

## **Providing a Multidimensional Measurement Model for Assessing Mobile Telecommunication Service Quality (MS-Qual)**

*Seyed Yaghoob Hosseini<sup>1\*</sup>, Manijeh Bahreini Zadeh<sup>2</sup>, Alireza Ziaei Bideh<sup>3</sup>*

*1, 2. Assistant Professor of Management Science, Department of Business Management, Persian Gulf University, Bushehr, Iran*

*3. Master of Management Science, Department of Business Management, Persian Gulf University, Bushehr, Iran*

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### **Abstract**

Because of the need to develop specific measurement scales for different services industries, this study aimed to empirically develop a reliable and valid model specifically for measuring mobile telecommunication service quality. A multidimensional measurement model (MS-Qual) has been proposed based on an extensive literature review and then, to assess the model validity, convergent and discriminant validity have been established based on the survey data gathered from 363 of Iranian mobile phone subscribers. Findings of this study showed that customers form their service quality perceptions based on their evaluations of seven primary dimensions including: network quality, value-added service, pricing plans, employees' competency, billing system, customer services, and service convenience. This study has several practical implications. First, practitioners could use developed MS-Qual scale for measuring and managing service quality in the mobile telecommunication sector. Second, this study showed that customers' evaluation of value-added service, pricing plans and service convenience are most important factors in their overall perceived service quality. Mobile phone operators could use these results to set their priorities for the development of service quality, to better utilize their resources.

### **Keywords:**

Service quality, Telecommunication, Multidimensional scale, Discriminant validity, Scale validation.

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\* Corresponding Author, Tel: +98-9128113628

Email: hosseini@pgu.ac.ir

## **Introduction**

Mobile telecommunication service industry is on a fast growth path in the world as well as in Iran. Over the last few years, the mobile telecommunication market in Iran has undergone dramatic changes. This market has followed a transformation from a monopoly to a deregulated, almost open and free competitive market. At the time of this study, there existed two mobile phone operators in Iran, and the third one was going to start its operation soon. Business Monitor International's (BMI) forecast for Iran, expects the mobile sector expanding by over eight percent in 2012, with the mobile subscriber base forecast to grow to 80.85 mn by the end of the year. BMI continues to expect the Iranian mobile market to cross the one hundred percent penetration threshold in early 2012 (BMI, 2011). Because of this changing dynamics, the Iranian mobile phone operators face some significant challenges. First, retaining existing customers in a high churn market has become very difficult and costly. Second, new customer acquisition is becoming more difficult than ever because potential subscribers now have more alternatives to choose from according to their perceived performance and service quality and also mobile phone operators offer charming deals to attract them. In such a competitive market, it is essential to consider customer satisfaction as a strategic priority.

There are many benefits for a company from a high customer satisfaction level. Research evidence shows that customer satisfaction has a direct effect on the financial performance of a company (Gupta & Zeithaml, 2006; Smith & Wright, 2004). Also, satisfied customers have a higher tendency to stay with their existing service provider (Kim et al., 2004; Lim et al., 2006) and are more likely to recommend the service provider to others (Eshghi et al., 2008; Sweeney & Swait, 2008). Research evidences also show that the main driver of customer satisfaction is the customers' perceptions of service quality (Kim et

al., 2004; Zeithaml & Bitner, 2002). In mobile telecommunication industry, several previous researches have proved the positive effect of service quality on customer satisfaction (Wang & Lo, 2002; Eshghi et al., 2008; Negi, 2009; Gunjan et al., 2011). Thus, it is important that mobile phone operators not only provide services that customers need but also improve their service quality simultaneously.

Our review of service quality literature points out two limitations. First, several researchers have considered mobile telecommunication service quality from different perspectives and there is no consensus on its measurement, which is important for mobile phone operators to identify and improve their service quality. Second, as noted by Babakus and Boller (1992), there is a need to develop industry-specific measures of service quality. The more specific the scale items are in a service quality instrument and the more applicable they are to a manager's own contextual circumstance, the better he or she will be able to use the information. Thus, instead of taking an existing instrument and trying to fit it to the context, a better approach is to develop an instrument, specifically for that service industry (Karatepe et al., 2005). On the other hand, compared with other services, mobile services have unique characteristics such as mobility, anytime and anywhere computing, and social conditions. Because generic service quality scales do not take these characteristics into consideration, it is important to develop a scale of service quality specifically for mobile telecommunication services (Lu et al., 2009). This paper tries to acquit these limitations and develop a multidimensional service quality model specifically for assessing mobile telecommunication service quality.

The rest of the paper consists of the following sections. The next section provides a review of the relevant literature. Thereafter, the research methodology and results of empirical study have been introduced. In The final section, we discuss managerial implications and provide directions for future research.

## Literature Review

### Service Quality

What is perceived service quality? How must service quality be measured? These two questions have been extremely discussed by academics over the last three decades and are among the most frequent topics in management and marketing literature (Martínez & Martínez, 2010). To answer these questions, several service quality models have been proposed and widely tested in applied research (see Martínez & Martínez, 2010; Seth et al., 2005 for a review). Gronroos's (1984) service quality model was the first attempt, and later other researchers proposed their own conceptualizations. Gronroos (1984) proposed two distinct service dimensions including technical and functional quality. Technical quality refers to how well the core service meets the customers' expectation. In turn, functional quality refers to the impact of the interaction process or how the service production and delivery process itself is perceived (Grönroos, 1984). Functional quality includes a broad range of service delivery items, such as perceptions of a firm's customer care and the manner of service personnel (Lim et al., 2006).

Later on, based on the disconfirmation paradigm, Parasuraman et al. (1988) developed the SERVQUAL scale, in which service quality is viewed as the result earned from carrying out a comparison between expectations and perceptions of performance. Parasuraman et al. (1988) argued that, regardless of the type of service, consumers evaluate service quality using similar criteria, which can be grouped into five dimensions: tangibles, reliability, responsiveness, assurance, and empathy (Parasuraman et al., 1988). Despite SERVQUAL having been applied across a wide range of service contexts (Leisen & Vance, 2001), it was also extensively criticized and its reliability and validity has been questioned by many researchers (Buttle, 1996; Carman, 1990; Martínez & Martínez, 2010). SERVQUAL's weaknesses led to the development of alternative models to measure customer perceptions of service quality. For example, Cronin and Taylor (1992) developed the SERVPERF model, a method that used the performance

alone to measure the perceived service quality (Cronin & Taylor, 1994). Results from many studies showed that using performance scores alone rather than expectations minus perceptions, resulted in better reliability and validity (Carman, 1990; Cronin & Taylor, 1994; Martínez & Martínez, 2010). This is because people always tend to give high expectation ratings while their perception scores rarely exceed their expectations (Babakus & Boller, 1992). After that, several researchers began to develop different industry-specific models to measure service quality, For example, RSQS for measuring retail service quality (Dabholkar et al., 1996), E-S-Qual for assessing electronic service quality (Parasuraman et al., 2005), Bank-SQUAL for measuring service quality of banks (Karatepe et al., 2005), e-GovQual for measuring e-government service quality (Papadomichelaki & Mentzas, 2012), ASP-Qual for measuring application service provider quality (Sigala, 2004), and much more.

#### **Service Quality in the Mobile Telecommunication Industry**

In mobile telecommunication literature, service quality has been conceptualized in different ways. Some of the researchers measured mobile service quality as customers' overall evaluation of their experience with the service provider, and did not consider it as a multidimensional construct (Akroush et al., 2011; Aydin & Özer, 2005; Edward et al., 2010; Liu et al., 2011; Shin & Kim, 2008; Lai et al., 2009). Nonetheless, most researchers considered mobile service quality as a multidimensional concept. However, the number and content of these dimensions are different across studies. Some of them used and adapted generic models like SERVQUAL to measure mobile service quality (Boohene & Agyapong, 2011; Leisen & Vance, 2001; Negi, 2009; Wang & Lo, 2002). Moreover, SERVQUAL or SERVPERF, as very general instruments, are inadequate to measure mobile service qualities in making satisfactory service related decisions because the dimensions of service quality depends on the type of service offered (Babakus & Boller, 1992). For example, Wang and Lo (2002) employed a modified version of SERVQUAL model to measure service quality of mobile phone operators in China. They added network quality dimension to the model based on focus group discussions and expert

opinions. According to their findings based on structural equation modeling, the most important service quality dimensions in predicting customers' overall satisfaction was assurance, followed by reliability and network quality. But they found no evidence to support the influence of responsiveness and empathy on customer satisfaction (Wang & Lo, 2002).

Similarly, Negi (2009) tried to modify SERVQUAL scale to best fit in the context of mobile telecommunication market in Ethiopia. In a pilot study, respondents were asked about additional service quality dimensions by using open-ended questions. Three additional dimensions were derived including network quality, compliant handling and service convenience. According to regression analysis, network quality scored the highest in predicting overall customer satisfaction followed by reliability, empathy and assurance (Negi, 2009).

Some researches in mobile telecommunication industry extended the traditional definition of service quality and incorporated aspects particularly relevant to mobile services. For example, Eshghi et al. (2008) used literature review to identify thirty two attributes relevant to mobile telecommunication industry. Six factors were derived using factor analysis including relational quality, competitiveness, reliability, reputation, customer support and transmission quality. These factors were taken as service quality dimensions. Based on regression analysis, competitiveness and reliability had the greatest effect on customer satisfaction followed by relational quality and transmission quality. Also, a regression analysis was done to identify most important service quality dimensions in predicting repurchase intention of customers. Results indicated that relational quality and reliability are the most determinant factors in customers' purchase decisions (Eshghi et al., 2008).

In another study on the perceptions of mobile phone operators' service quality, Santouridis and Trivellas (2010) suggested that customers evaluate service quality of their mobile phone operators based on quality of six dimensions including network, value-added services, mobile devices, customer service, pricing structure and

billing system. This scale was administered to two hundred five residential non-business mobile phone users in Greece. Their findings show that customer service, pricing structure and billing system are the service quality dimensions that have the most significant positive effect on customer satisfaction, which in turn have significant positive impact on customer loyalty (Santouridis & Trivellas, 2010).

Moreover, Lu et al. (2009) developed a multidimensional and hierarchical model to measure mobile service quality. They proposed that mobile service quality was composed of three primary dimensions, which are interaction quality, environment quality and outcome quality. Each primary dimensions further included sub-dimensions. An instrument was developed and empirically tested using data collected from four hundred thirty eight mobile brokerage service users (Lu et al., 2009). Also recently, Zhao et al. (2012) used this model to assess the effect of mobile telecommunication service quality on customer satisfaction and the continuance intention of mobile value-added services. Their findings showed that all three dimensions of service quality have significant and positive effect on customers' satisfaction and continuance intention (Zhao et al., 2012).

Many other researches were reviewed and mobile telecommunication service quality dimensions which can be evaluated by customers in their decision making have been identified. Table 1 summarizes identified dimensions along with their respective sources.

### **Proposed Model for Mobile Telecommunication Service Quality**

This study identifies a comprehensive set of technical and functional attributes of mobile telecommunication services based on literature review. Technical aspects of mobile services include customers' perceptions of network quality, value-added services and pricing plans. Functional attributes comprise employees' competency, billing system, customer service quality and convenience. Table 1 summarizes identified service quality dimensions. Previous researches that used these dimensions to measure mobile service quality are also presented.

**Table 1. Mobile telecommunication service quality dimensions based on literature review**

<b>Dimensions</b>	<b>Researches</b>
<b>Network Quality</b>	Wang and Lo (2002); M. K. Kim et al. (2004); H. S. Kim & Yoon (2004); Kassim (2006); Lim et al. (2006); Eshghi (2008); Ling & De Run (2009); Negi (2009); Pezeshki, Mousavi & Grant (2009); Santouridis & Trivellas (2010); Wong (2010); Gunjan et al. (2011); Gautam (2011); Liang, Ma & Qi (2012)
<b>Value-added services</b>	M. K. Kim et al. (2004); H. S. Kim & Yoon (2004); Lim et al. (2006); Santouridis & Trivellas (2010); Gunjan et al. (2011); Jahanzeb, Fatima & Khan (2011)
<b>Pricing Plans</b>	M. K. Kim et al. (2004); Lim et al. (2006); Ling & De Run (2009); Santouridis & Trivellas (2010); Gunjan et al. (2011)
<b>Employees Competency</b>	Eshghi et al. (2008); Krishnan & Kothari (2008); Jahanzeb et al. (2011)
<b>Billing System</b>	Lim et al. (2006); Krishnan & Kothari (2008); Pezeshki et al. (2009); Santouridis & Trivellas (2010)
<b>Customer Service</b>	H. S. Kim & Yoon (2004); M. K. Kim et al. (2004); Lim et al. (2006); Kassim (2006); Pezeshki et al. (2009); Negi (2009); Negi & Ketema (2010); Y. E. Kim & Lee (2010); Santouridis & Trivellas (2010); Gautam (2011); Gunjan et al. (2011); Jahanzeb et al. (2011); Khaligh, Miremadi & Aminilari (2012)
<b>Convenience</b>	M. K. Kim et al. (2004); Ling & De Run (2009); Negi (2009); Liang et al. (2012)

Literature review showed that in mobile telecommunication industry, researchers used different models with several technical and functional dimensions to measure service quality. However, most of them agreed that perceptions of mobile operators' service quality are of a multidimensional nature. In this study, based on literature review a multidimensional model has been developed (MS-Qual) that determines customers' perceived service quality in mobile telecommunication industry. Figure 1 shows the outline of the proposed model.

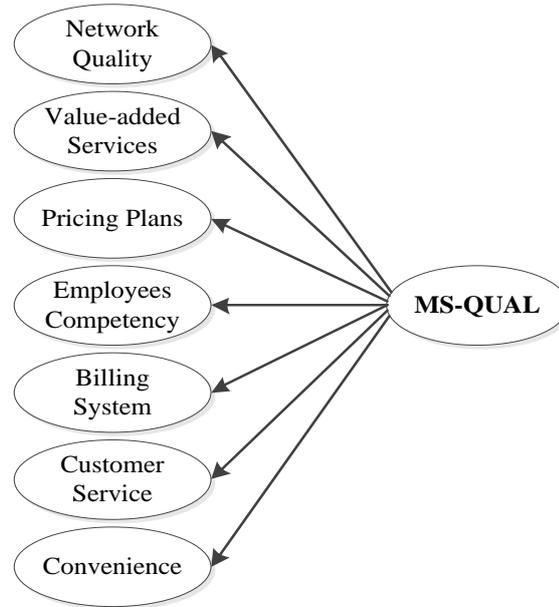


Figure 1. Multidimensional model for mobile telecommunication service quality

### Data Collection

This study aims at developing a reliable model that can be used to measure the service quality of mobile phone operators and to understand the underlying service quality dimensions. Therefore, the main focus is on the perception of mobile phone users and a survey was conducted accordingly.

### Survey Instrument

To test the proposed model, data from mobile operators' subscribers were collected using a structured questionnaire. All service quality dimensions have been measured using existing and tested scales adopted from previous researches. Measures were translated from English into Persian. Hence, to ensure content validity, they were assessed by three academics, and based on their feedbacks; some items were reworded, added or deleted so that respondents would understand the questions correctly. For each item, a five-point Likert scale was used with anchors from "1=strongly disagree" to "5=strongly agree" for employees competency and customer service

items and anchors from “1=very poor” to “5=very good” for the rest of the items.

Next, a pre-test of the questionnaire was conducted with fifty respondents to confirm that the instrument and measures were clear, legible and understandable. Based on respondents’ feedback, the questionnaire was revised and finalized. Also, to assess the internal consistency (reliability) of the questionnaire’s items, Cronbach’s alpha was calculated.

**Table 2. Details of scales used in the survey questionnaire**

<b>Scale</b>	<b>Source of measure</b>	<b>Items</b>	<b>Reliability</b>
<b>Network Quality</b>	Lim et al. (2006)	<ul style="list-style-type: none"> <li>• Frequency of dropped calls</li> <li>• Voice quality</li> <li>• Coverage</li> </ul>	0.79
<b>Value-added services</b>	M. K. Kim et al. (2004)	<ul style="list-style-type: none"> <li>• Variety of value-added services</li> <li>• Convenience in use of value-added services</li> <li>• Whether value-added services are up-to-date</li> </ul>	0.83
<b>Pricing Plans</b>	Lim et al. (2006)	<ul style="list-style-type: none"> <li>• Offering the best plan that meets a customer’s need</li> <li>• Ease of changing pricing plans</li> <li>• Delivery of information</li> </ul>	0.82
<b>Employees Competency</b>	Eshghi et al. (2008)	<ul style="list-style-type: none"> <li>• Employees are efficient and competent</li> <li>• Employees are courteous, polite and respectful</li> <li>• Employees are willing to help</li> </ul>	0.74
<b>Billing System</b>	Lim et al. (2006)	<ul style="list-style-type: none"> <li>• Provision of accurate billing</li> <li>• Ease of understanding</li> <li>• Resolving billing issues quickly</li> </ul>	0.87
<b>Customer Service</b>	M. K. Kim et al. (2004)	<ul style="list-style-type: none"> <li>• Variety of customer support systems</li> <li>• Speed of complaint processing</li> <li>• Ease of reporting complaint</li> </ul>	0.81
<b>Convenience</b>	Liang et al. (2012); M. K. Kim et al. (2004)	<ul style="list-style-type: none"> <li>• number of retailers/kiosks</li> <li>• methods/locations for bill payment</li> <li>• Ease of subscribing and changing service</li> </ul>	0.88

Table 2 shows all the scale items used in the survey questionnaire with their reliability and source of the measures. The Cronbach's alphas of our scales ranged from (0.74) to (0.88), which were all higher than the recommended value of (0.7). Besides, composite reliability (CR) will be calculated in further section to re-confirm the reliability of scales.

### **Sample**

The population of the study is the mobile users in Iran at Yazd Province. The sample was collected from subscribers of two mobile phone operators including: MTN Irancell and Hamrahe-Aval. A convenience sampling method was used to select the respondents. So that, the interviewers randomly selected passers-by, asked them to take part in the study and to complete the standardized, self-administered questionnaire. A total of four hundred initial responses have been received. In order to ensure the accuracy of the survey results, respondents that had used the service for less than six months, selected the same answer for all questions or had too many missing answers were excluded. Thus, the final sample consisted of three hundred sixty three respondents, resulting in a response rate of (90.7%).

## **Data Analysis and Results**

### **Sample Profile**

Table 3 summarizes the descriptive statistics of the sample. Among the respondents, (79.9%) were male and (20.1%) were female. As shown in Table 3, the sample is rather skewed towards young and medium educated users with monthly income lower than 10 million Rials. The majority of respondents used Hamrahe-Aval services (63.9%). Also, some information about respondents' mobile phone usage is presented in Table 3.

Table 3. Sample profile

Measure	Items	Frequency	Percentage (%)
<b>Gender</b>	Male	290	79.9
	Female	73	20.1
<b>Age (year)</b>	Less than 24	134	36.9
	25-30	129	35.6
	31-40	54	14.9
	41-50	42	11.6
	More than 51	4	1.1
<b>Education</b>	Diploma degree or lower	125	34.5
	Associate degree	55	15.2
	Bachelor's degree	158	43.5
	Master's degree	12	3.3
	D.C.	13	3.6
<b>Income (Rials)</b>	Less than 5Milion	58	16
	5M -10M	202	55.6
	10M- 20M	80	22
	More than 20M	23	6.3
<b>Service provider</b>	MTN Irancell	131	36.1
	Hamrahe-Aval	232	63.9
<b>Monthly expenses</b>	Less than 200 Thousand Rials	132	36.4
	200 <sup>th</sup> -500 <sup>th</sup>	173	47.6
	500 <sup>th</sup> -800 <sup>th</sup>	40	11
	More than 800 <sup>th</sup>	18	5
<b>Length of use (year)</b>	Less than 1	50	13.8
	2-4	137	37.7
	5-7	106	29.2
	More than 8	70	19.3

### Model Testing

Since the proposed multidimensional service quality model was generated from the review of the existing literature, it is necessary to empirically confirm that the model is supported by the survey data. For this purpose, confirmatory factor analysis (CFA) was carried out using AMOS 18. Then, to assess the model validity, convergent and discriminant validity have been established.

#### Confirmatory factor analysis

A series of confirmatory factor analysis were estimated to confirm the proposed multidimensional model. Initially, a first-order measurement model has been developed to confirm the quality of the measures and

assess validity of the primary dimensions (see Figure 2). The model fit was evaluated using the most stable and robust approximate fit indices and it showed an excellent model fit (Schermelleh Engel & Moosbrugger, 2003), with Chi-square to degree of freedom equal to 3.72, GFI=0.85, RMSEA=0.67, CFI=0.93 and NFI=0.90. Also, standardized loadings of individual items (factor loadings) were highly significant ( $p < 0.001$ ) and the values were larger than the recommended threshold of 0.50 (see Figure 2).

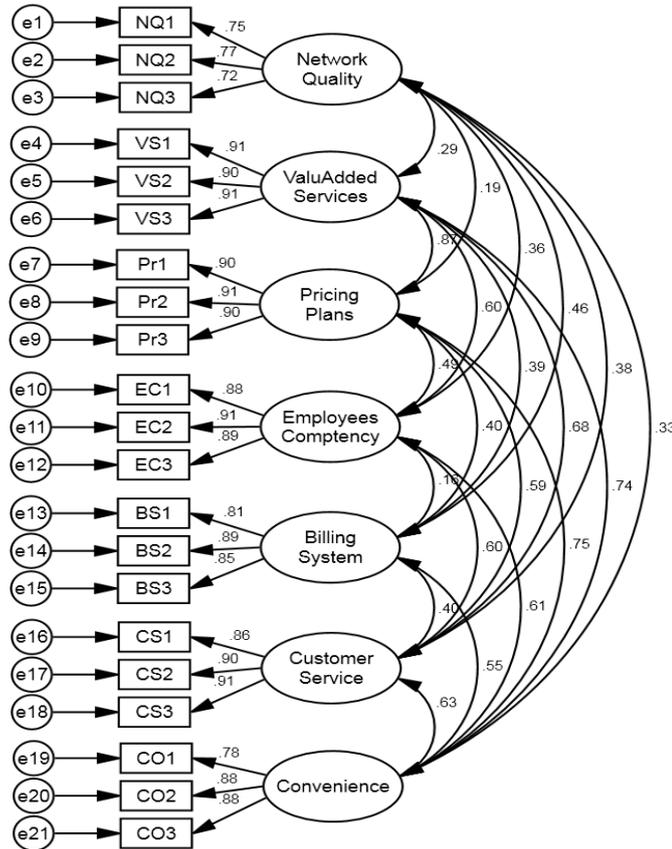


Figure 2. The first-order measurement model

Convergent and discriminant validity

To test the convergent and discriminant validity of the seven factors of the first-order measurement model, average variances extracted (AVE) have been calculated for each construct. Further,

composite reliability (CR) has been estimated to confirm the internal consistency of each scale. Several researchers have mentioned its advantages compared to the Cronbach's alpha (Cristobal et al., 2007; Yang et al., 2005). The composite reliability values ranged from 0.79 to 0.93, which are all higher than the evaluation criteria of 0.6 (Bagozzi & Yi, 1988) and thus prove high internal consistency and reliability of all dimensions. Table 4 summarizes composite reliability and AVE values along with correlation matrix of constructs for first-order measurement model.

**Table 4. Composite reliability and AVE values along with correlation matrix**

	CR	AVE	CV	NQ	VS	PP	EC	BS	CO
Customer Service (CV)	0.92	0.79	0.89						
Network Quality (NQ)	0.79	0.56	0.38	0.74					
Value-added Service (VS)	0.93	0.82	0.68	0.28	0.90				
Pricing Plans (PP)	0.93	0.81	0.59	0.19	0.87	0.90			
Employees Competency (EC)	0.92	0.79	0.59	0.35	0.59	0.49	0.89		
Billing System (BS)	0.88	0.72	0.40	0.46	0.39	0.39	0.16	0.85	
Convenience (CO)	0.88	0.72	0.62	0.33	0.74	0.74	0.61	0.54	0.85

Note: Square root of AVE is represented on the diagonal

All the items loaded significantly ( $p < 0.001$ ) and highly (higher than 0.7) on their respective factors (see Figure 2) and the AVE of each construct is higher than 0.5. These results confirm the convergent validity of each models' construct (Fronell & Larcker, 1981; Steenkamp & van Trijp, 1992).

Discriminant validity means that a latent variable is able to account for more variance in the observed variables associated with it than: a) measurement error or similar external, unmeasured influences, or b) other constructs within the conceptual framework (Farrell, 2010). To examine the discriminant validity, the shared variance (squared correlation) between constructs has been compared with the AVE, as suggested by Fronell and Larcker (1981). As shown in Table 4, the square root of AVE of each construct is greater than its correlation with any other construct, confirming good discriminant validity (Farrell, 2010). The correlation coefficient among factors is also low and moderate and does not exceed the cut-off point of 0.9.

This also implies discriminant validity (Omar & Musa, 2011), Because scales that correlate too highly may be measuring the same rather than different constructs (Churchill, 1979).

In the proposed multidimensional model for measuring mobile telecommunication service quality, it is assumed that there exists a second-order factor of overall service quality that explains the seven first-order factors (see Figure 1). Furthermore, all correlations between the seven constructs are significant at ( $p < 0.01$ ) in the first-order measurement model, indicating that the seven scales converge on a common underlying construct (Bauer et al., 2006). Therefore, a second-order factor measurement model has been developed and validated (see Figure 3).

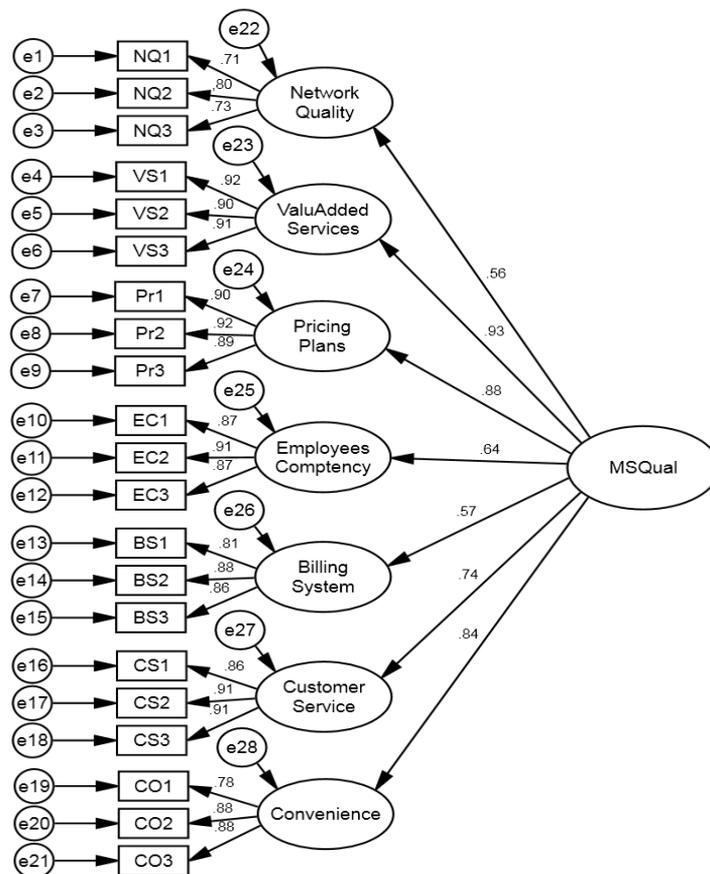


Figure 3. Second order measurement model of mobile telecommunication service quality

Each of the seven first-order dimensions has a significant ( $p < 0.001$ ) and positive loading on the second-order factor, ranging from (0.56) to (0.93). The fit indices of the second-order measurement model also propose a good model fit, with Chi-square to degree of freedom equal to (4.38),  $GFI=0.83$ ,  $RMSEA=0.77$ ,  $CFI=0.91$  and  $NFI=0.88$ . These results show that the second-order model accounts well for the data.

### **Conclusions and Managerial Implications**

Because of the growing level of competition that can be observed in Iranian telecommunication industry, mobile phone operators should make efforts to continuously improve the level of service quality offered to their subscribers. However, a basic principle of quality management is that to improve quality, it must first be measured. On the basis of the need to develop specific measurement tools for different services (Carman, 1990), this study aimed at developing and validating a model specifically for measuring mobile telecommunication service quality. A multidimensional model has been proposed (MS-Qual) based on an extensive literature review and then tested and validated by the survey data collected through Iranian mobile phone subscribers. This model provides a very useful tool, for both researchers and practitioners, for measuring and managing service quality in the mobile telecommunication sector.

Finding of this study showed that mobile phone subscribers form their service quality perceptions based on their evaluations of seven primary dimensions including: network quality, value-added service, pricing plans, employees' competency, billing system, customer services and service convenience. According to developed MS-Qual scale, mobile telecommunication service quality is a second-order factor underlying these seven dimensions. Each of the seven identified and verified dimensions had significant loading on second-order factor. For practitioners, the twenty one items across seven factors can serve as a useful diagnostic purpose. They can use the validated scale to measure and improve service quality.

The results of confirmatory factor analysis indicated that value-added services is the most important factor driving customers' perceived

service quality (MS-Qual), followed by pricing plans and service convenience. These findings indicate that enhancing quality of value-added services can provide mobile phone operators with competitive advantages over their competitors. Iranian mobile phone operators have been struggling over the past several years to improve their network quality through massive equipment investments. However, the results of this study show that network quality is the least important factor in customers' perception of service quality. Thus, mobile service providers must concentrate their efforts on developing value-added services, diversifying pricing plans and increasing service convenience to improve service quality and achieve customer satisfaction.

These results are in contrast with the findings of Santouridis and Trivellas (2010). They did not find any significant relationship between customers evaluation of value-added services and their overall perceived service quality neither their satisfaction. But in contrast, they concluded that network quality is the most effecting factor on customer satisfaction and loyalty. On the other hand, findings similar to the results of this study were reported by Kim et al. (2004) and Lim et al. (2006) that confirm a positive effect of value-added services on customer satisfaction.

Mobile technology has developed rapidly and provided a wealth of opportunities for mobile service providers. As a result, many mobile phone users enjoy access to value-added services in addition to basic voice communication. Value-added services could be separated into four main types including communicating services, system based services, downloads and subscription services and internet access services (MOEA, 2007). Communicating services refer to services that subscribers use other than traditional voice calls to communicate through video, pictures or text such as SMS, MMS and video call. System based services refer to services provided through setup on the operators such as ring back tones and two phone ringing. Downloads and subscription services refer to services such as downloading ringtones, wallpaper and games or subscription to newsletter and weather forecasting information. Internet access services refer to mobile internet provided by operators through WAP, GPRS or 3G internet access. Through developing and improving quality of

mentioned value-added services, a mobile phone operator will stand a much better chance of retention and acquisition of more subscribers.

Furthermore, findings of this study showed that customers' evaluation of pricing plans and service convenience has important role in forming their overall perceived service quality. These results are similar to the findings of Santouridis and Trivellas (2010) which found pricing plans as a significant determinant in customer satisfaction and also similar to the findings of Negi (2009) which confirmed the importance of service convenience in driving customers perceived service quality. Thus, mobile phone operators must try to offer various pricing plans that meet customers' need, provide easy procedures for changing plans and deliver required information about pricing plans to improve customers' evaluation of pricing plans. Also, they must give great attention to issues such as sufficient number of retailers or kiosks, sufficient methods and locations for bill payment and ease of subscribing and changing services.

### **Limitations and Directions for Further Research**

This study has some limitations on the generalizability of the findings. First, since the data were gathered in a specific geographic area of Iran, the results may be specific for this area. In order to generalize the proposed model, further researches should replicate this model in other populations and provinces. Second, the possibility to generalize the results to other countries with different characteristics (such as different cultural context, different level of economic development) needs to be verified, by re-testing the proposed model. Another limitation of this study could be the significant difference between the population of men and women in survey sample. This happened because women were less likely to cooperate with interviewers and complete the questionnaire.

Further researchers could examine the relationship between MS-Qual, customers' satisfaction and other relevant variables such as customer loyalty. Also, future research could focus on the antecedents of mobile telecommunication service quality and how customers form their perceptions about each of the MS-Qual dimensions.

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## ارائه مدل اندازه‌گیری چند بعدی برای ارزیابی کیفیت خدمات تلفن همراه

سید یعقوب حسینی<sup>۱\*</sup>، منیژه بحرینی‌زاده<sup>۲</sup>، علیرضا ضیایی بیده<sup>۳</sup>

۱ و ۲. استادیار گروه مدیریت بازرگانی، دانشگاه خلیج فارس، بوشهر

۳. کارشناس ارشد مدیریت بازرگانی، دانشگاه خلیج فارس، بوشهر

### چکیده

بواسطه نیاز به توسعه و ارائه مقیاس‌های سنجش کیفیت خدمات مختص به صنایع مختلف، هدف از این پژوهش ارائه مدلی معتبر و قابل اعتماد مختص سنجش کیفیت خدمات تلفن همراه بود. بدین منظور یک مدل اندازه‌گیری چندبعدی برپایه مرور جامع پیشینه پژوهش ارائه شد و سپس برای بررسی اعتبار مدل، روایی همگرا و افتراقی آن بر پایه داده‌های جمع‌آوری شده از ۳۶۳ مشترک تلفن همراه مورد تایید قرار گرفت. یافته‌های پژوهش نشان می‌دهند ادراک مشتریان از کیفیت خدمات بر پایه ارزیابی آن‌ها از ۷ بعد اصلی شامل کیفیت شبکه، خدمات ارزش افزوده، تعرفه‌های پرداخت، شایستگی کارمندان، صدور صورت حساب، خدمات مشتری و راحتی، شکل می‌گیرد. این پژوهش نتایج کاربردی متعددی نیز به همراه داشت. نخست اینکه مدیران می‌توانند از مدل اندازه‌گیری ارائه شده در این پژوهش برای سنجش و مدیریت کیفیت خدمات در صنعت خدمات تلفن همراه استفاده کنند. دوم اینکه، نتایج این پژوهش نشان دادند ارزیابی مشتریان از خدمات ارزش افزوده، تعرفه‌های پرداخت و راحتی خدمات از مهمترین عوامل در شکل‌دهی ادراک کلی آنها از کیفیت خدمات سازمان است. اپراتورهای تلفن همراه می‌توانند از این نتایج برای تعیین اولویت‌های بهبود کیفیت خدمات و تخصیص بهینه منابعشان استفاده کنند.

### واژگان کلیدی

کیفیت خدمات، خدمات تلفن همراه، مقیاس چندبعدی، روایی افتراقی، اعتبار مقیاس.