

# A Comparison of Service Quality Dimensions in the Mobile Service Market: Evidence from Emerging Markets

Mamoun Akroush<sup>1</sup>, Ghazi Samawi<sup>2</sup>, Majdy Zuriekat<sup>1\*</sup>, Metri Mdanat<sup>2</sup>, Israa Affara<sup>3</sup>, Shuhd Dawood<sup>4</sup>

<sup>1</sup>Graduate School of Business Administration, German Jordanian University, Amman, Jordan

<sup>2</sup>School of Logistics and Management Sciences, German Jordanian University, Amman, Jordan

<sup>3</sup>Relief and Development Peer Foundation, Sana'a Office, Sana'a, Yemen

<sup>4</sup>Logistics, Supply and Procurement, UNICEF Yemen, Sana'a, Yemen

Email: \*majdy.zuriekat@gju.edu.jo

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## Abstract

This study compares service quality (SERVQUAL) dimensions from customers' perspectives and examines their impact on customer satisfaction in the mobile service markets of Jordan and Yemen. A questionnaire was distributed to 1400 participants in both countries. Utilizing structural equation modeling (SEM), it was found that the most important SERVQUAL dimensions in the studied countries are: reliability, interaction quality (empathy, assurance, and responsiveness), and tangibles in Jordan; and reliability, assurance-empathy, tangibles, and responsiveness in Yemen. In both samples, SERVQUAL was able to predict customer satisfaction, whereby reliability exerted the strongest effect, and it successfully measured service quality from customers' perspectives in both countries. Furthermore, the current study provides managers of mobile service operators in both markets with insightful knowledge related to SERVQUAL dimensions and their role in ensuring customer satisfaction. Managing SERVQUAL dimensions relative to consumer needs in targeted markets is essential for business competitiveness and marketing strategies.

## Keywords

Service Quality, SERVQUAL, Customer Satisfaction, Mobile Telecommunications

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## 1. Introduction

The services sector is vital for economic growth and prosperity at the national

and global levels. The world economy is increasingly characterized by the great role of the services sector, which in 2014 contributed a third of global gross value added, half of world employment, a fifth of global trade, and more than half of foreign direct investment flow [1]. This is primarily due to the increasing importance and share of the services sector in the economies of most developed and developing countries. The information and communication technology sector, comprising a wide range of activities from electronic components manufacturing to telecommunication services, will continue to enjoy dynamic growth with an expected increase in sector revenues of +4.4% in 2018 [2] [3]. According to the latest statistics published by the International Telecommunication Union, the number of mobile subscribers in 2017 was more than 7.74 billion, representing approximately 104% of the global population. Therefore, studying and analyzing service quality constructs is fundamentally important for the whole services sector and mobile services in particular in today's competitive global markets [4].

Service quality has received much academic-practitioner attention over the last three decades and is considered one of the most contentious areas of services marketing. Recent research has invested much effort on the conceptualization and measurement of service quality and its effect on business performance. Delivering quality services to customers is intuitively and empirically the most important factor in satisfying and retaining customers as well as building and sustaining profitability [5] [6] [7] [8] [9]. Services organizations find it more essential than ever in the modern digital economy to provide high quality services to customers in order to enhance customer retention [10] [11] [12]. In the telecommunications sector, service quality is of paramount importance as a strategic tool to attract and retain customers, as the sector has reached the maturity stage in several parts of the world, with over 100% penetration globally.

Service quality enhances service organizations' ability to differentiate themselves from their competitors and gain competitive advantage; it increases customer satisfaction, customer loyalty, market share, and profitability, and lowers costs [13]-[19]. Nonetheless, a disagreement exists among service quality scholars regarding its definition, measurements, models, dimensions, items, and even its methodology. Excellent reviews on such debatable issues have also been discussed in service quality literature [20] [21] [22] [23] [24]. Recently, the interest in defining and measuring service quality (SERVQUAL) dimensions in the mobile telecommunications sector worldwide has increased as a response to the high penetration rates and the new advancements in related technology [25].

The service quality tool (SERVQUAL) is still one of the most controversial models of service quality measurement over the last two decades [10], and there is no agreement yet on the number of SERVQUAL dimensions as proposed by the original developers. In 1988, five dimensions of SERVQUAL were proposed (tangibles, reliability, responsiveness, assurance, and empathy) [26]. In the 1990s decade, researchers [27] [28] refined the SERVQUAL dimensions and items and they claimed that they are still valid and reliable as a general skeleton to meas-

ure service quality. The SERVQUAL instrument and dimensions have been extensively utilized by academics and managers alike [29]-[34]. Although the SERVQUAL instrument is very popular in service quality literature, it has been criticized from different perspectives [35] [36]. One of the major criticisms of SERVQUAL is its use of gap scores to measure service quality [37]. SERVQUAL was also criticized because of its unstable dimensionality and conceptualization [38]. Moreover, SERVQUAL measures the attributes of the functional service quality (*i.e.*, process) and it lacks technical quality [39]. The SERVQUAL dimensions also appear to be different according to the type of service industry and country. Finally, a number of research studies [40] have also challenged the validity and reliability of the SERVQUAL concept, model, and dimensions among several service settings.

The vast majority of related literature indicates that service quality is a major driver of customer satisfaction [41] [42] [43]. This, in turn, may lead to either positive or negative behavioural intentions depending on the degree of perceived service quality [44] [45]. In this vein, the existence of the role of perceived service quality in customer satisfaction is given, but the degree of perception under different dimensions might or might not affect customer satisfaction [46]. Several studies reported that service quality has a strong positive effect on customers' satisfaction, and the later has a positive and significant effect on customers' loyalty [47]. In the mobile telecommunications industry, scholars underlined the importance of service quality and customer satisfaction as major antecedents of customer loyalty [48] [49] [50]. Therefore, managers and practitioners in the industry have shifted their strategic focus to increasing service quality in order to retain existing customers and sustain long-term profitability [51]. For instance, an empirical study of the South Korean mature mobile telecommunication industry found that companies were shifting their strategic focus from attracting new customers toward retaining existing ones [52].

Service quality concepts, dimensions, items, and their impacts on the business performance of mobile telecommunication providers differ among countries due to particular cultural and economic characteristics, thus it is expected that service quality concepts, dimensions, items, and their impacts will commensurately differ in different national markets, including in terms of their affects on customer satisfaction and loyalty, and these also differ according to the service quality measurement tool used within the mobile telecommunications context. A literature review concerning telecommunications service quality during the period 2001-2017 concluded that the service quality construct is multidimensional, ranging from three to thirteen items, and SERVQUAL is one of the most popular and effective service quality measurement tools that have been used in various service industries, including telecommunications [25]; however, the applicability of SERVQUAL across different cultures is potentially problematic due to the inherent differences in services discussed above, since SERVQUAL was primarily developed in Western contexts [53].

As a result, it has been suggested that researchers should be acutely sensitive

to cultural differences in examining the dimensionality of service quality in national markets [54]. While national cultures are generally held to exist, obviously most modern societies are increasingly diverse and cosmopolitan, and consumer groups affiliated with myriad cultures can exist within a single country; nevertheless, in general the prevailing national culture is a good proxy for the general cultural attributes of national markets. This was supported by several empirical studies, which found that customers vary in both overall service quality expectations, and their expectations of each specific dimension of service quality, according to their national culture [55] [56] [57] [58].

For instance, customers in countries with predominantly Western cultural backgrounds are generally more reliant on tangible cues and value the hedonic dimension of consumption more than customers in countries with mainly Asian cultural influences [59]. Examinations of cross-cultural differences between North American and Latin American consumers found that the relative importance of service quality dimensions was different between the two groups [60]. Another study affirmed the more general conclusion that cultural differences affect the impact of customer satisfaction on customer loyalty in the mobile telecommunications context [61]. Regarding the service quality perceptions in the banking sector, a comparative study between Canadian and Tunisian customers found that Canadian customers were perceiving service quality higher than Tunisians customers [62]. Therefore, multinational companies can take advantage of cultural differences to fine-tune marketing strategies in order to maximize customer loyalty in different national markets. Recent studies indicated that understanding service quality items in various business contexts in different countries requires conducting comparative studies on mobile service providers between two or more countries [53] [63]. Managers and researchers have become closely interested in determining the sources and consequences of cross-national differences in service quality, customer satisfaction and loyalty. However, the majority of studies in services marketing have focused on examining these links within single industries in specific countries [11] [12] [43], while few studies have comparatively examined differences between multiple countries [19] [61] [64]. Similar studies should also be conducted in other countries, and cross-national comparison should be performed. Such studies can potentially explain cross-national differences in the adoption and usage of mobile services around the globe in order to observe the evolution of customers' behavior [65] [66].

Many recent studies [67] [68] of service quality recommended conducting comparative studies worldwide to reveal service quality dimensions and items from the perspectives of customers and managers among various countries. Moreover, recent studies in Asia have focused on service sectors such as the banking sector [62] [65] [69] [70], retailing [51] [58] [71], hotels [13] and SMEs [56]. Although, Asia was targeted by researchers, there was a little focus on conducting comparative studies between customers in the Arab countries. There are almost no empirical comparative study designed to investigate customers' perceptions on service quality dimensions that are conducted on mobile tele-

communication industry between two Arab countries. Most of the studies [25] [72] [73] have targeted the mobile telecommunication industry in one Arab country. Therefore, our research builds on previous research recommendations to address these gaps by conducting a comparative study of service quality dimensions and their impacts on customer satisfaction in the mobile telecommunications markets of Jordan and Yemen. Specifically, the objectives of the current research are twofold: to reveal and compare the service quality dimensions in Jordan and Yemen mobile service markets; and to examine the effect of the service quality dimensions on customer satisfaction in both markets.

This paper is organized in seven sections. This section provides the introduction, and Section 2 explains relevant literature based upon which the study model and hypotheses were developed. The research constructs operationalization is presented in Section 3. Section 4 presents the research methodology and analysis. Section 5 explains the research results and differences between the Jordanian and Yemeni samples. Sections 6 and 7 present the theoretical and managerial implications of the research. Finally, Section 8 discusses the research limitations and identifies future research directions.

## 2. Literature Review

A great amount of service quality literature exists, examining its theoretical foundations, measurement efficacy, and other empirical aspects. The literature reviewed in this research paper is related to two main issues: the SERVQUAL dimensions; and the relationship between these dimensions and customer satisfaction. Consequently, only selected literature is reviewed closely related to the research objectives. **Table 1** shows previous research findings regarding the SERVQUAL dimensions found in different industries and countries.

Numerous key issues are immediately apparent from the literature presented in **Table 1**: first, many researchers modified the original scale's dimensions and items; second, identical service quality dimensions in some industries were identified in most of the studies; third, SERVQUAL dimensions vary from one industry to another, and from one country to another; fourth, previous comparative research has focused on examining the SERVQUAL scale and its dimensions from customers' perspectives through comparing two samples of customers [62] [65], while few comparative research studies have investigated the SERVQUAL dimensions and items from customers' perspectives in multiple countries for the same service industry; and fifth, SERVQUAL has also been the most discussed and debated service quality model and measurement tool [20] [21] [22] [23] [73] [74]. Thus, the main question in this research paper is: do customers' perspectives in the mobile service industries of Jordan and Yemen support the five main SERVQUAL dimensions proposed by the original developers? [26].

### Service Quality and Customer Satisfaction

Strong empirical evidence indicates that service quality is a major driver of customer satisfaction [16] [17] [18] [32] [74]. Customer satisfaction is the "customer's

**Table 1.** Selected SERVQUAL literature review.

Previous Research	SERVQUAL Dimensions
Parasuraman <i>et al.</i> 1988	Tangibles, reliability, responsiveness, assurance, and empathy.
Johnson and Sirikit, 2002	Tangibles, reliability, responsiveness, assurance, and empathy
Wang and Lo, 2002	Tangibles, reliability, responsiveness, assurance, empathy, and network quality
AL-Tamimi and AL-Amiri, 2003	Tangibles, reliability, and empathy.
Khan, 2003	Tangibles, ecotangibles, reliability, assurance, responsiveness, and empathy.
Arasli <i>et al.</i> 2005	Tangibles, reliability, assurance, and empathy.
Jaboun and Khalifa, 2005	Personal skills, reliability, values, and image.
Kang, 2006	Tangibles, reliability, responsiveness, assurance, and empathy
Akroush, 2008	Service quality dimensions (functional and technical) have a positive and significant effect on bank performance.
Ladhari, 2009	Tangibles, reliability, responsiveness, confidence, and communications.
Kumar <i>et al.</i> 2009	Tangibility, reliability, competence, and convenience.
Chaniotakis and Lymeropoulos, 2009	Tangibles, reliability, responsiveness, assurance, and empathy.
Ramseook-Munhurrin <i>et al.</i> 2009	Assurance-empathy, reliability-responsiveness, and tangibles.
Negi, 2009	Reliability and network aspect dimensions
Akroush and Khatib, 2009	Service quality dimensions (functional and technical) have positively and significantly affected banks performance assessed based on financial performance and customer indicators.
Kumar <i>et al.</i> 2010	Tangibility, reliability, competence, and convenience.
Ladhari <i>et al.</i> 2011	Canadian sample, empathy and reliability, while in the Tunisian sample, reliability and responsiveness.
Al-Rousan and Mohamed, 2010	Empathy, reliability, responsiveness, tangible and assurance.
Dahiyat <i>et al.</i> 2011	Reliability, interaction quality, and tangibles
Morales <i>et al.</i> 2011	Tangibles, reliability, responsiveness, assurance, and empathy.
Shekarchizadeh <i>et al.</i> 2011	Professionalism, reliability, hospitality, tangibles, and commitment.
Vaughan and Woodruffe-Burton, 2011	Staff professionalism, reliability, and tangibles.
Abdullah <i>et al.</i> 2011	Systemisation, reliable communication, and responsiveness.
Alireza <i>et al.</i> 2011	Service quality significantly affects value, satisfaction and image, three factors determining satisfaction and loyalty.
Hafeez and Muhammad, 2012	Reliability, tangibility, empathy, assurance, and responsiveness.
Abu-El Samen <i>et al.</i> 2013	Reliability, tangibility, empathy, assurance, and responsiveness.
Abdel Megeid, 2013	Reliability, tangibility, empathy, assurance, and responsiveness.
Akroush <i>et al.</i> 2015	Reliability, responsiveness, assurance, empathy, and tangibility.
Surulivel <i>et al.</i> 2016	Reliability, tangibility, empathy, assurance, and responsiveness
Datta and Vardhan, 2017	Reliability, empathy, assurance, tangibles, and responsiveness
Sharma and Jhamb, 2017	Tangibles, reliability, responsiveness, assurance and empathy
Palese and Usai, 2018	Reliability, tangibility, empathy, assurance, and responsiveness.
Kumar <i>et al.</i> 2018	Convenience, tangibility, reliability, responsiveness, empathy and assurance.
Ramanathan <i>et al.</i> 2018	Attractive, reliability, responsiveness, empathy and assurance.

Source: Authors.

fulfillment response”, which is an evaluation of a service, as well as an emotion-based response to it [75]. Service quality is believed to be an antecedent to satisfaction on the basis that service quality perception is considered a cognitive evaluation made on the part of the customer, which has implications (either positive or negative, depending on the degree of service quality perceived) on that customer’s satisfaction. Thus, service quality is proposed to have a direct, positive relationship with customer satisfaction [18] [41], whereby the probability of customer satisfaction increases as service quality improves. This, in turn, may lead to either positive or negative behavioral intentions, depending on the degree of service quality perceived, and the degree of satisfaction [7] [45] [69]. A higher level of customer satisfaction leads to favorable behavioral outcomes, such as commitment and customer retention [16] [76]. Overall, the service quality-satisfaction causal order has received considerable support and empirical validation [41] [45]. Accordingly, this study hypothesizes that:

H<sub>1a</sub>: Service quality positively and significantly affects Jordanian customer satisfaction.

H<sub>1b</sub>: Service quality positively and significantly affects Yemeni customer satisfaction.

### 3. Constructs Operationalization

#### 3.1. Service Quality

The SERVQUAL instrument developed by Parasuraman and his colleagues was chosen to measure service quality in this study, a well-established tool that has been used in other telecommunication industries in emerging markets, and whose psychometric properties have been empirically examined [77]. It has also been applied to explore mobile service industries similar to those of Jordan [18] and Yemen [64]. The 22-item SERVQUAL scale measures service quality with five determinants: “tangibles”, “reliability”, “responsiveness”, “assurance”, and “empathy” [26]. In this study, minor modifications were made to the 22 items of the SERVQUAL instrument to tailor it to both the Jordanian and Yemeni mobile service market settings to measure service quality (Table 2). Such modification and tailoring of the instrument for different service settings was encouraged by its original developers [30], and is recommended by other researchers [7] [18] [31] [37] [39] [64] [77] [78] [79].

#### 3.2. Customer Satisfaction

Customer satisfaction is a cumulative construct that is a function of service expectations and performance perceptions in any given period. Performance here refers to the customers’ perceived level of service quality relative to the price they pay, as well as other elements such as area coverage. This approach has relatively stable reliability and validity and does not suffer from many methodological problems, having been used successfully in leading studies of customer satisfaction [7] [18] [80] [81]. Hence, customer satisfaction was measured by five

**Table 2.** Jordanian and yemeni samples-exploratory and confirmatory factor analyses.

Code	Constructs, Items and Measurements	Jordanian Sample		Yemeni Sample*		
		EFA Loadings	CFA Loadings	Code	EFA Loadings	CFA Loadings
<b>Interaction Quality: Eigenvalue = 10.12; CR = 0.90; AVE = 0.55</b>		<b>Factor 1</b>	<b>Factor 1</b>	<b>Code</b>	<b>Factor 1</b>	<b>Factor 1</b>
Res 1	Employees in your mobile phone operator give you prompt service.	Deleted		Ass 1	0.72	0.70
Res 2	Employees in your mobile phone operator are willing to help you.	0.72	0.73	Ass 2	0.63	0.68
Res 3	Employees in your mobile phone operator never too busy to respond to your requests.	0.65	0.72	Ass 3	0.69	0.61
Ass 1	The behaviour of employees in your mobile phone operator instills confidence in you.	0.69	0.71	Ass 4	0.59	0.60
Ass 2	You feel safe in your transactions with your mobile phone operator.	0.61	0.68	Emp 1	0.70	0.72
Ass 3	Employees in your mobile phone operator are consistently courteous with you.	0.70	Deleted	Emp 2	0.71	0.66
Ass 4	Employees in your mobile phone operator have the knowledge to answer your questions.	0.56	0.69	Emp 3	0.63	0.69
Emp 1	Your mobile phone operator gives you individual attention.	0.66	0.78	EMP 4	0.58	0.62
Emp 2	Your mobile phone operator has employees who give you individual attention.	0.77	0.74			
Emp 3	Your mobile phone operator has your best interests at heart.	0.69	Deleted			
EMP 4	Employees of your mobile phone operator understand your specific needs.	Deleted				
<b>Reliability: Eigenvalue = 1.60; CR = 0.85; AVE = 0.60</b>		<b>Factor 2</b>	<b>Factor 2</b>	<b>Code</b>	<b>Factor 2</b>	<b>Factor 2</b>
Rel 1	When your mobile phone operator promises to do something by certain time, it does so.	0.74	0.72	Rel 1	0.65	0.65
Rel 2	When you have a problem, my mobile operator shows a sincere interest in solving it.	0.60	0.76	Rel 2	0.56	0.72
Rel 3	The mobile operator performs the service right the first time.	0.63	0.78	Rel 3	0.78	0.62
Rel 4	The mobile operator provides its service at the time it promises to do so.	0.70	0.80	Rel 4	0.67	0.66
Rel 5	The mobile phone operator keeps its customers informed about when services be performed.	0.73	0.82	Rel 5	0.58	0.62
<b>Tangibles: Eigenvalue = 1.29; CR = 0.78; AVE = 0.53</b>		<b>Factor 3</b>	<b>Factor 3</b>	<b>Code</b>	<b>Factor 3</b>	<b>Factor 3</b>
Tan 1	Your mobile phone operator has modern-looking equipment.	Deleted		Tan 1	0.55	0.62
Tan 2	Your mobile phone operator physical facilities are visually appealing.	0.78	0.77	Tan 2	0.72	0.61
Tan 3	Your mobile phone operator employees appear neat.	0.83	0.73	Tan 3	0.68	0.64
Tan 4	Materials associated with the service (such as pamphlets or statements) are visually appealing at your mobile phone operator.	0.69	0.67	Tan 4	0.75	0.61
				<b>Code</b>	<b>Factor 4</b>	<b>Factor 4</b>
				Res 1	0.78	0.62
				Res 2	0.80	0.81
				Res 3	0.65	0.64
<b>Customer Satisfaction: Eigenvalue = 1.04; CR = 0.84; AVE = 0.56</b>		<b>Factor 4</b>	<b>Factor 4</b>	<b>Code</b>	<b>Factor 5</b>	<b>Factor 5</b>
CS 1	My mobile phone operator completely meets expectations from any other operator.	0.74	0.70	CS 1	0.71	0.67
CS 2	I am satisfied with my mobile phone operator's service quality.	0.78	0.84	CS 2	0.73	0.70
CS 3	I am satisfied with my mobile phone operator's prices.	0.78	0.73	CS 3	0.69	0.67
CS 4	My mobile phone operator meets my pre-purchase expectations.	0.76	0.74	CS 4	0.71	0.72
CS 5	I am satisfied with my mobile phone operator's coverage area.	0.71	0.70	CS 5	0.55	0.64

**Source: Authors:** \*For the Yemeni Sample: Factor 1: Assurance-Empathy: Eigenvalue = 7.44; CR = 0.89; AVE = 0.55. Factor 2: Reliability: Eigenvalue = 1.60; CR = 0.82; AVE = 0.53. Factor 3: Tangibles: Eigenvalue = 1.41; CR = 0.84; AVE = 0.51. Factor 4: Responsiveness: Eigenvalue = 1.34; CR = 0.82; AVE = 0.62. Factor 5: Customer Satisfaction: Eigenvalue = 1.10; CR = 0.89; AVE = 0.55.

Likert scale items, as shown in **Table 2**, to assay customer satisfaction in relation to overall satisfaction with expectation, satisfaction with price, service quality, pre-purchased expectations, and coverage area.

## **4. Research Methodology**

### **4.1. The Jordanian and Yemeni Samples**

For the Jordanian sample, the population are all valid mobile service subscribers to one of the three mobile operators in Jordan registered with Jordan's Telecommunications Regulatory Commission [82]. The three mobile operators were extremely reluctant to provide access to their customers' databases due to confidentiality and competitive reasons. Hence, a convenience sample was chosen from the three main cities in the country, which account for 85% of all subscribers: Amman (the capital), Irbid, and Zarqa [82]. Therefore, a convenience sample consisting of 1400 subscribers was chosen, which is sufficient for multivariate data analysis. The same sampling procedures were followed for the Yemeni sample. The research population are all mobile service subscribers who had a valid subscription in Yemen. According to the latest statistics concerning Yemen's mobile service industry, there are 14 million subscribers with four mobile operators. To draw a representative sample, a convenience sample was chosen from the capital, Sana'a, which represents over 50% of subscribers. Therefore, a convenience sample consisting of 1400 subscribers was chosen, which is sufficient for multivariate data analysis.

### **4.2. Research Instrument and Data Collection**

The research instrument for the Jordanian and Yemeni samples was developed based on measures and operationalization adapted from relevant literature on service quality and customer satisfaction. The instrument was piloted using personal interviews with customers in Jordan and Yemen to determine the ability of customers (respondents) to understand it properly. This pilot study led the researchers to make minor alterations on the research instrument for both samples. Consequently, through a team of research assistants and two of the researchers, the instrument was personally delivered to all the participants, whereby the research objectives and their rights to participate or refuse, and to withdraw from the study at any time were explained in full, along with related information on confidentiality and the anonymity of all participant responses. For both samples, the primary data collection process was carried out using a highly structured questionnaire to achieve the research objectives. Five-point Likert-type scales were used to measure the SERVQUAL items, ranging from 1 (strongly agree) to 5 (strongly disagree); and the customer satisfaction items, ranging from 1 (highly satisfied) to 5 (highly dissatisfied). For the Jordanian sample, we delivered 1400 questionnaires to subscribers of the three mobile operators in Jordan from which 1156 were returned (a response rate of 82.6%), of which 1089 were valid and useable for data analysis (94.2% of returned forms).

For the Yemeni survey, through a team of 10 research assistants and two of the researchers, the instrument was delivered to all participants. Using the mall interception method, 1400 questionnaires were delivered to subscribers in Sana'a from which 1024 were returned (a response rate of 73.1%), of which 999 were valid and useable for data analysis (97.6% of returned forms). For both samples, the response rate was relatively high due to the primary data collection approach, personal delivery, which usually yields a high response rate.

### 4.3. Data Analysis

#### 4.3.1. The Jordanian Sample: Exploratory and Confirmatory Factor Analysis

The analysis started by examining the structure and dimensionality of the study constructs using Exploratory Factor Analysis (EFA) and reliability analysis for both samples. For the Jordanian sample constructs, an index of Kaiser's measure of sampling adequacy (overall MSA = 0.95) and Bartlett's test of sphericity chi-square ( $p \leq 0.000$ ) suggested that factor analysis is appropriate for analyzing the data. As shown in **Table 2**, the factor structure revealed that four factors explained 76% of the variance: the first factor includes all the items measuring service reliability; the second factor includes the items measuring service responsiveness, assurance and empathy (named as "interaction quality"); the third factor includes the items measuring service tangibility; and the fourth factor includes the items measuring customer satisfaction. After examining the rotated component matrix, four items were deleted due to weak loadings as revealed by the rotated matrix of EFA (Res 1, Emp 4, and Tan 1). The Cronbach's alpha values were 0.84 for the five-item reliability, 0.90 for the nine-item interaction quality, 0.78 for the three-item tangibility variable, and 0.85 for the five-item customer satisfaction variable.

The data obtained from the EFA was subjected to confirmatory factor analysis (CFA), with the objective of retaining the items with high loadings to maintain construct validity. Therefore, consistent with the extant literature, offending items were sequentially deleted until the standardized loadings and the fit indices revealed that no improvement could be attained through item deletion. In addition, a series of shortened versions of the scale were compared using  $\chi^2$  difference test, goodness of fit indices (GFI), and adjusted goodness of fit indices (AGFI). Following the decision rules, the item deletion process stops when one of two possible results occur: the  $\chi^2$  difference test shows no difference; or the AGFI does not increase.

Additionally, the comparative fit indexes are used to compare between the scales (*i.e.*, model AIC, CFI). We tested the theoretical five-factor model with a three-factor model. The two models were evaluated by comparing their performances according to the value of  $X^2$ , df, CFI, RMSEA and Model AIC for the Jordanian sample. As shown **Table 3**, the  $X^2$  difference for both models is well above the critical value at  $p < 0.05$ . This significant difference favors the model with less df, which is in this case the three-factor model, which will be used for

**Table 3.** CFA Models comparison for the Jordanian Sample.

	$\chi^2$ , df	CFI	RMSEA	Model AIC
Five-Factor Model	898.48, 249	0.89	0.069	1017.18
Three-Factor Model	499.72, 145	0.94	0.046	580.68
Models' Comparison	398.76, 104	Accept the Three Factors Model		

Source: Authors.

the subsequent analysis. Consequently, as shown in **Table 2** and **Table 3**, the measurement model was estimated using EQS (6.1). The model has adequate fit indexes ( $\chi^2 = 499.72$ , df 145, CFI = 0.94, RMSEA = 0.046, AGFI = 0.91, and model AIC = 580.68). The modification indexes suggested that items Ass 3 and Emp 3 have significant cross-loadings. We decided to sequentially delete these items and run the measurement model again. The fit indices revealed that the model provides excellent fit to the data [83]. ( $\chi^2 = 380.4$ , df 128, CFI = 0.96, RMSEA = 0.04, AGFI = 0.94, and model AIC = 446.4). This model has better fit indexes thus it was favored and used in the subsequent analysis.

#### 4.3.2. Unidimensionality and Construct Validity

The scales we adopted are examples of the direct reflective model for two reasons: 1) items in the scales are interchangeable and have similar meaning themes; and 2) items possess internal consistency, as indicated by the high level composite reliability (discussed in the next section) [80]. Additional evidence provided by the CFA suggests that the resulting measures are reliable and valid. What follows is a discussion on the different types of validity [80] [84]. Convergent validity is established if the items of a specific construct share a high proportion of variances in common. As shown in **Table 2** and **Table 4**, the convergent validity is indicated by: 1) significant factor loadings; 2) the average variances extracted (AVE) values being within the cut-off point of 50%; and 3) composite reliability being higher than 0.7, providing evidence in support of the measures' reliability. Thus, the correlation between the indicators of any construct is high, which evinces internal consistency, and hence construct unidimensionality [80]. Discriminant validity is established by the absence of significant cross-loadings that are not represented by the measurement model (*i.e.* congeneric measures), which is also evidence of construct unidimensionality [80]; and by comparing the shared variance among the constructs with AVE from each construct. The discriminant validity is established between two constructs if the AVE of each is higher than the shared variance. Comparing the shared variance and AVE values shown in **Table 4**, where the diagonal values are the AVEs, our results indicated support for the discriminant validity among the latent variables in our model.

#### 4.3.3. The Yemeni Sample: Exploratory and Confirmatory Factor Analysis

The same analysis procedures are applied on the Yemeni sample. For the Yemeni sample constructs, an index of Kaiser's measure of sampling adequacy (overall

**Table 4.** Jordanian sample-shared variance among the constructs.

Research Constructs	Reliability	Interaction Quality	Tangibles	Customer Satisfaction
Reliability	0.60			
Interaction Quality	0.55	0.55		
Tangibles	0.30	0.38	0.53	
Customer Satisfaction	0.59	0.50	0.27	0.56

Source: Authors.

MSA = 0.93) and Bartlett's test of sphericity chi-square ( $p \leq 0.000$ ) suggested that factor analysis is appropriate for analyzing the data. As shown in **Table 2**, the factor structure revealed five factors that explained 57% of the variance: the first factor includes all the items measuring service assurance and empathy; the second factor includes the items measuring service reliability; the third factor includes the items measuring service tangibility; and the fourth factor includes the items measuring service responsiveness. Cronbach's alpha values were 0.87 for the eight-item assurance and empathy, 0.78 for the five-item reliability, 0.69 for the four-item tangibility variable, 0.64 for the three-item responsiveness variable, and 0.77 for the five-item customer satisfaction variable.

We tested the theoretical five-factor model with a four-factor model. The two models were evaluated by comparing their performances according to the value of  $\chi^2$ , df, CFI, RMSEA and Model AIC for the research sample. As shown in **Table 5**, the  $\chi^2$  difference for the four-factor model is well above the critical value at  $p < 0.05$ . This significant difference favors the model with less df, which in this case is the four-factor model, which is thus used for the subsequent analyses. Consequently, the data obtained from the EFA was subjected to CFA. As shown in **Table 2**, the model has adequate fit indexes ( $\chi^2 = 385.64$ , df 146, CFI = 0.950, RMSEA = 0.044, GFI = 0.963, AGFI = 0.950, and model AIC = 157.56), which reveals that the model provides an excellent fit to the data [83]. Also, we followed the same procedures used for the Jordanian sample to establish the unidimensionality and construct validity for the Yemeni sample. As shown in **Table 2** and in **Table 6**, the results indicate that the average variance extracted and composite reliability indicators are above the cut-off points and are well established, indicating unidimensionality and construct validity.

#### 4.3.4. Structural Equation Modeling: The Jordanian and Yemeni Samples

A structural analysis using EQS (6.1) software aimed at testing the hypothesized relationships between the constructs that emerged for each sample. For the Jordanian sample the data showed excellent model fit, with NFI exhibiting 1:00-perfect fit with the data. The structural results show that reliability ( $\beta = 0.45$ ,  $t = 12.60$ ), interaction quality ( $\beta = 0.39$ ,  $t = 8.40$ ), and tangibles ( $\beta = 0.18$ ,  $t = 4.90$ ) have a significant positive effect on customer satisfaction, thus, supporting  $H_{1a}$ . Furthermore, reliability exerted the strongest impact on customer satisfaction ( $\beta = 0.45$ ,  $t = 12.60$ ). Finally, the  $R^2$  result of 0.62 indicates that 62% of

**Table 5.** CFA models comparison for the yemeni sample.

	$\chi^2$ , df	CFI	RMSEA	Model AIC
Five-Factor Model	450.53, 190	0.93	0.052	185.53
Four-Factor Model	385.64, 146	0.95	0.044	157.56
Models' Comparison	64.89, 44	Accept the Four-Factor Model		

Source: Authors.

**Table 6.** Yemeni sample-shared variance among the constructs.

Research Constructs	Assurance-Empathy	Reliability	Tangibility	Responsiveness	Customer Satisfaction
Assurance-Empathy	0.55				
Reliability	0.36	0.53			
Tangibility	0.23	0.18	0.51		
Responsiveness	0.03	0.03	0.02	0.62	
Customer Satisfaction	0.34	0.33	0.26	0.02	0.55

Source: Authors.

variation in customer satisfaction was caused by the three dimensions of service quality paths (*i.e.* Reliability, Interaction Quality, and Tangibles).

For the Yemeni sample the data showed excellent model fit, with NFI exhibiting 1:00-perfect fit with the data. The structural results indicate that assurance-empathy ( $\beta = 0.28$ ,  $t = 9.36$ ), reliability ( $\beta = 0.32$ ,  $t = 10.20$ ), and tangibility ( $\beta = 0.25$ ,  $t = 9.19$ ) have a significant positive impact on customer satisfaction, thus supporting  $H_{1b}$ . Responsiveness ( $\beta = 0.01$ ,  $t = 0.03$ ) has a non-significant but maintained weak positive effect on customer satisfaction. Furthermore, reliability exerted the strongest effect ( $\beta = 0.32$ ,  $t = 10.20$ ) on customer satisfaction. Finally, the  $R^2$  result of 0.49 indicates that 49% of variation in customer satisfaction was caused by three dimensions of service quality paths (*i.e.* Assurance, Reliability, and Tangibles).

#### 4.3.5. Differences between the Jordanian and Yemeni Samples

The analysis revealed that there are significant differences between the service quality dimensions of customer satisfaction and its antecedents among Jordanian and Yemeni customers, the most significant of which were the following:

1) The significant dimensions of service quality, as shown in **Table 4**, are for the Jordanian sample interaction quality (responsiveness and empathy), reliability, and tangibles; and for the Yemeni sample, they are assurance-empathy, reliability, tangibles, and responsiveness. Statistical analysis for the two samples using Independent-Samples T Test indicated that there are statistically significant differences between the two samples with regard to service quality items and dimensions ( $P < 0.05$ ).

2) We also conducted Independent-Samples T Test to identify statistically significant differences between the Jordanian and Yemeni samples with regard to

the customer satisfaction items and construct ( $P < 0.05$ ).

3) We conducted confidence intervals test to examine whether the  $R^2$  for the Jordanian and Yemeni samples overlap, and to examine if there is a significant difference between 62% of variation in Jordanian customer satisfaction and 49% of variation in Yemeni customer satisfaction. The results indicate that confidence intervals for the  $R^2$  of the samples are between 2.43 and 2.53 for the Jordanian, and between 2.71 and 2.81 for the Yemeni sample. Based on the confidence intervals results, there is no overlap between the  $R^2$  for the Jordanian and Yemeni samples, which indicates that the two samples are statistically different from each other. Consequently, there is a significant difference between the Jordanian and Yemeni samples.

From a comparative services marketing perspective, the mobile operators in Jordan and Yemen should focus on certain items and dimensions of service quality and customer satisfaction. The mobile operators in Jordan should give high priority to reliability and interactive aspects of service quality through focusing on being more reliable and responsive, as well as assuring customers of proper service quality and giving them more attention. The essence is that the mobile telecommunication service market is mature, thus service quality and customer satisfaction play a major role in driving customer loyalty and retention.

The mobile operators in Yemen should focus on reliability as the top priority, followed by assuring customers of the quality of service and giving them more individual attention during and after the service delivery process. Also, rendering service quality tangible is important with regard to Yemeni customers, for whom responsiveness is not a significant contributor to satisfaction. This could be attributable to the fact that the Yemeni market is still growing and the customer acquisition rate is high; and although responsiveness is an important dimension of service quality, it seems that the Yemeni customers are still focusing on the core reliability and assurance-empathy service aspects of mobile telecommunication.

## 5. Results and Discussion

The main objectives of this comparative study were to identify and compare the service quality dimensions in the Jordanian and Yemeni mobile service markets and to examine the impact of its dimensions on customer satisfaction. SERVQUAL was used to measure mobile service quality in both markets. The empirical results from the exploratory analysis and CFA indicated that SERVQUAL items, dimensions, and their impacts on customer satisfaction are different in each mobile service market. The major finding of this study is that SERVQUAL dimensions are not five, as proposed by the original model; although this conclusion has been reached in previous studies, the SERVQUAL dimensions and items are also different depending on the context of each market and industry. Since our study is comparative, we found that SERVQUAL is in fact a three-dimensional construct (reliability, interaction quality, and tangibles) in the Jorda-

nian mobile service market, and five items of the scale were deleted (Res 1, Emp 4, Tan 1, Ass 3, and Emp 3) due to weak factor loadings and improving model fit indices.

In the Yemeni mobile service market, we found that SERVQUAL is in fact a four-dimensional construct, and none of the scale items was deleted. Also, the results from the CFA confirmed the connotation that the three factor model in Jordan and the four factor model in Yemen have better fit indices than the original five factor model. These findings are consistent with the extent literature on the topic, which found SERVQUAL to be three or four dimensional constructs rather than a five dimensional one [43] [62] [65] [70] [85] [86] [87]. Furthermore, the three-dimensional model in Jordan and the four-dimensional model in Yemen are consistent with the SERVQUAL literature [12] [25] [63] [88], which found that the five dimensions are different across service industries and countries.

Despite the similarity in the number of SERVQUAL dimensions used between the Jordanian and the Yemeni samples, the dimensions and items' loadings were different among the two samples. With regard to Jordanian customers, SERVQUAL consists of three facets: reliability, interaction quality (empathy, assurance, and responsiveness), and tangibles. For Yemeni customers, SERVQUAL consists of four facets: reliability, assurance-empathy, tangibles, and responsiveness. For the Jordanian customers, responsiveness, assurance and empathy loaded onto one dimension, labeled "interaction quality"; meanwhile, for the Yemeni customers' sample assurance and empathy dimensions loaded on one dimension labeled as "assurance-empathy". Furthermore, the impacts of SERVQUAL dimensions varied between the markets. The only finding, which is consistent with the original SERVQUAL model, is that "reliability" exerted the strongest effect on customer satisfaction for both samples. Meanwhile, responsiveness has a non-significant effect on customer satisfaction in the Yemeni sample, and it loaded with empathy and assurance in the Jordanian sample (interaction quality) which exerted a strong impact on customer satisfaction in Jordan. These findings are also consistent with the literature review discussed in **Table 1**, which indicates that the SERVQUAL dimensions are unstable and vary across countries and industries.

The second objective of this research was to examine the effect of SERVQUAL dimensions on customer satisfaction. The structural findings from both samples supported the current literature [17] [18] [19] [41] [45] [89] [90] that found service quality to be essential to improve the probability of customer satisfaction. Hence, for the Jordanian sample, the three dimensions of service quality positively and significantly affect customer satisfaction, providing support for  $H_{1a}$ , whereby service reliability exerts the strongest influence on customer satisfaction. For the Yemeni sample, only three dimensions of service quality positively and significantly influence customer satisfaction, providing support for  $H_{1b}$ , and service reliability exerted the strongest influence on customer satisfaction. These findings are in accordance with service quality literature discussed in **Table 1**.

Interestingly, although SERVQUAL dimensions and items were different among the two samples, and both of them were able to predict customer satisfaction, the magnitude of this effect varied, which provides strong support to the original contention of SERVQUAL as a generic skeleton of service quality rather than a specific measure of its particular contextual dimensions. This is evinced by the fact that, for the Jordanian sample, the three dimensions of service quality paths explained 62% of variation in customer satisfaction, while in the Yemeni sample three dimensions out of four explained 49% of variation in customer satisfaction.

The findings of this study indicate that responsiveness has almost no influence on customer satisfaction in the Yemeni mobile service market, contrary to the prevailing findings reported in previous literature, which indicates that responsiveness is an important factor that necessitates friendly attitudes and prompt services; if customers' expectations are met, their impression of the services is supposed to increase their satisfaction [74] [88]. In addition, prompt services are also essential, thus streamlining services may increase the level of customers' satisfaction by increasing the speed of delivery [91] [92] [93]. However, this result is related to the Yemeni mobile service market, a specific service industry context. Yemeni mobile service subscribers' focus on reliability and other dimensions of service quality reflect the relatively primitive and fragile infrastructure of the country (which is currently a conflict area), and mobile service operators in Yemen may not prioritize conventional aspects of customers' needs due to the need to ensure basic service availability.

## 6. Theoretical Implications

Overall, the theoretical contributions of this comparative study to the literature on SERVQUAL and customer satisfaction are fourfold. This study contributes to knowledge concerning: 1) understanding the dimensions of SERVQUAL in two developing countries; 2) customers' perceptions of the services provided by mobile telecommunication companies; 3) the antecedents of satisfaction among Jordanian and Yemeni customers; and 4) the importance of key mobile services required by customers in the two markets.

There is a noted dearth of studies on SERVQUAL dimensions worldwide, and comparative studies between two or more countries on service quality dimensions and customer satisfaction are particularly necessary [53] [56] [57] [63] [65] [66] [67]. This study has contributed to marketing literature by conducting a comparative study of service quality dimensions and their impact on customer satisfaction on the mobile telecommunications markets of Jordan and Yemen. Theoretically, our study has responded to important requests from e-service quality researchers [43] [64] who indicated that previous studies on e-service quality differences are limited, and the measurement scales of SERVQUAL and SERVPERF have been introduced and verified in Europe and North America.

This study builds on existing discussions about SERVQUAL in developed

economies, providing different perspectives on Mobile Telecommunications in emerging economies by comparing quality dimensions between Jordanian and Yemeni customers. We observed similarities and differences in SERVQUAL dimensions between the two samples, which could be attributed to the nature of the two markets in terms of economic conditions, as well as behavioral and cultural differences of customers in both Jordan and Yemen. Moreover, the quantitative analysis presented in this study confirmed most of the previous propositions derived from the international literature, as customers are influenced by aspects situated in their countries.

In relation to this, the differences between customers' perceptions remain fairly low in the mobile telecommunication industry. Hence, the notion of comparative studies on SERVQUAL is considered essential for service organizations operating in developed countries, thus the differences reported in the current study would benefit researchers in the two countries by providing them with key perceptions related to the drivers of customers' satisfaction, which usually lead to enhanced performance. However, to the best of our knowledge, the study presented here is the first to show how SERVQUAL dimensions are perceived by customers in one industry but in two different countries, providing evidence on the relevance of individual-level antecedents of service quality dimensions and level of satisfaction in two developed countries.

## **7. Managerial Implications**

The results from this research have several implications for managers and decision-makers in the Jordanian and Yemeni mobile service markets. SERVQUAL is perceived to be a three-dimensional and four-dimensional construct in the contexts of Jordan and Yemen, respectively. Service quality items loadings were different between the two samples, indicating a difference or gap in the perception of service quality between Jordanian and Yemeni customers. For the Jordanian sample, customers focus on service reliability, interaction quality (responsiveness, assurance and empathy), and tangibles as three different sets of attributes they use to evaluate service quality, and they treat responsiveness, assurance, and empathy as one set. Yemeni customers focus on reliability, assurance-empathy, and tangibles, and treat assurance-empathy as one set. Surprisingly, the Yemeni sample do not focus on responsiveness as an important dimension of service quality, while they strongly prioritize reliability.

Therefore, for the Jordanian sample, it is crucial that managers correct their service quality lens to match how customers perceive quality. Service quality has been described as a great differentiator between companies, which is linked to customer satisfaction [10] [72] [93]. The primary focus should be on reliability, interaction quality (responsiveness, assurance, and empathy), and tangibles as major drivers of satisfaction in Jordan's mobile service market. For the Yemeni sample, customers focus on reliability, assurance-empathy, and tangibles as major drivers of satisfaction in the mobile service market. Having identified the

significance of these relationships, it is essential to explore the managerial implications.

First, for both samples, service reliability seems to be the most important factor influencing customer satisfaction. Hence, customers pay more attention to the functionality of service encounter in term of delivering the required service as promised and at the right time, and less emphasis is placed on the physical appearance of the service facility as a determinant of their satisfaction. Therefore, managers should invest their effort in developing the service delivery process and its interactive aspects. Second, managers in Jordan should invest effort and focus on responsiveness-assurance-empathy as an essential part of their business strategy; meanwhile, the Yemeni sample view service assurance-empathy to be the second most influential in driving customer satisfaction, which should be the main focus for mobile organizations operating in Yemen. Hence, managers should direct their effort toward building a culture that encourages professionalism in the workplace to improve service encounters, in order to ensure better performance.

## **8. Limitations and Future Research**

Although we have achieved our research objectives, some limitations still exist. First, the research was carried out in a single service industry, mobile services, in two different countries, Jordan and Yemen, and the implications of the findings are generally limited to this context. However, our argument is still consistent with recent calls within services marketing that argued for building marketing knowledge in single industries across countries due to certain industry and cultural characteristics. Therefore, a potential area of future research is to extend our research instruments into other service industries inside and outside Jordan and Yemen, in order to shed more light on SERVQUAL in other developing countries.

Second, we have used SERVQUAL to measure service quality from customers' perspectives in both countries and found that SERVQUAL dimensions and items are different but, in both samples, SERVQUAL was able to predict customer satisfaction. A very fruitful area of future research is to investigate why and how SERVQUAL dimensions and items are different from customers' perspectives in both countries. This investigation could utilize qualitative and/ or quantitative research design and methodologies to find out the causes of such differences between them. Finally, this study examined service quality dimensions and their impacts on customer satisfaction only. A potential area of research is to examine antecedents and consequences of service quality (e.g. in terms of customer loyalty, retention, and word-of-mouth) from customers' perspectives in Jordan and Yemen, as well as other developing countries. More comparative studies, using qualitative and quantitative methodologies, and comparing developing with developed countries are also fruitful areas for future research.

## Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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