Mobile communications: a comprehensive hierarchical modelling approach

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Abstract
Purpose – Global mobile communication is one of the most dynamic and important service markets. Several researchers suggest using a theoretical approach to develop a much deeper insight into key marketing constructs such as service quality, customer perceived value, customer satisfaction, perceived switching costs, corporate image, and customer loyalty is of vital importance to the mobile communications market. This study aims to develop and test a comprehensive hierarchical model of these six important constructs. The model also incorporates the retailing function of a major mobile communication provider.

Design/methodology/approach – The research sample of 516 was drawn from customers of one of the largest mobile communications service providers in China. The data were analysed using exploratory factor analysis, confirmatory factor analysis and structural equation modelling.

Findings – The results of the study support using a hierarchical and multidimensional approach for conceptualising and measuring customers' perceptions of service quality in the mobile communications market. In addition, the findings illustrate that service quality is an important determinant of customer perceived value, customer satisfaction, corporate image, and perceived switching costs. Customer perceived value is also an antecedent of customer satisfaction. Corporate image, customer satisfaction, and perceived switching costs are three key drivers of customer loyalty. However, the findings also indicate that corporate image is not an important determinant of customer satisfaction and that customer perceived value is not a key driver of customer loyalty.

Originality/value – This is the first paper that has developed and tested a comprehensive hierarchical model of the mobile communications market.

Keywords Mobile communication, Comprehensive hierarchical model, Service quality, Customer satisfaction, Customer loyalty, Structural equation modelling

Paper type Research paper

Introduction
The rapid growth and dynamic nature of the global mobile communications industry has attracted the interests of several marketing academics and practitioners. Researchers have examined the relationships between several behavioural constructs in the mobile communications market in: France, switching costs and the customer satisfaction link (Lee et al., 2001); Germany, customer retention, loyalty and satisfaction (Gerpott et al., 2001); Hong Kong, customer satisfaction (Woo and Fock, 1999); South Korea, customer satisfaction, switching barriers, customer loyalty (Kim et al., 2004); the USA, m-loyalty (Lim et al., 2006); and Turkey, antecedents of customer loyalty (Aydin...
More recently, a comprehensive hierarchical modelling approach has been adopted by marketing academics for the conceptualization and measurement of the dimensions of service quality, service quality, and the important higher order constructs (e.g. satisfaction, image, perceived value, loyalty) in various service industries such as education (Clemes et al., 2007), health services (Dagger et al., 2007), hospitality (Clemes et al., 2010), and the sporting industry (Clemes et al., 2011).

The global mobile communication market is evolving constantly and this manifests in changes in dimensional structures, how customers evaluate the dimensions of service quality and the relationships among the higher order constructs. However, to date, no study has developed and tested a comprehensive hierarchical model for the mobile communications market that simultaneously measures customers’ perceptions of the dimensions of service quality (a second-order conceptualisation) and the relationships among six higher order marketing constructs (service quality, customer perceived value, customer satisfaction, perceived switching costs, corporate image, and customer loyalty) in the same measurement instrument. Nor have any studies used a large sample size (approximately 400) that is recommended for research using exploratory factor analysis and structural equation modelling in their analysis as the sample needs to be equally divided (Hair et al., 2010). Given the large number of existing mobile phone users, the rapid industry growth rate, the continuing technology advances that are a feature of the industry, and the number of multi-nationals that are involved in supplying mobile communication components, telecommunication companies must understand their customers’ changing perceptions in order to keep their current customers engaged and cultivate new customers. Therefore, the three research objectives of this study are:

1. to identify the service quality dimensions as perceived by mobile communication service customers;
2. to identify the least and most important service quality dimensions as perceived by mobile communication service customers; and
3. to test the relationships among service quality, customer satisfaction, customer perceived value, corporate image, perceived switching costs, and customer loyalty in a comprehensive hierarchical modelling framework.

This study makes the following contributions by satisfying the three research objectives. First, unlike the previous studies, this study develops and tests a comprehensive hierarchical model that provides a complete and integrative analysis of the dimensions underlying customers’ perceptions of service quality and also analyses the relationships that exist among several important higher order marketing constructs in the mobile communications market. Second, this study provides empirical support for the use of a hierarchical model to conceptualise and measure customers’ perceptions of service quality in the mobile communications market. Third, the results of this study will benefit marketers and practitioners who are already operating in, or preparing to enter, the mobile communications market as the findings may assist these organisations in developing and implementing successful business strategies.

Mobile communications is also one of the most important service markets in China. China has one of the world’s fastest growing economies, with growth rates averaging 10 per cent per year since the mid-1990s (Chang et al., 2005). Concurrently, the Chinese telecommunications industry experienced the fastest growth in its history (Nie and Özer, 2005).
Zeng, 2003). China also has the world’s largest mobile subscriber base and the market was worth an estimated US$48 billion in 2008 (End-to-End Efficiency, 2009). In 2008, the number of mobile phone subscribers in China reached 641 million (ITU, 2008), increasing to 859 million in 2010 (ITU, 2012). The total number of mobile phone subscribers in China reached 1 billion in 2012 (ITU, 2012).

The Chinese public telecommunications sector traditionally operated under a monopolistic structure. However, by the middle of the 1990s, the Chinese Government began to reform the telecommunications sector in order to encourage market competition and improve efficiency in the telecommunications market. In 2002, the Chinese Government allowed four major telecommunication companies to offer fixed network telecommunication, mobile communication, and other basic communication services: China Mobile, China Netcom, China Telecom, and China Unicom (Lai et al., 2009). These mobile communications service providers sought to improve customer perceived service quality, customer perceived value, customer retention, and customer acquisitions through massive investments in network extensions, network improvements, and price reductions (Wang et al., 2004). In 2008, the Chinese Government restructured the telecommunications service sector. China Netcom was merged with China Unicom. China TieTong (formerly China Railcom, established in 2001) was combined into China Mobile. The five state-owned companies: China Mobile, China Telecom, China Unicom, China Netcom and China TieTong were reduced to three in 2008. They are China Mobile, China Unicom, and China Telecom (End-to-End Efficiency, 2009).

The Chinese mobile communications market has been neglected by most prior researchers despite its size, complex and dynamic nature (Lai et al., 2007). China’s sustained economic growth, social transition, and unique culture shape consumer demand for its goods and services and influence the reactions of consumers to services and loyalty. Applying western derived and theory and strategies in China may be very challenging for marketers (Lai et al., 2009; Zhao et al., 2006). The few empirical studies that have been conducted on service quality on the Chinese mobile communications market have relied on the SERVQUAL/SERVPERF scale. Wang et al. (2004) use the five generic dimensions derived from the SERVQUAL scale and add network quality as a sixth dimension to measure customers’ perceptions of service quality (for a critique of the SERVQUAL scale and its dimensions (Carman, 1990; Cronin and Taylor, 1992; Van Dyke et al., 1997)). Wang et al.’s results show that the responsiveness dimension has an insignificant impact on service quality. The authors’ also examine the relationships that exist between service quality, customer value, and customer satisfaction. However, value is correlated to both satisfaction and customer perceived service quality, therefore the coefficient term should be interpreted with caution. Further, the authors argue for research analysing longitudinal data incorporating other constructs such as reputation (image).

Lai et al. (2007) examine Chinese mobile communication customers’ perceptions of service quality using a modified SERVQUAL scale and add convenience as a sixth dimension. A low response rate and a small sample size (118 usable questionnaires) limit the generalizability of the study. In light of the theoretical and methodological criticisms of the SERVQUAL scale, Lu et al. (2009) use a mobile brokerage service as an example, and test a service quality hierarchical model based on Brady and Cronin’s (2001) conceptualisation to investigate customers’ perceptions of e-service quality in the Chinese mobile communications market. The authors do not investigate the
relationships among the important, higher order marketing constructs and the retail function is not included in the study.

Lai et al. (2009) develop and test a model to examine the relationships among five higher order marketing constructs (service quality, customer satisfaction, customer perceived value, corporate image, and customer loyalty) in the Chinese telecommunications market using a small sample (118 usable questionnaires). A dimensional structure for service quality was not developed and the construct was measured using five elements from the SERVQUAL instrument. Perceived switching costs were not included in the model and the small sample size limits the generalizability of the results.

Literature review, hypotheses, and conceptual research model

Service quality

Service quality is described as a form of attitude, as it is a global judgment regarding the superiority of the service (Carman, 1990; Cronin and Taylor, 1992; Parasuraman et al., 1988). Service quality has been described as an abstract and elusive construct (Parasuraman et al., 1985). Despite a number of service quality studies, there is no consensus on the conceptualization and measurement of service quality, the dimensions of service quality, and the content of its dimensions (Brady and Cronin, 2001). Although there is a lack of consensus on the conceptualization and measurement of service quality, marketing academics generally agree that service quality is a multidimensional, higher order construct (Brady and Cronin, 2001; Clemes et al., 2011). Brady and Cronin (2001) and Dabholkar et al. (1996) introduce an approach for conceptualizing and measuring service quality on the premise that service quality is a multidimensional construct with a hierarchical structure. Customers evaluate their overall perceptions of service quality at three ordered and hierarchical levels: an overall level, a primary dimensional level, and a sub-dimensional level. The overall level is the customers’ overall perceptions of service quality. The primary dimensional level consists of primary dimensions pertaining to customers’ overall perceptions of service quality. The sub-dimensional level consists of sub-dimensions pertaining to the primary dimensions.

One consensus that has emerged from several recent studies is that researchers empirically modelling the service quality construct have consistently identified at least three primary dimensions of service quality: interaction quality, physical environment quality, and outcome quality (Brady and Cronin, 2001; Clemes et al., 2011; Clemes et al., 2010; Clemes et al., 2007; Dagger et al., 2007; Lu et al., 2009; Martínez Caro and Martínez García, 2008). These three primary dimensions are used in this current study. The proposed sub-dimensions pertaining to each of the three primary dimensions of service quality were derived from the literature review and focus group discussions. Participants in the focus groups were asked to explain factors that contributed to their perceptions of service quality as mobile communications service users in China. Following these discussions, the participants were asked to place the factors under each of the three pertaining primary dimensions of service quality.

Interaction quality

The interactions between customers and employees that take place during service delivery impact on customers’ overall perceptions of service quality (Brady and Cronin, 2001). Despite the fact that mobile communication services may often involve less interpersonal interactions when compared to other types of services such as education
or hospitals, the service marketing literature suggests that the interpersonal interactions between mobile communications service providers and their customers significantly impact on mobile communications service quality as perceived by customers (Kim et al., 2004; Lai et al., 2007; Lim et al., 2006; Lu et al., 2009; Wang et al., 2004). Therefore, the following hypothesis is formulated:

\[ H1. \] There is a significant positive relationship between the interaction quality primary dimension and customers’ overall perceptions of service quality.

The literature review and focus group discussions indicate the following sub-dimensions pertain to the interaction quality primary dimension:

(a) Attitudes (Brady and Cronin, 2001; Clemen et al., 2007; Lu et al., 2009; Martinez Caro and Martinez Garcia, 2007).
(b) Behaviour (Brady and Cronin, 2001; Winsted, 2000).
(c) Expertise (Brady and Cronin, 2001; Lu et al., 2009; Martinez Caro and Martinez Garcia, 2008).

Therefore, the following hypothesis is formulated:

\[ H2. \] There is a significant positive relationship between the sub-dimensions of interaction quality (attitudes, behaviour, and expertise) and the interaction quality primary dimension.

**Physical environment quality**

The surrounding physical environment in which the service delivery process takes place has a notable impact on customers’ overall perceptions of service quality, despite the fact that services are characterised by intangibility (Bitner, 1992). Dabholkar et al. (1996) suggest that in a retail store the physical aspects are similar to the tangible dimension of SERVQUAL, but that the physical aspects have a broader meaning. Lai et al.’s (2007) and Wang et al.’s (2004) findings show that the store environment, such as whether the physical facilities provided by mobile communications service providers are visually appealing, and whether employees of mobile communications service providers are well dressed and neat in appearance, have a significant impact on customers’ overall perceptions of mobile communications service quality in the mobile communications market. Therefore, the following hypothesis is formulated:

\[ H3. \] There is a significant positive relationship between the physical environment quality primary dimension and customers’ overall perceptions of service quality.

The literature review and focus group discussions suggest the following sub-dimensions pertain to the physical environment quality primary dimension:

(d) Store atmosphere (Brady and Cronin, 2001; Ko and Pastore, 2005; Martinez Caro and Martinez Garcia, 2008).
(e) Physically appealing (Brady and Cronin, 2001; Clemen et al., 2007; Ko and Pastore, 2005).
(f) Customer convenience (Lai et al., 2007; Negi, 2009).
(g) Social factors (Brady and Cronin, 2001; Clemen et al., 2007).
Therefore, the following hypothesis is formulated:

**H4.** There is a significant positive relationship between the sub-dimensions of physical environment quality (store atmosphere, physically appealing, customer convenience, and social factors) and the physical environment quality primary dimension.

**Outcome quality**

Outcome quality, or technical quality, is what customers receive after the service delivery process and buyer-seller interactions are complete (Grönroos, 1984). Brady and Cronin (2001) suggest that there is a consensus that customers’ perceptions of outcome quality have a significant impact on customers’ overall perceptions of service quality. For example, Lim et al. (2006) note that outcome quality, such as whether mobile communications service providers provide an accurate and understandable billing, significantly impacts on customers’ overall perceptions of mobile communications service quality in the USA. In addition, Wang et al. (2004) maintain that outcome quality, such as whether mobile communications service providers deliver their services at the times they promise to do so, significantly impacts on customers’ overall perceptions of mobile communications service quality. Therefore, the following hypothesis is formulated:

**H5.** There is a significant positive relationship between the outcome quality primary dimension and customers’ overall perceptions of service quality.

The literature review and focus group discussions suggest the following sub-dimensions pertain to the outcome quality primary dimension:

- (h) Network quality (Kim et al., 2004; Negi, 2009; Wang et al., 2004).
- (i) Billing system (Lee et al., 2001; Lim et al., 2006; Pezeshki et al., 2009).
- (j) Waiting time (Brady and Cronin, 2001; Martínez Caro and Martínez García, 2008).
- (k) Reliability (Lai et al., 2007; Wang et al., 2004).
- (l) Privacy (Hsu and Hsu, 2008; Parasuraman et al., 2005; Vlachos and Vrechopoulos, 2008).

Therefore, the following hypothesis is formulated:

**H6.** There is a significant positive relationship between the sub-dimensions of outcome quality (network quality, billing system, waiting time, reliability, and privacy) and the outcome quality primary dimension.

**Customer perceived value**

Zeithaml (1988, p. 14) defines customer perceived value as “the customer’s overall assessment of the utility of a product based on perceptions of what is received and what is given”. Dodds et al. (1991) define customer perceived value as the trade-off between perceived quality and perceived psychological benefits as well as a monetary sacrifice. Nguyen and LeBlanc (1998, p. 53) define customer perceived value as “the trade-offs between costs and benefits and arises from both quality and price”.

Although the definitions of customer perceived value are divergent, these definitions have some common points. Customer perceived value is always associated
with the use of certain products or services. The extent of value as perceived by
customers is determined by customers’ perceptions and not by the suppliers’
assumptions or intentions (Bhattacharya and Singh, 2008; Wang et al., 2004). The
extent of value as perceived by customers typically involves a trade-off between what
customers receive, such as quality and utilities, and the costs incurred by customers,
such as money, effort, and time (Wang et al., 2004).

A number of empirical studies in service settings have revealed that a positive,
causal relationship exists between service quality and customer perceived value
(Lai et al., 2009; Lim et al., 2006; Wang et al., 2004). Lai et al. (2009) and Wang et al.
(2004) empirically demonstrate that favourable customer perceived quality has a
positive impact on customer perceived value in the Chinese mobile communications
market. Therefore, the following hypothesis is formulated:

\( H7. \) Higher perceptions of service quality positively affect customer perceived
value.

Customer satisfaction
Rust and Oliver (1994, p. 2) define customer satisfaction as “a summary cognitive and
affective reaction to a service incident” that results from the comparison of customers’
perceptions of service quality with their expectations of service performance. Customer
satisfaction is at the centre of a chain of relationships that connects the antecedents of
customer satisfaction including perceived quality, perceived value, and customer
expectations, with the consequence of customer satisfaction including complaints and
loyalty (Fornell et al., 1996). Cronin et al. (2000), Clemes et al. (2007) and Dagger et al.
(2007) demonstrate that a high level of customer satisfaction results from a high level
of perceived service quality.

Kim et al. (2004) examine the relationship that exists between customer perceived
service quality and customer satisfaction in the Korean mobile communications
market and report that customer perceived service quality has a positive impact on
customer satisfaction. Similarly, Wang et al. (2004) examine the Chinese mobile
communications market and demonstrate that customer perceived service quality
positively impacts on customer satisfaction. Therefore, the following hypothesis is
formulated:

\( H8. \) Higher perceptions of service quality positively affect customer satisfaction.

Customer perceived value, like customer perceived quality, is an encounter specific
input to customer satisfaction (Rust and Oliver, 1994). Empirical evidence from
previous studies indicates that customer perceived value is one of the determinants of
customer satisfaction (Cronin et al., 2000; Lai et al., 2009). For example, Cronin et al.’s
(2000) findings reveal that customer perceived value is a significant predictor of
customer satisfaction in different service industries (e.g. health care, fast food, and
entertainment). Lai et al. (2009) and Wang et al. (2004) also report that the empirical
evidence supports the contention that customer perceived value positively contributes
to customer satisfaction in the mobile communications market. Therefore, the
following hypothesis is formulated:

\( H9. \) Higher customer perceived value positively affects customer satisfaction.
Corporate image
Barich and Kotler (1991) define corporate image as the sum of beliefs, attitudes, and impressions towards an organisation. Grönroos (1984) argues that corporate image is mainly determined by customers’ assessment of the services they receive. Nguyen and LeBlanc (1998, 2001) maintain that corporate image results from customers’ overall consumption experiences. The authors identify the physical and behavioural attributes of the organisation that are related to corporate image, such as organisation name, architecture, and the variety of products/services. Nguyen and LeBlanc (1998) also describe corporate image as a cumulative construct that is updated each time the customer consumes the service.

Corporate image is very important to service organisations, as corporate image serves as a filtering mechanism that has an influence on customers’ perceptions and customer satisfaction (Grönroos, 1984). Andreassen and Lindestad (1998) explain that corporate image is of vital importance to service organisations, because corporate image influences customers’ purchase decisions when customers have insufficient information about the service attributes. Grönroos (1984) suggests that both, technical quality, what the customers receive from the service experiences, and functional quality, the manner in which the services are delivered, contribute to the formation of customers' perceptions of corporate image. Aydin and Özer (2005) maintain that corporate image results from customers’ overall consumption experiences, and argue that service quality is a function of these consumption experiences. Thus, the authors suggest that customers’ perceptions of service quality should have a direct impact on the formation of customers’ perceptions of corporate image.

Empirical evidence from several marketing studies indicates that customer perceived quality has a positive impact on the formation of customers’ perceptions of corporate image (Aydin and Özer, 2005; Lai et al., 2009). For example, Aydin and Özer’s (2005) findings reveal that there is a positive causal relationship between service quality and corporate image in the Turkish mobile communications service market. Lai et al. (2009) empirically demonstrate that service quality has a significant positive effect on corporate image in the Chinese mobile communications market. Therefore, the following hypothesis is formulated:

**H10.** Higher perceptions of service quality positively affect corporate image.

Nguyen and LeBlanc (1998) argue that customers who perceive good service quality over repeated service encounters tend to have an overall favourable image of the firm. However, the authors’ point out that that customer satisfaction has no significant direct effect on corporate image. Therefore, a favourable corporate image does not necessarily result from a high level of customer satisfaction. Correspondingly, Andreassen and Lindestad (1998) maintain that when customers are satisfied with the services they receive their attitudes towards the organisation are improved. Subsequently, these attitudes influence these customers’ levels of satisfaction with the organisation. Thus, the authors claim that corporate image leads to a halo effect on customers’ satisfaction judgments.

Andreassen and Lindestad (1998) and Clemes et al. (2007) empirically identify the positive impact that corporate image has on customer satisfaction. Therefore, the following hypothesis is formulated:

**H11.** A higher corporate image positively affects customer satisfaction.
Perceived switching costs
Porter (1980) defines switching costs as “one time costs” that occur to customers when the customers switch from one service provider to another. Murray (1991) describes switching costs as potential losses perceived by customer when switching service providers, such as losses of a financial, performance-related, social, psychological, and safety-related nature. Caruana (2004) states that switching costs can be either monetary or nonmonetary, and real or perceived.

Lee et al. (2001, p. 41) suggest that switching costs, as perceived by customers in the mobile communications market, include:

(...) the costs in time and effort of seeking information on prices, benefits and service levels from the different providers, filling out forms, having the phone switched to a different provider and informing friends, relatives and business associates of the new telephone number.

However, the authors also argue that switching costs only become important when a few viable alternative service providers exist in the market, because customers cannot switch their service provider in a monopolistic market.

Kim et al. (2004) describe switching costs as the perceived risk when customers switch service providers. Sharma and Patterson (2000) explain that customers tend to perceive a high level of risk regarding a new service provider they have never used. Customers encounter risk when they prefer a rival service provider, because the customers cannot evaluate service quality delivered by the preferred service provider before actual purchasing. Aydin and Özer (2005) argue that when customers perceive a high level of service quality from their current service providers the customers’ perceptions of switching costs are likely to be high. The authors also report that the empirical evidence supports the notion that service quality contributes positively to customer perceived switching costs in the Turkish mobile communications market. Therefore, the following hypothesis is formulated:

H12. Higher perceptions of service quality positively affect perceived switching costs.

Customer loyalty
Oliver (1997, p. 233) defines customer loyalty as:

(....) a deeply held commitment to rebuy or repatronize a preferred product/service consistently in the future, thereby causing repetitive same-brand or same brand-set purchasing, despite situational influences and marketing efforts having the potential to cause switching behaviour.

Kim et al. (2004) describe customer loyalty as a combination of customers’ favourable attitudes and the behaviour of repurchase. Aydin and Özer (2005) suggest that customer loyalty is characterised by repurchase intention, a resistance to switching to a competitor’s product/service that is superior to the preferred vendor’s product/service, and a willingness to recommend a preferred vendor’s product/service to friends and associates.

Customer loyalty is important to service organisations, because the construct closely relates to a service organisation’s continued survival and future growth (Kim et al., 2004). In a mature and highly competitive market, maintaining a high level of customer
loyalty among existing customers is more important than inducing potential customers to expand the size of the overall market (Lee and Cunningham, 2001).

Anderson and Srinivasan (2003) argue that if customer perceived value is low, customers tend to switch to a competitor’s product/service in order to increase perceived value, thus low customer loyalty occurs. Customer perceived value has been empirically demonstrated as having a positive impact on customer loyalty in service settings such as electronic commerce (Yang and Peterson, 2004), retailing (Sirdeshmukh et al., 2002), and telephone (Bolton and Drew, 1991). Lin and Wang’s (2006) findings indicate that customer perceived value positively contributes to customer loyalty in the context of mobile commerce in Taiwan. Therefore, the following hypothesis is formulated:


Marketing academics generally agree that satisfied customers tend to have a higher usage level of a product/service (Bolton and Lemon, 1999), a stronger repurchase intention, and a higher level of willingness to recommend the product/service to their friends and associates than customers who are dissatisfied (Aydin and Özer, 2005). Anderson and Srinivasan (2003, p. 125) explain that “a dissatisfied customer is more likely to search for information on alternatives and more likely to yield to competitor overtures than is a satisfied customer”.

Several marketing studies support the general notion that customer satisfaction is a predictor of customer loyalty (Cronin et al., 2000; Gerpott et al., 2001; Lin and Wang, 2006). Kim et al. (2004) explain that when customers experience a high level of satisfaction these customers tend to remain with their existing mobile communications service providers and maintain their subscriptions. The authors’ findings reveal that customer satisfaction has a positive impact on customer loyalty in the Korean mobile communications market. Lai et al. (2009) also empirically demonstrate that customer satisfaction is positively related to customer loyalty in the Chinese mobile communications market. Therefore, the following hypothesis is formulated:


Kandampully and Hu (2007) note that corporate image serves as an important factor that enhances customer loyalty. Dick and Basu (1994) explain that a customer’s favourable corporate image towards a service provider can lead to repeat patronage. Johnson et al. (2001) argue that corporate image, as an attitude, should directly influence customer behavioural intentions such as customer loyalty. This influence is present because attitudes are functionally related to behavioural intentions (Fishbein and Ajzen, 1975).

Andreassen and Lindestad’s (1998) findings reveal that there is a positive causal relationship between corporate image and customer loyalty in the Norwegian tourism industry. Nguyen and LeBlanc (1998, 2001) empirically demonstrate that corporate image positively affects customer loyalty in the financial and education service sectors, respectively. Therefore, the following hypothesis is formulated:

H15. A higher corporate image positively affects customer loyalty.

Fornell (1992) notes that switching costs play an important role and may make customers unwilling to change their current service providers, because switching costs
make it costly for customers to change their current service providers. The author also suggests that switching costs reduce customers’ sensitivity to price and the level of satisfaction and exhibit loyalty behaviour. Ruyter et al. (1998) suggest that customers of service industries that have relatively high switching costs tend to be more loyal when compared to the customers of service industries that have relatively low switching costs. Aydin and Özer (2005) note that markets with high switching costs are generally characterized by consumer lock-in, observing that consumers repeatedly purchase the same brand, even after competing brands become cheaper. The authors also find empirical support for the positive effect of high perceived switching costs on customer loyalty in the Turkish mobile communications market. Therefore, the following hypothesis is formulated:


The conceptual research model (Figure 1) is based on the hierarchical models introduced by Brady and Cronin (2001) and Dabholkar et al. (1996) to conceptualize service quality and developed into more comprehensive hierarchical models (including the higher order constructs) by Clemes et al. (2007) and Dagger et al. (2007).

**Conceptual research model**

**Research design and methods**

The questionnaire used in this research was designed following an extensive review of the literature and the information obtained from focus group interviews. Prior to conducting the survey, a pre-test was conducted in order to improve face validity and content validity of the initial version of the survey instrument. The assessment of face and content validity for the initial version of the survey instrument was performed using a two-step process. The first step involved asking three service marketing experts and two industry experts to review the instrument and ensure the items were an adequate and thorough representation of the constructs under investigation. The second step involved selecting a small representative group to review the survey questions. A convenience sample was drawn from 30 customers of Chinese mobile communication services. Respondents to the pre-test were encouraged to make comments and suggestions on any question items that they thought were ambiguous or difficult to answer. Minor modifications of the questionnaire, such as clarifying sentences and using appropriate words and question order, were made after the pre-test was completed. All items in the questionnaire used a standard seven-point Likert-type scale ranging from strongly disagree (1) to strongly agree (7). The Appendix presents a summary of the items.

The research sample was drawn from the customers of one of the largest mobile communications service providers in China. A face-to-face survey was conducted in a participating retail store of the service provider using a random sampling approach. Five hundred and twenty three questionnaires were distributed and returned. Seven of the questionnaires were excluded, as they were incomplete or not suitable for use, resulting in a total of 516 useable responses.

The data collected from the survey was analysed using the programs: SPSS 15 and LISREL 8.7. Prior to data analysis, the total sample was randomly divided into two sub-samples of equal size: Samples 1 and 2. A two-stage process was used in order to perform the data analysis. The first stage involved performing the exploratory factor
analyses on Sample 1 to identify the underlying factors that represented the sub-dimensions of service quality. Structural equation modelling was conducted in the second step. First, confirmatory factor analyses were performed on Sample 2 to validate the measurement models developed, and to reassess the results of the exploratory factor analyses. The second process involved developing and estimating a structural equation model on Sample 2 to test the hypotheses on the relationships between service quality, customer satisfaction, customer perceived value, corporate image, perceived switching costs, and customer loyalty.

Figure 1. Conceptual research model
Data analysis and results

Exploratory factor analyses

The exploratory factor analyses were undertaken using a principal component factor analysis approach with the VARIMAX orthogonal rotation. Items that had significant loadings above ± 0.35 were retained in the analyses. Items that highly loaded on more than one factor were eliminated as suggested by Hair et al. (2006). The visual inspection of the anti-image correlation matrix showed that the majority of the partial correlations were low and the Kaiser-Meyer-Olkin measure of sampling adequacy index was 0.851 indicating the data set was appropriate for exploratory factor analysis (Field, 2009; Kaiser and Rice, 1974). The results of exploratory factor analysis for interaction quality indicated that three sub-dimensional factors for interaction quality should be extracted from 11 retained variable items: attitudes, behaviour, and expertise. The total variance explained by the three sub-dimensional factors is 67.80 per cent. The results of exploratory factor analysis for physical environment quality indicated that four sub-dimensional factors should be extracted from 15 retained variable items. Two items (Pha2 and Pha5) were removed from the analysis because of cross loadings. The sub-dimensions of physical environment quality are store atmosphere, physically appealing, customer convenience, and social factors. The total variance explained by the four sub-dimensional factors is 62.44 per cent. The results of exploratory factor analysis for outcome quality indicated that five sub-dimensional factors should be extracted from 15 retained variable items: network quality, billing system, waiting time, reliability, and privacy. The total variance explained by the five sub-dimensional factors is 74.80 per cent. The Cronbach’s $\alpha$ for 12 sub-dimensions range from 0.78 to 0.84, all above 0.70 (Nunnally and Bernstein, 1994), indicating that the measures for 12 sub-dimensions have adequate reliability. Table I presents a summary of the results of the exploratory factor analyses.

The results of the exploratory factor analyses

Confirmatory factor analyses

Nine confirmatory factor analysis models were developed and assessed in this research: five first-order confirmatory factor analysis models for interaction quality,
physical environment quality, outcome quality, service quality, and the six higher order constructs, and four second-order confirmatory factor analysis models for interaction quality, physical environment quality, outcome quality, and the six higher order constructs. Table II presents a summary of the results of the first-order confirmatory factor analysis models.

The model fit was evaluated using the normed $\chi^2/df$, the goodness-of-fit index (GFI), the standardized root mean residual (SRMR), the comparative fit index (CFI), the normed fit index (NFI), and the root mean square error of approximation (RMSEA). The model fit indices of all the five first-order confirmatory factor analysis models sufficiently meet the recommended fit criteria in the literature – that is $\chi^2/df < 3.00$, GFI $\geq 0.90$, SRMR $\leq 0.10$, CFI $\geq 0.90$, NFI $\geq 0.90$, and RMSEA $\leq 0.08$ (Hair et al., 2006; Kline, 2005), indicating a good model fit. The construct reliabilities of the first-order factors range from 0.77 to 0.86, above the recommended threshold of 0.70 (Hair et al., 2006), confirming that the measures for the first-order factors have adequate reliability. All standardized factor loadings are statistically significant ($p < 0.01$), and range from 0.69 to 0.90, above the recommended threshold of 0.60 (Bagozzi and Yi, 1988). The average variances extracted (AVEs) of the first-order factor range from 0.53 to 0.71, above the recommended threshold of 0.50 (Fornell and Larcker, 1981), confirming that the measures for the first-order factors have adequate convergent validity. The correlation coefficients of the first-order factors range from 0.45 to 0.83, below the recommended threshold of 0.85 (Kline, 2005), confirming that the measures for the first-order factors have adequate discriminant validity.

**The results of the first order confirmatory factor analysis**

Figures 2–5 summarize the results of the second-order confirmatory factor analysis models. The model fit indices of all the four second-order confirmatory factor analysis models sufficiently meet the recommended fit criteria, indicating a reasonable model fit. The standardized estimate results reveal the order of the sub-dimensions that are the strongest indicators of their pertaining primary dimensions.

**Interaction quality:**
- 1st expertise ($\lambda = 0.87$, $t$-value = 9.75, $p < 0.01$, $R^2 = 0.75$).
- 2nd attitudes ($\lambda = 0.82$, $t$-value = 10.29, $p < 0.01$, $R^2 = 0.67$).
- 3rd behaviour ($\lambda = 0.72$, $t$-value = 8.79, $p < 0.01$, $R^2 = 0.52$).

**Physical environment quality:**
- 1st physically appealing ($\lambda = 0.82$, $t$-value = 9.91, $p < 0.01$, $R^2 = 0.67$).
- 2nd store atmosphere ($\lambda = 0.80$, $t$-value = 10.63, $p < 0.01$, $R^2 = 0.65$).
- 3rd customer convenience ($\lambda = 0.79$, $t$-value = 10.13, $p < 0.01$, $R^2 = 0.63$).
- 4th social factors ($\lambda = 0.79$, $t$-value = 9.75, $p < 0.01$, $R^2 = 0.62$).

**Outcome quality:**
- 1st reliability ($\lambda = 0.78$, $t$-value = 10.53, $p < 0.01$, $R^2 = 0.61$).
- 2nd waiting time ($\lambda = 0.76$, $t$-value = 9.46, $p < 0.01$, $R^2 = 0.58$).
- 3rd network quality ($\lambda = 0.72$, $t$-value = 9.31, $p < 0.01$, $R^2 = 0.52$).
<table>
<thead>
<tr>
<th>Model</th>
<th>First-order factors</th>
<th>Factor loadings *</th>
<th>CR</th>
<th>AVE</th>
<th>Correlation coefficients</th>
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<tr>
<td>Interaction quality</td>
<td>Attitudes</td>
<td>0.71-0.78</td>
<td>0.84</td>
<td>0.56</td>
<td>0.59-0.72</td>
</tr>
<tr>
<td></td>
<td>Behaviour</td>
<td>0.72-0.80</td>
<td>0.85</td>
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<td>Expertise</td>
<td>0.71-0.79</td>
<td>0.80</td>
<td>0.56</td>
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<tr>
<td>Physical environment quality</td>
<td>Store atmosphere</td>
<td>0.69-0.82</td>
<td>0.86</td>
<td>0.55</td>
<td>0.62-0.66</td>
</tr>
<tr>
<td></td>
<td>Physically appealing</td>
<td>0.71-0.79</td>
<td>0.83</td>
<td>0.56</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Customer convenience</td>
<td>0.70-0.83</td>
<td>0.81</td>
<td>0.59</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Social factors</td>
<td>0.70-0.75</td>
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<td>0.53</td>
<td></td>
</tr>
<tr>
<td>Outcome quality</td>
<td>Network quality</td>
<td>0.72-0.80</td>
<td>0.81</td>
<td>0.59</td>
<td>0.45-0.65</td>
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<td>Billing system</td>
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<td></td>
<td>Waiting time</td>
<td>0.74-0.81</td>
<td>0.83</td>
<td>0.61</td>
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</tr>
<tr>
<td></td>
<td>Reliability</td>
<td>0.78-0.84</td>
<td>0.85</td>
<td>0.66</td>
<td></td>
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<tr>
<td></td>
<td>Privacy</td>
<td>0.73-0.86</td>
<td>0.84</td>
<td>0.64</td>
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<td>Service quality</td>
<td>Interaction quality</td>
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<td>0.82</td>
<td>0.69</td>
<td>0.62-0.71</td>
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<tr>
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<td>Physical environment quality</td>
<td>0.82-0.83</td>
<td>0.81</td>
<td>0.68</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Outcome quality</td>
<td>0.78-0.90</td>
<td>0.83</td>
<td>0.71</td>
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</tr>
<tr>
<td>Six higher order constructs</td>
<td>Service quality</td>
<td>0.71-0.78</td>
<td>0.80</td>
<td>0.57</td>
<td>0.65-0.83</td>
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<tr>
<td></td>
<td>Customer satisfaction</td>
<td>0.75-0.83</td>
<td>0.84</td>
<td>0.63</td>
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</tr>
<tr>
<td></td>
<td>Customer perceived value</td>
<td>0.79-0.82</td>
<td>0.85</td>
<td>0.65</td>
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<td></td>
<td>Corporate image</td>
<td>0.75-0.80</td>
<td>0.82</td>
<td>0.60</td>
<td></td>
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<td></td>
<td>Perceived switching costs</td>
<td>0.74-0.77</td>
<td>0.80</td>
<td>0.57</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Customer loyalty</td>
<td>0.77-0.79</td>
<td>0.82</td>
<td>0.61</td>
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<table>
<thead>
<tr>
<th>Model fit indices</th>
<th>$\chi^2$</th>
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<th>GFI</th>
<th>SRMR</th>
<th>CFI</th>
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<tr>
<td>Interaction quality</td>
<td>105.30</td>
<td>41</td>
<td>2.56</td>
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<td>0.047</td>
<td>0.98</td>
<td>0.96</td>
<td>0.078</td>
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<tr>
<td>Physical environment quality</td>
<td>171.98</td>
<td>84</td>
<td>2.05</td>
<td>0.92</td>
<td>0.044</td>
<td>0.98</td>
<td>0.96</td>
<td>0.064</td>
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<tr>
<td>Outcome quality</td>
<td>124.09</td>
<td>80</td>
<td>1.55</td>
<td>0.94</td>
<td>0.041</td>
<td>0.99</td>
<td>0.97</td>
<td>0.046</td>
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<tr>
<td>Service quality</td>
<td>613</td>
<td>6</td>
<td>1.02</td>
<td>0.99</td>
<td>0.013</td>
<td>1.00</td>
<td>0.99</td>
<td>0.009</td>
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<tr>
<td>Six higher order constructs</td>
<td>171.67</td>
<td>120</td>
<td>1.43</td>
<td>0.93</td>
<td>0.033</td>
<td>0.99</td>
<td>0.98</td>
<td>0.041</td>
</tr>
</tbody>
</table>

**Note:** *Standardized factor loadings are significant ($p < 0.01$)
Figure 2. Second-order confirmatory factor analysis model for interaction quality

Notes: *Standardized factor loadings are significant (p < 0.01); ( ) t-value; Att – attitudes; Beh – behaviour; Exp – expertise

Figure 3. Second-order confirmatory factor analysis model for physical environment quality

Notes: *Standardized factor loadings are significant (p < 0.01); ( ) t-value; Sta – store atmosphere; Pha – physically appealing; Cuc – customer convenience; Sof – social factors
Figure 4. Second-order confirmatory factor analysis model for outcome quality

<table>
<thead>
<tr>
<th>Variable</th>
<th>Standardized Estimate $\lambda$</th>
<th>$R^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neq</td>
<td>0.72 (9.31)*</td>
<td>0.52</td>
</tr>
<tr>
<td>Bis</td>
<td>0.67 (8.55)*</td>
<td>0.45</td>
</tr>
<tr>
<td>Wat</td>
<td>0.76 (9.46)*</td>
<td>0.58</td>
</tr>
<tr>
<td>Rel</td>
<td>0.78 (10.53)*</td>
<td>0.61</td>
</tr>
<tr>
<td>Pri</td>
<td>0.63 (8.38)*</td>
<td>0.40</td>
</tr>
</tbody>
</table>

Notes: *Standardized factor loadings are significant ($p < 0.01$); (   ) $t$-value; Neq – network quality; Bis – billing system; Wat – waiting time; Rel – reliability; Pri – privacy

Figure 5. Second-order confirmatory factor analysis model for service quality

<table>
<thead>
<tr>
<th>Variable</th>
<th>Standardized Estimate $\lambda$</th>
<th>$R^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>IQ</td>
<td>0.85 (12.28)*</td>
<td>0.72</td>
</tr>
<tr>
<td>PEQ</td>
<td>0.83 (10.79)*</td>
<td>0.69</td>
</tr>
<tr>
<td>OQ</td>
<td>0.74 (10.59)*</td>
<td>0.55</td>
</tr>
</tbody>
</table>

Notes: *Standardized factor loadings are significant ($p < 0.01$); (   ) $t$-value; IQ – interaction quality; PEQ – physical environment quality; OQ – outcome quality
• 4th billing system ($\lambda = 0.67, t$-value $= 8.55, p < 0.01, R^2 = 0.45$).
• 5th privacy ($\lambda = 0.63, t$-value $= 8.38, p < 0.01, R^2 = 0.40$).

Interaction quality ($\lambda = 0.85, t$-value $= 12.28, p < 0.01, R^2 = 0.72$) is the strongest indicator of service quality, followed by physical environment quality ($\lambda = 0.83, t$-value $= 10.79, p < 0.01, R^2 = 0.69$), and outcome quality ($\lambda = 0.74, t$-value $= 10.59, p < 0.01, R^2 = 0.55$). These results support $H1$-$H6$.

**Structural equation model**

The structural equation model shown in Figure 6 was designed to test the relationships between service quality, customer satisfaction, customer perceived value, corporate image, perceived switching costs, and customer loyalty. Table III summarizes the results of the structural equation model.

Service quality, customer perceived value, and corporate image explain 78 per cent of the variance of customer satisfaction. The most significant determinant of customer satisfaction is service quality ($\lambda = 0.62, t$-value $= 4.05, p < 0.01$), followed by customer perceived value ($\lambda = 0.23, t$-value $= 2.35, p < 0.01$). The total causal effect of corporate image on customer satisfaction is 0.09 ($t$-value $= 0.84$), which is not statistically significant. Service quality explains 61 per cent of the variance of customer perceived value, 63 per cent of the variance of corporate image, and 61 per cent of the variance of perceived switching costs. Service quality has a significant total causal effect of 0.78 ($t$-value $= 9.68, p < 0.01$) on customer perceived value, a significant total causal effect of 0.80 ($t$-value $= 9.88, p < 0.01$) on corporate image, and a significant total causal effect of 0.78 ($t$-value $= 9.47, p < 0.01$) on perceived switching costs. Customer satisfaction, customer perceived value, corporate image, and perceived switching costs explain 74 per cent of variance of customer loyalty. The most significant determinant of customer loyalty is customer satisfaction ($\lambda = 0.37, t$-value $= 3.03, p < 0.01$), followed by perceived switching costs ($\lambda = 0.29, t$-value $= 3.40, p < 0.01$) and corporate image ($\lambda = 0.24, t$-value $= 2.73, p < 0.01$). The total causal effect of customer perceived value on customer loyalty is 0.07 ($t$-value $= 0.78$), which is not statistically significant. Therefore, $H7$-$H10$, $H12$, and $H14$-$H16$ are supported. $H11$ and $H13$ are not supported.

**Discussion and implications**

**Primary dimensions**

The results of this research empirically demonstrate that there are significant positive relationships between the three primary dimensions (interaction quality, physical environment quality, and outcome quality) and customers’ overall perceptions of service quality, indicating that customers evaluate their overall perceptions of service quality by assessing the three primary dimensions. Moreover, in measuring customers’ overall perceptions of service quality for mobile communication services, interaction quality is the most important indicator, followed by physical environment quality, and outcome quality.

The results provide empirical evidence that the interpersonal interactions occurring during the service delivery often have the greatest effect on customers’ perceptions of service quality (Bitner et al., 1994; Hartline and Ferrell, 1996). These results suggest that mobile communications service providers should not only concentrate on
Figure 6.
Structural equation model

Notes: CI – corporate image; CL – customer loyalty; CPV – customer perceived value; CS – customer satisfaction; PSC – perceived switching costs; SQ – service quality
<table>
<thead>
<tr>
<th>Outcome</th>
<th>Determinant</th>
<th>Causal effect $\lambda$ (t-value)</th>
<th>Hypothesis</th>
<th>Assessment</th>
<th>Notes</th>
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<tr>
<td>CS ($R^2 = 0.78$)</td>
<td>SQ</td>
<td>0.62* (4.05)</td>
<td>$H_8$</td>
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</tr>
<tr>
<td></td>
<td>CPV</td>
<td>0.23* (2.35)</td>
<td>$H_9$</td>
<td>Supported</td>
<td></td>
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<tr>
<td></td>
<td>CI</td>
<td>0.09 (0.84)</td>
<td>$H_{11}$</td>
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<tr>
<td>CPV ($R^2 = 0.61$)</td>
<td>SQ</td>
<td>0.78* (0.68)</td>
<td>$H_7$</td>
<td>Supported</td>
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</tr>
<tr>
<td>CI ($R^2 = 0.63$)</td>
<td>SQ</td>
<td>0.80* (0.88)</td>
<td>$H_{10}$</td>
<td>Supported</td>
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<tr>
<td>PSC ($R^2 = 0.61$)</td>
<td>SQ</td>
<td>0.78* (0.47)</td>
<td>$H_{12}$</td>
<td>Supported</td>
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<tr>
<td>CL ($R^2 = 0.74$)</td>
<td>CPV</td>
<td>0.07 (0.78)</td>
<td>$H_{13}$</td>
<td>Not supported</td>
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<tr>
<td></td>
<td>CS</td>
<td>0.37* (3.03)</td>
<td>$H_{14}$</td>
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</tr>
<tr>
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<td>CI</td>
<td>0.24* (2.73)</td>
<td>$H_{15}$</td>
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<tr>
<td></td>
<td>PSC</td>
<td>0.29* (3.40)</td>
<td>$H_{16}$</td>
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<td></td>
<td>198.34</td>
<td>125</td>
<td>1.59</td>
<td>0.92</td>
<td>0.040</td>
<td>0.99</td>
<td>0.98</td>
<td>0.048</td>
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</table>

**Notes:** *Standardized loading estimates are significant ($p < 0.01$); ( ) t-value; CI – corporate image; CL – customer loyalty; CPV – customer perceived value; CS – customer satisfaction; PSC – perceived switching costs; SQ – service quality
improving their service quality through massive investments in network extensions and network improvements, but also focus on delivering superior services using well-trained and professional employees.

**Interaction quality**

Expertise, attitudes, and behaviour are the three sub-dimensions of interaction quality. The expertise sub-dimension is the most important indicator in measuring customers’ perceptions of interaction quality. Vaerenbergh *et al.* (2012) note that customers are sensitive to how competently service providers deal with problems and customer complaints. Grönroos (1990) and Grönroos and Ravald (2011) maintain that the skills of employees are important for customers to be able to perceive and evaluate service quality and to co-create value. The next most important predictor of interaction quality is attitude. Czepiel *et al.* (1985) note that the attitude of employees, such as friendliness, politeness, courtesy, and patience, significantly influence customers’ service quality perceptions. Grönroos (1990) maintains that customers carefully consider employees’ attitudes when forming their service quality perceptions. Behaviour is also significantly predictive of interaction quality. Winsted (2000) empirically demonstrates the importance of employee behaviour when customers’ evaluate services. The focus group participants in this study indicated that they were not willing to tolerate the bad behaviour of employees in the mobile communications service market.

**Physical environment quality**

Physically appealing, store atmosphere, customer convenience, and social factors are the sub-dimensions of physical environment quality. The physically appealing sub-dimension is the most important indicator in measuring customers’ perceptions of physical environment quality. Several researchers suggest that customers rely on extrinsic cues such as the presence of certain physical evidence to form and assess their service quality perceptions (Ariffin and Aziz, 2008; Choudhury, 2008). The importance of extrinsic cues to customers’ perceptions of service quality was also supported in the earlier studies by Bitner (1990) and Dabholkar *et al.* (1996). Store atmosphere is the next most important indicator of physical environment quality. Bitner (1992) suggests that non-visual aspects of the service environment such as temperature, lighting, noise, and scent can significantly impact on customers’ service quality perceptions. Customer convenience is the third most important predictor of physical environment quality. Parasuraman *et al.* (1985) explain that approachability and ease of contact, such as convenient operating hours and locations, significantly influence customers’ service quality perceptions. Ko and Pastore (2005) and Martínez Caro and Martínez García (2007) maintain the importance of the convenience factor to customers’ service quality perceptions. The fourth most important indicator of physical environment quality is social factors. The influences that other customers may have upon a customer’s service experiences have been noted by several researchers (Grove and Fisk, 1997; Lovelock, 1996). Lovelock (1996) argues that, sometimes, it is necessary for service providers to act as a “police officer” in order to ensure proper behaviour among their customers.

**Outcome quality**

Reliability, waiting time, network quality, billing system, and privacy are five sub-dimensions of outcome quality. The reliability sub-dimension is the most
important indicator in measuring customers’ perceptions of outcome quality. Parasuraman et al. (1988, p. 23) define reliability as “ability to perform the promised service dependably and accurately.” Dabholkar et al. (1996) consider reliability in a retail context as a combination of keeping promises and “doing it right”. The importance of the reliability factor to customers’ perceptions of service quality has been consistently supported in the service marketing literature (Cronin and Taylor, 1992; Dabholkar et al., 1996; Parasuraman et al., 1994; Parasuraman et al., 1988). Waiting time is the second most important predictor of outcome quality. The uncertainty involved in waiting can result in unpleasant customers as timeliness is an important component of service quality (LeBlanc, 1992). Taylor and Claxton (1994) and Katz et al. (1991) provide empirical evidence for the contention that customers’ waiting experiences can significantly affect their evaluation of overall service experiences. Network quality is the third most important predictor of outcome quality. Wang et al. (2004) explain that the network quality factor can significantly influence customers’ quality perceptions of mobile communication services. Kim et al. (2004) argue that the importance of call quality to customers’ quality perceptions of mobile communication services has not changed, despite the fact that mobile communication service providers have been continually improving call quality over the past several years. Negi (2009) maintains that the network aspects, such as transmission quality and network coverage, can significantly drive customers’ perceptions of mobile communications service quality. Billing system is the fourth most important sub-dimension. Lee et al. (2001) identify that customers believe that the precision of the billing service is one of the most important service performance attributes. Pezeshki et al.’s (2009) results indicate that ensuring the accuracy of billing is one of the major weaknesses in the mobile telecommunication industry and errors lead to customer dissatisfaction.

Higher order constructs
In response to the call for more investigations into the complex relationships among important service marketing constructs, this study examines the relationships among service quality, customer satisfaction, customer perceived value, corporate image, perceived switching costs, and customer loyalty in the mobile communications market. The results of this study indicate that service quality and customer perceived value are important determinants of customer satisfaction. However, service quality is a more important determinant of customer satisfaction than customer perceived value. Fornell et al. (1996, p. 7), empirically demonstrate that “customer satisfaction is more quality-driven than value- or price-driven”.

The results of this study also indicate that a higher corporate image has a positive effect on customer satisfaction. However, this effect is not statistically significant. Surprisingly, corporate image is not an important determinant of customer satisfaction in the Chinese mobile communications market. A customer may have a favourable image towards a mobile communications service provider. However, this does not necessarily mean that the customer is satisfied with the services provided by the
mobile communications service provider. Though corporate image is not an important determinant of customer satisfaction, it is a key driver of customer loyalty. Therefore, creating a favourable corporate image among customers is still important for mobile communications service providers to keep customers engaged.

Customer satisfaction is the most important determinant of customer loyalty, followed by perceived switching costs, and corporate image in this study. However, the positive effect of customer perceived value on customer loyalty is not statistically significant indicating that customer perceived value is not a key driver of customer loyalty. A plausible reason for this result is that the Chinese mobile communications service providers have regularly used price reductions as an important part of their strategic marketing to retain customers and attract new customers. If this is a common strategy among providers, the tactic may result in a lower variation of market prices than expected during the price reduction stage of the cycle. Customers may perceive a similar level of value, regardless of which company provides their mobile communications services. Higher customer perceived value does have a significant positive impact on customer satisfaction, which in turn, positively impacts on customer loyalty.

Comprehensive hierarchical modelling
This study presents a thorough evaluation of customers’ perceptions of service quality in the mobile communications market through developing and testing a comprehensive hierarchical model. The conceptualisation and the measurement of customers’ perceptions of service quality are controversial in the domain of the services marketing literature. However, the results of this study support the use of a hierarchical approach for conceptualising and measuring mobile communication customers’ perceptions of service quality.

In today’s worldwide competitive mobile communications market, mobile communications service providers must retain their customers through superior service performance. This study provides a framework that enables mobile communications service providers to identify and assess the dimensions underlying customers’ perceptions of service quality. From a managerial perspective, mobile communication companies can use the framework and/or the dimensions of service quality identified in this study in their strategic management. For example, given the importance of the interaction quality dimension to customers’ perceptions of overall service quality, managers should constantly educate, train, and empower their employees, hire employees who have positive attitudes towards customers, and ensure that their employees behave with respect, care, and concern towards customers.

Moreover, according to the comparative importance of the dimensions, managers of mobile communication companies can allocate different importance weights to the dimensions and efficiently use their limited resources (e.g. human resources and financial resources) accordingly. Network quality and billing system are important dimensions underlying customers’ perceptions of service quality in the Chinese mobile communications market. The customers sampled in this study perceived the network quality dimension as a more important service quality dimension than the billing system dimension. Therefore, managers of mobile communications companies may want to allocate more resources to improve network quality than to update their billing systems.
Further, the findings of this study provide valuable information regarding the relationships among service quality, customer satisfaction, customer perceived value, corporate image, perceived switching costs, and customer loyalty for marketers and practitioners who are already operating in, or preparing to enter, the mobile communications market. The comprehensive hierarchical model should assist mobile communications service providers in developing and implementing successful marketing strategies. For example, discount offers or free rewards may increase customer perceived value, however they may not necessarily have a favourable impact on customer loyalty. Increasing customer perceived value through improved service performance may increase customer satisfaction, which in turn, leads to improved customer loyalty and customer retention. Similarly, strategies that enhance corporate image may not increase customer satisfaction, but they may improve customer loyalty. This is particular the case in the Chinese mobile communications market.

Limitations and directions for future research
The sample in this research, although randomly drawn from the subscribers of one of the largest mobile communications service providers in China, does not fully represent all customers in the Chinese mobile communications market.

This study sought to identify all the factors that impact on customers’ perceptions of service quality in the mobile communications market. However, there may be some unrevealed factors influencing customers’ perceptions of service quality. Future researchers should seek to identify these factors. In addition, although this study examined the relationships among service quality, customer perceived value, customer satisfaction, corporate image, perceived switching costs, and customer loyalty, there are some potential relationships that are omitted from the structural model. For example, researchers have suggested that customer perceived value has a moderating effect on the relationship between service quality and customer satisfaction (Caruana et al., 2000; Wang et al., 2004), and perceived switching costs have a moderating effect on the relationship between customer satisfaction and customer loyalty (Aydin et al., 2005; Lee et al., 2001). These relationships were not explored in this study.

Moreover, future researchers may use the current study as a framework to test if the hierarchical modelling approach for conceptualising and measuring customers’ perceptions of service quality and the relationships among the six important marketing constructs is applicable in other industry or cultural settings.

References


Further reading


Appendix. Scale items

**Attitudes**

*Att1.* Employees are friendly.

*Att2.* Employees are polite.

*Att3.* Employees are courteous.

*Att4.* Employees are patient.

**Behaviour**

*Beh1.* Employees are willing to provide me with advice and assistance.

*Beh2.* Employees always give prompt service.

*Beh3.* Employees care about my concerns.

*Beh4.* Employees use the appropriate body language when they interact with me.

**Expertise**

*Exp1.* Employees are skilled workers and solve my problems.

*Exp2.* Employees are knowledgeable when answering my questions.

*Exp3.* Employees are professional and well trained.

**Store atmosphere**

*Sta1.* Temperature is comfortable.

*Sta2.* Noise level is reasonable.

*Sta3.* Air circulation is good.

*Sta4.* Space is adequate.

*Sta5.* Lighting is appropriate.

**Physically appealing**

*Pha1.* Materials such as handbooks or brochures associated with the mobile services are visually appealing and easy to access.

*Pha2.* Employees are well dressed and neat in appearance.

*Pha3.* Stores are well decorated.

*Pha4.* Goods such as mobile phones are visually appealing and easy to sample.
Pha5. There are sufficient counters with clear signs that direct customers. So they can access different services.

Pha6. Stores are clean.

Customer convenience

Cuc1. Stores have operating hours and locations that are convenient for all of their customers.

Cuc2. Stores have convenient car parking for their customers.

Cuc3. Stores provide adequate physical facilities such as seating or rest rooms for all their customers.

Social factors

Sof1. The attitudes of other customers do not disturb me in the stores.

Sof2. The behaviour of other customers does not disturb me in the stores.

Sof3. I am not disturbed when other customers interact with the employees in the stores.

Network quality

Neq1. The other person’s voice is loud and clear.

Neq2. The network coverage is good.

Neq3. The call quality is always good.

Billing system

Bis1. The service provider provides accurate billing.

Bis2. The invoice is clear and easy to understand.

Bis3. Payment of the invoice is convenient (e.g. cash, credit card, bank transfer).

Waiting time

Wat1. Problems such as poor network quality or customer complaints are solved quickly with simple procedures.

Wat2. The service provider always responds promptly to my requests.

Wat3. The service provider knows that waiting time is important to me.

Reliability

Rel1. The service provider fulfils its customer commitments.

Rel2. The service provider continually delivers its services at the times it promises to do so.

Rel3. The service provider guarantee is excellent.

Privacy

Pri1. No one can check my personal information that is associated with the service provider’s services except me.
Pri2. The service provider does protect my private information.
Pri3. The service provider knows that my privacy is important to me.

Interaction quality
IQ1. Employees deliver superior services.
IQ2. Overall, the quality of the interaction with employees is excellent.

Physical environment quality
PEQ1. I feel comfortable with the physical environment of stores.
PEQ2. Overall, the physical environment of the stores is excellent.

Outcome quality
OQ1. It is always a good experience to use the services of the service provider.
OQ2. Overall, I receive the desired outcome by using the services of the service provider.

Service quality
SQ1. The service provider delivers superior services in every way.
SQ2. The service provider consistently provides high quality service products.
SQ3. Overall, the service quality is excellent.

Customer satisfaction
CS1. My choice to be a subscriber of the service provider is a wise one.
CS2. I feel delighted with the services and goods delivered by the service provider.
CS3. Overall, the service provider provides a very satisfying experience.

Customer perceived value
CPV1. The services that I receive from the service provider provide value for money.
CPV2. Compared to what I have to give up, such as money, time, energy, and effort, the services that I receive from the service provider are excellent.
CPV3. Overall, I feel the service provider’s services and goods are valuable.

Corporate image
CI1. I have always had a good impression of the service provider.
CI2. In my opinion, the service provider has a good image in the minds of consumers.
CI3. Overall, I consider that the service provider has a positive image in the marketplace.

Perceived switching costs
PSC1. If I switch to a new service provider, I will be concerned that the services offered by the new service provider may not work as well as my current service provider.
PSC2. I want to remain as a subscriber of the servicer provider rather than switch to a new service provider when I consider money, time, energy, effort, and relations.

PSC3. Overall, it is not worthwhile to switch to a new service provider.

Customer loyalty

CL1. I intend to repurchase the services of the service provider.

CL2. I will recommend the service provider to others.

CL3. Overall, given the other choices of the service provider, I will remain as a subscriber of the servicer provider.

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