



## Service Quality of Mobile Phone Telecommunications Service Providers: Scale Development - The CCAAT MODEL

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### **ABSTRACT**

Mobile phone telecommunications as an intensely competitive industry in the contemporary marketing context has expanded as a high-velocity service throughout the world, while service quality has become an interesting phenomenon in response to the growing importance of services in satisfying customer needs. The purpose of the study is to design a scale to measure the service quality of mobile phone telecommunication service providers and evaluate the effect of service quality dimensions on customer satisfaction. The mobile phone subscribers were selected as the unit of analysis of the study. Service quality attributes were generated by having a focus group discussion with the industry experts. Next, the data were collected in two stages from mobile phone subscribers. At the first stage, data were collected from 420 subscribers, and an exploratory factor analysis was employed. In the second stage, 700 questionnaires were administered, and the structural equation modelling approach was used to validate the results. As the major outcome of the study, the tool: 'CCAAT', is proposed to measure the service quality of the mobile phone telecommunications service providers, and the model consists of five key dimensions of service quality: 'Credibility', 'Coverage', 'Assurance', 'Access' and 'Tangibility'.

**Keywords:** *CCAAT, Customer Satisfaction, Mobile Phone Telecommunication Service Providers, Service Quality*

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## 1. INTRODUCTION

In the contemporary marketing context, service quality plays a vital role in satisfying customer needs, drawing utmost attention as the focal point of interest and critical area of study among many marketing researchers and practitioners (Cronin & Taylor, 1992; Parasuraman et al., 1994; Bei & Chiao, 2001; Ali & Raza, 2017; Melo et al., 2017; Tabaku & Kruja, 2019; Lopentus & Erdiansyah, 2020; Nunkoo et al., 2020; Wijaya et al., 2020). Service quality has become an interesting phenomenon of study due to its profound impact on the performance and profitability of service companies. According to Parasuraman et al. (1994), service quality measurement has become an area of growing interest to researchers and managers. Subsequently, academic and managerial interest in service quality has also been evident in the services marketing literature for the past several years (Zeithaml et al., 1996; Dabholkar et al., 2000; Abdullah, 2006; Brochado, 2009; Teeroovengadum et al., 2016). In the fast-moving service economy, savvy customers are seriously concerned with the quality of the goods and services. In this context, delivering service quality has become a vital strategy for the success of business organizations (Parasuraman et al., 1988; Glaveli et al., 2006; Raza et al., 2020). Due to this greater magnitude, many of the research studies on service quality have been conducted in various industries (Namukasa, 2013; Hahn et al., 2017; Fatima et al., 2018; Meesala & Paul, 2018; Nunkoo et al., 2020; Slack & Singh, 2020). In response to the growing importance of the services industry, the attention on measuring and managing service quality has become a well-addressed phenomenon. Accordingly, evaluating service quality in customer perceptions and experiences has drawn greater attention in the context of services.

Even though different tools and scales developed by various scholars (Parasuraman et al., 1988; Cronin & Taylor, 1992; Avkiran, 1994; Bahia & Nantel, 2000; Abdullah, 2006; Teeroovengadum et al., 2016) are available to measuring service quality, the inadequacy of such scale to measure service quality of mobile phone telecommunications service providers is a greater concern. The mobile phone has become the most exciting weapon and the most familiar communication tool in the current society. It provides the opportunity to communicate with family members, colleagues, employees, business partners and any other interesting parties at the right moment from any corner of the world since the mobile phone can be carried wherever we go. The mobile phone today is not merely a device used for communication, and today a mobile phone is a mini-computer (Gerpott et al., 2001; Wei & Lo, 2006; Chen & Li, 2017). Therefore, mobile phone service has expanded its breadth and depth, and many supporting services have also been developed, creating the mobile phone as an essential tool in human life. Due to the inherent unique features of the mobile phone services industry, evaluating customers' perception of the quality of service in the mobile phone services industry has become a timely need. This study will contribute to fill this gap by developing a conceptual model to evaluate the service quality of the mobile phone service industry. The scholarly literature confirms a strong and significant relationship between service quality and customer satisfaction (Sa & Cunha, 2019; Lopentus & Erdiansyah, 2020; Slack &

Singh, 2020). Therefore, the impact of the intended service quality model on customer satisfaction will also be assessed.

## **2. LITERATURE REVIEW**

A rigorous review of the literature will be presented in the following section in relation to the phenomenon of service quality. First, the concept of service quality will be discussed as evaluated by various scholars. Next, different service quality models introduced by various scholars in different contexts will be appraised as evidence to justify the new model presented in the context of the mobile phone telecommunications service industry. Finally, the relationship between service quality and customer satisfaction is evaluated.

### **2.1. Service Quality**

Service quality is acknowledged as one of the most important parameters and global competitive tools for a service firm (Glaveli et al., 2006). According to Lepmets et al. (2014), service quality is an abstract and elusive construct because of the nature of service attributes such as intangibility, heterogeneity and inseparability of consumption and production. Aaker (2001) states that quality is largely based on the perceived competence, responsiveness and empathy of the people with whom customers interact in the context of services. Zeithaml et al. (1996) evaluate service quality as superior and inferior, where superior service quality stimulates favourable behavioural intentions that direct customer retention, while inferior service quality causes unfavourable behavioural intentions resulting in customer defection. Providing high quality of service is a must to customer retention that contributes to the growth of the business (Dabholkar et al., 2000). Zeithaml et al. (1996) have studied the behavioural consequences of service quality. Hence, the underlying premise of their study is that service quality relates to the retention of customers at the aggregate level. Accordingly, the consequences of service quality perceptions on individual-level behavioural intentions can be viewed as signals of retention or defection. When perceived service quality is high, the customers' behavioural intentions are favourable, contributing to remaining customers. When perceived service quality is low, the behavioural intentions of customers seem unfavourable, and the relationship is more likely to be weakened, which may result in defection. The authors argue that service quality is positively associated with favourable behavioural intentions and negatively associated with unfavourable behavioural intentions (Zeithaml et al., 1996). Although the quality of tangible goods could be easily evaluated, measuring quality in services is challenging due to its nature of intangibility and variability. Sharp et al. (2000) state that the purpose of service quality research is not to determine whether or not customers give positive or negative evaluations but what really needs to be discovered is what sort of services are delivered and how this would impact real customer behaviour. Service quality measurement methods are basically based on customer perceptions since services are customer-centric by nature (Urban, 2013). According to

Zeithaml (1988), measuring quality has largely depended on unidimensional rating scales at the early stage of academic research. However, the complexity of the factors defined by service quality has led to the development of multidimensional models in later stages (Ekinici, 2002).

## **2.2. Service Quality Models in Different Contexts**

At the initial stage where the concept of service quality had no much attention, Gronroos (1984) addressed this concept and examined how the quality of service is perceived and evaluated. Accordingly, Gronroos (1984) developed a service quality model to assess the perceived service quality comparing expected service and perceived service and introduced a model highlighting two important components of service quality, namely technical quality and functional quality. Technical quality is the quality of what the consumer receives as a result of his/her interaction with a service firm where the functional quality corresponds to the expressive performance of a service that is how he/she gets the technical outcome.

As an unexplored phenomenon, Parasuraman et al. (for instance, 1985, 1988, & 1994) have drawn a greater interest in evaluating service quality, thus have developed various conceptual models to measure service quality. Service quality is a function of the differences between expectation and performance along the quality dimensions. Accordingly, Parasuraman et al. (1985) developed a service quality model based on gap analysis, thus introduced the GAP model identifying five gaps developed as propositions. Gap 01 relates between consumer expectations and management perceptions of those expectations, while gap 02 relates to the gap between management perceptions of consumer expectations and the firm's service quality specifications. The gap between service quality specifications and actual service delivery is identified as the third gap, where the gap between actual service delivery and external communications about the service is identified as the fourth gap. Finally, the gap between expected service and perceived service was developed as the fifth gap (Parasuraman et al., 1985).

Parasuraman et al. (1985) initially identified ten major dimensions: access, communication, competence, courtesy, credibility, reliability, responsiveness, security, tangibles and understanding/knowing the customer as the determinants of service quality. Later, they reduced the ten dimensions to five as tangibles, reliability, responsiveness, assurance and empathy and introduced the tool SERVQUAL: A multiple-item scale for measuring consumer perceptions of service quality. SERVQUAL framework presented by Parasuraman et al. (1988) is the most popular tool, which is worldwide used by various scholars to evaluate the service quality in different industries (Alexandris et al., 2002; Akama & Kieti, 2003; Ladhari et al., 2011). This SERVQUAL framework is highly praised as the standard tool introduced to measure service quality. However, due to some limitations and methodological shortcomings of this framework, applying it to measure service quality in different

industries is impractical (Carman, 1990; Babakus & Boller, 1992; Buttle, 1996; Caruana et al., 2000; Sureshchandar et al., 2002; Martinez & Martinez, 2010). Meanwhile, Sureshchandar et al. (2001) appreciate the SERVQUAL framework as stating that the 22 items used in the scale to measure service quality are reasonably good predictors. However, Sureshchandar et al. (2001) state that the efficacy of SERVQUAL in measuring service quality has been criticized by some authors for diverse reasons, such as the operationalization of expectations, the reliability and validity of the instrument's difference score formulation and the scale's dimensionality across disparate industrial settings. Sureshchandar et al. (2001) further declare that the scale is not all-inclusive in the sense that it fails to address some of the critical aspects of customer perceived service quality. Because due to the nature of each type of service, different measurement tools are required for different types of services. Accordingly, various tools and models have been introduced by different scholars in order to measure service quality in different disciplines. For instance, Cronin and Taylor (1992) presented a model called SERVPERF, which can be considered as a derivative of the SERVQUAL framework.

Dabholkar et al. (2000) have developed a comprehensive conceptual model of service quality in a longitudinal setting by examining the antecedents, consequences, and mediators of service quality, providing a deeper understanding of conceptual issues related to service quality. More importantly, they identify the factors relevant to service quality as its antecedents rather than its components. Service quality models and tools in different industries as well as in different perspectives can be identified as follows.

### **2.2.1. Bank Services**

Parasuraman et al. (1988) introduced the SERVQUAL targeting the banking services. Accordingly, Ladhari et al. (2011) have conducted a study to evaluate the bank service quality, using the SERVQUAL dimensions of tangibles, reliability, responsiveness, assurance, and empathy. Two samples have been used, and the results declare that empathy and reliability are found to be the most important predictors of satisfaction and loyalty in the Canadian sample, while reliability and responsiveness are the most important predictors of satisfaction and loyalty in the Tunisian sample. Since the SERVQUAL has left out certain important constituents of service quality, Sureshchandar et al. (2002) propose a comprehensive model and an instrument framework for measuring customer perceived service quality in the banking sector, which covers five major factors, namely core service or service product, human element of service delivery, systematization of service delivery (non-human element), tangibles of service and social responsibility. Meanwhile, Ali and Raza (2017) evaluate service quality perception and customer satisfaction in Islamic banks in Pakistan. For this purpose, they use dimensions of compliance, assurance, reliability, tangibles, empathy and responsiveness by modifying the SERVQUAL framework to measure the service quality of Islamic banks. The compliance dimension

of this model has made a higher contribution over the other dimensions. Oppewal and Vriens (2000) proposed a method based on hierarchical information integration theory, which avoids some of the limitations and problems of SERVQUAL. Accordingly, Oppewal and Vriens (2000) presented four major dimensions such as accuracy and friendliness of the service, competence of the personnel, tangibles and accessibility to the bank as the components of bank service quality. Bahia and Nantel (2000) developed a new measurement scale called BSQ (Bank Service Quality) to measure service quality in retail banking. The scale includes 31 items spanning six dimensions: effectiveness and assurance, access, price, tangibles, services portfolio and reliability. Glaveli et al. (2006) have also used the BSQ scale to evaluate the perceived service quality in retail banking. Olorunniwo and Hsu (2006) declare that service quality comprises responsiveness, tangibility, reliability, knowledge and accessibility dimensions in the context of retail banking. Meanwhile, the BANKSERV instrument developed by Avkiran (1994) is also a widely-used instrument to measure service quality in banking services. BANKSERV consists of four broad dimensions, namely staff conduct, credibility, communication and access to teller services, along with 17 service attributes that adopt a ‘perception-expectation’ approach to measure service quality. Karatepe et al. (2005) have presented a four-dimensional scale consisting of service environment, interaction quality, empathy and reliability to measure customer perceptions of service quality of retail banks.

### **2.2.2. E-Services**

E-service quality has become a fascinating area of study in the contemporary business context. Parasuraman et al. (2005) have developed a multiple-item scale for assessing electronic service quality delivered by websites on which customers shop online due to the profound impact of electronic services on satisfying consumers’ needs. Accordingly, two different scales have been developed in conceptualizing electronic service quality. The basic electronic service quality (E-S-QUAL) scale was developed with a 22-item scale of four major dimensions such as efficiency, fulfilment, system availability and privacy, while the second scale of electronic recovery service quality (E-RecS-QUAL) was constructed with 11 items in three dimensions such as responsiveness, compensation and contact which is salient only to customers who exhibit non-routine encounters with the websites. Bauer et al. (2006) developed a transaction process-based scale termed eTransQual for measuring service quality in online shopping, including five quality dimensions: functionality/design, enjoyment, process, reliability and responsiveness. Barnes and Vidgen (2002) presented the WebQual scale to measure the quality of websites, which is a method for assessing the quality of an organization’s e-commerce offering. The instrument: SITEQUAL scale to measure the perceived quality of internet shopping sites, which includes four dimensions: ease of use, aesthetic design, processing speed and security, was presented by Yoo & Donthu (2001). Yang et al. (2005) have developed five-dimension service quality instrument including usability, usefulness of content, adequacy of information, accessibility and interaction in



order to measure service quality of web portals. Cristobal et al. (2007) presented a multiple-item scale for measuring e-service (website) quality. Accordingly, service quality (PeSQ) is a multidimensional construct, including four dimensions: web design, customer service, assurance and order management. Meanwhile, Liu and Arnett (2000) identify four factors: information and service quality, system use, playfulness, and system design quality as critical factors to website success in the electronic commerce context. Jun and Cai (2001) conceptualize internet banking service quality based on three broader quality perspectives of customer service quality, banking service product quality and online systems quality. They have identified 17 underlying dimensions of electronic banking service quality, including reliability, responsiveness, competence, courtesy, credibility, access, communication, understanding the customer, collaboration, continuous improvement, content, accuracy, ease of use, timeliness, aesthetics, security and product variety/diverse features. Hahn et al. (2017) have conceptualized e-service quality with respect to the hotel website quality and developed a corresponding measurement scale. Accordingly, six factors, namely functionality, atmospheric quality, reliable information, locality information, customer reviews and emotional engagement, have been presented to measure e-service quality in the hotel context.

### **2.2.3. Education Services**

On the evaluation of service quality in the context of higher education, different measures and tools have been applied (Brochado, 2009). While popular tools such as SERVQUAL (Parasuraman et al., 1988) and SERVPERF (Cronin & Taylor, 1992) are used with necessary changes, more specific tools have been introduced. For instance, HEDPERF, directly related to the higher education sector, has been developed by Abdullah (2006). This new tool introduced to measure the higher education performance comprises 41 items under five dimensions: non-academic aspects, academic aspects, reputation, access, and programme issues. Joseph and Joseph (1997) have identified seven dimensions of service quality, namely academic reputation, career opportunities, programme issues, cost/time, physical aspects, location and other factors as per the perceptions of students in education, New Zealand. By conducting an exploratory study of customer impressions of service quality in business education, LeBlanc and Nguyen (1997) identify seven factors: reputation, administrative personnel, faculty personnel, curriculum, responsiveness, physical evidence and access to facilities that influence student evaluations of service quality. Sohail and Shaik (2004) emphasize that contact personnel, physical evidence, reputation, responsiveness, access to facilities and curriculum are the factors influencing students' evaluation of educational service quality. Meanwhile, Teeroovengadam et al. (2016) have developed the model of HESQUAL to measure service quality in higher education, adopting a holistic approach by considering both functional and technical aspects of service quality in higher education. The model consists of five dimensions: administrative quality, physical environmental quality, core educational quality, support facilities quality and transformative quality.

#### **2.2.4. Airport Services**

Airport passengers are another group of customers whose needs are greatly assessed by the service providers and find the ways and means of satisfying passengers' expectations at various levels since the airport services have become a million-dollar business. At the major international airports, millions of passengers enjoy the services on any particular given day. Service quality is recognized as an essential element in airport management where international tourism and business activities in the corresponding country largely depend on the overall airport experience perceived by international travellers (Park & Jung, 2012). Thus, it is required to ratchet up airport performance while managing customer expectations regarding service delivery to achieve higher levels of customer satisfaction (Paternoster, 2008). Therefore, different models have been developed by identifying the key dimensions: function, interaction, and diversion (Fodness & Murray, 2007), and pre-flight service quality, in-flight service quality, and post-flight service quality (Namukasa, 2013) in order to evaluate service quality of airport services in terms of passengers' expectations. Meanwhile, Tsaur et al. (2002) identify courtesy of attendants, safety, comfort and cleanness of seat and responsiveness of attendants as the most important attributes of airline service quality. According to Ardakani et al. (2015), safety, timeliness and variety, and the type of airplane are the most important service quality dimensions in the airline industry, while tangibles and responsiveness have the least importance. Hong et al. (2020) have identified three key service dimensions, namely physical environment, outcome and interactional quality, to measure airport users' satisfaction level. Upon comparing the perceptions of airport service providers and air travellers, Hong et al. (2020) affirm that air travellers are more concerned with interaction and outcome quality attributes, while services providers reflect on interaction and physical environment quality attributes.

#### **2.2.5. IT Services**

Lepmets et al. (2011) have presented an IT service quality measurement framework for the IT service industry. In conceptualising the model, they have initially categorised IT service quality measures into two groups: intrinsic measures (common issue areas on IT service quality, information system quality, and process quality); and extrinsic measures (common issue area of customer satisfaction). Based on the results of a systematic literature review, the preliminary measurement framework has been extended with two additional common issue areas of service behaviour and the value of the IT service in the second iteration of building IT service quality measurement framework (Lepmets et al., 2012). The framework comprises six common issue areas divided into 25 corresponding measurement categories and 36 measures. The five intrinsic common issue areas are IT service quality, information system quality, process quality, value of the IT service, service behaviour, and the single extrinsic common issue area is customer satisfaction. Further, Lepmets et al. (2014) have evaluated the validity of the proposed IT service quality measurement framework and refined based on the evaluation by suggesting IT service quality measures that support IT service quality improvement in different contexts.



### **2.2.6.Sporting Events**

The interest has been taken to investigate service attributes used by sports fans in evaluating the quality of the service experience at sporting events. Kelley and Turley (2001) have generated 35 such attributes based on sports marketing and service quality literature. By employing a factor analysis, Kelley and Turley (2001) have introduced nine factors: employees, price, facility access, concessions, fan comfort, game experience, showtime, convenience, and smoking, to measure service quality of sporting events.

### **2.2.7.Telephone Services**

Bolton and Drew (1991) have developed a multistage model on how customers with prior experiences and expectations assess service performance levels, overall service quality and service value. The model has been developed based on residential customers' assessments of local telephone service. The results indicate that residential customers' assessments of quality and value are primarily a function of disconfirmation arising from discrepancies between anticipated and perceived performance levels.

Moreover, many services quality models and scales have been introduced by scholars in various other industries. For instance, the public sector is another critical service enjoyed by many individuals in fulfilling their needs. Abdullah and Zamhari (2013) have evaluated the public sector service quality and presented five dimensions: systemization, employee-oriented, assurance, hospitality and efficiency to measure public sector service quality. Padma et al. (2009) have developed a comprehensive framework to measure service quality on healthcare services by conceptualizing service quality from the perspectives of patients and attendants. Meanwhile, Shokouhyar et al. (2020) accentuate the importance of assessing the effect of after-sales services quality elements on customer satisfaction since after-sales elements play a critical role in customer satisfaction. This review of various service quality models has revealed that service quality outcome and measurement depend on the type of service setting, situation, need and time. Accordingly, this synthesis of literature provides evidence that service quality has become a strategic tool for a firm's performance and has drawn a higher interest in academic research.

Based on the above scenario, this study was conducted as a timely requirement to develop an appropriate model to measure service quality in the context of the mobile phone telecommunications services industry.

## **2.3. The Relationship between Service Quality and Customer Satisfaction**

Customer satisfaction constitutes a critical barometer for assessing the performance of a firm, where delighted customers exhibit distinct behavioural patterns and more likely to return while dissatisfied customers tarnish the image and reputation (Li et al., 2020). Accordingly, the performance of a product

in satisfying the needs of the customer has strategic importance. According to Bowen and Shoemaker (1998, p. 14), “customer satisfaction measures how well a customer’s expectations are met by a given transaction.” Woodruff (1997, p. 143) states that “overall satisfaction is the customer’s feelings in response to evaluations of one or more user experiences with a product.” Accordingly, a customer who receives what he or she expected is most likely to be satisfied. Moreover, if the expectations are exceeded, he or she may be delighted (Bowen & Shoemaker, 1998). Kotler and Armstrong (2014, p. 35) define customer satisfaction as “the extent to which a product’s perceived performance matches a buyer’s expectations.” According to Oliver (1999, p. 14), “consumer senses that consumption fulfils some need, desire, goal or so forth and that this fulfilment is pleasurable, and satisfaction is the consumer’s sense that consumption provides outcomes against a standard of pleasure versus displeasure.” Accordingly, Oliver (1997) defines satisfaction as pleasurable fulfilment. Although customer satisfaction is a major focus of many companies, satisfying customers is a severe challenge in the competitive marketplace (Yap et al., 2012).

According to Jones & Sasser (1995), high-quality products and associated services designed to meet customer needs will create a high level of customer satisfaction. The study of customer satisfaction is imperative for the success of the business since customer satisfaction plays as a causal driver of recommending and repeat intentions (Kassim & Abdullah, 2010). Cronin and Taylor (1992) state that service quality is an antecedent of consumer satisfaction. According to Beerli et al. (2004), perceived quality has a direct influence on customer satisfaction in the retail banking market. Izogo and Ogba (2015) declare that service quality is a significant predictor of customer satisfaction as per the evidence in the automobile repair services sector. However, Meesala and Paul (2018) declare that among the service quality dimensions of tangibility, reliability, responsiveness, assurance and empathy, only the dimensions of reliability and responsiveness impact patient satisfaction in the context of service quality of hospitals in India. Kassim and Abdullah (2010) confirm that service quality has a significant positive impact on customer satisfaction in e-commerce settings. Slack and Singh (2020) declare that service quality is statistically significant in influencing customer satisfaction. Accordingly, service quality, which has a significant positive impact on customer satisfaction, is well-established (Kassim & Abdullah, 2010; Izogo & Ogba, 2015; Ali & Raza, 2017; Dehghanpouri et al., 2020; Lopentus & Erdiansyah, 2020; Nunkoo et al., 2020; Wijaya et al., 2020). As a result, the effect of the intended service quality model on customer satisfaction in the context of the mobile telecommunications service industry will be assessed.

### 3. METHODOLOGY

This study aims to develop a scale to measure the service quality of mobile phone telecommunications service providers. The rigorous review of the literature revealed that existing service quality models and scales are not adequate to measure the service quality of mobile phone telecommunications service providers, which is one of the highest demanded and interesting fields of services in the contemporary business context. Accordingly, the mobile phone subscribers were used as the unit of the analysis of the study.

At the initial stage, a focus group discussion was held with 10 industry executives in the field of mobile phone services and 5 senior academics in the marketing discipline. The researcher provided the major service quality models and tools introduced by various scholars to the group. Then, the group discussed the practicability of those models and tools to measure the service quality of the mobile phone telecommunications service. The group explored the attributes and developed a pool of 17 such attributes to measure the service quality of the mobile phone telecommunications service. In this context, the basic service attributes were considered. The augmented service attributes, including online services, gaming, news alerts and other secondary services, were not considered since those service attributes varied among different service providers based on their strengths and weaknesses. The construct of customer satisfaction was measured using a four-item scale derived from Fornell (1992) and Oliver (1999).

Data were collected from mobile phone subscribers in two stages to employ exploratory factor analysis and confirmatory factor analysis, respectively. Accordingly, two clusters of respondents were selected. In the first stage, data were collected from 420 mobile phone subscribers, employing a structured questionnaire with a seven-point Likert type scale ranging from ‘Not important at all’ (1) to ‘Most important’ (7). Exploratory Factor analysis was employed as a data reduction technique to identify the key attributes and underlying factors for measuring service quality. Accordingly, the attributes were categorized into five dimensions, which were named as Credibility, Coverage, Assurance, Access, and Tangibility.

For the second stage of data collection, a different sample was selected consisting of 700 mobile phone subscribers. Then, confirmatory factor analysis using AMOS was employed, and structural equation modelling technique was applied to validate the results derived by exploratory factor analysis. Accordingly, the deductive research approach, which involves developing a conceptual and theoretical structure tested by empirical observations, was adopted for the study (Collis & Hussey, 2014).

Table 1: Demographic Statistics of the Respondents

	Stage 01		Stage 02	
	# Respondents	Percentage	# Respondents	Percentage
Gender				
Male	248	59.0%	416	59.4%
Female	172	41.0%	284	40.6%
Age Category				
Below 20 Years	100	23.8%	85	12.1%
20 – 29 Years	135	32.1%	281	40.1%
30 – 39 Years	64	15.2%	153	21.9%
40 – 49 Years	59	14.1%	145	20.7%
50 and Above	62	14.8%	36	5.1%
Type of Occupation				
Public Sector	120	28.6%	222	31.7%
Private Sector	140	33.3%	222	31.7%
Students	160	38.1%	256	36.6%
Duration of Patronage				
1 - 2 Years	44	10.5%	58	8.3%
3 - 5 Years	121	28.8%	229	32.7%
6 - 10 Years	98	23.3%	298	42.6%
11 - 15 Years	116	27.6%	101	14.4%
16 and Above	41	9.8%	14	2.0%
Total	420	100%	700	100%

Table 1 illustrates the demographic statistics of the respondents in the study. According to Table 1, both male and female mobile phone subscribers represent the samples in stages 1 and 2. The composition of both male and female subscribers makes the sample more appropriate since every individual tends to use a mobile phone despite the gender, where the perceptions of both groups are equally important in assessing the attributes of the service quality.

Moreover, the sample comprises different age categories of mobile phone subscribers. Accordingly, college students represent the teenage category. Half of the age category of ‘20 - 29’ is represented by undergraduates. Since both of these age groups represent the youth and are treated as very active customers of mobile phone services, their representation of the sample is very important in this type of study. The age categories of ‘30 - 39’ and ‘40 - 49’ also provide a substantial contribution for the study as the heavy users of the services. In addition, the perceptions of the mobile phone subscribers who are in the age 50 and above category were also considered since they are treated as mature customers.

The sample represents mobile phone subscribers enrolled in both private and public sector employment as their occupation along with students since the perceptions of all these categories are equally important in evaluating the service quality attributes of the mobile phone telecommunications service. The student category is represented by both college students and undergraduates.

As depicted in Table 1, the duration of the patronage of mobile phone subscribers was considered since their experience with the respective service is imperative for the evaluation of the quality of the service. Accordingly, around 8% - 10% of the sample is represented by new users (for instance, 1 - 2 years). However, the majority of the respondents in the samples have been using the service for a considerable number of years, having a good experience to evaluate the quality of the service. The sample representation in terms of the number of years of patronage is imperative in appraising the service quality in the study.

#### 4. DATA ANALYSIS

The key objective of the study is to develop a new scale to measure the service quality of mobile phone telecommunications service providers. Accordingly, the study explored the service quality attributes in the context of mobile phone telecommunications services and developed a pool of attributes, including 17 such attributes. As the first stage, exploratory factor analysis was employed to identify the key attributes and underlying factors of service quality in the context since exploratory factor analysis is treated as a tool of data reduction technique, where it reduces the variables from a fairly large set of observable variables to a smaller more manageable number and pools them together to identify as latent constructs (Conway & Huffcutt, 2003; Matsunaga, 2010; Hair et al., 2014).

Table 2: Exploratory Factor Analysis: Rotated Factor Matrix

Attributes	Dimensions				
	1	2	3	4	5
Trustworthiness	.979				
Customer Care	.978				
Promised Service	.971				
Fair Rates	.717				
Coverage		.917			
Attractive Packages		.900			
Up-to-date technology		.899			
Additional Services		.883			
Employee Competency			.905		
Enthusiastic Employees			.857		
Complaint Handling			.844		
Branch Network				.902	
Convenient Location				.858	
Easy Access to AIS				.847	
Clean & Tidy					.894
Atmospherics					.845
Employee Grooming					.712

Table 2 displays the results of the Rotated Factor Matrix. The KMO measure of sampling adequacy for the items is 0.789, and Bartlett's test value is statistically significant (Chi-square = 8219.794,  $P < 0.000$ ), indicating the adequacy of inter-correlations among the items. The results show that the pool of seventeen attributes explored to measure service quality in the mobile phone telecommunications service has been classified into five major dimensions, which are introduced as the key factors of service quality of the mobile phone telecommunications service providers.

The first dimension consists of four attributes: trustworthiness, customer care, promised service (service provider delivers service as promised), and fair rates. This dimension was named 'Credibility' due to the nature of the service attributes. The second dimension includes coverage (wide area network coverage), availability of attractive packages for selection, up-to-date technology (service provider has up-to-date technology), and additional services provided by the service operator. Accordingly, this dimension which includes four attributes, was labelled as 'Coverage' by the nature of the attributes. The third dimension specified as 'Assurance' consists of three service attributes such as employee competency (services are provided by competent employees), employee enthusiasm (employees are enthusiastic about serving customers), and complaint handling (service provider has an effective customer requests/complaints handling system). The fourth dimension includes three items, namely branch network (the company has a sufficient number of branch network to provide services), convenient location (branches are conveniently located close to customers), and easy access to customer automatic support system, which was labelled as 'Access'. The fifth dimension includes three attributes facilitating the tangibles: clean & tidy ambience of branches, elegant atmospherics of branches and grooming of employees. Accordingly, the dimension was labelled as 'Tangibility'.

The descriptive statistics of each dimension of the service quality derived by the exploratory factor analysis were evaluated. Accordingly, four dimensions of service quality: Credibility, Coverage, Assurance and Access have reported Mean Value above 6.0, while the dimension of Tangibility has reported 5.7 Mean Value, which means that mobile phone subscribers have perceived and evaluated the selected service quality attributes of each dimension as important elements in consuming this service.

#### **4.1. Validating the Model of Service Quality**

In order to validate the model derived by the exploratory factor analysis, the confirmatory factor analysis, which is treated as an effective tool for theory testing, was used (Schreiber et al., 2006; Byrne, 2010; Hair et al., 2014). The structural equation modelling technique was employed to test the model of the study. Table 3 depicts the scale items of the dimensions of service quality and customer satisfaction. According to the rule of thumb, the standardized factor loading estimates should be 0.5 or higher, ideally, 0.7 or higher, for good converge (Hair et al., 2014). Accordingly, Table 3 depicts that the scale items of the study have reported a good convergence.



Table 3: Variables and Scale Items of the Study

Variables	Scale Items	Item Code	Factor Loading
Credibility	I have built trust upon the service provider. (The service provider is trustworthy)	CRE 1	.80
	Customer care of the service provider is fascinated.	CRE 2	.92
	The service provider delivers service as promised.	CRE 3	.85
Coverage	The service provider has a wide area network coverage.	COV 1	.75
	Attractive packages are provided for selection.	COV 2	.88
	The service provider has up-to-date technology.	COV 3	.89
Assurance	Skilful employees provide services at branches.	ASS 1	.80
	Employees are enthusiastic to serve customers.	ASS 2	.78
	Service provider has an effective customer requests/complaints handling system.	ASS 3	.83
Access	Company has a sufficient number of branch network to provide services.	ACC 1	.89
	Branches are conveniently located close to customers.	ACC 2	.89
	Easy access to customer automatic support system is admired.	ACC 3	.80
Tangibility	Branches are clean & tidy.	TAN 1	.75
	The elegant atmospherics at the branches are attractive.	TAN 2	.69
	Employees are well-groomed.	TAN 3	.69
Customer Satisfaction	My experience with this service provider is pleasant.	SAT 1	.89
	This service provider has met my expectations.	SAT 2	.90
	I enjoy a successful service offered by service provider.	SAT 3	.92
	Overall, I am satisfied with this service.	SAT 4	.88

The model  $\chi^2$  is significant ( $\chi^2 = 662.657$  with 137 degrees of freedom). The  $p$ -value is significant ( $p < 0.01$ ), which is to be expected with a sample size of 700. The key fit indices, including the absolute fit indices, incremental fit indices, and parsimony fit indices of the model (Hu & Bentler, 1999; Byrne, 2010; Hair et al., 2014), have also produced satisfactory results. Accordingly, the Normed Chi-Square value (CMIN/DF) of the model is 4.837, which is expected to be below 5, can be treated as a good indicator. Moreover, the Root Mean Square Error of Approximation (RMSEA) of the study has reported 0.074, which should be below 0.08 as the threshold value is also satisfactory. Also, Goodness of Fit Index (GFI) value is 0.912, which is above 0.9. As far as the Incremental Fit Indices are considered, both the Comparative Fit Index (CFI) and Normed Fit Index (NFI) have reported above the threshold value of 0.9, indicating 0.946 (CFI) and 0.933 (NFI), respectively. Moreover, the Adjusted Goodness of Fit Index (AGFI) as the Parsimony Fit Index indicates the value of 0.878, which is above the threshold value of 0.8. Table 4 includes the summary of the fit indices of the analysis.

Table 4: CFA Fit Indices

Goodness of Fit Indices	Value
Chi Square ( $\chi^2$ )	662.657( $p < 0.01$ )
Degree of freedom	137
Absolute Fit Indices	
Normed Chi Square value (CMIN/DF)	4.837
RMSEA	0.074
Goodness of Fit Index (GFI)	0.912
Incremental Fit Indices	
Comparative Fit Index (CFI)	0.946
Normed Fit Index (NFI)	0.933
Parsimony Fit Index	
Adjusted Goodness of Fit Index (AGFI)	0.878

#### 4.2. Construct Validity and Reliability

It is mandatory to assess the construct validity of the proposed model using convergent validity and discriminant validity (Fornell & Larcker, 1981; Hu & Bentler, 1999; Byrne, 2010; MacKenzie et al., 2011; Hair et al., 2014). Convergent validity refers to “the extent to which indicators of a specific construct converge or share a high proportion of variance in common” (Hair et al., 2014, p. 601), whereas discriminant validity refers to “a construct is truly distinct from other constructs both in terms of how much it correlates with other constructs and how distinctly variables represent only this single construct” (Hair et al., 2014, p. 601).

Table 5: AVE, Correlations, Squared Correlations and Composite Reliability Among the Dimensions of Service Quality

Dimensions	Credibility	Coverage	Assurance	Access	Tangibility	Composite Reliability
Credibility	.74	.11	.41	.30	.21	.893
Coverage	.33	.71	.02	.09	.01	.879
Assurance	.64	.13	.65	.22	.18	.845
Access	.55	.30	.47	.74	.34	.896
Tangibility	.46	.08	.43	.58	.51	.753

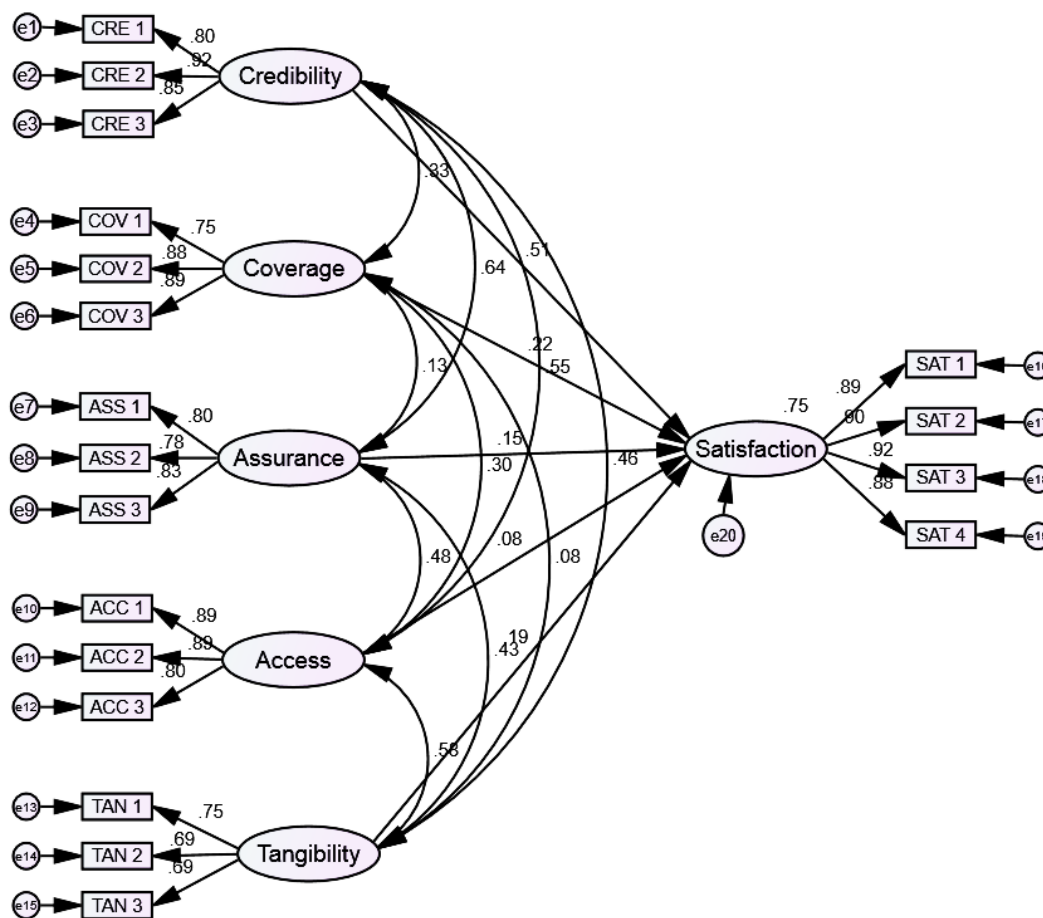
\*Values below the diagonal are correlation estimates among the variables and values above the diagonal are squared correlations, and the values on the diagonal represent the AVE values of the study variables.

Table 5 depicts the values of Average Variance Extracted (along the diagonal) of each dimension of service quality, the correlations (below the diagonal) and squared correlations (above the diagonal). Accordingly, all dimensions have reported AVE value above 0.5, confirming the convergent validity.

The statistics in Table 5 can be further used to assess the discriminant validity of the dimensions. Discriminant validity can be evaluated by comparing the average variance-extracted values for any two dimensions with the squared correlation estimate between the two dimensions or comparing the square root of average variance-extracted values with the correlation estimate (Fornell & Larcker, 1981; MacKenzie et al., 2011; Hair et al., 2014). The AVE, which should be greater than the squared correlation estimates of each dimension to confirm the discriminant validity, is also satisfactory, as illustrated in Table 5.

The internal consistency among the items of a construct commonly known as reliability has a high weight in social science research. Either Cronbach Alpha value or Composite Reliability value can be used as the key tools used to measure reliability (Fornell and Larcker, 1981; Raykov, 1997; Cavana et al., 2001; Hair et al., 2007; MacKenzie et al., 2011). Table 5 shows that all dimensions of service quality in the study are reliable with the reliability values above 0.7 of Composite Reliability, where four dimensions, namely Credibility, Coverage, Access and Tangibility have reported Composite Reliability value above 0.8. Meanwhile, Composite Reliability of Customer Satisfaction was reported a higher value of 0.943, confirming a higher level of internal consistency among the items.

Figure 1: The Structural Model of the Service Quality Model



The results of the structural model are depicted in Figure 1, where it illustrates the standardized factor loading estimates of each dimension and the correlation values among the dimensions. Moreover, Figure 1 shows the regression weight of each service quality dimension of the proposed model on the dependent variable of customer satisfaction. Accordingly, the structural model has produced satisfactory results where the variance of customer satisfaction can be successfully predicted by 75% with the service quality dimensions, namely Credibility, Coverage, Assurance, Access and Tangibility of the proposed model. Moreover, Table 6 presents the regression statistics of the study, confirming that all five dimensions of service quality are statistically significant and have positive impact on customer satisfaction.

Table 6: Regression Statistics of the Structural Model of the Study

Service Quality	Dimensions	Standardized Regression ( $\beta$ )	Significance Level ( $P$ )
Credibility		.506	.000
Coverage		.218	.000
Assurance		.149	.000
Access		.081	.024

Tangibility	.186	.000
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According to the results in Table 6, all dimensions of the proposed service quality model, namely Credibility, Coverage, Assurance, Access and Tangibility, are statistically significant and positively impact customer satisfaction. It denotes that Credibility has the highest impact on customer satisfaction ( $P < 0.01$ ) among the dimensions. Accordingly, Credibility is a critical determinant that has strong power on customer satisfaction in the context of the mobile telecommunications service industry. Secondly, Coverage has a considerable positive impact on customer satisfaction which is significant ( $P < 0.01$ ). Next, Tangibility and Assurance have significant positive impact on customer satisfaction ( $P < 0.01$ ) respectively. Moreover, Access ( $P < 0.05$ ) also has a significant positive impact on customer satisfaction, although it is not as strong as other dimensions.

## 5. RESULTS AND DISCUSSION

Service quality has become the ubiquitous concept in the marketing literature, which has succeeded to draw the utmost attention of scholars in the past (Gronroos, 1984; Parasuraman et al., 1988; Cronin & Taylor, 1992; Zeithaml et al., 1996; Aaker, 2001), as well as to keep the interest among scholars to the present (Kasiri et al., 2017; Fatima et al., 2018; Meesala & Paul, 2018; Lopentus & Erdiansyah, 2020; Nunkoo et al., 2020; Raza et al., 2020; Slack & Singh, 2020; Tabaku & Kruja, 2019; Wijaya et al., 2020).

The need to develop different measurement scales, tools and models to measure service quality is greatly acknowledged since the nature of services in satisfying customer needs differs in various industries and contexts. Carman (1990) states that service quality conceptualization and measurement has been an elusive concept. Sureshchandar et al. (2002) declare that various researchers have addressed service quality and administered various service quality models over the past few years across the world. Moreover, the degree of significance of service attributes and service quality dimensions tend to differ in different service contexts (Ardakani et al., 2015). Meanwhile, Babakus and Boller (1992) affirm that the dimensionality of service quality may depend on the type of services under study. Especially, the challenge of evaluating the quality of service is a concern due to the nature of intangibility and variability of services. Accordingly, different tools and scales have been introduced by various scholars to measure service quality, and many scholars have paid attention to behavioural consequences of service quality and measuring service quality (Parasuraman et al., 1988; Bitner, 1990; Bolton & Drew, 1991; Boulding et al., 1993; Zeithaml et al., 1996). For instance, the SERVQUAL scale is highly recognized to measure service quality, which has become one of the most productive and heavily used tools for several years in measuring service quality. Parasuraman et al. (1988) presented five broad dimensions of service quality, including tangibles, reliability, responsiveness, assurance and empathy, and introduced the tool SERVQUAL: A multiple-item scale for measuring consumer perceptions of

service quality. However, alternative scales and models for measuring service quality were later introduced by various scholars due to some limitations of the SERVQUAL model. For instance, Parasuraman et al. (1994) have paid attention to developing alternative scales for measuring service quality by having a comparative assessment based on psychometric and diagnostic criteria. Cronin and Taylor (1992) have presented an alternative method of operationalizing perceived service quality, which is identified as a performance-based measure of service quality. Accordingly, Cronin and Taylor (1992) presented a model called SERVPERF to evaluate the service performance. This study focused on developing a tool to measure the service quality of mobile phone service providers since a lack of studies has been conducted to evaluate the service of mobile phone service providers. Therefore, as the major outcome of the study, the model, namely 'CCAAT', is proposed to measure service quality of the mobile phone telecommunications service providers, and the model consists of five key dimensions of service quality: 'Credibility', 'Coverage', 'Assurance', 'Access' and 'Tangibility'. Accordingly, this study contributes to the services industry by adding a new flavour to the service quality.

Moreover, since service quality is highly correlated with customer satisfaction, the significant impact of service quality on customer satisfaction has been well-established in the marketing literature (Caruana, 2002; Beerli et al., 2004; Izogo & Ogba, 2015; Slack & Singh, 2020). For instance, Izogo and Ogba (2015) declare that service quality is a significant predictor of customer satisfaction as per the evidence in the automobile repair services sector. According to Beerli et al. (2004), perceived quality has a direct influence on customer satisfaction in the retail banking context. While Caruana (2002) also confirms the impact of service quality on customer satisfaction, Cronin and Taylor (1992) identify service quality as an antecedent of consumer satisfaction. Slack and Singh (2020) declare that service quality is statistically significant in influencing customer satisfaction in the context of supermarkets. According to Kassim and Abdullah (2010), service quality has a significant positive impact on customer satisfaction in e-commerce settings. Dehghanpouri et al. (2020) state that customer satisfaction is significantly influenced by service quality within the context of electronic customer relationship management systems. Moreover, Lopentus and Erdiansyah (2020), Nunkoo et al. (2020) and Wijaya et al. (2020) also confirm the positive impact of service quality on customer satisfaction. Accordingly, the result of the current study is consistent with the results of other studies conducted by various scholars, which confirms that the service quality of mobile phone service providers has a significant positive impact on customer satisfaction. In this context, the service quality dimensions of Credibility, Coverage, Access, Assurance and Tangibility are of paramount importance in order to satisfy mobile phone subscribers.

### **5.1. Theoretical Implications**

Understanding customer buying behaviour is the prime focus in marketing (Marsden, 1998; Aaker, 2001; Sheth, 2002; Bellou & Andronikidis, 2008; Schiffman et al., 2015; Reim et al., 2018), which



roots from social and psychological studies (Gergen, 1973; Newman & Foxall, 2003; Daunt & Harris, 2012). The consumption of services by customers has remarkably increased at current than ever. In the current competitive business context, the marketplace is proliferated with various types of services both from local and global contexts, creating a platform for customers to select their preferred services among many alternatives (Keller, 2013; Guo et al., 2019; Nie & Wang, 2021). At present, the dominance of the service sector in the economy, the emergence of new types of services and radical increase of the length of the services play a critical role in fulfilling customer needs (Lee & McKibbin, 2018; Petrenko et al., 2018; Abd-Elrahman et al., 2019). The telecommunications industry, which has become an essential service to fulfil customer needs, plays a remarkable role as a high-velocity industry in the current decade. The distance among the countries is shrinking due to the rapid development of communications technology. Within the telecommunications industry, the role of the mobile phone by means of communicating and exchanging information is remarkable, and it has made a revolution among the people and changed the entire behaviour of consumers creating a new fashion of life. In evaluating the performance of services, the concept of service quality is the prominent element, and various scholars have investigated this concept and introduced tools to measure service quality in respective service industries (Parasuraman et al., 1988; Cronin & Taylor, 1992; Zeithaml et al., 1996; Aaker, 2001; Hong et al., 2020; Shokouhyar et al., 2020). However, the conceptualization and empirical validation of the service quality model in the context of the mobile phone telecommunications service industry have not been well-addressed. Accordingly, this study was conducted to develop a theoretical model to measure the service quality of mobile phone telecommunications service providers. As such, this study contributes to the service theory by adding a new scale: the CCAAT model to measure service quality of mobile phone telecommunications service providers.

## **6. Practical Implications**

The evolution of the mobile phone has made a revolution in consumer behaviour as a result of augmented features and benefits, new trends and styles, technological enhancements, and competitive strategies, actions and reactions, which have made this industry more appealing, and this trend dynamically grows up at an unprecedented rate. Accordingly, the mobile phone has become a stronger tool today, strengthening the relationships and social bonds among family members, friends, and other interesting parties (Gerpott et al., 2001; Wei & Lo, 2006; Chen & Li, 2017).

If not subscribed to a service provider, the mobile phone will be another instrument with no value. Hence, linking with a service provider is essential to activate and function the mobile phone. Many service providers compete in this industry and facilitate a range of services and various features and benefits for the satisfaction of their subscribers while employing effective novel strategies for retaining their existing subscribers and attracting new subscribers. Due to the increasing demand for the services

by mobile subscribers and healthy profits enjoyed by the existing service providers, the mobile phone service industry has been an attractive battlefield, and more service providers are entering both from local and global contexts. Therefore, measuring the service quality of mobile phone service providers has become imperative in the contemporary marketing context.

The outcome of the study provides valuable insight to mobile phone service providers. Accordingly, the proposed ‘CCAAT’ model consists of five key dimensions of service quality: ‘Credibility’, ‘Coverage’, ‘Assurance’, ‘Access’ and ‘Tangibility’, which are critical for satisfying their subscribers. Since this service has specific features and amenities over other services, the attention paid to the key dimensions identified in the study by the respective mobile phone service provider will bring them an added advantage in order to satisfy their subscribers since each service quality dimension of the model significantly impact customer satisfaction. More importantly, the credibility and the coverage among the dimensions are prominent factors that affect the satisfaction level of subscribers.

## **7. CONCLUSIONS AND FUTURE RESEARCH DIRECTIONS**

The role of the mobile phone by means of communicating and exchanging information is remarkable, and it has made a revolution among the people and changed the entire behaviour of consumers creating a new fashion of life. The mobile phone has become an essential and powerful tool to strengthen relationships and social bonds among people. The rigorous analysis of the literature revealed that existing service quality models and scales are not adequate to measure the service quality of mobile phone telecommunications service providers. Accordingly, this study was conducted to identify the key attributes and underlying factors of service quality in the context of mobile phone telecommunications service providers and develop a new scale to measure service quality.

As the major outcome of the study, the model, namely ‘CCAAT’, is proposed to measure service quality of the mobile phone telecommunications service providers, and the model consists of five key dimensions of service quality: ‘Credibility’, ‘Coverage’, ‘Assurance’, ‘Access’ and ‘Tangibility’. Moreover, the relationships between service quality dimensions and customer satisfaction are statistically significant. This relationship between service quality and customer satisfaction is well-established in the marketing literature, and the current study further confirms this relationship in relation to mobile phone telecommunications services. Accordingly, the results of the study produced the desired outcome, which will be interesting for service providers who are highly concerned about the satisfaction of their subscribers. However, the study focused on the basic service attributes of mobile phone telecommunications service providers, while the augmented service attributes, including online services, gaming, news alerts and other secondary services, were not considered since those service attributes are varied among different service providers based on their strengths and weaknesses.

Therefore, the future research direction is aimed at extending the existing scale, adding those augmented service attributes.

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