QATAR UNIVERSITY

COLLEGE OF BUSINESS AND ECONOMICS

M-SERVICE QUALITY OF TELECOMMUNICATION COMPANIES IN QATAR

BY

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ABSTRACT

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Title: E-Service Quality of Telecommunication Companies in Qatar

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Today, although mobile applications make our lives easier, the service quality provided by such applications has become a vital element in increasing customer satisfaction. This research paper aims to identify the significant mobile service quality factors (Application Design, Ease of Use, Information Content, Reliability, Responsiveness, Empathy, Security and Prices and offers) that influence customer satisfaction and loyalty in Qatar's telecommunications sector.

To answer the research question and test the hypotheses that form the study model, data were collected through an online questionnaire of 195 random customers who use Ooredoo or Vodafone mobile applications in Qatar. The proposed model was evaluated using partial least squares structural equation modelling (PLS-SEM). The results show that Ease of Use, Information Content, Responsiveness and Security are the most significant factors that affect M-Customer Satisfaction. Also, there is a strong relationship between M-customer Satisfaction and M-loyalty. On the contrary, Application Design, Reliability, Empathy, and Prices and offers did not affect M-customer satisfaction.

Thus, the managers in telecommunication companies should adopt a strategy that focuses on the M-service quality factors that most influence M-customer satisfaction to increase customer satisfaction rates and loyalty to their products and services. It will also help reduce overall costs by delivering those products and services to a higher proportion of customers through the mobile application rather than physical branches. This paper also helps the researchers use the proposed model in future

research to understand these relationships in other countries better.

Keywords: M-service Quality, Application Design, Ease of Use, Information Content, Responsiveness, Security, Reliability, Empathy, Prices and offers, M-customer satisfaction, M-loyalty, e-service Quality, e-customer satisfaction, e-loyalty, telecommunication, mobile application.

DEDICATION

I dedicate this research to My family who supported me during the MBA programme.

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First of all, thank God for giving me the strength and patience to complete this MBA programme and finalise this research paper. After that, I would like to thank my supervisor Professor Emad Abu Shanab, for his continuous support and guidance throughout the graduation project stages. Thank you for sharing your experience with me as a mentor and friend to overcome the difficulties I faced during the research. I look forward to working with you to do more research papers in the future.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER 1: INTRODUCTION

1.1. Background

1.1.1. The Growth of Mobile Services

Today, more than three and a half billion people are using a smartphone, and this number is expected to increase by several hundred million in the next several years(O'Dea, 2020). With the rapid development of information technology, the smartphone creates new opportunities for mobile development companies, internet service providers and other sectors to build competitive advantages (Gowthami & Venkatakrishnakumar, 2016).

One of the most attractive features of modern smartphones are the wide range of applications that can be used on them. The advent of software development kits (SDK) and service platforms has revolutionised the development of applications (Phongtraychack & Dolgaya, 2018), allowing companies rapidly to create e-service/e-commerce mobile applications that can deliver competitive advantages. E-service, which may include e-commerce, is the act of providing services through the Internet (Alotaibi, 2020), while any transactions and information accessed through mobile devices are called m-service/m-commerce (Mort & Drennan, 2005) .

M-service/m-commerce applications allow companies to reach their customers and promote their product and/or service easily, effectively and at a low cost, wherever their customers are. Moreover, mobile apps are easier to set up and maintain than websites. Also, they increase the inventory turnover ratio by reaching more customers, and selling more products to them, faster than physical stores. This reduces the overall maintenance and inventory cost. In addition to that, mobile apps create an opportunity channel to bring new customers to the company, because they are always available in the app store to download. Furthermore, with innovative templates and simple

functionality, they can provide customers with a quality shopping experience. For all these reasons, the strategic use of mobile applications can improve customer experience (Kaur & Kaur, 2016).

1.1.2. Telecommunications in Qatar

In the last decade, there have been massive changes in consumer trends in the telecommunications industry from customers just using standard voice calls and Short Message Services (SMS) to more and more internet data consumption (Ernst & Young, 2016). This change in how phones are used extends to the sheer scale of mobile phone adoption. More than four million users are registered on Qatar's mobile network, which means more than 150% of the total population (Simon, 2020). These telecommunications services, including mobile and broadband networks, are delivered by a duopoly comprised of Ooredoo Qatar and Vodafone Qatar (Diane, 2019).

Ooredoo Qatar, formerly known as Qtel, was established in 1998 by the privatisation and listing on the Qatar stock exchange of the Qatar Public Telecommunications Corporation (QPTC). Ooredoo provides landline and mobile services, fibre-optic Internet and financial services, under the name Ooredoo Money, through which customers can use their mobile phones to pay bills, wages for their domestic workers, and send money within Qatar or internationally (Ooredoo, n.d.).

Meanwhile, Vodafone Qatar started operations in March 2009 to become the second telecoms provider in Qatar. It is also listed on the Qatar Stock Exchange and provides a range of services that include mobile services, Internet and IoT and ICT management solution. Today, it serves more than 1.7 million subscribers in Qatar (Vodafone, n.d.).

Both of these companies have their own mobile app and, as the major portal through which they engage with their customers and provide e-services, this has

become the focal point for competition between them.

1.1.3. M-Service Quality, M-customer Satisfaction and M-Loyalty

Service Quality is a measure of how well the service provider's service level meets customer expectations (Gronroos, 1984; Parasuraman et al., 1985). Nowadays, this concept encompasses e-service and m-service quality in order to reflect the growth of electronic and mobile commerce. E-Service quality is the consumers' overall feedback about the services provided to them on the online market (Hidayat, 2020; Santos, 2003). Likewise, Zeithaml (2002) and Parasuraman et al. (2005) defined e-service quality as the extent to which a website makes browsing, purchasing, and distributing goods and/or services efficiently and effectively. In the m-service/m-commerce context, m-service quality is a way of assessing applications based on several criteria (for example, Responsiveness, Empathy, Tangible, Assurance and Reliability) relating to the development of the application and services provided by organisation via the application (Georgiadis & Stiakakis, 2009).

Customer satisfaction is the disparity between prior expectations and cognitive output (Tse & Wilton, 1988). E-customer satisfaction is therefore described based on the customer's previous purchase experience in e-commerce (Anderson & Srinivasan, 2003). Likewise, e-customer satisfaction is defined as the customer's psychological assessment of their experience of the purchasing process and product usage (Kim, 2005). A high degree of satisfaction leads to product repurchase intention and behaviours. Investing in customer satisfaction is like purchasing insurance, allowing a firm to retain some customer loyalty even in the face of a crisis (Anderson & Srinivasan, 2003).

Loyalty means the desire to repurchase goods and services reliably in the future (Khan, 2013). Thus, e-loyalty is defined as the customer's intention to revisit or make

a transaction from a specific website in the future (Cyr et al., 2007). Likewise, Anderson and Srinivasan (2003) described e-loyalty as customers' positive attitudes towards e-commerce, which leads to repeat purchasing activity.

In mobile applications (m-service/m-commerce), m-customer satisfaction and m-loyalty reflect customers' happiness to use the applications and recommend them to others (Choi et al., 2008). M-satisfaction is the main variable determining how successful applications are (Wang & Liao, 2007).

1.2. Research Questions

Currently, many organisations are focused on e-service/e-commerce or m-service/m-commerce to provide adequate services for customers. Several factors for evaluating these applications, and they affect customer satisfaction. Thus, this study seeks to answer the following questions.

Q1: What are the critical factors that affect m-customer satisfaction?

Q2: Are customers satisfied with Ooredoo's and Vodafone's mobile applications?

Q3: How does m-customer satisfaction affect customer M-loyalty?

1.3. Project Objectives

This study aims to measure m-service quality factors for mobile application in the telecommunications industry, specifically, Ooredoo's and Vodafone's mobile applications, and determine how they affect m-customer satisfaction. It also studies the impact of m-customer satisfaction on e-loyalty. The following objectives will be met in the course of the study:

- Examine the effect of m-service quality factors (Information content, Application Design, Ease of use, Reliability, Empathy, Responsiveness, Security, and Prices and Offers) on M-customer satisfaction in respect to Ooredoo's and Vodafone Qatar's mobile applications.

- Examine the level of customer satisfaction regarding use of mobile applications.
- Examine the correlation between M-customer satisfaction and M-loyalty among users of Ooredoo's and Vodafone Qatar's mobile applications.

1.4. The problem statements

M-service is not just delivering the organisation's services via the mobile application but is the central way for organisations to interact with their customers through the mobile application. Some organisations use m-services without considering the quality of the application and how it will help their customers. Managers responsible for service provision should understand how the customer evaluates their online services, identify critical e-service quality dimensions that affect e-service, and measure them (Zeithaml et al., 2002).

1.5. Importance of the study

A few papers (Anjum et al., 2016; Kazem, 2020; Moghadam & Kaboly, 2015) have focused on m-service quality, mainly in the telecommunications sector, and the impact on m-customer satisfaction and m-loyalty. This study builds on that work by evaluating telecommunication companies' mobile applications in Qatar, while also adding more factors to the m-service quality model used in previous studies. It is anticipated that, with time, researchers will improve their understanding of the specific characteristics and dimensions affecting the model, thereby providing a framework for a deeper understanding of m-service in the telecommunications sector.

CHAPTER 2: LITERATURE REVIEW

2.1. M-Service Quality

The first structured attempt to measure service quality (SERVQUAL) was developed in 1985 by Parasuraman and his partners, and contained ten factors (access, communication, competence, courtesy, credibility, reliability, responsiveness, Security, tangibles, and understanding/knowing the customer) (Parasuraman et al., 1985). Later, in 1988, they reduced these to five core dimensions (tangibles, reliability, responsiveness, assurance and empathy) (Berry et al., 1988). Those factors have subsequently been utilised in several research papers to measure SERVQUAL in different organisations. Ariff et al. (2012), Nemati et al. (2012) and Stiakakis & Georgiadis, 2009) all agree that the first paper to develop e-service quality (e-SQ) dimensions for online services was that of Zeithaml et al. (2000). Based on focus group interviews segmented according to age and experience with internet purchasing, Zeithaml et al. (2000) found that customers considered the following factors when assessing the e-SQ: access, ease of navigation, efficiency, flexibility, reliability, personalisation, Security and privacy, responsiveness, assurance and trust, site aesthetics and price knowledge. Yang et al. (2003), meanwhile, tried to explore e-SQ dimensions by following users' reviews in the most ten prominent websites selected on the basis that they (1) allowed customers to rate and write impartial comments about the company; (2) allowed the customer to type positive and negative comments; and, (3) that no financial motivation was offered to customers to share their opinion. They identified fourteen factors in total, but found that eight of these, responsiveness, credibility, ease of use, reliability, convenience, communication, access and competence, formed 89.9% of all mentions. In contrast, the other six factors (courtesy, personalisation, continuous improvement, collaboration, security/privacy and

aesthetics) appeared in only 10.1% of the comments. They also found that responsiveness, reliability, ease of use and credibility are the most factors that most affect customer satisfaction. A study by Ting et al. (2016) used efficiency, privacy and trust, fulfilment, responsiveness, contact and website design as factors to evaluate the impact of e-SQ on e-satisfaction and e-loyalty for online retailer websites. They found that all the above elements had positive and significant effects on e-satisfaction. Correspondingly, Zhou et al. (2019) tested the impact of e-SQ factors (functional completeness, performance, interface and interaction quality, content and information, support or service) on customer satisfaction and loyalty in telecom sectors. They confirmed that those variables had a positive impact on customer satisfaction and loyalty. Likewise, Li and Suomi's (2009) systematic review of the research in this area explored eight critical dimensions for e-SQ (reliability, responsiveness, personalisation, fulfilment, Security, empathy, information and website design). Similarly, Rita et al. (2019) used website design, fulfilment, security/privacy and customer service to determine the e-SQ, finding that the first three of these have the most impact on the e-SQ. On the other hand, the paper of Al-dweeri et al. (2017) found that customer service positively affects e-customer satisfaction, whereas privacy and efficiency did not have any relation to e-satisfaction.

Ladhari (2010) and Murad et al. (2018) both found the same six common factors that were often used in earlier studies to determine e-SQ: namely, privacy and Security, design, the accuracy of the information, ease of use, reliability and responsiveness.

Nowadays, mobile devices have become the key point for users to purchase or apply for a service (Kaatz et al., 2018). For that reason, several studies have sought to build on the e-SQ research to create a model for mobile applications' service quality. Rahman et al. (2017) used five factors (tangibles, reliability, responsiveness, empathy

and assurance) to evaluate mobile banking applications in Bangladesh, finding that the first four of these were the most significant factors affecting customer satisfaction. Also, Jun and Palacios (2016) discovered that accuracy, ease of use, features and convenience were the main variables for customer satisfaction or dissatisfaction with m-service quality. Likewise, Huang et al. (2015) concluded that contact, responsiveness, fulfilment, privacy and efficiency were five m-service quality factors essential for service applications; while contact, responsiveness, fulfilment and efficiency were necessary for m-retailing applications.

Based on the above work, the model of M-SQ created in this thesis applies the following factors to evaluate m-customer satisfaction with telecommunication sector applications in Qatar: Application Design, Ease of use, Information Content, Reliability, Responsiveness, Empathy, Security, and Prices and offers. These are introduced in turn below.

2.2. Research model:

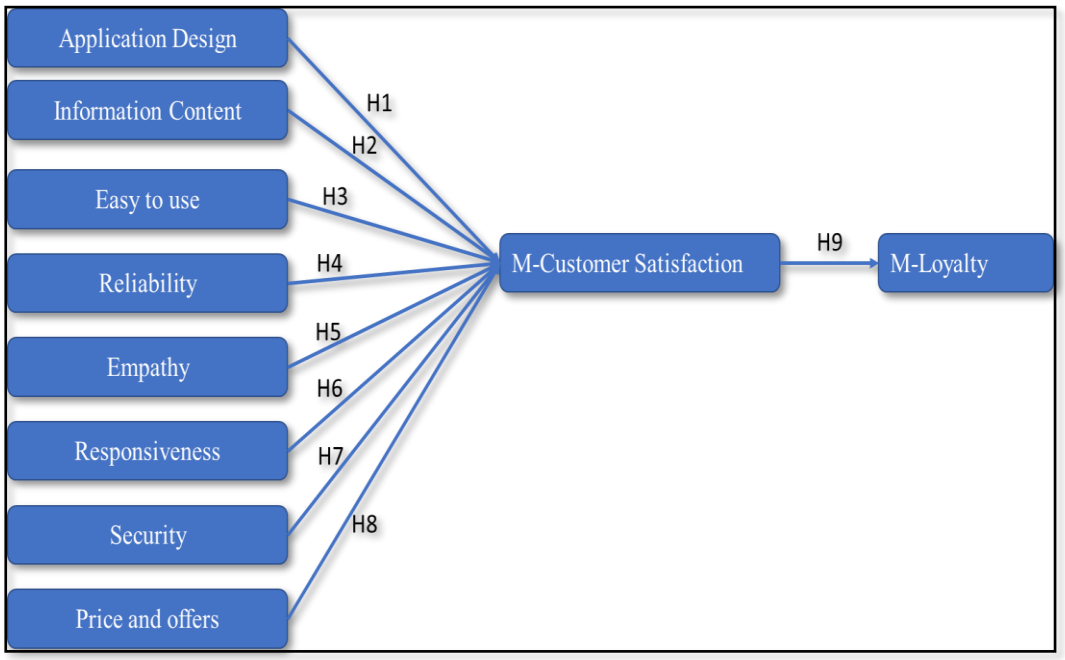

Figure 1: Research model

2.2.1. Application Design

Design is the system's layout that is presented to the users (Christian & Ayodele, 2020). According to Zehir and Narcıkara (2016), the design is defined as to what degree the mobile application design is appropriate, clear and friendly to users. For both websites and mobile applications, the system's design is the first point to create customer confidence. It should contain an attractive user interface with good navigation to attract more customers (Li & Suomi, 2008). It plays an important role that influences customer purchase intention (Wilson et al., 2019; Zhang & Prybutok, 2005), while, according to Cristobal et al. (2007), the web design should be user-friendly in terms of enabling users to place orders and search for items quickly. Such systems are associated with higher customer satisfaction and loyalty, and thus system design is one of the dimensions that positively affects both overall e-service quality (Rita et al., 2019) and e-customer satisfaction (Christian & Ayodele, 2020; Lee & Lin, 2005; Ul Haq & Awan, 2020; Wilson et al., 2019). On the other hand, the study by Arcand et al. (2017) found no link between application design and customer satisfaction.

On the mobile application side, the design has been found to be an important dimension underpinning perception of M-SQ, with a p-value of < 0.01 (Kaatz, 2020). Lin (2013) and Özer et al. (2013), meanwhile, discovered that applications that have a good layout make users more confident and allow them to learn the application features fast. The application design factor is measured by: design professionality, creativity and visual appeal (Arcand et al., 2017).

Accordingly, the following hypothesis will be examined:

H1: Design of mobile applications has a significant and positive relationship with m-customer satisfaction.

2.2.2. Information Content

In e-service quality, the information content is defined as the extent to which the content, pictures, and related information are clear and easy to understand (Lin & Wu, 2002). Thus, the information includes the details of the service offering, the status of the order, and the clear presentation of relevant policies on a webpage (Raval & Bhatt, 2020b, 2020a). Moreover, the information presented must be brief, correct, and useful in respect to the service or product (Abelse et al., 1998).

In an m-service quality context, meanwhile, information is defined as the extent to which the information in the mobile application is suitable and correct (Huang et al., 2015). It should be accurate and contain specific details about the company's items or services (Wulfert et al., 2019).

The information content was one of the essential variables that Tandon et al. (2017) found as affecting customer satisfaction positively. Zhou et al. (2019) also found that information content is crucial for e-service quality, explaining 16.7% of customer satisfaction. On the other hand, Singh (2018) reported that information content was not a statistically significant influence on m-customer satisfaction, with a p-value equal to 0.653.

Wulfert et al. (2019) measured the information content through assessments of competence, usefulness and correctness. Similarly, Lin (2013) evaluated information content by means of four attributes: accuracy, up-to-date, relevance and completeness. Huang et al. (2015), meanwhile, weighed information content by eight attributes: brief information about product, accuracy, completeness, relevance, important details, fashionable content, up-to-date and clarity.

These result from previous articles lead us to develop and test the following

hypothesis:

H2: Information content has a significant and positive relationship with m-customer Satisfaction

2.2.3. Ease of use

The application should be easy to understand, manageable, precise, flexible, comfortable and easy to use (Moghadam & Kaboly, 2015; San et al., 2010). Ease of use is defined as to what degree the user believes that using a particular system would be free of effort (Ojasalo, 2010; Venkatesh & Davis, 2000). It should also be easy for users to search and navigate the system (Ojasalo, 2010; Santos, 2003). For Santos (2003, this was the most significant value in e-service quality, while, in e-banking practices, ease-of-use has been found as positively affecting e-Customer satisfaction (Abd Ghani et al., 2017; Kumbhar, 2011). Similarly, Tu et al. (2012) found that ease of use in e-auction systems positively influences customer satisfaction. In telecommunications field, the study of Moghadam and Kaboly (2015) concluded, based on 332 participants, that customers determined ease of use as a medium to highly important factor in e-service quality, and that they were more likely to return to easy to use applications in the future. Özer et al. (2013), meanwhile, found that ease of use has a positive effect on m-customer satisfaction.

Ease of use is measured by three attributes: classification of menu, easy to navigate and design of application. It is also quantified by consistency and standardisation, reduced effort, application organisation and ease of using the application; with these positive outcomes in these factors being linked to improved customer loyalty (Younus Hossain & Hossain, 2011). On the contrary, Đkudienë et al. (2015) reported that ease of use did not affect customer satisfaction in e-shops in a

statistically significant way (p >0.05). Thus, this leads us to test the following hypothesis:

H3: ease of use has a significant and positive relationship with m-customer satisfaction.

2.2.4. Reliability

In the traditional service quality (SERVQUAL) model, reliability is defined as a firm's ability to perform what it promised correctly and successfully (Berry et al., 1988; Parasuraman et al., 1985). Turning to e-service quality, reliability, is the extent to which the platform (mobile app or/and website) delivers the service or product as promised, and the extent wo which the technical functioning is available and working correctly (Sohn & Tadisina, 2008; Stevano et al., 2018; Swaid & Wigand, 2007). Papadomichelaki and Mentzas (2009) went further to include within the concept of reliability the accessibility and availability of the platform, and the speed of loading and transaction. Swaid and Wigand (2007), meanwhile. used the following attributes to evaluate reliability: availability, order confirmation, cancellations and refunds, order tracking, as promised, and first time right. Their results, based on responses from 370 online customers, showed that reliability is one of most significant variables affecting e-customer satisfaction in e-commerce. Similarly, the research of Anjum et al. (2016), which focused on the telecommunications sector, discovered that reliability positively influences customer satisfaction ($p < 0.05$). On the other hand, Stevano et al. (2018) found that reliability has no impact on customer satisfaction.

In respect to M-SQ, meanwhile, Jun and Palacios (2016) applied the Critical Incident Technique to identify reliability both as one of the elements underpinning M-SQ and as playing an important role in determining customer satisfaction or dissatisfaction. The Critical Incident Technique is a qualitative analysis technique used in consumer markets research to discover the main source of customer satisfaction and

dissatisfaction. Using quantitative methods Aghdaie and Faghani (2012) also found that reliability had a positive and significant relationship with customer satisfaction.

In e-SQ, reliability is measured by premises to do, order confirmation, system availability, order tracking, refunds and cancellations and providing the service right the first time (Swaid & Wigand, 2007). Wulfert (2019) added "sustainable updating" to the above list in the context of mobile applications.

Hence the following hypothesis will be tested:

H4: reliability has a significant and positive relationship with e-customer satisfaction.

2.2.5. Empathy

In the SERVQUAL model, empathy is defined as the personal attention paid to customers (Berry et al., 1988). While there is no direct human interaction in e-services, some human function is still needed to complete the task and serve the customers (Aly Shared, 2019). In this context, therefore, empathy is defined as the attention paid to individuals through electronic channels (Li et al., 2009), e.g. by contacting customers directly through online communications rather than sending auto-replies (Madu & Madu, 2002). Taking customers into account is also considered a type of empathy (Ali et al., 2017). Li et al. (2009) and Zhang and Prybutok (2005) concluded that empathy was a critical e-service quality factor to satisfy customers. Several papers have also agreed that empathy is the significant factor having a positive impact on e-customer service (Ahmed et al., 2017; Hadid et al., 2020; Menezes et al., 2016; Norhisham et al., 2015; Sleimi et al., 2018). Empathy also has a positive correlation with M-customer satisfaction (Aghdaie & Faghani, 2012). On the other hand, Ali et al. (2017) eliminated the empathy from e-service quality because all empathy's decimation were placed under 0.5 in factor analysis test , and both Hussein and El Aziz (2013) and Ladhari (2010)

found that empathy was less critical in the case of online portals. Indeed, Ali (2017) went so far as to eliminate empathy from the e-service quality factors investigated in his study. Other studies have also concluded that empathy has an insignificant influence on e-customer satisfaction (Aly Shared, 2019; Pechinthorn et al., 2020). The following hypothesis will therefore be tested:

H5: Empathy has a significant and positive relationship with e-customer satisfaction.

2.2.6. Responsiveness

In the SERVQUAL model, responsiveness is defined as employees'' readiness to help and provide services to customers quickly (Parasuraman et al., 1985). It also included understanding customers' needs and giving personal attention to customers' issues (Kumar et al., 2009). In the digital world, it is defined as the effectiveness with which problems in applications are handled (Huang et al., 2015; Parasuraman et al., 2005), as well as referring to the e-service application's ability to provide suitable information to users when problems occur and having the mechanism to handle this error (John, 2015). Responsiveness also entails a quick response to customer feedback or questions when they are utilising the system (Palmer, 2002; Zeithaml et al., 2002). Customers become more comfortable when the firm's online delivery of its services is prompt and free of disruption (Li et al., 2009).

Responsiveness is an important factor for e-service quality in internet banking (Ariff et al., 2012; Zavareh et al., 2012). Various scholars have also agreed that responsiveness is one of the most important aspects of e-service quality for customer satisfaction and for attracting customers to online services (Kumbhar, 2011; Li et al., 2009; N & S, 2018; Singh, 2019). Another study of the speed of responses from banks both to users' inquiries and in respect to complaint resolution had a positive effect on customer satisfaction (George & Kumar, 2014). Likewise, Ariff et al. (2013) discovered

that responsiveness had a significant positive association with perceptions of e-customer service ($p < 0.01$). Similarly, both Aghdaie and Faghani's (2012) and Rahman et al.'s (2017) evaluations of m-service quality found that responsiveness has a positive relationship with customer satisfaction. On the other hand, Jun and Palacios (2016) argued that it had little impact on perceptions of m-service quality.

Ariff et al. (2012) evaluated responsiveness using factors like the availability of online applications without any interruption, quick response to customer requests and rapid resolution of any problems occurring on the website.

This leads to the following hypothesis:

H6: responsiveness has a significant and positive relationship with e-customer satisfaction.

2.2.7. Security

According to Parasuraman et al. (1985) paper, the security factor in SERVQUAL is the freedom from risk or doubt. It includes physical safety, financial Security and confidentiality. In e-service quality, Security is defined as the freedom from risk or doubt during the order fulfilment (Li & Suomi, 2009). Likewise, Security in e-service quality refers to the degree to which the application is secure and protects customer information (Parasuraman et al., 2005), as well as the Security of the payment method during and after the service (Blut, 2016). In m-service quality, Security refers to protecting login, transaction safety and customers' privacy (Jun & Palacios, 2016).

This factor is ranked as the most important in e-service quality (Li & Suomi, 2009). It is also an essential factor in evaluating and forming m-service quality for mobile apps (Kuo et al., 2009; Stiakakis & Georgiadis, 2011). It has a strong and positive impact on m-service quality (Rita et al., 2019; Stiakakis & Georgiadis, 2011).

On the contrary, Yaghoubi & Rigi (2017) found that Security is the least important factor in e-service quality.

Three attributes are used to measure Security: personal information protection, secured payment transaction and protection of credit card details (Blut, 2016; Ho & Lee, 2007; Huang et al., 2015; Li & Suomi, 2009; Yaghoubi & Rigi, 2017).

Several studies have shown that Security has a positive impact on customer satisfaction. Christian & Ayodele (2020) reported that Security has a positive and significant effect on e-customer satisfaction. Likewise, Arcand et al. (2017) conducted a survey of 375 banking customers who used mobile banking apps to find that Security is associated with the trust between customers and banks and positively influences customer satisfaction. Similarly, Ul Haq and Awan (2020) discovered that Security positively affects customer satisfaction ($p<0.05$).

From this result, the following hypothesis is proposed:

H7: Security has a significant and positive relationship with m-customer satisfaction.

2.2.8. Prices and offers

In e-service quality, price offerings are defined as the prices offered on goods or services by online providers during any fulfilment process steps (Blut, 2016). This includes the products offered and/or discount on product prices (Holloway & Beatty, 2008). According to Laureti et al. (2018), customers always compare costs and look for price offers when they want to buy goods or services (Laureti et al., 2018). Thus, the online price factor plays an important role in customer's intention to repurchase (Rohwiyati & Praptiestrini, 2019). In m-service quality, Choi et al. (2008) found that the price offered through m-service could increase the customer satisfaction level even if the customer is dissatisfied with the transaction process.

Mohammed (2017) found that price has a strong relationship with customer satisfaction ($p < 0.01$), while Wilis and Nurwulandari (2020) showed that the offer price positively affects e-customer satisfaction with a wight equal to 0.3 in the e-satisfaction equation, and Holloway and Beatty (2008) found, based on 616 survey responses, that price comprised 17.2% of customer satisfaction. Three attributes are used to measure price: discounted or free shipment, discount price and lower price than physical stores (Blut, 2016). This leads to the following hypothesis:

H8: Prices and offers have a significant and positive relationship with m-customer satisfaction.

2.2.9. M-Customer Satisfaction:

M-customer satisfaction is defined as the customer's intention to reuse the application in the future (Profile & Profile, 2015). It therefore acts as a positive mediator between m-service quality and m-loyalty (Kuo et al., 2009; N & S, 2018; Ul Haq & Awan, 2020). This is similar to the role played by e-service quality (Ariff et al., 2013; Kazem, 2020; N & S, 2018; Rodríguez et al., 2020) and e-customer satisfaction (Cristobal et al., 2007; Kazem, 2020; N & S, 2018; Rodríguez et al., 2020; Ul Haq & Awan, 2020; Wilis & Nurwulandari, 2020). With a beta value of 0.477, Ganapathi and Abu-Shanab (2020) found that customer satisfaction positively impacts loyalty. This leads to the following hypothesis:

H9: m-customer satisfaction has a significant and positive relationship m-loyalty.

2.2.10. M- Loyalty:

The principle of customer loyalty has been understood for several years, but practical validation of customer loyalty in m-commerce was not fully discussed (Lee & Wong, 2016). Anderson and Srinivasan (2003) identified e-loyalty as customers'

positive attitudes towards e-commerce, which leads to repeat purchasing activity. (Ergün & Kuşcu, 2013)found that a small percentage of visitors revisited the website to purchase. Thus, enhancement customer loyalty in online business is the critical objective for any company (Carter et al., 2014) as well as the most challenging objective to be achieved for the online company than the offline firm (Harris & Mark Goode, 2014). The m-loyalty is considered a strong indicator for the success of online business because loyal customers will repeatedly buy, which leads to increased profitability (Ergün & Kuşcu, 2013; Lee & Wong, 2016).

CHAPTER 3: METHODOLOGY

This chapter describes the methodology used to answer the research question. First, the data collection method will be described. Next, the measurement of the construct will be discussed.

3.1. Data collection and sample

A quantitative method was used to collect the data through an online survey constructed in Google Forms with two versions (Arabic and English). This concentrated on people aged over 18 who used either the Ooredoo or the Vodafone applications in Qatar. The questionnaire comprised two parts. The first part captured general demographic information about participants, while the second part included 37 items to test the factors.

A pre-test was carried out with a professor and nine MBA students who used Ooredoo or Vodafone app to ensure that the survey was well-designed and the questions clear. Then, the questionnaire was sent to 350 participants through the WhatsApp application and tweeted on Twitter. Additionally, it was shared by email with MBA students from Qatar University. To get more responses, the sample method used in this study is snowball as the respondents were asked to forward the survey to their colleagues. A total of 195 completed responses were received.

3.2.Measurement of constructs

The five-point Likert scale (1 = strongly disagree, 2 = disagree, 3 = Neutral, 4= agree, 5 = strongly agree) was used to assess participants' perceptions in respect to the importance of the tested constructs. Likert scales have been shown to improve response rate and response quality and reduce the frustration level of the participants (Babakus & Mangold, 1992). All constructs were mandatory. Thus, the respondents could not skip any questions, which prevented the need to eliminate surveys with missing data.

Eight independent variables were used to represent M-SQ (Application Design, Ease of use, Information Content, Reliability, Responsiveness, Empathy, Security, and Prices and offers). There was also one mediator variable (m-customer satisfaction), and one dependent variable (m-loyalty). Each variable was assessed through between three and six questions. Table 1 displays the definition of each variable and the questions used to measure it.

Table 1: Variables

Variables	Definition	Item	Symbols
Information content (INFO)	To what degree the information of service/product is clear and detailed	• Information on product's specifications and service packages are clear • Information about a product or service is clear and understandable • Information about a product or service is correct	INFO1 INFO2 INFO3
Application Design (AD)	To what degree the mobile application design is appropriate and clear.	• The application has a modern, simple, and attractive design • The application has search and filter functionality • The application uses a layout and colours that reflect company design and layout	AD1 AD2 AD3
Ease of use (EU)	To what degree a user can easily use the mobile application and complete the tasks successfully.	• The application is easy to use • I used the application without any effort to know the steps • The content of the application is consistent • I can complete the order with simple steps	EU1 EU2 EU3 EU4
Reliability (REL)	To what degree the mobile application provides service as promised as well as technical functioning is	• The application is available all the time • The application is operated sustainably after	REL1 REL2

Variables	Definition	Item	Symbols
	available and working properly	the installation of an update	REL3
		• A Confirmation notification is sent after applying a service or purchasing items	REL4
		• Ordered items can be easily tracked by the application until items delivered	REL5
		• Orders can be cancelled or returned	REL6
		• The commodity or service is received on the scheduled timing	
Empathy (EMP)	To what degree the application provides individualised attention to customers	• All services are available in the application. Hence, I do not need to visit the branches	EMP1
		• The mobile application understands my needs	EMP2
		• The application gives me personal attention by sending a notification of offers and/or new services	EMP3
Responsiveness (RES)	To what degree the mobile application responds to customer interaction as well as the customer service responds to customer inquiries or problems related to the application	• The customer service representatives/call centre agents are available when needed	RES1
		• There is a live chat within the application	RES2
		• My problems have been quickly solved	RES3
		• The application responds fast to my interaction when browsing	RES4
		• The application starts-up quickly when I open it	RES5
Security (SEC)	To what degree the application is secure and protect customer information.	• My personal and payment data are secured	SEC1
		• The application asks for my login information when used	SEC2
		• The application asks for my verification for each transaction like	SEC3

Variables	Definition	Item	Symbols
		using OTP or other methods	SEC4
		• The application asks me for extra permission when I install or use it.	
Price offerings (PO)	To what degree the application provides a lower price and offers	• The application offers extra free service/ product or gift	PO1
		• The application offers lower prices of products/services than branches.	PO2
		• The application offers some special services which may not be available in branches	PO3
M-Customer Satisfaction (CS)	To what degree customers are satisfied to use the mobile application	• I am overall satisfied with the application	CS1
		• I did not face any problem when using the application	CS2
		• I am satisfied with the overall transaction of the application.	CS3
M-Loyalty (LOY)	To what degree the customer will use the mobile application in the future and recommend other people to use it	• I would recommend this application to others	LOY1
		• I would like to say positive things about the application to other people	LOY2
		• I expect to continue using the application in the future	LOY3

CHAPTER 4: DATA ANALYSIS AND DISCUSSION

This chapter analyses the collected data. The first section presents a descriptive analysis of the demographic information of the respondents, analysed using Excel. The next section reports the results of the Measurement Model, which tests the reliability, factor analysis and validity of the constructs in the survey. After that, the Structure Model is reported, to evaluate the hypothesis, Coefficient of determination (R2) and Effect size (F2). Finally, the proposed model is evaluated using the Partial Least Squares (PLS) method to check the predictive relevance and model fit for use globally. Hermann and Svante Wold introduced this as a linear model to describe or predict the differences in the values of one property from the values of other properties (Cramer, 1993). Smart PLS 3 software was used to perform the PLS analysis.

Before starting analysis, outlier responses were identified in order to remove responses that might unduly affect the results of the analysis. To do this, the residuals were first calculated (the difference between the actual values (average independent variables) and the predicted outcome as to the effect of the dependent variable). Residuals that were three or more standard deviations away from the mean of the dependent variable (customer satisfaction) were eliminated from the sample. There were four such outlying residuals, as shown in table 2, below. These were eliminated from the sample leaving a final sample size of 191.

Table 2: Outlier

Case Number	Std. Residual	CS	Predicted Value
16	-4.133	1.00	2.9554
21	-3.290	1.00	2.5569
43	-3.184	2.00	3.5065
107	-4.133	1.00	2.9554

4.1.Demographic Analysis

The demographic results show that 62.03% of participants were male and 37.7% female. Most were aged between 26 and 40 years old. 61% were educated to at least bachelor's degree level; and 39% had postgraduate qualifications. 89% of participants used the Ooredoo Qatar application while 11% used Vodafone Application, compared with the overall market share of these companies of 66% and 34%, respectively. 55% of participants used these applications between one and five times a month. Table 3 below reports all the demographic data collected from the participants.

Table 3: Descriptive Information of the Sample (N=191)

		Frequency	Percentage (%)
Gender	Male	119	62.30
	Female	72	37.70
Age	18 to 25	11	5.76
	26 to 40	126	65.97
	41 to 60	52	27.23
	Above 60	2	1.05
Educational level	High School or less	16	8.38
	Undergraduate	100	52.36
	Postgraduate	70	36.65
	Doctoral	4	2.09
Application used	Ooredoo Qatar	170	89.01
	Vodafone Qatar	21	10.99
Times of used	1 to 5 times	105	54.97
	5 to 10 times	44	23.04
	more than 10 times	42	21.99

4.2.Descriptive analysis

The descriptive analysis was performed to check how the respondents perceived each item in the survey. Thus, the means and standard deviations for each factor and its

items were calculated as shown in Table 4. The mean of the 5-point Likert scale response to each statement was categorised into three levels of agreement with the statement, namely: low agreement, which was between 1 and 2.33; moderate agreement, which was between 2.33 and 3.67; and strong agreement, which was between 3.67 and 5.

All items had negative skewness, which means they skewed left, except for item EMP1, the empathy factor, which skewed right (i.e. positive skewness). The average of M-service quality items was between 2.8 and 4.079, and the standard deviation ranged from 0.636 to 1.072. The average of all M-service quality factors was between 3.009 and 3.864, and the standard deviation ranged from 0.563 to 0.883.

The participants strongly agreed that the application has a simple and attractive design (AD1), as well as a nice design that reflects the company's design and layout (AD3). On the other hand, they moderately agreed that the application had useful features like search and filter, with a mean 3.216 and standard deviation 1.021. Overall, the application design factor was categorised at a level of strong agreement, with an average 3.717 and a standard deviation 0.659. The participants also strongly agreed with the ease of use statements, which received an average score of more than 3.8, with a standard deviation around 0.7. This was the highest average score among the various M-service Quality factors. For information content, the INFO1 and INFO3 statements were classified as strong agreement, with means above 3.67, whereas the INFO2 statement fell slightly below that level to reflect moderate agreement with an average 3.61. This means that while the information on products' specifications and service packages was felt to be complete and correct, participants were slightly less convinced that such information was clear and understandable. Overall, however, the information content factor received a strong level of agreement, with an average of 3.69. The

reliability factor, meanwhile, was grouped as a moderate level of agreement, with an average of 3.64, because REL4, REL5 and REL6 had an average below 3.67. This means that customers felt that the order was not easy to track during the fulfilment processing, and that cancelling or returning items was not easy through the mobile application. Moreover, there was felt to be a delay to delivery of the product or service. Empathy also reflected a moderate level of agreement, with an average of 3.32 and a standard deviation of 0.804. Because the participants had slightly agreed with Empathy's item. Regarding the Responsiveness factor, the availability of customer service availability (RES1), availability of a live chat feature (RES2), and the extent to which enquiries received a quick reply and solution (RES3) were all classified at a moderate level, with averages between 3.22 and 3.55. On the other hand, the responsiveness of the application itself (RES4) and its ability to start up quickly (RES5) were all ranked above 3.67 (strong agreement). In respect to the security factor, the overall average was 3.7, with participants thus exhibiting strong agreement that the application's security features enhanced their customer satisfaction. Data protection (SEC1) and request for password to login (SEC2) had the highest averages in the security section, while request authentication during transactions, like OTP (SEC3) and limited permissions when installing the application (SEC4) recorded the lowest averages in this factor. Turning to prices and offers, the participants ranked this as the lowest of the M-service Quality factors, with a mean of 3.009 (moderate agreement). Finally, M-Customer satisfaction and M-loyalty statements received strong agreement, except for the CS2 items that were considered moderate. The overall average for M-customer satisfaction was 3.752, with a standard deviation of 0.705 from the average. This means that customers were satisfied to use the application again, thus answering the second research question. Also, the average M-loyalty was 3.895 with a standard

deviation of 0.674, which means that the participants strongly agreed that they would use the application in future. Both of these results had negative skewness.

Table 4: descriptive analysis

Item	Mean	Standard Deviation	Skewness
AD1	3.9	0.722	-1.114
AD2	3.216	1.021	-0.295
AD3	4.037	0.791	-1.548
AD	3.717	0.659	-0.832
EU1	3.932	0.795	-1.396
EU2	3.832	0.797	-0.757
EU3	3.847	0.749	-0.878
EU4	3.847	0.79	-1.141
EU	3.864	0.691	-0.897
INFO1	3.674	0.845	-0.953
INFO2	3.611	0.843	-0.803
INFO3	3.8	0.769	-0.898
INFO	3.695	0.758	-0.836
REL1	4.079	0.64	-0.557
REL2	4.016	0.636	-1.248
REL3	3.937	0.693	-0.68
REL4	3.342	0.855	-0.366
REL5	3.026	0.948	-0.127
REL6	3.463	0.874	-0.386
REL	3.644	0.563	-0.418
EMP1	3.026	1.068	0.104
EMP2	3.626	0.89	-0.635
EMP3	3.316	0.965	-0.104
EMP	3.323	0.804	0.051
RES1	3.558	0.897	-0.638
RES2	3.421	0.93	-0.341
RES3	3.226	0.998	-0.436
RES4	3.779	0.756	-1.518
RES5	3.8	0.769	-0.968
RES	3.557	0.663	-0.248
SEC1	3.937	0.678	-0.536
SEC2	3.874	0.837	-1.008
SEC3	3.611	1.024	-0.672
SEC4	3.411	0.9	-0.34
SEC	3.708	0.65	-0.126
PO1	3.3	0.917	-0.22
PO2	2.8	1.072	-0.032
PO3	2.926	1.054	-0.233
PO	3.009	0.883	-0.076
CS1	3.826	0.758	-1.156
CS2	3.611	0.932	-0.876
CS3	3.821	0.767	-1.019
CS	3.752	0.705	-0.774
LOY1	3.879	0.775	-1.083
LOY2	3.805	0.774	-1.157
LOY3	4	0.649	-0.583
LOY	3.895	0.674	-0.725

4.3. Assessment of Measurements Model (outer model)

4.3.1 Reliability

Cronbach's alpha and composite reliability measure the items' reliability for each factor and their internal consistency. Pallant (2016) states that a Cronbach's alpha value above 0.7 is considered to show an acceptable level of reliability. Khairul Azhar et al. (2018) and Hulin et al. (2001), however, believed that a value below 0.6 is low; between 0.6 and 0.8 acceptable, and above 0.8 very good. Furthermore, Hair et al. (2016) used composite reliability to evaluate internal consistency, stating that a value above 0.7 is acceptable level. Table 5 demonstrates the Cronbach's alpha and composite reliability results for all factor items, indicating that all reach an acceptable level of reliability. The composite reliability of all variables exceeded 0.7. The Cronbach's Alpha for AD, EMP and SEC was acceptable while the remaining variables fell in the very good range.

Table 5: Reliability

Factor	Cronbach's Alpha	Composite Reliability
AD	0.698	0.834
EU	0.908	0.935
INFO	0.919	0.949
EMP	0.77	0.851
REL	0.826	0.873
RES	0.821	0.875
SEC	0.746	0.837
PO	0.837	0.902
CS	0.83	0.898
LOY	0.911	0.944

4.3.2 Factor analysis

Factor analysis is a statistical method used to minimise a large number of items into smaller set. There are two concepts of factor analysis: exploratory and confirmatory. In this research, confirmatory concept is used to evaluate the factors and

factor loading of measured items and thus to validate whether or not the existing understanding of the relationships is correct or not (Statistics Solutions - Factor Analysis, 2021). All items must be above 0.7 to be considered acceptable.

The first run showed that AD2, REL4, REL5, and RES2 had values of less than 0.7. Accordingly, REL4, REL5 and RES2 were deleted. The item AD2 was kept because Application Design has only three items, meaning that if it were deleted, only two items would be left to define a single factor, which we judged to be insufficient. All items had loaded above 0.7 and loaded correctly in the second run, as shown in table 6.

Table 6: Outer Loading

	AD	EU	INFO	REL	EMP	RES	SEC	PO	CS	LOY
AD1	0.912									
AD2	0.626									
AD3	0.819									
EU1		0.883								
EU2		0.874								
EU3		0.896								
EU4		0.888								
INFO1			0.939							
INFO2			0.94							
INFO3			0.903							
REL1				0.866						
REL2				0.876						
REL3				0.761						
REL6				0.731						
EMP1					0.829					
EMP2					0.843					
EMP3					0.8					
RES1						0.826				
RES3						0.816				
RES4						0.858				
RES5						0.75				
SEC1							0.788			
SEC2							0.753			
SEC3							0.744			
SEC4							0.711			
PO1								0.815		

	AD	EU	INFO	REL	EMP	RES	SEC	PO	CS	LOY
PO2								0.876		
PO3								0.912		
CS1									0.921	
CS2									0.806	
CS3									0.862	
LOY1										0.943
LOY2										0.918
LOY3										0.903

4.3.3 Validity:

Two validity subtypes are usually used to test validity: convergent validity and discriminant validity (Henseler et al., 2009).

4.3.3.1 Convergent Validity

Convergent validity is the extent to which an item correlates with other items for the same construct (Guthrie, 2010). Fornell and Larcker (1981) used an Average Variance Extracted (AVE) value of greater than 0.5 as the benchmark to evaluate convergent validity. Hair et al. (2019) also require AVE to be greater than 0.5 and composite reliability to be greater than 0.7 to assess convergent validity. From Table 7, all the AVE values for the included items were above 0.5 and all the composite reliability values were greater than 0.7. Thus, the items for each independent factor have convergent validity.

Table 7: Convergent Validity

Constructs	items	Factor Loading	Composite Reliability	Average Variance Extracted (AVE)
AD	AD1	0.912		
	AD2	0.626	0.8	0.6
	AD3	0.819		
EU	EU1	0.883		
	EU2	0.874	0.9	0.8
	EU3	0.896		
	EU4	0.888		
INFO	INFO1	0.939		
	INFO2	0.94	0.9	0.9
	INFO3	0.903		
REL	REL1	0.866		
	REL2	0.876	0.9	0.5
	REL3	0.761		
	REL6	0.731		
EMP	EMP1	0.829		
	EMP2	0.843	0.9	0.6
	EMP3	0.8		
RES	RES1	0.826		
	RES3	0.816	0.9	0.6
	RES4	0.858		
	RES5	0.75		
SEC	SEC1	0.788		
	SEC2	0.753	0.8	0.6
	SEC3	0.744		
	SEC4	0.711		
PO	PO1	0.815		
	PO2	0.876	0.9	0.8
	PO3	0.912		
CS	CS1	0.921		
	CS2	0.806	0.9	0.7
	CS3	0.862		
LOY	LOY1	0.943		
	LOY2	0.918	0.9	0.8
	LOY3	0.903		

4.3.3.2 Discriminant validity

Discriminant validity reflects the degree to which the factor can be distinguish from other elements (Hair et al., 2016). Fornell–Larcker and the cross-loadings are the criteria to test discriminant validity in the PLS path modelling (Henseler et al., 2009).

1- Cross loadings

Cross loadings is the first method to assess discriminant validity, with the test being passed if the item's outer loading for a specific construct is greater than that item's loading for other constructs (Hair et al., 2016). As shown in table 8, each item in this study has the highest loading value under its own construct. For example, the AD items had the highest number under the AD factor and a lower score under other factors.

Table 8: Cross-loadings

	AD	CS	EMP	EU	INFO	LOY	PO	REL	RES	SEC
AD1	0.91	0.66	0.37	0.76	0.59	0.65	0.19	0.60	0.50	0.37
AD2	0.63	0.41	0.48	0.48	0.42	0.41	0.40	0.35	0.42	0.32
AD3	0.82	0.53	0.32	0.67	0.33	0.52	0.05	0.65	0.38	0.41
CS1	0.67	0.92	0.62	0.80	0.72	0.84	0.46	0.64	0.66	0.62
CS2	0.49	0.81	0.56	0.56	0.55	0.59	0.44	0.59	0.59	0.42
CS3	0.60	0.86	0.46	0.69	0.58	0.74	0.27	0.59	0.59	0.51
EMP1	0.32	0.42	0.83	0.40	0.40	0.40	0.59	0.36	0.47	0.41
EMP2	0.47	0.59	0.84	0.61	0.49	0.56	0.36	0.51	0.56	0.36
EMP3	0.34	0.52	0.80	0.49	0.42	0.44	0.56	0.43	0.57	0.45
EU1	0.77	0.70	0.49	0.88	0.50	0.63	0.25	0.65	0.59	0.51
EU2	0.69	0.66	0.49	0.87	0.50	0.63	0.25	0.63	0.49	0.51
EU3	0.72	0.74	0.62	0.90	0.64	0.68	0.36	0.67	0.61	0.53
EU4	0.69	0.72	0.57	0.89	0.65	0.69	0.31	0.59	0.60	0.45
INFO1	0.57	0.72	0.49	0.65	0.94	0.71	0.41	0.62	0.63	0.41
INFO2	0.51	0.64	0.52	0.58	0.94	0.63	0.43	0.55	0.63	0.41
INFO3	0.52	0.64	0.48	0.57	0.90	0.59	0.35	0.55	0.62	0.41
LOY1	0.61	0.77	0.54	0.67	0.71	0.94	0.34	0.59	0.60	0.52
LOY2	0.63	0.82	0.59	0.71	0.68	0.92	0.44	0.65	0.69	0.60
LOY3	0.63	0.75	0.47	0.67	0.53	0.90	0.21	0.60	0.50	0.53
PO1	0.27	0.41	0.52	0.33	0.40	0.36	0.82	0.39	0.47	0.32
PO2	0.10	0.30	0.49	0.19	0.33	0.20	0.88	0.17	0.39	0.32
PO3	0.24	0.45	0.53	0.32	0.39	0.35	0.91	0.29	0.45	0.41
REL1	0.65	0.61	0.43	0.69	0.48	0.57	0.22	0.87	0.44	0.45
REL2	0.63	0.62	0.39	0.66	0.55	0.62	0.21	0.88	0.52	0.51
REL3	0.42	0.47	0.44	0.52	0.39	0.39	0.28	0.76	0.44	0.45
REL6	0.47	0.55	0.49	0.45	0.58	0.55	0.41	0.73	0.51	0.43
RES1	0.36	0.54	0.50	0.49	0.48	0.49	0.37	0.41	0.83	0.37
RES3	0.41	0.58	0.62	0.50	0.60	0.55	0.59	0.42	0.82	0.38
RES4	0.58	0.67	0.52	0.63	0.62	0.60	0.36	0.60	0.86	0.47
RES5	0.40	0.50	0.48	0.47	0.48	0.47	0.34	0.46	0.75	0.48
SEC1	0.48	0.58	0.44	0.56	0.46	0.56	0.23	0.61	0.43	0.79
SEC2	0.41	0.41	0.22	0.46	0.25	0.40	0.24	0.43	0.33	0.75
SEC3	0.22	0.41	0.39	0.32	0.25	0.48	0.33	0.28	0.34	0.74
SEC4	0.19	0.36	0.40	0.29	0.33	0.29	0.50	0.29	0.48	0.71

2- Fornell–Larcker criterion

The Fornell-Larcker criterion requires that the square root of the AVE of the specific construct is greater than that item's square root of the AVE for other constructs (Hair et al., 2016). Table 9 shows that each factor has a higher AVE square root with itself.

Table 9: Fornell-Larcker

	AD	CS	EMP	EU	INFO	LOY	PO	REL	RES	SEC
AD	0.795									
CS	0.683	0.864								
EMP	0.47	0.63	0.824							
EU	0.78	0.797	0.616	0.885						
INFO	0.573	0.72	0.532	0.65	0.927					
LOY	0.673	0.845	0.578	0.744	0.698	0.921				
PO	0.245	0.454	0.595	0.333	0.431	0.36	0.869			
REL	0.68	0.699	0.536	0.72	0.619	0.667	0.34	0.811		
RES	0.545	0.713	0.652	0.649	0.672	0.651	0.51	0.588	0.813	
SEC	0.458	0.604	0.488	0.564	0.446	0.595	0.413	0.563	0.523	0.749

4.4. Discussion of Results

This part reviews the relationship between the independent and dependent variables. First, the proposed hypotheses are examined, then the Coefficient of determination (R2) and Effect size (f2) will be evaluated. Finally, the proposed model's suitability will be assessed according to Predictive relevance (Q2) and Goodness of fit.

1- Structural Model and Hypotheses Tests

The P-value is used in this study to evaluate the proposed hypotheses. It is to check the probability of getting results at least as extreme as the sample result by random chance. A P-value of less than 0.05 is considered significant in this study, leading to the rejection of the null hypothesis. Otherwise, the null hypothesis is not

rejected.

The results as displayed in table 10 indicate that the information content (H2), ease of use (H3), responsiveness (H6) and Security (H7) are the most important factors affecting M-customer satisfaction positively, with P-values of less than 0.05. These results answer the first research question. Also, the results show that there is a strong positive relationship between M-Customer satisfaction and M-loyalty (H9), which answers the third research question. On the other hand, the application design (H1) , reliability (H4), empathy (H5), and price & offers (H8) factors were found not to have a statistically significant effect on M-customer satisfaction. Overall, the results show that the model can be used globally and performs well enough to predict customer satisfaction and loyalty.

Previous studies by Christian et al. (2020), Lee & Lin (2005) , Ul Haq & Awan (2020) and Wilson et al. (2019) that were reviewed in the literature review chapter showed that the application design has a significant and positive impact on customer satisfaction. In contrast, in this research, the application design did not affect customer satisfaction. These findings match those of Arcand et al. (2017). The lack of agreement in the literature in respect to this factor suggests that there is a need for further study involving experimentation by adding or modifying the items measuring the factor.

Another finding that differs from previous studies relates to the issue of reliability. In the literature review it was noted that Aghdaie and Faghani (2012) identified reliability as an important factor affecting customer feedback positively, but our analysis showed no relationship between reliability and customer satisfaction, a finding that agrees with that of Stevano et al. (2018). Similarly, our study showed that prices and offers do not affect customer satisfaction, whereas the literature suggests the opposite. Indeed, in previous studies, prices and offers are found to have a significant

effect on customer satisfaction, even if the customer is dissatisfied with the transaction process and application design.

In terms of the Empathy factor, our result aligned with the conclusion of Aly Shared (2019) and Pechinthorn et al. (2020) that empathy has an insignificant influence on customer satisfaction. Also, the results from this present study for information content, ease of use, responsiveness and security align with those of previous research. This was also the case of the relationship between customer satisfaction and loyalty. Overall, clear and accurate information content about services or products increases customer confidence in the application and thence increases customer satisfaction, which leads to an increase in loyalty. The ease of use of an application in respect to the ease of ordering products or accessing services also increases customer satisfaction related to use of the application. In addition, the speed of interaction between the application and customers, as well as a quick response to customer enquiries serves to increase customer satisfaction. Finally, if the transaction and customer information are secure, the customer satisfaction will increase, and customers will feel comfortable when undertaking transactions.

Table 10: Hypothesis test

Hypo	Relationship	T-Value	P Values	Decision
H1	Application Design -> M-Customer Satisfaction	0.666	0.506	Not supported
H2	Information Content -> M-Customer Satisfaction	2.999	0.003	Supported
H3	Easy to use -> M-Customer Satisfaction	3.944	0.000	Supported
H4	Reliability -> M-Customer Satisfaction	1.329	0.184	Not supported
H5	Empathy -> M-Customer Satisfaction	0.713	0.476	Not supported

Hypo	Relationship	T-Value	P Values	Decision
H6	Responsiveness -> M-Customer Satisfaction	1.972	0.049	Supported
H7	Security -> M-Customer Satisfaction	2.273	0.023	Supported
H8	Prices and Offers -> M-Customer Satisfaction	1.012	0.312	Not supported
H9	M-Customer Satisfaction -> M-Loyalty	32.072	0.000	Supported

The figure 2 shows the T-value between items and its factor and the T-value between the independent and dependent variables.

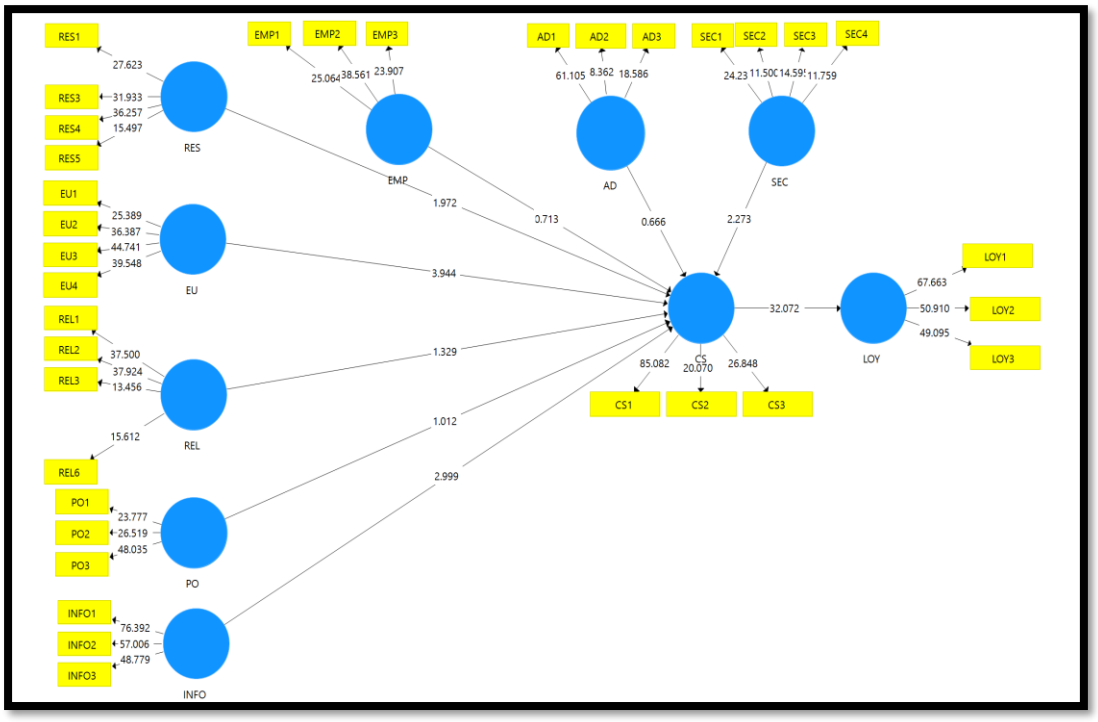

Figure 2: Hypothesis test

2- Coefficient of determination (R2 value)

The coefficient of determination is an essential measure for evaluating the structural model in PLS (Hair et al., 2016; Henseler et al., 2009). It represents how much the dependent variable's variance is explained by all independent variables linked to it (Hair et al., 2016). Falk & Miller (1992) suggested 0.1 as a minimum value to

accept R2. Meanwhile, Chin (1998) recommended 0.19, 0.33, and 0.67 for R2 values in PLS path models as weak, moderate and high, respectively. The results for this study show a high R-Square value for the dependent variables. Specifically, the M-SQ factors explain 75.5% of M-Customer Satisfaction, while M-Customer Satisfaction explains 71.4% of M-loyalty.

Table 11: Coefficient of determination

Construct	R Square	Result
M-Customer Satisfaction	0.755	High
M-Loyalty	0.714	High

3- Effect size f2

Effect size is increasingly used in quantitative research, alongside p-values, to show the strength of the independent variable's influence on a specific dependent variable (Hair et al., 2016; Henseler et al., 2009). Cohen (1988) considered an f2 above 0.35 as representing a large effect size, between 0.15 and 0.35 as representing a medium effect size, between 0.02 and 0.15 as representing a small effect size, and less than 0.02 as indicating no effect. The table below shows effect size results in line with the above hypothesis test. The AD, EMP, REL and PO had no effect on M-customer satisfaction, but INFO, EU, RES and SEC had a small effect on it. The results also showed that M-customer satisfaction had a large effect on M-loyalty.

Table 12: Effect Size

	CS	LOY	Result
AD	0.004		No effect
INFO	0.08		small effect size
EU	0.11		small effect size
EMP	0.004		No effect
REL	0.011		No effect

RES	0.033		small effect size
SEC	0.035		small effect size
PO	0.007		No effect
CS		2.497	large effect size

4- Predictive relevance, Q2

The Q2 value is an indicator of the predictive power, or predictive relevance, of the model out-of-sample (Hair et al., 2016). A Q2 with a positive sign means the model has predictive relevance while a Q2 with a negative sign indicates a lack of predictive relevance (Shanmugapriya & Subramanian, 2015). Q2 values can be defined as having small (0.02), medium (0.15), and large (0.35) predictive relevance (Hair et al., 2016). The results for this study show large predictive relevance with Q2 values of 0.536 for M-customer satisfaction and 0.602 for M-loyalty as shown in figure 3.

Table 13: Predictive relevance

	SSO	SSE	Q^2
EU	764	764	
INFO	573	573	
RES	764	764	
SEC	764	764	
CS	573	266.073	0.536
LOY	573	228.02	0.602

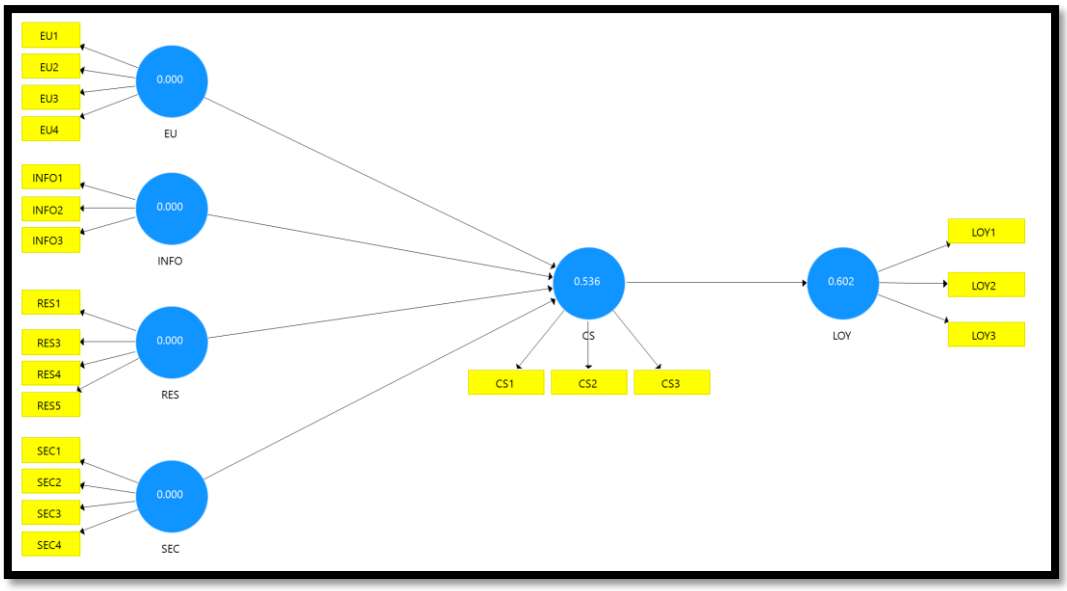

Figure 3: Predictive relevance

5- The Goodness of fit index

Goodness of fit is an indicator of the overall fit of the proposed model, thus serving to validate the PLS path model globally (Tenenhaus et al., 2005). It is calculated by the following formula:

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

A GoF value below 0.1 is considered as showing no fit, a value between 0.1 and 0.25 shows a small fit, one between 0.25 and 0.36 shows a medium fit, while above 0.36 is a strong fit (Akter et al., 2011). In the proposed research model, the GoF value is 0.625, hence it can be concluded that the model of this study is well fitted and sufficient to act as a global PLS model.

Table 14: Goodness of Fit

$\overline{R^2}$	$\overline{AVE}$	GoF
0.53	0.73	0.625

Figure 4 shows the final structural model with the factor loading for each item, the R-square for CS and LOY and path coefficients.

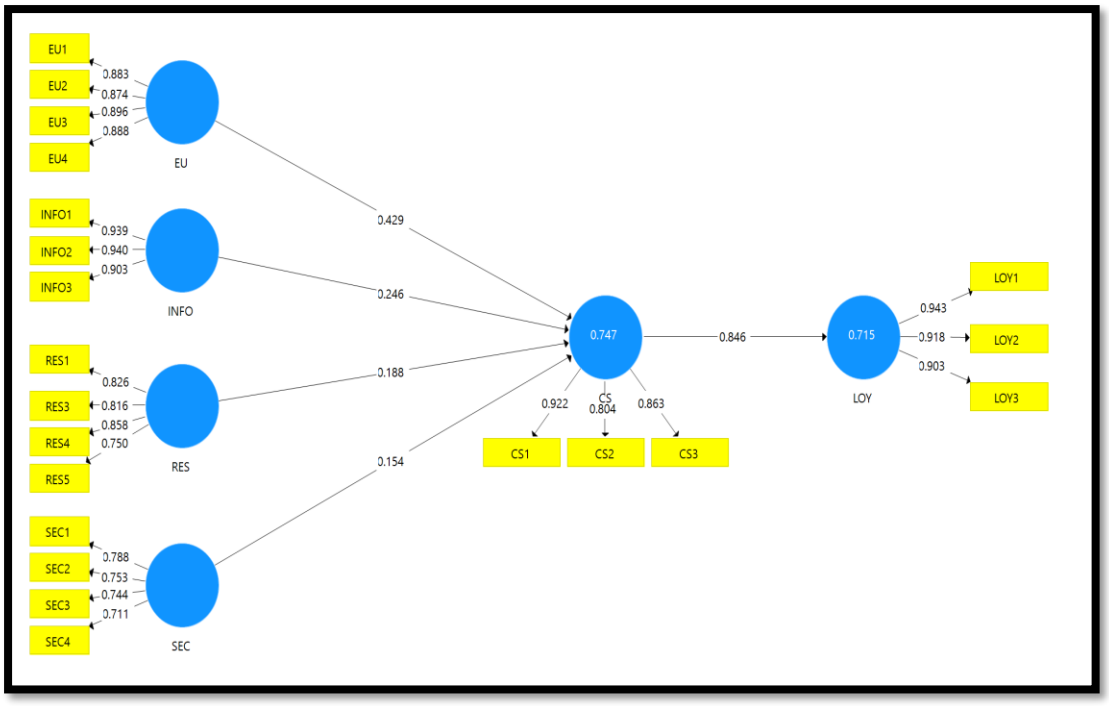

Figure 4: Final Proposed Model

CHAPTER 5: CONCLUSIONS AND FUTURE WORKS

This chapter provides a summary of our findings, along with our recommendations for general managers. The chapter ends by outlining the limitations of the current study and identifying possible future avenues of research.

5.1. Conclusion

The current study evaluates the mobile service quality factors that affect M-customer satisfaction to use mobile applications for applying for services or purchasing products in Qatar's telecommunication sector. It also tests the relationship between M-customer satisfaction and M-loyalty to use the mobile application in the future, or recommend others to use it.

This paper's hypotheses were tested through an online survey distributed through social media and emails for those above 18 and using the Ooredoo or Vodafone Qatar applications. The proposed model was tested using partial least squares structural equation modelling (PLS-SEM) using Smart PLS software. The findings reveal that Ease of use (EU), Information Content (INFO), Responsiveness (RES), and Security (SEC) are the most significant factors that affect M-Customer Satisfaction. They also show that there is a strong relationship between M-customer Satisfaction and M-loyalty. On the other hand, Application Design (AD), Reliability (REL), Empathy (EMP), and Prices and offers do not have any impact on M-Customer Satisfaction.

5.2. Recommendations and Managerial Implications

This paper has important implications for the Ooredoo or Vodafone managers or any telecommunication industry company that wants to increase M-customer satisfaction rates, and loyalty to their company's products and services, while reducing overall costs by delivering those products and services to a higher proportion of

customers through the mobile application rather than physical branches. This paper suggests that, to achieve the above, managers should adopt a strategy that focuses on the M-service quality factors that most influence M-customer satisfaction. According to the data analysis of the proposed model in this paper, these are as follows.

Firstly, customer satisfaction is affected by the ease of use dimension. This suggests that managers should look for a suitable strategy to make sure that using the application is as efficient and effective possible. Also, the application's content should be consistent and standardised, allowing the customer to move easily and quickly between the application contents. Moreover, the process of completing orders and other transactions needs to be simple, with as few steps as possible to place the order.

The second important factor that the managers should take care of is information content. The information about product specifications or service package should be clear and understandable for the customers. Clarity of information helps increase customer satisfaction when customers try to buy the product or apply for a service. The product or service information should also be correct so as to increase customer confidence in using the mobile application.

Responsiveness is the third factor that affects customer satisfaction. Based on the findings of this study, the responsiveness to customer requests through the current applications is only moderate. Managers should therefore look for strategies that increase the responsiveness rate. The application should contain a live chat feature for contacting a customer service representative quickly. Also, customer problems should be resolved quickly while they are using the application. In the application context, the application should respond rapidly to customers during start-up and browsing.

Security of data is the fourth factor that managers should pay attention to.

Personal and payment data should be secured and encrypted so that customers feel safe about keeping their personal information and card details saved inside the application. Also, using verification processes like One Time Password (OTP) during transactions will give customers confidence that no one can apply for a service or purchase the product without their permission.

Finally, the new management strategies should also try to increase M-loyalty by increasing M-customer satisfaction. To achieve this, every effort should be made to ensure that customers will be satisfied when using the application. Also, the application should be tested before being published to customers. In addition, customer satisfaction will increase if transactions are completed without any error. If these elements of customer satisfaction can be met then loyalty will also increase.

5.3. Limitations and Future Research

As with any study, this research paper has some limitations. First, the sample size was very small compared to previous studies, and to the number of both companies' customers. Most of the participants used the Ooredoo application, which potentially adds a source of bias and may affect the results. Second, data collection was limited to the customers who use Ooredoo Qatar or Vodafone Qatar applications only. So, the findings should not be generalised to other countries and companies. Third, this research does not consider factors other from M-service quality, such as demographic factors. Studying the effect of M-service quality by including demographic factors such as age, gender, income and education will be required in future research.

Future studies should cover a larger sample size and distribute the questionnaire to users who usually use mobile application to apply for services or purchase products. The sample should be on a large scale and not limited to telecommunication companies in Qatar only. So, future research may repeat this study in other countries with more

companies in the telecommunications industry. It is also suggested that future studies compare the results between companies to evaluate the service quality for their applications. Moreover, the evaluation of the direct impact of M-service quality on M-loyalty is suggested for future study.

REFERENCES

Abd Ghani, M., Mohd Yasin, N., & Alnaser, F. (2017). Adoption of Internet Banking: Extending the Role of Technology Acceptance Model (TAM) with E-Customer Service and Customer Satisfaction Technology Acceptance Model View project The moderating effect View project. 35(9), 1918–1929. https://doi.org/10.5829/idosi.wasj.2017.1918.1929

Abelse, E. G., White, M. D., & Hahn, K. (1998). A User-based Design Process for Web Sites. Internet Research, 8(1), 39–48. https://doi.org/https://doi.org/10.1108/10662249810368879

Aghdaie, S. F. A., & Faghani, F. (2012). Mobile Banking Service Quality and Customer Satisfaction (Application of SERVQUAL Model). International Journal of Management and Business Research, 2(4), 351–361.

Ahmed, R. R., Vveinhardt, J., Štreimikienė, D., Ashraf, M., & Channar, Z. A. (2017). Modified SERVQUAL model and effects of customer attitude and technology on customer satisfaction in banking industry: mediation, moderation and conditional process analysis. Journal of Business Economics and Management, 18(5), 974–1004. https://doi.org/10.3846/16111699.2017.1368034

Akter, S., D'Ambra, J., & Ray, P. (2011). An evaluation of PLS based complex models: The roles of power analysis, predictive relevance and GoF index. 17th Americas Conference on Information Systems 2011, AMCIS 2011, 2, 1313–1319.

Al-dweeri, R. M., Obeidat, Z. M., Al-dwiry, M. A., Alshurideh, M. T., & Alhorani, A. M. (2017). The Impact of E-Service Quality and E-Loyalty on Online Shopping: Moderating Effect of E-Satisfaction and E-Trust. International Journal of Marketing Studies, 9(2), 92. https://doi.org/10.5539/ijms.v9n2p92

Ali, M., Asmi, F., Rahman, M. M., Malik, N., & Ahmad, M. S. (2017). Evaluation of

E-Service Quality through Customer Satisfaction (a Case Study of FBR E-Taxation). Open Journal of Social Sciences, 05(09), 175–195. https://doi.org/10.4236/jss.2017.59013

Ali, M. S. Y. (2017). The effect of E-Banking orientation on customer service quality KSA banks customers' perspective. International Journal of Civil Engineering and Technology, 8(9), 546–563.

Alotaibi, R. S. (2020). Assessing user satisfaction with the MAKKEN system in Shaqra University: A structural equation m odelling analysis. Indian Journal of Science and Technology, 13(18), 1830–1839. https://doi.org/10.17485/ijst/v13i18.467

Aly Shared, H. (2019). The Relationship between E-Service Quality and E-Customer Satisfaction: An Empirical Study in Egyptian Banks. International Journal of Business and Management, 14(5), 171. https://doi.org/10.5539/ijbm.v14n5p171

Anderson, R. E., & Srinivasan, S. S. (2003). E-Satisfaction and E-Loyalty: A Contingency Framework. Psychology and Marketing, 20(2), 123–138. https://doi.org/10.1002/mar.10063

Anjum, U., Aftab, J., Sultan, Q.-A., & Ahmed, M. (2016). Factors Affecting the Service Quality and Customer Satisfaction in Telecom Industry of Pakistan. International Journal of Management, Accounting & Economics, 3(9), 509–520. http://search.ebscohost.com/login.aspx?direct=true&db=bsh&AN=119485992&site=ehost-live

Arcand, M., PromTep, S., Brun, I., & Rajaobelina, L. (2017). Mobile banking service quality and customer relationships. International Journal of Bank Marketing, 35(7), 1066–1087. https://doi.org/10.1108/IJBM-10-2015-0150

Ariff, M. S. M., Yun, L. O., Zakuan, N., & Ismail, K. (2013). The Impacts of Service

Quality and Customer Satisfaction on Customer Loyalty in Internet Banking. Procedia - Social and Behavioral Sciences, 81, 469–473. https://doi.org/10.1016/j.sbspro.2013.06.462

Ariff, M. S. M., Yun, L. O., Zakuan, N., & Jusoh, A. (2012). Examining Dimensions of Electronic Service Quality for Internet Banking Services. Procedia - Social and Behavioral Sciences, 65(ICIBSoS), 854–859. https://doi.org/10.1016/j.sbspro.2012.11.210

Babakus, E., & Mangold, W. G. (1992). Adapting the SERVQUAL scale to hospital services: an empirical investigation. Health Services Research, 26(6), 767–786. http://www.ncbi.nlm.nih.gov/pubmed/1737708%0Ahttp://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=PMC1069855

Berry, L. L., Parasuraman, A., & Zeithaml, V. A. (1988). SERVQUAL: A multiple-item scale for measuring consumer perceptions of service quality. Journal of Retailing, 64(1), 12–40.

Blut, M. (2016). E-Service Quality: Development of a Hierarchical Model. Journal of Retailing, 92(4), 500–517. https://doi.org/10.1016/j.jretai.2016.09.002

Carter, M., Wright, R., Thatcher, J. B., & Klein, R. (2014). Understanding online customers' ties to merchants: The moderating influence of trust on the relationship between switching costs and e-loyalty. European Journal of Information Systems, 23(2), 185–204. https://doi.org/10.1057/ejis.2012.55

Chen, Y. C., Shen, Y. C., Lee, C. T. Y., & Yu, F. K. (2017). Measuring quality variations in e-service. Journal of Service Theory and Practice, 27(2), 427–452. https://doi.org/10.1108/JSTP-03-2015-0063

Chin, W. W. (1998). The partial least squares approach for structural equation modeling. Modern Methods for Business Research, April, 295–336.

Choi, J., Seol, H., Lee, S., Cho, H., & Park, Y. (2008). Customer satisfaction factors of mobile commerce in Korea. Internet Research, 18(3), 313–335. https://doi.org/10.1108/10662240810883335

Christian, E., Ayodele, A. A., Panama, A., & Ejiroghene. (2020). Self Service Technology and Customer Satisfaction in the Nigerian Online Sport Betting Industry. European Journal of Business and Management, March. https://doi.org/10.7176/ejbm/12-8-01

Cohen, J. (1988). Set Correlation and Contingency Tables. Applied Psychological Measurement, 12(4), 425–434. https://doi.org/10.1177/014662168801200410

Cramer, R. D. (1993). Partial Least Squares (PLS): Its strengths and limitations. Perspectives in Drug Discovery and Design, 1(2), 269–278. https://doi.org/10.1007/BF02174528

Cristobal, E., Flavián, C., & Guinalíu, M. (2007). Perceived e-service quality (PeSQ): Measurement validation and effects on consumer satisfaction and web site loyalty. Managing Service Quality, 17(3), 317–340. https://doi.org/10.1108/09604520710744326

Cyr, D., Hassanein, K., Head, M., & Ivanov, A. (2007). The role of social presence in establishing loyalty in e-Service environments. Interacting with Computers, 19(1), 43–56. https://doi.org/10.1016/j.intcom.2006.07.010

Diane, M. (2019). Telecoms regulation in Qatar. https://www.pinsentmasons.com/out-law/guides/telecoms-regulation-in-qatar

Đkudienë, V., Èertokas, Đ., McCorkle, D., & Reardon, J. (2015). the Effect of E-Shops' Service Quality on Lithuanian Consumers' Purchase Intentions. International Journal of Business, Marketing, & Decision Science, 8(1), 43–59. http://search.ebscohost.com/login.aspx?direct=true&db=bth&AN=111947949

&lang=it&site=ehost-live

Ergün, H. S., & Kuşcu, Z. K. (2013). Innovation Orientation, Market Orientation and e-Loyalty: Evidence from Turkish e-Commerce Customers. Procedia - Social and Behavioral Sciences, 99, 509–516. https://doi.org/10.1016/j.sbspro.2013.10.520

Ernst & Young. (2016). Global telecommunications study: navigating the road to 2020. https://doi.org/10.18356/de48b538-en

Falk, R. F., & Miller, N. B. (1992). A Primer for Soft Modeling. The University of Akron Press, April, 80. http://books.google.com/books/about/A_Primer_for_Soft_Modeling.html?id=3CFrQgAACAAJ

Fornell, C., & Larcker, D. F. (1981). Evaluating Structural Equation Models with Unobservable Variables and Measurement Error. Journal of Marketing Research, 18(1), 39. https://doi.org/10.2307/3151312

Ganapathi, P., & Abu-Shanab, E. A. (2020). Customer satisfaction with online food ordering portals in Qatar. International Journal of E-Services and Mobile Applications, 12(1), 57–79. https://doi.org/10.4018/IJESMA.2020010104

George, A., & Kumar, G. S. G. (2014). Impact of service quality dimensions in internet banking on customer satisfaction. Decision, 41(1), 73–85. https://doi.org/10.1007/s40622-014-0028

Georgiadis, C. K., & Stiakakis, E. (2009). Key issues for the quality assessment of mobile commerce services. 2009 4th Balkan Conference in Informatics, BCI 2009, May, 148–153. https://doi.org/10.1109/BCI.2009.26

Gowthami, S., & Venkatakrishnakumar, S. (2016). Impact of Smartphone : A pilot study on positive and negative effects. International Journal of Scientific

Engineering and Applied Science, 3(2), 2395–3470. www.ijseas.com

Gronroos, C. (1984). A Service Quality Model and its Marketing Implications. European Journal of Marketing, 18(4), 36–44. https://doi.org/10.1108/EUM0000000004784

Guthrie, G. (2010). Basic Research Methods: An Entry to Social Science Research. SAGE Publications India Pvt Ltd.

Hadid, K. I., Soon, N. K., & Amreeghah, A. A. E. (2020). The Effect of Digital Banking Service Quality on Customer Satisfaction: A Case Study on the Malaysian Banks. Asian Journal of Applied Science and Technology, 04(01), 06–29. https://doi.org/10.38177/ajast.2020.4102

Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2019). Multivariate Data Analysis (8th Editio). EMEA.

Hair, J. F., Hult, G. T. M., Ringle, C. M., & Sarstedt, M. (2016). A Primer on Partial Least Squares Structural Equation Modeling (PLS-SEM). In SAGE Publications (Second Edi). http://www.elsevier.com/locate/scp

Harris, L., & Mark Goode. (2014). The Four Levels of Loyalty and the Pivotal Role of Trust: A Study of Online Service Dynamics. Journal of Retailing, 80, 139–158.

Henseler, J., Ringle, C. M., & Sinkovics, R. R. (2009). The use of partial least squares path modeling in international marketing. Advances in International Marketing, 20, 277–319. https://doi.org/10.1108/S1474-7979(2009)0000020014

Hidayat, R. (2020). Analysis of E-Service Quality on Website E-Commerce on E-Customer Satisfaction. 298(iCAST 2018), 90–94.

Ho, C. I., & Lee, Y. L. (2007). The development of an e-travel service quality scale. Tourism Management, 28(6), 1434–1449. https://doi.org/10.1016/j.tourman.2006.12.002

Holloway, B. B., & Beatty, S. E. (2008). Satisfiers and dissatisfiers in the online environment: A critical incident assessment. Journal of Service Research, 10(4), 347–364. https://doi.org/10.1177/1094670508314266

Huang, E. Y., Lin, S. W., & Fan, Y. C. (2015). M-S-QUAL: Mobile service quality measurement. Electronic Commerce Research and Applications, 14(2), 126–142. https://doi.org/10.1016/j.elerap.2015.01.003

Hulin, C., Netemeyer, R. G., & Cudeck, R. (2001). Can a Reliability Coefficient Be Too High? Journal of Consumer Psychology, 10(2), 55–58. https://doi.org/10.2307/1480474

JOHN, R. R. (2015). REVIEW OF LITERATURE FOR SCALE DEVELOPMENT: E-SERVICE QUALITY. INTERNATIONAL JOURNAL OF RESEARCH IN COMMERCE & MANAGEMENT, 6(1041).

Jun, M., & Palacios, S. (2016). Examining the key dimensions of mobile banking service quality: an exploratory study. International Journal of Bank Marketing, 34(3), 307–326. https://doi.org/10.1108/IJBM-01-2015-0015

Kaatz, C. (2020). Retail in my pocket– replicating and extending the construct of service quality into the mobile commerce context. Journal of Retailing and Consumer Services, 53(September 2019), 101983. https://doi.org/10.1016/j.jretconser.2019.101983

Kaatz, C., Brock, C., & Blut, M. (2018). Developing a Conceptualization of Mobile Service Quality. ICIS 2017: Transforming Society with Digital Innovation.

Kaur, G., & Kaur, G. (2016). MOBILE APPLICATIONS ARE MAJOR PLAYERS IN THE WORLD OF E-COMMERCE. International Journal of Advanced Research in IT and Engineering, 5(2), 13–21.

Kazem, E. (2020). The Impact of Electronic Services' Quality on Customers' E-Loyalty

(An Applied Study on Telecom Egypt Group). Media Research Journal.

Khairul Azhar, M. D., Khidzir, N. Z., Ahmad Rasdan, I., & Fadhilahanim Aryani, A. (2018). Validity and reliability of instrument to measure social media skills among small and medium entrepreneurs at Pengkalan Datu River. International Journal of Development and Sustainability, 7(3), 1026–1037. www.isdsnet.com/ijds

Khan, M. T. (2013). Customers Loyalty: Concept & Definition (A Review). International Journal of Information, Business and Management, 5(3), 168–191. https://doi.org/http://dx.doi.org/10.1108/17506200710779521

Kim, H.-R. (2005). Developing an index of online customer satisfaction. Journal of Financial Services Marketing, 10(1), 49–64. https://doi.org/10.1057/palgrave.fsm.4770173

Kumar, M., Kee, F. T., & Manshor, A. T. (2009). Determining the Relative Importance of Critical Factors in Delivering the Service Quality of Banks: An Application of Dominance Analysis in SERVQUAL Model. Journal of Service Theory and Practice. https://doi.org/10.1108/09604520910943198

Kumbhar, V. M. (2011). Factors Affecting on Customers' Satisfaction in E-Banking: Some Evidences Form Indian Banks. Factors Affecting on Customers' Satisfaction in E-Banking: Some Evidences Form Indian Banks, 3(4), 1–14.

Kuo, T., Tsai, G. Y., Lu, I.-Y., & Chang, J.-S. (2009). Relationships among Service Quality, Customer Satisfaction and Customer Loyalty: A Case Study on Mobile Shopping APPs. Computers in Human Behavior, 25(4), 887–896. http://apiems2016.conf.tw/site/userdata/1087/papers/0186.pdf

Laureti, T., Piccarozzi, M., & Aquilani, B. (2018). The effects of historical satisfaction, provided services characteristics and website dimensions on encounter overall

satisfaction: A travel industry case study. TQM Journal, 30(3), 197–216. https://doi.org/10.1108/TQM-07-2017-0080

Lee, G. G., & Lin, H. F. (2005). Customer perceptions of e-service quality in online shopping. International Journal of Retail and Distribution Management, 33(2), 161–176. https://doi.org/10.1108/09590550510581485

Lee, W. O., & Wong, L. S. (2016). Determinants of Mobile Commerce Customer Loyalty in Malaysia. Procedia - Social and Behavioral Sciences, 224(August 2015), 60–67. https://doi.org/10.1016/j.sbspro.2016.05.400

Li, H., Liu, Y., & Suomi, R. (2009). Measurement of eservice quality: An empirical study on online travel service. 17th European Conference on Information Systems, ECIS 2009.

Li, H., & Suomi, R. (2008). Dimensions of e-service quality: an alternative model. Proceedings of the 2008 2nd International Conference on Future Generation Communication and Networking, FGCN 2008, 1, 29–35. https://doi.org/10.1109/FGCNS.2008.104

Li, H., & Suomi, R. (2009). A Proposed Scale for Measuring E-service Quality. International Journal of U- and e-Service, Science and Technology, 2(1), 1–10.

Lin, C. S., & Wu, S. (2002). Exploring the impact of online service quality on portal site usage. Proceedings of the Annual Hawaii International Conference on System Sciences, 2002-Janua(c), 2654–2661. https://doi.org/10.1109/HICSS.2002.994223

Lin, H. F. (2013). Determining the relative importance of mobile banking quality factors. Computer Standards and Interfaces, 35(2), 195–204. https://doi.org/10.1016/j.csi.2012.07.003

Madu, C. N., & Madu, A. A. (2002). Dimensions of e-quality. International Journal of

Quality and Reliability Management, 19(3), 246–258. https://doi.org/10.1108/02656710210415668

Menezes, L. S., Sellitto, M. A., Librelato, T. P., Borchardt, M., & Pereira, G. M. (2016). Identification and quantification of influent factors in perceived quality of the e-service provided by a university. Business Process Management Journal, 22(3), 438–457. https://doi.org/10.1108/BPMJ-07-2015-0100

Moghadam, S. R., & Kaboly, M. R. (2015). Analysing Electronic Service Quality from Customer Point of View in Telecommunications Company of Esfahan. 1(2), 39–44.

Mohammed, N. H. (2017). Relationship among Service and Product Quality, and Price in Establishing Customer Satisfaction Task Performance: The Use of Email in the Workplace View project financial literacy View project Suzila Mat Salleh. Article in Journal of Biological and Environmental Sciences, October. www.textroad.com

Mort, G. S., & Drennan, J. (2005). Marketing m-services: Establishing a usage benefit typology related to mobile user characteristics. Journal of Database Marketing & Customer Strategy Management, 12(4), 327–341. https://doi.org/10.1057/palgrave.dbm.3240269

N, S., & S, S. (2018). E-Banking Service Qualities, E-Customer Satisfaction, and e-Loyalty: A conceptual Model. The International Journal of Social Sciences and Humanities Invention, 5(6), 4808–4819. https://doi.org/10.18535/ijsshi/v5i6.08

Nemati, B., Gazor, H., MirAshrafi, S. N., & Nazari Ameleh, K. (2012). Analyzing e-service quality in service-based website by E-SERVQUAL. Management Science Letters, 2(2), 727–734. https://doi.org/10.5267/j.msl.2011.12.001

Ngoc Duy Phuong, N., & Thi Dai g, T. (2018). Repurchase Intention: The Effect of

Service Quality, System Quality, Information Quality, and Customer Satisfaction as Mediating Role: A PLS Approach of M-Commerce Ride Hailing Service in Vietnam. Marketing and Branding Research, 5(2), 78–91. https://doi.org/10.33844/mbr.2018.60463

Norhisham, N., Saddam, S. Z., Iskandar, A. I., & Mohd, N. (2015). A Study on Customers' Satisfaction towards Services Provided by Agencies at Urban Transformation Centre (UTC) Melaka. Global Journal of Business and Social Science Review, 1(March), 231–238.

O'Dea, S. (2020). Number of smartphone users worldwide from 2016 to 2021. Our Research and Content Philosophy. https://www.statista.com/statistics/330695/number-of-smartphone-users-worldwide/

Ojasalo, J. (2010). E-Service Quality: A Conceptual Model. International Journal of Arts and Sciences, 3(7), 127–143.

Ooredoo. (n.d.). Milestones. Retrieved August 2, 2020, from https://www.ooredoo.qa/portal/OoredooQatar/milestones

Özer, A., Argan, M. T., & Argan, M. (2013). The Effect of Mobile Service Quality Dimensions on Customer Satisfaction. Procedia - Social and Behavioral Sciences, 99(November), 428–438. https://doi.org/10.1016/j.sbspro.2013.10.511

Palmer, J. W. (2002). Web site usability, design, and performance metrics. Information Systems Research, 13(2), 151–167. https://doi.org/10.1287/isre.13.2.151.88

Papadomichelaki, X., & Mentzas, G. (2009). A Multiple-Item Scale for Assessing E-Government Service Quality. Electronic Government. https://doi.org/10.1007/978-3-642-03516-6

Parasuraman, A., Zeithaml, V. A., & Berry, L. L. (1985). A Conceptual Model of Service Quality and Its Implications for Future Research. Journal of Marketing, 49(4), 41–50. https://doi.org/10.1177/002224298504900403

Parasuraman, A., Zeithaml, V. A., & Malhotra, A. (2005). E-S-QUAL a multiple-item scale for assessing electronic service quality. Journal of Service Research, 7(3), 213–233. https://doi.org/10.1177/1094670504271156

Pechinthorn, K., Shinn, K., & Zin, T. (2020). The Influences of Service Quality Dimensions, Corporate Image and Customer Satisfaction on Customer Loyalty towards a Commercial Bank in Myanmar. Academic Journal University of the Thai Chamber of Commerce Humanities and Social Sciences, 155–170.

Phongtraychack, A., & Dolgaya, D. (2018). Evolution of Mobile Applications. MATEC Web of Conferences, 155, 1–7. https://doi.org/10.1051/matecconf/201815501027

Profile, S. E. E., & Profile, S. E. E. (2015). an Assessment of M-Customer Satisfaction Drivers and Levels From M-Shopping Applications With Kano'S Model. MANAS Sosyal Araştırmalar Dergisi, 4(5), 244–262.

Rahman, A., Hasan, M., & Mia, M. (2017). Mobile Banking Service Quality and Customer Satisfaction in Bangladesh: An Analysis. The Cost and Management, 45(2), 1066–1087. https://doi.org/10.1108/IJBM-10-2015-0150

Raval, H., & Bhatt, V. (2020a). A study on customers' perceptions towards E service quality dimensions and their satisfaction of online shopping platforms. Mukt Shabd Journal, IX(Iv), 3984–3997.

Raval, H., & Bhatt, V. (2020b). A study on impact of E service quality dimensions of online shopping platforms on overall service experience. Alochana Chakra Journal, IX(2231–3990), 1066–1080.

Rita, P., Oliveira, T., & Farisa, A. (2019). The impact of e-service quality and customer satisfaction on customer behavior in online shopping. Heliyon, 5(10), e02690. https://doi.org/10.1016/j.heliyon.2019.e02690

Rodríguez, P. G., Villarreal, R., Valiño, P. C., & Blozis, S. (2020). A PLS-SEM approach to understanding E-SQ, E-Satisfaction and E-Loyalty for fashion E-Retailers in Spain. Journal of Retailing and Consumer Services, 57(June). https://doi.org/10.1016/j.jretconser.2020.102201

Rohwiyati, R., & Praptiestrini, P. (2019). The Effect of Shopee e-Service Quality and Price Perception on Repurchase Intention: Customer Satisfaction as Mediation Variable. Indonesian Journal of Contemporary Management Research, 1(1), 47. https://doi.org/10.33455/ijcmr.v1i1.86

San, L. Y., Jun, W. W., Ling, T. N., & Hock, N. T. (2010). ustomers' perceive online shopping service quality: The perspective of generation Y. European Journal of Economics, Finance and Administrative Sciences, 25(2), 84–91.

Santos, J. (2003). E-service quality: a model of virtual service quality dimensions. Managing Service Quality: An International Journal, 13(3), 233–246. https://doi.org/https://doi.org/10.1108/09604520310476490

Shanmugapriya, S., & Subramanian, K. (2015). Structural equation model to investigate the factors influencing quality performance in Indian construction projects. Sadhana - Academy Proceedings in Engineering Sciences, 40(6), 1975–1987. https://doi.org/10.1007/s12046-015-0421-3

Simon, K. (2020). Datareportal. https://datareportal.com/reports/digital-2020-qatar

Singh, D. S. (2018). Drivers of Customer Satisfaction from the Mobile Commerce and Mobile Marketing:The Case of Mobile Shopping Applications. Drivers of Customer Satisfaction from the Mobile Commerce and Mobile Marketing:The

Case of Mobile Shopping Applications, July, 108.

Singh, S. (2019). Measuring E-Service Quality and Customer Satisfaction with Internet Banking in India. Theoretical Economics Letters, 09(02), 308–326. https://doi.org/10.4236/tel.2019.92023

Sleimi, M. T., Karam, A. A., & Qubbaj, I. S. (2018). The Impact Of E-Banking Services Quality On Customers Satisfaction Moderated By Customer Trust: Survey On Arab Bank In Amman, Jordan. مجلة جامعة القدس المفتوحة للبحوث الإدارية والاقتصادية, 24. https://doi.org/10.33977/1760-003-009-016

Sohn, C., & Tadisina, S. K. (2008). Development of e-service quality measure for internet-based financial institutions. Total Quality Management and Business Excellence, 19(9), 903–918. https://doi.org/10.1080/14783360802224412

statistics solutions - Factor Analysis. (2021). https://www.statisticssolutions.com/

Stevano, Andajani, E., & Rahayu, S. (2018). Influence Service Quality To Customer Satisfaction and Customer Loyalty Using Self Service Technology: Internet Banking. 5th International Conference on Business, Economic and Social Sciences (ICBESS) 2018, 22.

Stiakakis, E., & Georgiadis, C. K. (2009). E-service quality: Comparing the perceptions of providers and customers. Managing Service Quality, 19(4), 410–430. https://doi.org/10.1108/09604520910971539

Stiakakis, E., & Georgiadis, C. K. (2011). A model to identify the dimensions of mobile service quality. Proceedings - 2011 10th International Conference on Mobile Business, ICMB 2011, 195–204. https://doi.org/10.1109/ICMB.2011.43

Swaid, S. I., & Wigand, R. T. (2007). Key dimensions of e-commerce service quality and its relationships to satisfaction and loyalty. 20th Bled EConference - EMergence: Merging and Emerging Technologies, Processes, and Institutions -

Conference Proceedings, 3, 414–428.

Tandon, U., Kiran, R., & Sah, A. N. (2017). Customer Satisfaction as mediator between website service quality and repurchase intention: An emerging economy case. Service Science, 9(2), 106–120. https://doi.org/10.1287/serv.2016.0159

Tenenhaus, M., Vinzi, V. E., Chatelin, Y. M., & Lauro, C. (2005). PLS path modeling. Computational Statistics and Data Analysis, 48(1), 159–205. https://doi.org/10.1016/j.csda.2004.03.005

Ting, O. S., Ariff, M. S. M., Zakuan, N., Sulaiman, Z., & Saman, M. Z. M. (2016). E-Service Quality, E-Satisfaction and E-Loyalty of Online Shoppers in Business to Consumer Market; Evidence form Malaysia. IOP Conference Series: Materials Science and Engineering, 131(1). https://doi.org/10.1088/1757-899X/131/1/012012

Tse, D. K., & Wilton, P. C. (1988). Models of Consumer Satisfaction Formation: An Extension. Journal of Marketing Research, 25(2), 204. https://doi.org/10.2307/3172652

Ul Haq, I., & Awan, T. M. (2020). Impact of e-banking service quality on e-loyalty in pandemic times through interplay of e-satisfaction. Vilakshan – XIMB Journal of Management, ahead-of-p(ahead-of-print). https://doi.org/10.1108/xjm-07-2020-0039

Venkatesh, V., & Davis, F. D. (2000). Theoretical extension of the Technology Acceptance Model: Four longitudinal field studies. Management Science, 46(2), 186–204. https://doi.org/10.1287/mnsc.46.2.186.11926

Vodafone. (n.d.). who we are. Retrieved August 3, 2020, from https://www.vodafone.qa/en/about-us/who-we-are

Wang, Y. S., & Liao, Y. W. (2007). The conceptualization and measurement of m-

commerce user satisfaction. Computers in Human Behavior, 23(1), 381–398. https://doi.org/10.1016/j.chb.2004.10.017

Wilis, R. A., & Nurwulandari, A. (2020). The effect of E-Service Quality , E-Trust , Price and Brand Image Towards E-Satisfaction and Its Impact on E-Loyalty of Traveloka ' s Customer. Jurnal Ilmiah MEA (Manajemen, Ekonomi, Dan Akuntansi), 4(3), 1061–1099.

Wilson, N., Keni, K., & Tan, P. H. P. (2019). The effect of website design quality and service quality on repurchase intention in the E-commerce industry: A cross-continental analysis. Gadjah Mada International Journal of Business, 21(2), 187–222. https://doi.org/10.22146/gamaijb.33665

Wulfert, T. (2019). Mobile App Service Quality Dimensions and Requirements for Mobile Shopping Companion Apps. Junior Management Science, 4(3), 339–391.

Wulfert, T., Betzing, J., & Becker, J. (2019). Eliciting Customer Preferences for Shopping Companion Apps: A Service Quality Approach. Wirtschaftsinformatik, March, 1220–1234.

Yaghoubi, N. M., & Rigi, F. (2017). Analysis of E-service quality from the management perspective: An empirical study on E-Government services. International Journal of Business Excellence, 11(1), 58–71. https://doi.org/10.1504/IJBEX.2017.080605

Yang, Z., Peterson, R. T., & Cai, S. (2003). Services quality dimensions of Internet retailing: An exploratory analysis. Journal of Services Marketing, 17(7), 685–700. https://doi.org/10.1108/08876040310501241

Younus Hossain, M., & Hossain, M. (2011). E-service Quality and Consumer Loyalty. 1–27.

Zavareh, F. B., Ariff, M. S. M., Jusoh, A., Zakuan, N., Bahari, A. Z., & Ashourian, M. (2012). E-Service Quality Dimensions and Their Effects on E-Customer Satisfaction in Internet Banking Services. Procedia - Social and Behavioral Sciences, 40, 441–445. https://doi.org/10.1016/j.sbspro.2012.03.213

Zehir, C., & Narcıkara, E. (2016). E-Service Quality and E-Recovery Service Quality: Effects on Value Perceptions and Loyalty Intentions. Procedia - Social and Behavioral Sciences, 229, 427–443. https://doi.org/10.1016/j.sbspro.2016.07.153

Zeithaml, V. A. (2002). Service excellence in electronic channels. Managing Service Quality: An International Journal, 12(3), 135–139. https://doi.org/https://doi.org/10.1108/09604520210429187

Zeithaml, V. A., Parasuraman, A., & Malhotra, A. (2000). A Conceptual Framework for Understanding e-Service Quality: Implications for Future Research and Managerial Practice - Marketing Science Institute. Marketing Science Institute.

Zeithaml, V. A., Parasuraman, A., & Malhotra, A. (2002). Service quality delivery through web sites: A critical review of extant knowledge. Journal of the Academy of Marketing Science, 30(4), 362–375. https://doi.org/10.1177/009207002236911

Zhang, X., & Prybutok, V. R. (2005). A consumer perspective of e-service quality. IEEE Transactions on Engineering Management, 52(4), 461–477. https://doi.org/10.1109/TEM.2005.856568

Zhou, R., Wang, X., Shi, Y., Zhang, R., Zhang, L., & Guo, H. (2019). Measuring e-service quality and its importance to customer satisfaction and loyalty: an empirical study in a telecom setting. Electronic Commerce Research, 19(3), 477–499. https://doi.org/10.1007/s10660-018-9301-3

APPENDIX

Appendix A: Online Survey

E-Service Quality of Telecommunication Companies in Qatar

Dear Respondent,

I would like to invite you to participate in this research study titled E-Service Quality of Telecommunication Companies in Qatar. Qatar University Institutional Review Board has approved this study with the approval number QU-IRB 1377-EA/20 ; If you have any questions related to ethical compliance of the study, you may contact them at (QU-IRB@qu.edu.qa).

The study aims to evaluate and compare electronic service quality between Ooredoo and Vodafone Qatar mobile applications. It will determine the impact of e-service quality on customer satisfaction related to the mobile application. Also, it will assess customer's loyalty to use the app in the future and how they would recommend these apps to others.

There are no associated risks involved in participating in this survey. Answering this survey will take 10 to 15 minutes. The information collected will be kept strictly confidential and secure, where only the researchers have access to it. Your participation is completely voluntary and anonymous. The data will not be re-used for any other purpose in the future. By clicking on the provided research questionnaire link, you give your full informed consent to participate in this research study. You can withdraw from the study at any given time with no explanation required and can skip any question. If you have any questions, you may contact the project supervisor, Prof. Emad Ahmed Mohammed Abushanab, College of Business and Economics, Qatar University, via email (eabushanab@qu.edu.qa), Phone (44035077).

Please indicate that you have read, understood, and voluntarily agree to participate. If you wish to participate, please click on Next to continue.

* Required

General Information

Please indicate the degree to which you agree or disagree with the following statements:

1. Gender *

Mark only one oval.

- ◯ Male
- ◯ Female

2. Age *

Mark only one oval.

- 18 to 25
- 26 to 40
- 41 to 60
- above 60

3. level of Education *

Mark only one oval.

- High School or less
- Undergraduate
- Postgraduate
- Doctoral

4. Currently, which mobile applications are you using: Ooredoo Qatar or Vodafone Qatar? *

Mark only one oval.

- Ooredoo Qatar
- Vodafone Qatar

5. How many times do you use the mobile application in a month? *

Mark only one oval.

- 1 to 5 times
- 5 to 10 times
- more than 10 times

Design

Please indicate the degree to which you agree or disagree with the following statements:

6. The application has a modern, simple, and attractive design *

Mark only one oval per row.

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
DE1	◯	◯	◯	◯	◯

7. The application has search and filter functionality *

Mark only one oval per row.

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
DE2	◯	◯	◯	◯	◯

8. The application uses a layout and colors that reflect company design and layout *

Mark only one oval per row.

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
DE3	◯	◯	◯	◯	◯

Easy to use

Please indicate the degree to which you agree or disagree with the following statements:

9. The application is easy to use *

Mark only one oval per row.

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
EU1	◯	◯	◯	◯	◯

10. I used the application without any effort to know the steps *

Mark only one oval per row.

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
EU2	◯	◯	◯	◯	◯

11. The content of the application is consistent *

Mark only one oval per row.

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
EU3	◯	◯	◯	◯	◯

12. I can complete the order with simple steps *

Mark only one oval per row.

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
EU4	◯	◯	◯	◯	◯

Information

Please indicate the degree to which you agree or disagree with the following statements:

13. Information on product's specifications and service packages are clear *

Mark only one oval per row.

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
INF01	◯	◯	◯	◯	◯

14. Information about a product or service is clear and understandable *

Mark only one oval per row.

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
INFO2	◯	◯	◯	◯	◯

15. Information about a product or service is correct *

Mark only one oval per row.

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
INFO3	◯	◯	◯	◯	◯

Reliability

Please indicate the degree to which you agree or disagree with the following statements:

16. The application is available all time *

Mark only one oval per row.

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
REL1	◯	◯	◯	◯	◯

17. The application is operated sustainably after the installation of an update *

Mark only one oval per row.

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
REL2	◯	◯	◯	◯	◯

18. A Confirmation notification is sent after applying a service or purchasing items *

Mark only one oval per row.

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
REL3	◯	◯	◯	◯	◯

19. Ordered items can be easily tracked by the application until items delivered *

Mark only one oval per row.

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
REL4	◯	◯	◯	◯	◯

20. Orders can be canceled or returned *

Mark only one oval per row.

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
REL5	◯	◯	◯	◯	◯

21. The commodity or service is received on the scheduled timing *

Mark only one oval per row.

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
REL6	◯	◯	◯	◯	◯

Empathy

Please indicate the degree to which you agree or disagree with the following statements:

22. All services are available in the application. Hence, I do not need to visit the branches *

Mark only one oval per row.

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
EMP1	◯	◯	◯	◯	◯

23. The mobile application understands my needs *

Mark only one oval per row.

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
EMP2	◯	◯	◯	◯	◯

24. The application gives me personal attention by sending a notification of offers and/or new services *

Mark only one oval per row.

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
EMP3	◯	◯	◯	◯	◯

Responsiveness

Please indicate the degree to which you agree or disagree with the following statements:

25. The customer service representatives/call center agents are available when needed *

Mark only one oval per row.

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
RES1	◯	◯	◯	◯	◯

26. There is a live chat within the application *

Mark only one oval per row.

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
RES2	◯	◯	◯	◯	◯

27. My problems have been quickly solved *

Mark only one oval per row.

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
RES3	◯	◯	◯	◯	◯

28. The application responds fast to my interaction when browsing *

Mark only one oval per row.

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
RES4	◯	◯	◯	◯	◯

29. The application starts-up quickly when I open it *

Mark only one oval per row.

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
RES5	◯	◯	◯	◯	◯

Security

Please indicate the degree to which you agree or disagree with the following statements:

30. My personal and payment data are secured *

Mark only one oval per row.

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
SEC1	◯	◯	◯	◯	◯

31. The application asks for my login information when used *

Mark only one oval per row.

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
SEC2	◯	◯	◯	◯	◯

32. The application asks for my verification for each transaction like using OTP or other methods *

Mark only one oval per row.

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
SEC3	◯	◯	◯	◯	◯

33. The application asks me for extra permission when I install or use it. *

Mark only one oval per row.

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
SEC4	◯	◯	◯	◯	◯

Prices and offers

Please indicate the degree to which you agree or disagree with the following statements:

34. The application offers extra free service/ product or gift *

Mark only one oval per row.

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
PG1	◯	◯	◯	◯	◯

35. The application offers lower prices of products/services than branches. *

Mark only one oval per row.

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
PG2	◯	◯	◯	◯	◯

36. The application offers some special services which may not be available in branches *

Mark only one oval per row.

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
PG3	◯	◯	◯	◯	◯

Customer Satisfaction

Please indicate the degree to which you agree or disagree with the following statements:

37. I am overall satisfied with the application *

Mark only one oval per row.

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
CS1	◯	◯	◯	◯	◯

38. I did not face any problem when using the application *

Mark only one oval per row.

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
CS2	◯	◯	◯	◯	◯

39. I am satisfied with the overall transaction of the application. *

Mark only one oval per row.

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
CS3	◯	◯	◯	◯	◯

Loyalty

Please indicate the degree to which you agree or disagree with the following statements:

40. I would recommend this application to others *

Mark only one oval per row.

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
LOY1	◯	◯	◯	◯	◯

41. I would like to say positive things about the application to other people *

Mark only one oval per row.

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
LOY2	◯	◯	◯	◯	◯

42. I expect to continue using the application in the future *

Mark only one oval per row.

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
LOY3	◯	◯	◯	◯	◯

قسم بلا عنوان

جودة الخدمة الإلكترونية لشركات الاتصالات في قطر

عزيزي المشارك:

اود دعوتك للمشاركة في هذه الدراسة البحثية بعنوان جودة الخدمة الإلكترونية لشركات الاتصالات في قطر. لقد تمت الموافقة على هذه الدراسة من قبل مجلس المراجعة المؤسسية في جامعة قطر (QU-IRB) تحت رقم الموافقة: QU-IRB 1377-EA/20 إذا كانت لديك اية أسئلة بخصوص المواءمة الاخلاقية الخاصة بهذه الدراسة فيمكنك الاتصال بالمجلس على QU-IRB@qu.edu.qa

الهدف من هذا البحث هو تقييم جودة الخدمات الإلكترونية لتطبيق الجوال لشركة اوريدو قطر و فودافون قطر ومقارنتها مع بعضها. وكذلك تحديد تأثير جودة خدمات التطبيق على رضا العملاء. أيضًا، سنقوم بدراسة تأثير رضا العملاء وولائهم لاستخدام التطبيق في المستقبل وتوصيتهم باستخدام هذا التطبيق للغير.

لا توجد أي مخاطر أو أضرار للمشاركة في هذا الاستبيان. و ستستغرق الإجابة على هذا الاستبيان من 10 إلى 15 دقيقة فقط.

المعلومات التي سيتم جمعها ستبقى سرية وآمنة للغاية حيث لا يمكن سوى للباحثين في هذه الدراسة من الوصول إليها. مشاركتك طوعية وغير مطلوب منك تزويدنا بأية معلومات تدل على هويتك. ولن يتم إعادة استخدام البيانات لأي غرض آخر في المستقبل.

يمكنك الانسحاب في أي وقت كما يمكنك الامتناع عن اجابة اي سؤال ايضا. من خلال النقر على رابط الاستبيان البحثي المقدم، فإنك تعطي موافقتك الكاملة على المشاركة في هذه الدراسة البحثية.

إذا كان لديك أي أسئلة، يمكنك الاتصال بمشرف المشروع الأستاذ عماد أحمد أبو شنب ، كلية الإدارة والاقتصاد، جامعة قطر، عبر البريد الإلكتروني eabushanab@qu.edu.qa ، الهاتف 44035077

يرجى الإشارة إلى أنك قد قرأت وفهمت ووافقت طواعية على المشاركة. إذا كنت ترغب في المشاركة، يرجى الضغط على زر التالي

* Required

المعلومات العامة

1. الجنس *

Mark only one oval.

- ذكر
- انثى

2. العمر *

Mark only one oval.

- من 18 الى 25
- من 26 الى 40
- من 41 الى 60
- أكبر من 60

3. المستوى التعليمي *

Mark only one oval.

- الثانوية العامة او اقل
- بكلوريوس
- ماجستير
- دكتوراه

4. ما هو التطبيق الذي تستخدمه *

Mark only one oval.

- تطبيق اوريدو قطر
- تطبيق فودافون قطر

5. كم مره تستخدم التطبيق في الشهر ؟ *

Mark only one oval.

- مره الى 5 مرات
- من 5 الى 10 مرات
- أكثر من 10 مرات

يرجى الإشارة إلى أي مدى توافق أو لا توافق فيها على العبارات التالية

التصميم

6. التطبيق ذو تصميم حديث وبسيط وجذاب *

Mark only one oval per row.

	غير موافق بشدة	غير موافق	محايد	موافق	موافق بشدة
DE1					

7. يحتوي التطبيق على خاصية البحث والفلتره *

Mark only one oval per row.

	موافق بشدة	موافق	محايد	غير موافق	غير موافق بشدة
DE2	◯	◯	◯	◯	◯

8. تصميم والوان التطبيق متناغم مع تصميم وشعار الشركة *

Mark only one oval per row.

	موافق بشدة	موافق	محايد	غير موافق	غير موافق بشدة
DE3	◯	◯	◯	◯	◯

سهولة الاستخدام

يرجى الإشارة إلى أي مدى توافق أو لا توافق فيها على العبارات التالية

9. التطبيق سهل الاستخدام *

Mark only one oval per row.

	موافق بشدة	موافق	محايد	غير موافق	غير موافق بشدة
EU1	◯	◯	◯	◯	◯

10. استطيع استخدام البرنامج بدون اي صعوبة لمعرفة الخطوات *

Mark only one oval per row.

	موافق بشدة	موافق	محايد	غير موافق	غير موافق بشدة
EU2	◯	◯	◯	◯	◯

11. محتوى التطبيق متناسق *

Mark only one oval per row.

	غير موافق بشدة	غير موافق	محايد	موافق	موافق بشدة
EU3	◯	◯	◯	◯	◯

12. استطيع انجاز الطلب بخطوات بسيطة *

Mark only one oval per row.

	غير موافق بشدة	غير موافق	محايد	موافق	موافق بشدة
EU4	◯	◯	◯	◯	◯

المعلومات

يرجى الإشارة إلى أي مدى توافق أو لا توافق فيها على العبارات التالية

13. المعلومات المتعلقة بالسلعة او حزمة الخدمة واضحة *

Mark only one oval per row.

	غير موافق بشدة	غير موافق	محايد	موافق	موافق بشدة
INFO1	◯	◯	◯	◯	◯

14. معلومات السلعة او الخدمة واضحة ومفهومة *

Mark only one oval per row.

	غير موافق بشدة	غير موافق	محايد	موافق	موافق بشدة
INFO2	◯	◯	◯	◯	◯

15. معلومات السلعة او الخدمة صحيحة *

Mark only one oval per row.

	غير موافق بشدة	غير موافق	محايد	موافق	موافق بشدة
INFO3	◯	◯	◯	◯	◯

يرجى الإشارة إلى أي مدى توافق أو لا توافق فيها على العبارات التالية

الموثوقية

16. التطبيق متوفر في جميع الأوقات *

Mark only one oval per row.

	غير موافق بشدة	غير موافق	محايد	موافق	موافق بشدة
REL1	◯	◯	◯	◯	◯

17. يعمل التطبيق بشكل سليم بعد تثبيت التحديث *

Mark only one oval per row.

	غير موافق بشدة	غير موافق	محايد	موافق	موافق بشدة
REL2	◯	◯	◯	◯	◯

18. يتم إرسال اشعار تأكيد العملية بعد طلب الخدمة أو شراء السلع *

Mark only one oval per row.

	غير موافق بشدة	غير موافق	محايد	موافق	موافق بشدة
REL3	◯	◯	◯	◯	◯

19. يمكن تتبع الطلب بسهولة عبر التطبيق ولغاية إيصال السلعة *

Mark only one oval per row.

	غير موافق بشدة	غير موافق	محايد	موافق	موافق بشدة
REL4	◯	◯	◯	◯	◯

20. يمكن الغاء الطلب او ارجاعه *

Mark only one oval per row.

	غير موافق بشدة	غير موافق	محايد	موافق	موافق بشدة
REL5	◯	◯	◯	◯	◯

21. تم استلام السلعة أو الخدمة في الوقت المحدد *

Mark only one oval per row.

	غير موافق بشدة	غير موافق	محايد	موافق	موافق بشدة
REL6	◯	◯	◯	◯	◯

يرجى الإشارة إلى أي مدى توافق أو لا توافق فيها على العبارات التالية

الاهتمام

22. جميع الخدمات متوفرة في التطبيق. وبالتالي ، لست بحاجة لزيارة مركز الخدمة *

Mark only one oval per row.

	غير موافق بشدة	غير موافق	محايد	موافق	موافق بشدة
EMP1	◯	◯	◯	◯	◯

23. التطبيق يلبي احتياجاتي *

Mark only one oval per row.

	غير موافق بشدة	غير موافق	محايد	موافق	موافق بشدة
EMP2	◯	◯	◯	◯	◯

24. التطبيق يعطيني الاهتمام الشخصي من خلال ارسال التنبيهات الخاصه بالعروض او الخدمات الجديدة *

Mark only one oval per row.

	غير موافق بشدة	غير موافق	محايد	موافق	موافق بشدة
EMP3	◯	◯	◯	◯	◯

الاستجابة

يرجى الإشارة إلى أي مدى توافق أو لا توافق فيها على العبارات التالية

25. يتواجد ممثلو خدمة العملاء عندما أواجه أي مشكلة في التطبيق *

Mark only one oval per row.

	غير موافق بشدة	غير موافق	محايد	موافق	موافق بشدة
RES1	◯	◯	◯	◯	◯

26. يحتوي التطبيق على خاصية التحدث المباشر(Live Chat) *

Mark only one oval per row.

	غير موافق بشدة	غير موافق	محايد	موافق	موافق بشدة
RES2	◯	◯	◯	◯	◯

27. يتم حل المشاكل التي اواجهها بسرعة *

Mark only one oval per row.

	غير موافق بشدة	غير موافق	محايد	موافق	موافق بشدة
RES3	◯	◯	◯	◯	◯

28. التطبيق يستجيب معي بسرعة عند تصفحه *

Mark only one oval per row.

	غير موافق بشدة	غير موافق	محايد	موافق	موافق بشدة
RES4	◯	◯	◯	◯	◯

29. يبدأ التطبيق بسرعة عندما أقوم بفتحه *

Mark only one oval per row.

	غير موافق بشدة	غير موافق	محايد	موافق	موافق بشدة
RES5	◯	◯	◯	◯	◯

يرجى الإشارة إلى أي مدى توافق أو لا توافق فيها على العبارات التالية

الحمايِة

30. بياناتي الشخصية وبيانات الدفع محمية *

Mark only one oval per row.

	غير موافق بشدة	غير موافق	محايد	موافق	موافق بشدة
SEC1	◯	◯	◯	◯	◯

31. يطلب مني التطبيق تسجيل الدخول عند استخدامه *

Mark only one oval per row.

	موافق بشدة	موافق	محايد	غير موافق	غير موافق بشدة
SEC2	◯	◯	◯	◯	◯

32. يطلب مني التطبيق التاكيد عند القيام باي عملية وذلك باستخدام OTP أو طريقة أخرى *

Mark only one oval per row.

	موافق بشدة	موافق	محايد	غير موافق	غير موافق بشدة
SEC3	◯	◯	◯	◯	◯

33. يطلب مني التطبيق اذونات إضافيه عند تثبيته أو استخدامه. *

Mark only one oval per row.

	موافق بشدة	موافق	محايد	غير موافق	غير موافق بشدة
SEC4	◯	◯	◯	◯	◯

يرجى الإشارة إلى أي مدى توافق أو لا توافق فيها على العبارات التالية

العروض والاسعار

34. يقدم التطبيق عروض إضافية على الخدمة او السلعة المطلوبة *

Mark only one oval per row.

	موافق بشدة	موافق	محايد	غير موافق	غير موافق بشدة
PG1	◯	◯	◯	◯	◯

35. يقدم التطبيق أسعار أقل من مراكز الخدمة للسلع والخدمات *

Mark only one oval per row.

	غير موافق بشدة	غير موافق	محايد	موافق	موافق بشدة
PG2	◯	◯	◯	◯	◯

36. يقدم التطبيق بعض الخدمات المميزة والغير متوفرة في مراكز الخدمة *

Mark only one oval per row.

	غير موافق بشدة	غير موافق	محايد	موافق	موافق بشدة
PG3	◯	◯	◯	◯	◯

مستوى رضا العملاء

يرجى الإشارة إلى أي مدى توافق أو لا توافق فيها على العبارات التالية

37. أنا راضي بشكل عام عن التطبيق *

Mark only one oval per row.

	غير موافق بشدة	غير موافق	محايد	موافق	موافق بشدة
CS1	◯	◯	◯	◯	◯

38. لم تواجهني أي مشكلة عند استخدام التطبيق *

Mark only one oval per row.

	غير موافق بشدة	غير موافق	محايد	موافق	موافق بشدة
CS2	◯	◯	◯	◯	◯

39. أنا راضي بشكل عام عن المعاملات التي تنجز عبر التطبيق *

Mark only one oval per row.

	موافق بشدة	موافق	محايد	غير موافق	غير موافق بشدة
CS3	◯	◯	◯	◯	◯

يرجى الإشارة إلى أي مدى توافق أو لا توافق فيها على العبارات التالية

الولاء

40. سأوصي الاخرين باستخدام هذا التطبيق *

Mark only one oval per row.

	موافق بشدة	موافق	محايد	غير موافق	غير موافق بشدة
LOY1	◯	◯	◯	◯	◯

41. ساقول أشياء إيجابية حول التطبيق للاخرين *

Mark only one oval per row.

	موافق بشدة	موافق	محايد	غير موافق	غير موافق بشدة
LOY2	◯	◯	◯	◯	◯

42. ساستمر في استخدام التطبيق في المستقبل *

Mark only one oval per row.

	موافق بشدة	موافق	محايد	غير موافق	غير موافق بشدة
LOY3	◯	◯	◯	◯	◯

قسم بلا عنوان

Appendix B: QU-IRB Approval

جامعة قطر
QATAR UNIVERSITY

Qatar University Institutional Review Board **QU-IRB**
QU-IRB Registration: IRB-QU-2020-006, QU-IRB, Assurance: IRB-A-QU-2019-0009

September 29th, 2020

Dr. Emad Abu Shanab
College of Business and Economics
Qatar University
Tel.: 4403 5077
Email: eabushanab@qu.edu.qa

Dear Dr. Emad Abu Shanab,

Sub.: Research Ethics Expedited Approval
Ref.: Student, Abdulla Nasser Alemadi/ e-mail: 200100440@student.qu.edu.qa
Project Title: "E-Service Quality of Telecommunication Companies in Qatar"

We would like to inform you that your application along with the supporting documents provided for the above project, has been reviewed by the QU-IRB, and having met all the requirements, has been granted research ethics **Expedited Approval** based on the following category(ies) listed in the Policies, Regulations and Guidelines provided by MOPH for Research Involving Human Subjects. Your approval is for one year effective from September 29th, 2020 till September 28th, 2021.

1) Present no more than minimal risk to human subject, and
2) Involve only procedures listed in the following category(ies).
Category 7: Research on individual or group characteristics or behavior (including, but not limited to, research on perception, cognition, motivation, identity, language, communication, cultural beliefs or practices, and social behavior) or research employing survey, interview, oral history, focus group, program evaluation, human factors evaluation, or quality assurance methodologies.

Documents Reviewed: QU-IRB Application Human Subject 07092020, QU-IRB Application Material Check List - abdulla updated 26082020, proposal V3.1 2, Consent form and Survey Arabic v3, Consent form and Survey v1.1 English 25082020, QU-IRB Review Forms, responses to IRB queries and updated documents.

Please note that expedited approvals are valid for a period of **one year** and renewal should be sought one month prior to the expiry date to ensure timely processing and continuity. Moreover, any changes/modifications to the original submitted protocol should be reported to the committee to seek approval prior to continuation.

Your Research Ethics Expedited Approval Number is: **QU-IRB 1377-EA/20**. Kindly state this number in all your future correspondence to us pertaining to this project. In addition, please submit a closure report to the QU-IRB upon completion of the project.

Best wishes,
Dr. Noora Lari

Vice Chair, QU-IRB

جامعة قطر
QATAR UNIVERSITY
Institutional Review Board
(IRB)
Office Of Academic Research