	0.03	4.7076	4.7567	-0.05	0.51	0.04	4.6463	4.7258	-0.08	0.61	0.04

Descriptive Statistics of Net Benefit Indicators Construct

NB01	4.0285	4.1131	-0.08	1.04	0.05	3.9649	4.0721	-0.11	1.19	0.09	4.0894	4.1820	-0.09	1.03	0.07
NB02	3.8938	3.9721	-0.08	1.04	0.05	4.0058	4.0815	-0.08	0.97	0.07	3.8902	3.9562	-0.07	1.00	0.06
NB03	4.0130	4.0872	-0.07	0.95	0.05	4.1520	4.2375	-0.09	0.92	0.07	4.0000	4.0781	-0.08	1.00	0.06
NB04	4.4093	4.4807	-0.07	0.75	0.04	4.4386	4.5198	-0.08	0.75	0.06	4.4106	4.4788	-0.07	0.73	0.05