A Hierarchical Model of the Chinese Mobile Communications Market: An Empirical Analysis

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As one of the most important service markets in China, the Chinese mobile communications market has been neglected by most prior studies (Lai et al., 2007). Despite a few recent studies, several researchers suggest that developing a much deeper insight into the marketing constructs such as service quality, customer perceived value, corporate image, and customer loyalty is of vital importance to the Chinese mobile communications market (Lai et al., 2009; Lai et al., 2007; Wang et al., 2004).

This study presents a comprehensive evaluation of customers' perceptions of service quality in the Chinese mobile communications market through developing and estimating a hierarchical and multidimensional model. The conceptualisation and the measurement of customers' perceptions of service quality have given rise to much controversy in the domain of the service marketing literature. However, the results of this study support the use of a hierarchical and multidimensional approach for conceptualising and measuring customers' perceptions of service quality, similar to the models developed by Brady and Cronin (2001), and Dabholkar et al. (1996).

In response to the call for more investigations into the complex relationships between important service marketing constructs (Adyin and Ozer, 2005; Wang et al., 2004; Caruana, Money, and Berthon, 2000; Nguyen and LeBlanc, 1998; Cronin and Taylor, 1992), this study examines the relationships between Service Quality, Customer Satisfaction, Customer Perceived Value, Corporate Image, Perceived Switching

Costs, and Customer Loyalty in the Chinese mobile communications market. The findings indicate that Service Quality is an important determinant of Customer Perceived Value, Customer Satisfaction, Corporate Image, and Perceived Switching Costs. Customer Perceived Value is an antecedent of Customer Satisfaction. Corporate Image, Customer Satisfaction, and Perceived Switching Costs are three key drivers of Customer Loyalty.

Keywords: Mobile Communication Services, Hierarchical and Multidimensional Model, Service Quality, Higher Order Constructs, Customer Loyalty, China

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Chapter 1

Introduction

1.1 Problem Setting

Marketing researchers continually study the complex relationships that exist in service industries among important service marketing constructs, such as service quality, customer satisfaction, customer perceived value, corporate image, perceived switching costs, and customer loyalty (e.g. Caruana, 2004; Cronin, Brady, and Huit, 2000; Fornell, Johnson, Anderson, Cha and Bryant, 1996; Fornell, 1992). These researchers have endeavoured to provide a theoretical framework, supported by empirical evidence, to improve the understanding of the complex relationships that exist among these service marketing constructs.

Many general suggestions have been made in previous studies about the relationships that exist among the service marketing constructs. However, these studies have been rather fragmented in examining the exact nature of the relationships, e.g. the complicated interrelationships among service quality, customer value, and customer satisfaction (Wang, Lo, and Yang, 2004). Therefore, several marketing academics suggest that new studies are required to investigate the relationships that exist among the service marketing constructs in global service industries (e.g. Adyin and Ozer, 2005; Caruana, Money, and Berthon, 2000; Nguyen and LeBlanc, 1998; Cronin and Taylor, 1992).

Since the 1990s, the booming growth of the global mobile communications market has made it an industry that has attracted the interests of several marketing academics and practitioners. Researchers have studied aspects of the mobile communications markets in China (Lai, Griffin, and Babin, 2009; Lu, Zhang, and Wang, 2009; Lai, Hutchinson, Li and Bai, 2007; Wang et al., 2004), France (Lee, Lee and Feick, 2001), Germany (Gerpott, Rams, and Schindler, 2001), Hong Kong (Woo and Fock, 1999), South Korea (Kim, Park and Jeong, 2004), Taiwan (Chi, Yeh, and Jang, 2008), the United States (Lim, Widdows and Park, 2006), and Turkey (Aydin and Özer, 2005) respectively. In particular, China has been the focus of a few recent studies as China has the world's largest and fastest-growing mobile communications market (Nie and

Zeng, 2003). However, as one of the most important service markets in China, the Chinese mobile communications market has been neglected by most prior studies (Lai et al., 2007). Thus, despite a few recent studies, several researchers suggest that developing a much deeper insight into the marketing constructs such as service quality, customer perceived value, corporate image, and customer loyalty is of vital importance to the Chinese mobile communications market (Lai et al., 2009; Lai et al., 2007; Wang et al., 2004).

The following sections begin with a review of the global mobile communications market, and a discussion of the Chinese mobile communications market. The research gaps and the objectives of the study are then stated, and finally, the contributions that this study will make to the service marketing literature are discussed.

1.2 The Global Mobile Communications Market

Since the 1990s, the worldwide growth in mobile communications market has been remarkable. For example, the number of mobile phone subscribers grew dramatically between 1991 and 2004 (See Table 1.1). In 2002, the worldwide number of mobile phone subscribers estimated by the International Telecommunication Union (ITU) was approximately 1.2 billion. This number of subscribers was more than the worldwide number of fixed telephones, estimated at approximately 1.1 billion in 2002 (ITU, 2004a).

Table 1.1 Number of Mobile Phone Subscribers Worldwide between 1991 and 2004

	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Mobile Phone Subscribers (Millions)	16	23	34	56	91	145	215	318	490	740	955	1,166	1,414	1,758

Source: International Telecommunication Union (2004a)

In 2005, the International Telecommunication Union (ITU, 2005) estimated that the worldwide number mobile phone subscribers had reached 2.2 billion. More recently, in 2008, the worldwide number mobile phone subscriber had reached 4 billion, (ITU, 2008).

The dramatic growth in the worldwide mobile communications market also results in increased competition and an increase in the number of mobile communications network operators. These mobile communications network operators primarily compete with each other by delivering mobile phone services at lower prices and/or improving service quality. These operating strategies, in turn, benefit mobile phone subscribers around the world (Banerjee and Ros, 2004).

1.3 The Chinese Mobile Communications Market

The Chinese mobile communications market has grown immensely since mobile phone services were first introduced in China in 1987. By 1997, the number of mobile phone subscribers in China had reached 10 million. At the end of April 2006, the number of mobile phone subscribers in China was 416 million and still increasing (China Daily, 2006). More recently, in 2008, the number of mobile phone subscribers in China had reached 641 million (ITU, 2008).

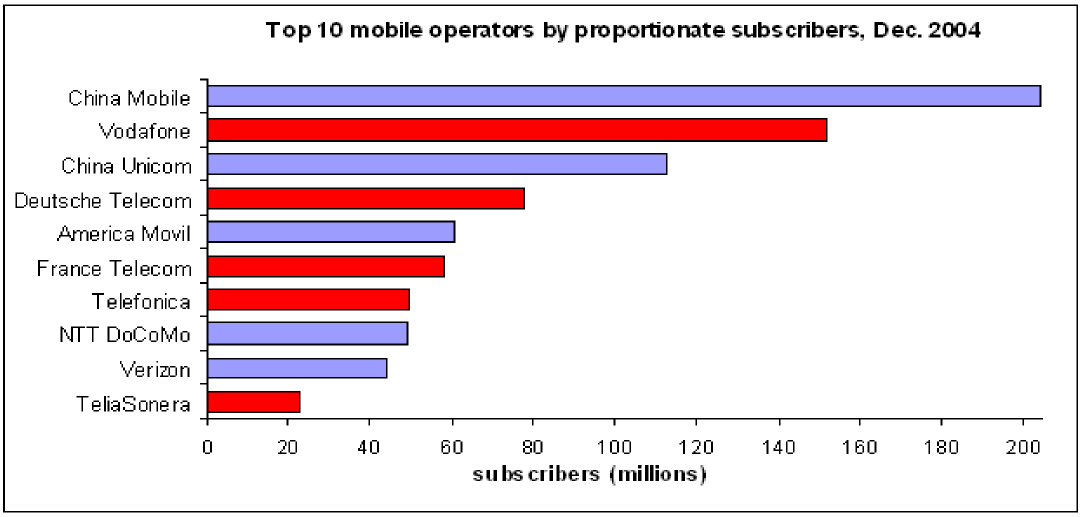
Traditionally, the Chinese public telecommunications sector was subject to a monopolistic structure. However, by the middle of the 1990s, the Chinese government began to reform the telecommunications sector in order to encourage market competition and improve efficiency in the Chinese telecommunications market. In 1999, the Chinese government restructured the state-owned monopolistic telecommunication company, China Telecom, into two telecommunication companies—China Mobile and China Unicom (Gao and Lyytinen, 2000). In 2002, four major telecommunication companies were allowed by the Chinese government to offer fixed network telecommunication, mobile communication, and other basic communication services: China Mobile, China Netcom, China Telecom, and China Unicom (Lai et al., 2007). By 2004, measured by the number of mobile phone subscribers, China Mobile and China Unicom respectively had become the number one and number three mobile communications service providers worldwide (See Figure 1.1) (ITU, 2004b).

China Mobile and China Unicom are market leaders and dominate the Chinese domestic mobile communications market, primarily, because there are entry barriers into the Chinese domestic mobile communications market (Wang et al., 2004). However, as deregulation continues there are increasing competitive threats in the

Chinese mobile communications market from internal and external sources (Lai et al., 2007; Wang et al., 2004; Nie and Zeng, 2003; Gao and Lyytinen, 2000).

The internal competition continues to increase, despite China Mobile and China Unicom's attempts to improve their customer perceived service quality, customer perceived value, customer retention, and customer acquisitions through a massive investment in network extensions, network upgradings, and price reductions (Wang et al., 2004). Lai et al. (2007) also note that the internal competition is increasing. However, these authors suggest that the Chinese mobile communications service providers are unfamiliar with the marketing concepts and tools that will enable their organisations to make an improvement in service quality. Further, the authors maintain that these organisations have insufficient experiences in making systematic improvements in service quality.

Figure 1.1 Top 10 mobile operators by proportionate subscribers worldwide, Dec. 2004



Source: International Telecommunication Union (2004b)

From an external perspective, since China's formal entry into the WTO (World Trade Organisation), the Chinese mobile communications service providers no longer operate under the protection of the Chinese government. These organisations gradually face direct threats from foreign mobile communication services providers, as under the "China-US Agreement" that set the fundamentals for the final commitment of China to enter the WTO, the Chinese government promised to open the market for all telecommunications services, starting with certain provinces (Gao and Lyytinen, 2000). A few major foreign telecom service providers have been permitted to enter the Chinese telecommunications market since China's formal entry into the WTO, such as SK Telecom, Telstra, SingTel, BT, and Japan Telecom (Roseman, 2005).

The Chinese mobile communications market is expected to become more competitive and the current high profit margins are predicted to be reduced, as an increasing number of foreign mobile communication services providers with the ability to deliver better mobile communication services than China Mobile and China Unicom enter the Chinese mobile communications market (Nie and Zeng, 2003). China Mobile and China Unicom must now improve service quality, deliver superior customer value, achieve higher customer satisfaction, and turn the favourable behaviour intentions of customers into true purchasing behaviour in order to compete with other mobile communication services providers (Wang et al., 2004).

1.4 Research Gaps

The first research gap relates to a lack of published research regarding customers' perceptions of service quality in the Chinese mobile communications market. The service quality dimensions and how these dimensions impact on subscribers' perceptions of service quality in the Chinese mobile communications market have not been fully investigated. In addition, the majority of empirical studies that have been conducted on the Chinese mobile communications market have relied on the SERVQUAL/SERVPERF scale (Lai et al., 2007; Wang et al., 2004). For example, the study by Wang et al. (2004) uses five generic dimensions derived from the SERVQUAL scale to measure customers' perceptions of service quality, and to examine the relationships that exist between service quality, customer value, and customer satisfaction in the Chinese mobile communications market. For a critique of the universal application of the SERVQUAL/SEVERPERF dimensions, see Brady and Cronin (2001), Van Dyke, Kappelman, and Prybutok (1997), and Teas (1994). Lu et al. (2009), in a recent study, adopted the multidimensional and hierarchical approach as suggested by Brandy and Cronin (2001), and Dabholkar et al. (1996) to investigate customers' perceptions of service quality in the Chinese mobile communications market.

The second research gap relates to a lack of published research pertaining to the service quality dimensions that the Chinese mobile subscribers perceive to be more or less important. This research gap is important, as mobile communication services providers cannot be confident that they are resourcing the appropriate dimensions of mobile communication services that their subscribers perceive as important.

The third research gap relates to a lack of published research investigating the relationships between service quality, customer satisfaction, customer perceived value, corporate image, perceived switching costs, and customer loyalty in the Chinese mobile communications market. This research gap is important as several service marketing academics suggest that new studies are required to investigate the relationships that exist among these important marketing constructs in service industries (Lai et al., 2007; Adyin and Ozer, 2005; Wang et al., 2004; Caruana et al., 2000; Nguyen and LeBlanc, 1998; Cronin and Taylor, 1992; Bitner, 1990).

1.5 Research Objectives

The purpose of this research is to examine the relationships between service quality, customer satisfaction, customer perceived value, corporate image, perceived switching costs, and customer loyalty in the Chinese mobile communications market. An integrated conceptual framework is developed in order to examine the potential relationships among these important service marketing constructs. In particular, this study adopts a multidimensional and hierarchical approach as suggested by Brady and Cronin (2001) and Dabholkar, Thorpe, and Rentz (1996) to conceptualize and measure the service quality as perceived by mobile service users.

This research has three main objectives:

1. To identify the service quality dimensions as perceived by mobile service users in the Chinese mobile communications market using a multidimensional and hierarchical model.
2. To identify the least and most important service quality dimensions as perceived by mobile service users in the Chinese mobile communications market.
3. To examine the relationships between service quality, customer satisfaction, customer perceived value, corporate image, perceived switching costs, and customer loyalty in the Chinese mobile communications market.

1.6 Contribution of this Research

This study will make contributions to the service marketing literature from both a theoretical and a practical perspective by satisfying the three research objectives.

From a theoretical perspective, this study will make a contribution to the service marketing literature by providing an analysis of the dimensions that determine customers' perceptions of service quality, and the relationships that exist among several important service marketing constructs. This is a valuable contribution as it helps to improve the overall understanding of customers' perceptions of service quality and the complex relationships that exist among important service marketing constructs in the Chinese mobile communications market.

This study will contribute to the service marketing literature by providing empirical support for the use of the multidimensional and hierarchical approach to conceptualise and measure customers' perceptions of service quality.

Moreover, this study will contribute to the service marketing literature by developing an integrated framework (a complete hierarchical model) that investigates the complex relationships between the lower order marketing constructs and the higher order marketing constructs. To date, only few studies have developed and tested a complete hierarchical model (Clemes et al., 2010; Clemes et al., 2007; Dagger et al., 2007).

This study will also contribute to the service marketing literature by developing a retail model that will incorporate the retail aspects of the Chinese mobile communications market. The retail aspects of the Chinese mobile communications market have been neglected by prior studies.

From a practical perspective, this study will benefit marketers and practitioners who are already operating in, or preparing to enter, the Chinese mobile communications market. The findings of this study will provide these organisations with an improved understanding of the Chinese mobile communications market, and the findings may also assist these organisations to develop and implement successful services marketing strategies in the Chinese mobile communications market.

Chapter 2

Literature Review

This chapter provides a review of the relevant literature regarding the conceptualisation and measurement of service quality, service quality studies focusing on the Chinese mobile communications market, the primary dimensions of mobile communications service quality, customer satisfaction, customer perceived value, corporate image, perceived switching costs, customer loyalty, and the relationships among these marketing constructs.

2.1 Conceptualisation of Service Quality

Parasuraman, Zeithaml, and Berry (1985) suggest that service quality is an abstract and elusive construct, mainly due to the unique characteristics of services—intangibility, heterogeneity, and inseparability of production and consumption. Brady and Cronin (2001) maintain that 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 the dimensions.

Service quality is described as a form of attitude, as it is a global judgment relating to the superiority of the service (Cronin and Taylor, 1992; Carman, 1990; Parasuraman, Zeithaml and Berry, 1988). However, service quality is not equivalent to satisfaction (Cronin and Taylor, 1992; Bolton and Drew, 1991; Parasuraman et al., 1988). Service quality and customer satisfaction are distinct in two aspects. First, service quality is a long-run overall evaluation, compared to customer satisfaction, which is a specific transaction measure (Bolton and Drew, 1991; Bitner, 1990; Parasuraman et al., 1988). Second, although service quality and customer satisfaction may both result from the comparison of customer expectations with the service performance (the disconfirmation paradigm), the term “expectations” is viewed differently in the service quality and satisfaction literature. Expectations are viewed as customers’ predictions about service performance in the satisfaction literature, whereas expectations are viewed as the desires or wants of customers in the service quality literature (Parasuraman et al., 1988).

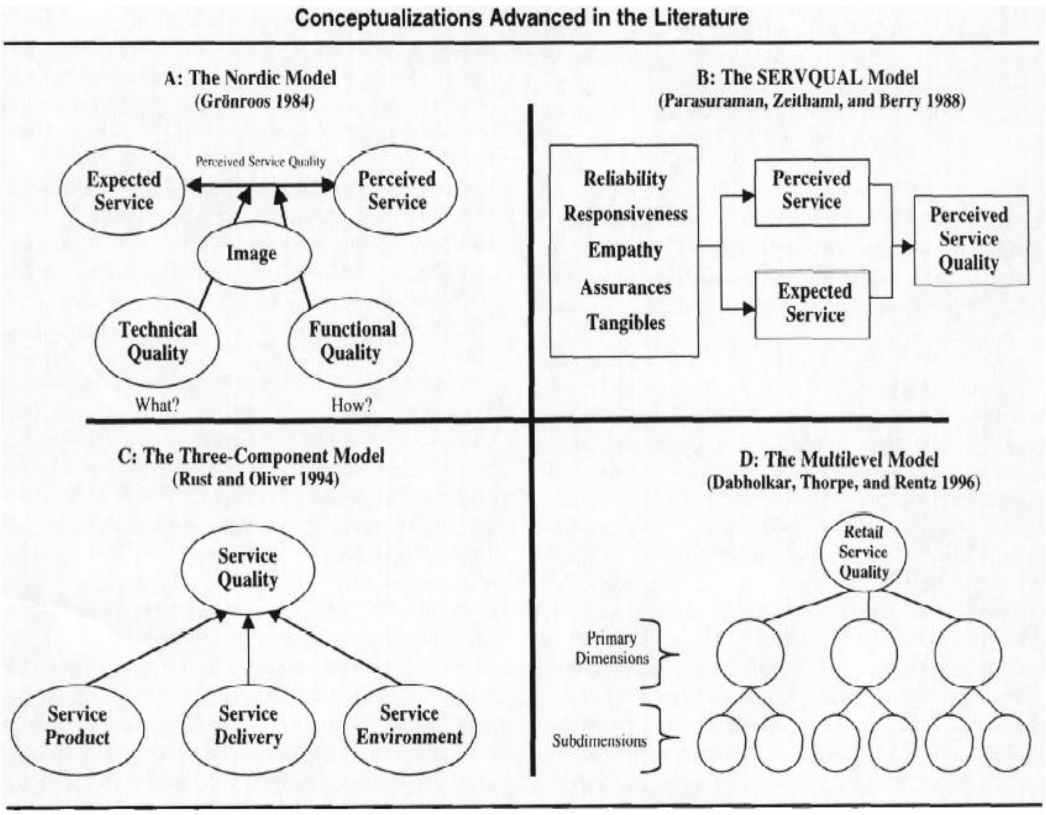
2.1.1 Nordic Perspectives versus American Perspectives of Service Quality

Brady and Cronin (2001) suggest that there are generally two types of alternative conceptualisations of service quality presented in the service marketing literature. One is the "Nordic" perspective (Gronroos 1984, 1982), which conceptualises that functional and technical quality are two dimensions that contribute to a customer's overall perception of service quality. The other is the "American" perspective (Parasuraman et al., 1988), which adopts the terms reliability, responsiveness, empathy, assurances, and tangibles that indicate service encounter characteristics. While the "American" perspective dominates the services marketing literature, a consensus over which approach is superior has not been reached (Brady and Cronin, 2001).

2.1.2 Service Quality Models

Service quality models are developed and refined by service marketing academics in order to properly conceptualize and measure customers' perceptions of service quality (Brady and Cronin, 2001; Dabbolkar et al., 1996; Rust and Oliver, 1994; Parasuraman et al., 1988; Gronroos, 1984)

Figure 2.1. Conceptualisations of Service Quality Advanced in the Literature



Source: Brady and Cronin (2001)

2.1.2.1 The Perceived Service Quality Model

Gronroos (1984) develops and tests the first perceived service quality model, commonly referred to as the Nordic Model (See Figure 2.1, Panel A), suggesting that perceived service quality results from the gap between perceived service performance and expected service performance, and that technical and functional quality are two service quality dimensions that contribute to overall perceived service quality. Functional quality is referred to as how the service is simultaneously experienced by customers and delivered by the service provider, whereas technical quality is referred to as what customers get after the service delivery process and the buyer-seller interactions (Gronroos, 1984).

2.1.2.2 The SERVQUAL Model

Parasuraman et al. (1988) develop and test the SERVQUAL Model (See Figure 2.1, Panel B), based on Gronroos's (1982) view that perceived service quality results from a gap between customers' perceptions and expectations of service performance. However, distinct from Gronroos's (1982) two dimensional service quality model, Parasuraman et al. (1988) identify five service quality dimensions:

- Tangibles: Physical facilities, equipment, and appearance of personnel;
- Reliability: Ability to perform the promised service dependably and accurately;
- Responsiveness: Willingness to help customers and provide prompt service;
- Assurance: Knowledge and courtesy of employees and their ability to inspire trust and confidence;
- Empathy: Caring, individualised attention the firm provides its customers.

2.1.2.3 The Three-Component Model

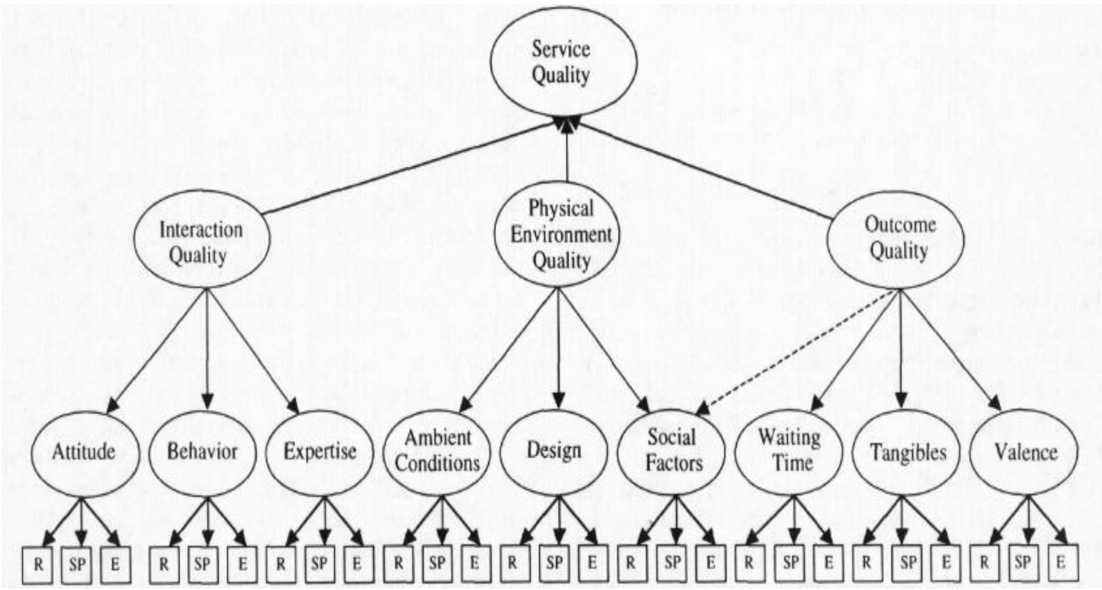
Rust and Oliver (1994) propose the Three-Component Model (See Figure 2.1, Panel C) as an expansion of Gronroos's (1982) two dimensional service quality model, suggesting that the perceptions of service quality stem from three service quality dimensions—the service product or technical quality, the service delivery or functional quality, and the service environment. However, Rust and Oliver (1994) do not empirically test their proposed model. McDougall and Levesque (1994) subsequently empirically confirm the existence of the three components in the retail banking industry.

2.1.2.4 The Multilevel Model

Drawing from an extensive review of the past literature on service quality, Dabholkar et al. (1996) develop and test the Multilevel Model, or the Hierarchical Retail Service Quality Model, (See Figure 2.1, Panel D) in order to measure retail service quality. The authors argue that customers not only evaluate the perceptions of service quality using multiple dimensions, but also use multilevel dimensions. The multilevel model reveals that customers form their perceptions of retail service quality at three ordered and hierarchical levels: the overall level that is the customers' overall perceptions of retail service quality, the primary dimensional level that consists of attributes that lead to customers' overall perceptions of retail service quality, and the sub-dimensional level that consists of attributes that contribute to the primary dimensional level attributes (Dabholkar et al., 1996).

2.1.2.5 The Integrated Hierarchical Model

Figure 2.2. The Integrated Hierarchical Model



R: Reliability SP: Responsiveness E: Empathy Source: Brady and Cronin (2001)

In light of previous literature (Dabholkar et al., 1996; Rust and Oliver, 1994; Bitner, 1992; Carman, 1990; Gronroos, 1982, 1984), Brady and Cronin (2001) develop the Integrated Hierarchical Model (See Figure 2.2), and demonstrate empirical support for the model based on a sample of customers from four industries: fast food, photograph developing, amusement parks, and dry cleaning. Brady and Cronin’s (2001) Integrated Hierarchical Model reveals that customers evaluate nine sub-dimensions to form their perceptions of service performance on each of three primary dimensions (Interaction Quality, Physical Environment Quality, and Outcome Quality) with each having three sub-dimensions. These perceptions in turn form customers’ overall perceptions of service quality (Brady and Cronin, 2001). The SERVQUAL dimensions (Reliability, Responsiveness, and Empathy) are reflective indicators for the sub-dimensions in the model.

2.2 Measuring Service Quality

2.2.1 The SERVQUAL Scale

The SERVQUAL scale is the most widely used instrument for measuring service quality in studies on different issues concerning service quality (Lai et al., 2007). SERVQUAL was developed by Parasuraman et al. (1988), and is based on the concept of the disconfirmation paradigm.

Originally, the concept of the disconfirmation paradigm was used to evaluate the level of customer satisfaction. The concept suggests that a customer’s satisfaction level towards to a product or a service depends on the level of disconfirmation which ranges from negative disconfirmation, confirmation, and positive disconfirmation. Negative disconfirmation occurs when the performance of the product or service is lower than a customer’s expectation, which results in customer dissatisfaction. Confirmation occurs when the performance of the product or service evenly match a customer’s expectation, which is likely to lead to either customer satisfaction or dissatisfaction. Positive disconfirmation occurs when the performance of the product or service exceeds a customer’s expectation, which causes customer satisfaction (Churchill and Suprenant, 1982). The disconfirmation framework is also recognised and adopted by service marketing academics in an attempt to conceptualise and measure service quality (Parasuraman et al., 1988 and Gronroos, 1984).

The original SERVQUAL scale consisted of 22 pairs of items representing five service quality dimensions—tangibles, reliability, responsibility, assurance, and empathy. The 22 items were used to evaluate the level of the customers’ expectations over a service delivered by a service provider. The other 22 items were used to evaluate the actual level of the service performance as perceived by the customers (Parasuraman et al., 1988).

Parasuraman, et al. (1988) note that the SERVQUAL scale is applicable across a broad spectrum of services. The authors contend that the SERVQUAL instrument helps to better measure the service expectations and perceptions of customers with good reliability and validity, and as a result, improve service. However, a consensus over the superior properties of the SERVQUAL scale has not been reached. Although the original SERVQUAL scale has undergone several modifications, considerable criticisms are expressed by several service marketing academics questioning the appropriateness of the use of the SERVQUAL instrument for measuring service quality (Oliver, 1993; Brown, Churchill, and Peter, 1993; Cronin and Taylor, 1992; Babakus and Boller, 1992; Carman, 1990).

2.2.1.1 Criticism of the SERVQUAL Instrument

Carman (1990) questions the applicability and the generalizability of the SERVQUAL scale across different service industries. Carman's (1990) findings reveal that the five dimensions of the SERVQUAL instrument are not completely generic across four different service settings (a dental school patient clinic, a business school placement center, a tire store, and an acute care hospital). Carman (1990) also suggests that modifications to the SERVQUAL instrument are necessary, depending on the nature of the service industry under investigation. Correspondingly, Babakus and Boller (1992) report that there are limitations of the 5-dimensional factor structure of the SERVQUAL instrument across different service settings. They suggest that it is inappropriate to use the SERVQUAL instrument as a standard measurement scale for all services, and recommend that measures should be designed for specific service industries.

Moreover, researchers also criticize the SERVQUAL scale for its use of gap scores, measurement of expectations, positively and negative worded items, problems with the reliability and the validity, and the defining of a baseline standard for good quality (Oliver, 1993; Brown et al, 1993; Cronin and Taylor, 1992; Bakakus and Boller, 1992; Carman, 1990). As a result, Bakakus and Boller (1992) conclude that researchers must put more efforts into finding alternative methods for the measurement of service quality in order to further define and understand the construct.

2.2.2 The SERVPERF Scale

Cronin and Taylor (1992) introduce the SERVPERF scale, a performance-based approach as an alternative method for measuring service quality. The SERVPERF scale is different from the SERVQUAL scale which measures the gap between customers' perceptions of service performance and customers' expectations of service performance. The SERVPERF scale measures customers' perceptions of service performance only. Cronin and Taylor (1992) report that the performance-based approach has a higher degree of model fit, and explains more of the variations in an overall measure of service quality than the gap-based SERVQUAL scale. Moreover, Cronin and Taylor (1992), and Carman (1990) argue that it is inadequate to use the gap-based SERVQUAL scale to measure service quality, because little empirical evidence supports that customers evaluate service quality in terms of the disconfirmation paradigm. Correspondingly, the empirical results of several studies strongly support Cronin and Taylor's (1992) use of the performance-based approach for measurement of service quality over the gap-based approach (Brown et al., 1993; Teas, 1993; Babakus, and Boller, 1992; Carman, 1990).

Parasuraman, Zeithaml, and Berry (1994) defend measuring customers' expectations as appropriate in order for marketing practitioners to understand customers' expectations. The authors also maintain that the superior diagnostic value of the SERVQUAL scale more than offset the loss in its predictive power. However, Zeithaml, Berry, and Parasuraman (1996) later concede that the performance-based approach is more appropriate if the primary purpose of a research is to explain the variance in a dependent construct.

2.2.3 The Hierarchical Approach

Although there is no 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; Dabholkar et al., 1996; Carman, 1990; Parasuraman et al., 1988; Gronroos, 1984). Brady and Cronin's (2001) and Dabholkar et al.'s (1996) studies introduce a framework for measuring service quality on the basis that service quality is a multidimensional construct with a hierarchical structure. Brady and Cronin's (2001) and Dabholkar et al.'s (1996) findings reveal a three dimensional structure of service quality as perceived by customers: a customer's overall perception of service quality; the primary dimensions; and the sub-dimensions. The sub-dimensions are treated as first-order factors of the service quality construct, and the primary dimensions are treated as second-order factors of the service quality construct. The hierarchical approach has been adopted by a number of marketing academics for measurement of service quality in various service contexts such as agribusiness (Gunderson, Gray, and Akridge, 2009), airport services (Fodness and Murray, 2007), education (Clemes, Gan, and Kao, 2007), electronic services (Fassnacht and Koese, 2006), health services (Dagger, Sweeney, and Johnson, 2007), mobile communication services (Lu et al., 2009; Kang, 2006), recreational sport industries (Alexandris, Kouthouris and Meligdis, 2006; Ko and Pastore, 2005), transport services (Martínez and Martínez, 2007), travel services (Martínez and Martínez, 2008), and a variety of other service businesses (Liu, 2005).

The following section provides a review of the use of the hierarchical models for the conceptualization and measurement of service quality in the service marketing literature.

2.2.3.1 The Use of Hierarchical Models

Gunderson et al. (2009) note that there is no evidence that suppliers of agricultural inputs have systematically evaluated their service performance. Therefore, the authors introduce a useful tool for measuring customers' perceptions of service quality in an agribusiness setting. The authors adopt Brady and Cronin's (2001) hierarchical model of service quality and test the applicability of the model in the American agribusiness industry. Gunderson et al.'s (2009) findings support the hierarchical model introduced by Brady and Cronin (2001) is a useful means of measuring agribusiness service quality. In addition, the authors suggest that the model can be used as a tool for suppliers of agricultural inputs to improve customers' perceptions of service quality.

Fodness and Murray (2007) note that the nature and role of airport passengers' expectations underlying airport service quality is understudied. The airport researchers tend to measure airport service quality by establishing and monitoring airport service quality performance measures only. Therefore, Fodness and Murray

(2007) develop a model for conceptualising and measuring airport passengers' service quality expectations in the United States. The model is based on the framework suggested by Brandy and Cronin (2001), and Dabholkar et al. (1996). Fodness and Murray's (2007) findings suggest that a passenger's expectation of airport service quality is a multidimensional and hierarchical construct that is composed of three primary dimensions: function, interaction, and diversion.

Clemes et al. (2007) develop and test a hierarchical model in order to identify the dimensions of service quality as perceived by university students in New Zealand, and to examine the relationships that exist among the important marketing constructs including service quality, price, image, student satisfaction, and behavioral intentions. Clemes et al.'s (2007) findings support the use of a hierarchical factor structure, such as those introduced by Brady and Cronin (2001) and Dabholkar, et al. (1996) to conceptualize and measure the service quality as perceived by university students in the education sector. However, Clemes et al. (2007) suggest that the identified dimensions of service quality may not be generic for service industries outside of the education sector.

Fassnacht and Koese (2006) note that the traditional measures of service quality cannot adequately capture the quality of electronic services. Thus, Fassnacht and Koese (2006) adopt the framework introduced by Rust and Oliver (1994) viewing service quality as a hierarchical construct with three dimensions for the conceptualization of the quality of electronic services in Germany: environment quality, delivery quality, and outcome quality. Each of the three dimensions has various sub-dimensions. Fassnacht and Koese's (2006) findings provide empirical evidence for the notion that service quality is a multidimensional hierarchical construct. Fassnacht and Koese (2006) conclude that the hierarchical approach they use for measuring service quality may be more easily applied to a broad range of electronic services than the traditional approaches (e.g. SERVQUAL and SERVPERF).

Consistent with Brady and Cronin (2001) and Dabholkar et al's (1996) notion that service quality is perceived at multiple levels of abstraction, Dagger et al., (2007) develop and empirically validate a multidimensional hierarchical scale for measuring health service quality in Australia. The authors investigate the scale's ability to predict customer satisfaction and behavioral intentions. Dagger et al.'s (2007) findings support the notion that customers evaluate service quality at an overall level, a dimensional level, and a sub-dimensional level and that each level drives perceptions at the level above. Dagger et al. (2007) conclude that the findings of their study provide an improved understanding of how customers evaluate health service quality.

Lu et al. (2009) note that there is little research on how to measure the service quality of mobile communications service providers. Using a mobile brokerage service as an example, the authors develop and test a multidimensional and hierarchical model to measure mobile communications service quality in China in order to assist providers of mobile communication services to improve their service quality as perceived by customers. The multidimensional and hierarchical model developed by Lu et al. (2009) is based on the framework suggested by Brady and Cronin (2001), and Dabholkar et al. (1996). Lu et al.'s (2009) findings provide empirical support for the contention that customers evaluate mobile communications service quality at three ordered and hierarchical levels. The authors conclude that their multidimensional and hierarchical model is applicable for measuring service quality in mobile communications markets.

Kang (2006) adopts a framework on the basis that service quality is multidimensional and has a hierarchical structure in order to measure service quality as perceived by cell-phone users in Korea. The framework involves identification of the dimensions of service quality as perceived by the cell-phone users, and the components that make-up each service quality dimension. Kang (2006) identifies two service quality dimensions as perceived by cell-phone users: functional quality and technical quality. However, Kang's (2006) study focuses on measuring only one of the identified service quality dimensions (functional quality) using a hierarchical approach. The study does not produce a multi-level factorial structure for the technical quality dimension.

Alexandris et al. (2006) note that despite the fact that the majority of the studies on sport, leisure and recreation services have used the SERVQUAL instrument for measuring service quality, the SERVQUAL instrument has not been shown to be fully applicable in these service settings. As a result, Alexandris et al. (2006) adopt Brandy and Cronin's (2001) three dimensional model, as an alternative approach to measure service quality as perceived by skiers in a skiing resort in Greece. Alexandris et al.'s (2006) findings indicate that Brandy and Cronin's (2001) three dimensional model is applicable to the skiing industry.

Ko and Pastore (2005) develop and test a hierarchical model in order to gain a better understanding of the factors that determine consumers' perceptions of service quality in the United States' recreational sport segment. Ko and Pastore's (2005) study is based on the framework introduced by Brandy and Cronin (2001), and Dabholkar et al. (1996). Ko and Pastore's (2005) findings indicate that the proposed hierarchical model of service quality is valid for the recreational sport industry. In addition, the authors conclude that their proposed hierarchical model may fill the gaps that exist in the conceptualization of service quality in the recreational sport industry, but further investigation into the construct is needed.

Martínez and Martínez (2007) note that the concern for service quality in the Spanish urgent transport industry is evident. Therefore, the authors attempt to introduce an effective approach for measuring service quality in the Spanish urgent transport industry in order to assist urgent transport suppliers to appropriately assess and improve their service performance. The authors develop and test a hierarchical and multidimensional model for measuring urgent transport service quality on the basis of the frameworks introduced by Brady and Cronin (2001), and Dabholkar et al. (1996). Martínez and Martínez's (2007) findings provide empirical support for the concept of the hierarchical and multidimensional structure of service quality. In addition, the authors maintain that the hierarchical conceptualization of service quality can provide service providers with an improved understanding of how customers assess service encounters.

Martínez and Martínez (2008) note that the majority of studies that measure customers' perceptions of service quality in travel agency industries have used the SERVQUAL approach. In addition, the authors note that the SERVQUAL approach has been substantially criticized by several marketing academics (See, Section 2.2.1.1). Therefore, instead of using an existing approach based on SERVQUAL, Martínez and Martínez (2008) adopt Brady and Cronin's (2001) performance based hierarchical model in order to introduce a more accurate tool for assessing service quality in the Spanish travel industry. Martínez and Martínez's (2008) findings show that customers evaluate three primary dimensions to form their overall perceptions of service quality of travel agencies: personal interaction, physical environment, and outcome, which are composed of seven sub-dimensions.

Liu (2005) note that the "American" perspective (See Section 2.1.1) is used in the majority of the service marketing studies for the conceptualisation and measurement of service quality. In addition, service marketing academics should make more of an effort to develop the process of measurement (Brown et al., 1993; Babakus, and Boller, 1992) and make less effort in determining what to measure. As a result, Liu (2005) adopts the hierarchical model introduced by Brady and Cronin (2001) for the measurement of service quality as perceived by customers of fast food restaurants, gasoline stations, medical clinic, photo shops, mobile phone repair shops, and 24-hour grocery stores in Taiwan. Liu's (2005) findings provide empirical support for the concept of perceived service quality is multidimensional and multi-level, replicating the framework introduced by Brady and Cronin (2001).

2.3 Service Quality Studies on the Chinese Mobile Communications Market

Lu et al. (2009) note that there is little research on how to measure the service quality of mobile communications. Using mobile brokerage service as an example, the authors measure customers' perception of service quality in the Chinese mobile communications market in order to help mobile communications service providers to improve their service quality as perceived by customers. In addition, Lu et al. (2009) note that the SERVQUAL scale, the most popular instrument for measuring the service quality construct, has been criticized on both methodological and theoretical grounds (Babakus and Boller, 1992; Van Dyke et al., 1997). In the light of the criticisms of SERVQUAL, the authors adopt the multidimensional and hierarchical approach as introduced by Brandy and Cronin (2001), and Dabholkar et al. (1996) to measure customers' perceptions of service quality in the Chinese mobile communications market. The use of the multidimensional and hierarchical approach has received substantial support from several marketing academics and has been validated by several researchers (e.g. Clemes et al., 2007; Dagger et al., 2007; Brandy and Cronin, 2001; Dabholkar et al., 1996).

Lu et al.’s (2009) findings provide empirical support for their proposed multidimensional and hierarchical model of service quality. Customers evaluate the service quality of mobile brokerage services at three different levels: a sub-dimension level, a primary dimension level, and an overall level. Ten sub-dimensions are combined together to represent three primary dimensions: interaction quality, environment quality, and outcome quality. These primary dimensions are then combined together to represent customers’ overall perceptions of mobile brokerage service quality. The authors conclude that their proposed multidimensional and hierarchical model is a useful tool that enables mobile communications service providers to assess their mobile brokerage service quality as perceived by customers. In addition, the authors maintain that their proposed multidimensional and hierarchical model can be applicable when service providers assess mobile communication services that are different from mobile brokerage services.

Lai et al. (2009) note that little research has been done to improve understanding of the relationships that exist between important marketing constructs such as service quality, customer satisfaction, customer perceived value, corporate image, and customer loyalty in China. In addition, the authors note that most of the previous research on services examines the relationships between these important constructs in a western cultural context. Therefore, Lai et al. (2009) develop and test an integrative model to examine the relationships between the higher order constructs: service quality, customer satisfaction, customer perceived value, corporate image, and customer loyalty in the Chinese telecommunications market. The research sample was drawn from customers of a Chinese mobile communications company. Lai et al. (2009) use five items that are derived from the five dimensions of SERVQUAL to measure customers’ perceptions of service quality. These items measure customers’ perceptions of service performance only. Lai et al.’s (2009) findings reveal that service quality is an important determinant of customer perceived value and corporate image in the Chinese mobile communications market.

Lai et al. (2007) note that as one of the most important service markets in China, the mobile communications industry has been neglected by most prior studies. As a result, the authors examine customers’ perceptions of service quality in the Chinese mobile communications market using the SERVQUAL instrument with minor modifications to tailor the instrument to the Chinese market.

The development of the original SERVQUAL instrument was based on the notion that perceived service quality resulted from the gap between customers' perceptions and expectations of service performance (Gronroos, 1988). Lai et al. (2007) only measure customers' perceptions of service performance using the SERVQUAL instrument, as the pilot study reveals some problems with the questionnaire length and confusion over perception and expectation items. In addition to SERVQUAL's five dimensions, convenience is included as an additional dimension of service quality. Lai et al. (2007) suggest that convenience is a very important dimension that may have a significant influence on customers' perceptions of service quality in the mobile communications industry.

Lai et al.'s (2007) claim that despite some minor problems, the SERVQUAL instrument is still an acceptable instrument to measure customers' perceptions of service quality in the Chinese mobile communications market. Moreover, Lai et al.'s (2007) findings also empirically confirm the additional dimension, convenience, contributes to overall service quality as perceived by customers in the Chinese mobile communications market. However, Lai et al.'s (2007) study has several limitations. For example, a low customer response rate and a relatively small sample size may lead to a problem regarding the generalisability of Lai et al.'s (2007) findings.

Wang et al. (2004) note that although many general conclusions have been made in previous studies about the relationships that exist among service quality, customer satisfaction, and customer value, these studies have been rather fragmented in examining the exact nature of the relationships. In addition, the authors note that there is a lack of related studies that are supported by empirical evidence focus on service quality, customer satisfaction, and customer value, and their impacts on customer behavioural intentions in the telecommunication industry. Therefore, Wang et al. (2004) examine service quality, customer satisfaction, customer value and behavioural intentions as perceived by Chinese mobile communication services users, and the relationships that exist among these important marketing constructs in the Chinese mobile communications market.

Wang et al. (2004) adopt the SERVERF instrument, developed by Cronin and Taylor (1992), to measure mobile communications service quality as perceived by the Chinese mobile communication services users instead of the SERVQUAL instrument. Several marketing academics criticize the use of the SERVQUAL instrument, and suggest that the performance-based SERVERF instrument is superior to the gap-based SERVQUAL instrument (Brown et al., 1993; Teas, 1993; Babakus, and Boller, 1992; Cronin and Taylor, 1992; Carman, 1990). In addition to SERVPERF's five dimensions, network quality is included as an additional dimension of service quality, as the findings of focus group discussions and pilot study indicate that network quality is a very important dimension that drives customer perceived service quality in the mobile communications industry.

Wang et al. (2004) maintain that the SERVPERF instrument is applicable to the Chinese mobile communications market, despite the fact that the responsiveness dimension appears to have an insignificant impact on overall service quality as perceived by customers of the Chinese mobile communication services. Wang et al.'s (2004) findings also empirically confirm that network quality is an important additional service quality dimension that has a significant influence on customers' overall perceptions of mobile communications service quality. In addition, Wang et al.'s (2004) findings reveal that customer perceived service quality positively contributes to both customer satisfaction and customer perceived value in the Chinese mobile communications market.

2.4 The Primary Dimensions of Service Quality

A multidimensional and hierarchical model based on the framework introduced by Brady and Cronin (2001), and Dabbolkar et al. (1996) is developed and empirically tested in this study in order to conceptualize and measure mobile communications service quality as perceived by the Chinese mobile communication services users. The research model suggests that customers of the Chinese mobile communications services evaluate mobile communications service quality at an overall level, a primary dimensional level, and a sub-dimensional level. The following sections provide a review of the service marketing literature that relates to the primary dimensions of mobile communications service quality.

2.4.1 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 involve less interpersonal interactions when compared to other types of services such as hotel or restaurant services, the service marketing literature suggests that the interpersonal interactions between mobile communications service providers and their customers have a significant impact on mobile communications service quality as perceived by customers (Lu et al., 2009; Lai et al., 2007; Lim et al., 2006; Wang et al., 2004; Kim et al., 2004). For example, Lai et al.'s (2007) findings reveal that if employees of mobile communications service providers are polite, a favourable impact on customers' perceptions of mobile communications service quality is likely to occur in the Chinese mobile communications market.

2.4.2 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). Dabbolkar et al. (1996) suggest that physical aspects are similar to the tangible dimension of SERVQUAL, but that 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 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 Chinese mobile communications market.

2.4.3 Outcome Quality

Outcome quality, or technical quality, is what customers receive after the service delivery process and buyer-seller interactions are complete (Gronroos, 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.'s (2006) findings reveal that outcome quality, such as whether mobile communications service providers provide accurate and understandable billing, has a significant impact on customers' overall perceptions of mobile communications service quality in the United States. In addition, Wang et al.'s (2004) findings show that outcome quality such as whether mobile communications service providers deliver their services at the times they promise to do so significantly impact on customers' overall perceptions of mobile communications service quality in the Chinese mobile communications market.

The multidimensional and hierarchical model developed for this study is also used as a framework to examine the relationships that may exist between several important marketing constructs including service quality, customer satisfaction, customer perceived value, corporate image, perceived switching costs, and customer loyalty in the Chinese mobile communications market. The following sections provide a review of the service marketing literature regarding these important marketing constructs and the interrelationships between these constructs.

2.5 Customer Satisfaction

Churchill and Surprenant (1982, pg.493) define customer satisfaction as "an outcome of purchase and use resulting from the buyer's comparison of the rewards and costs of the purchase in relation to the anticipated consequences". Rust and Oliver (1994, pg.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.

Wang et al. (2004) suggest that there are at least two different conceptualizations of customer satisfaction in the marketing literature. One is the transaction-specific perspective, which conceptualises that customer satisfaction is a post-choice evaluative judgement of a specific purchase occasion (Oliver, 1993, 1977). The other conceptualization is the more accepted cumulative perspective, which conceptualise that customer satisfaction is an evaluation that results from the overall purchase and consumption experiences with a product or service over time (Fornell et al., 1996; Anderson, Fornell, and Lehmann, 1994; Johnson and Fornell, 1991).

Service organisations are willing to make investments in customer satisfaction, as service organisations are likely to benefit from a high level of customer satisfaction. A high level of customer satisfaction tends to result in a high level of customer loyalty, a lower level of customer price sensitivity, a reduction in failed marketing costs and new customer creation and operating costs, and an improvement in the effectiveness of advertising and business reputation (Fornell, 1992). Fornell et al. (1996) argue that customer satisfaction is a very important marketing construct. The authors maintain that 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.

2.5.1 The Relationship between Customer Satisfaction and Service Quality

Cronin and Taylor (1992) suggest that there is confusion in the service marketing literature as to the relationship that exits between customer satisfaction and service quality. Two opposite views over the relationship exist in the service marketing literature. One suggests that a high level of customer satisfaction leads to a high level of perceived service quality (Bolton and Drew, 1991; Bitner, 1990), whereas the more accepted alternative view suggests that a high level of customer satisfaction results from a high level of perceived service quality (Clemes et al., 2007; Dagger et al., 2007; Fornell et al., 1996; Parasuraman et al., 1994; Cronin and Taylor, 1992).

Kim et al. (2004) examine the relationship that exists between customer perceived service quality and customer satisfaction in the Korean mobile communications market and demonstrate 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.

2.6 Customer Perceived Value

Despite the fact that the importance of customer perceived value is widely recognized by marketing academics and practitioners, several marketing academics suggest that understanding the precise nature of the construct, and the construct’s impact on customer behaviour is fragmented (Nguyen and LeBlanc, 1998), and that the definition of customer perceived value is divergent (Bhattacharya and Singh, 2008; Wang et al., 2004).

Zeithaml (1988, pg.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, Monroe, and Grewal (1991) define customer perceived value as the trade-offs between perceived quality and perceived psychological benefits as well as a monetary sacrifice. Woodruff (1997, pg.142) defines customer perceived value as "a customer's perceived preference for and evaluation of those product attributes, attribute performances, and consequences arising from use that facilitate (or block) achieving the customer's goals and purposes in use situations". Nguyen and LeBlanc (1998, pg.53) define customer perceived value as "the trade-offs between costs and benefits and arises from both quality and price".

Bhattacharya and Singh (2008), and Wang et al. (2004) maintain that although the definitions of customer perceived value are divergent, these definitions show some common points. Customer perceived value is always associated with the use of certain products or services (Bhattacharya and Singh, 2008; Wang, et al., 2004; Woodruff, 1997). 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; Anderson and Narus, 1998). 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).

2.6.1 The Relationship between Customer Perceived Value and Service Quality

Several marketing academics suggest that customer perceived service quality has a significant influence on customer perceived value (Oh, 1999; Sweeney, Soutar, and Johnson, 1999; Bolton and Drew, 1991; Zeithaml, 1988). Utility theory also argues that there is a clear relationship between customer perceived value and service quality if value is quality received for the price paid. This relationship exists because consumers often buy bundles of attributes that together represent a certain level of service quality that is offered by a firm at a certain price level rather than just buying services for their own sake (Lancaster, 1971). Bojanic (1996) argue that service quality is an important determinants of customer perceived value. Ostrom and Iacobucci (1995) report that factors including price, level of quality, friendliness of service personnel, and the degree of customization of the service are the important determinants to customer perceived value.

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; Chi et al., 2008; Lim et al., 2006; Wang et al., 2004; Sweeney et al., 1999; Bolton and Drew, 1991). Bolton and Drew's (1991) findings reveal that favourable customers' perceptions of service quality positively contribute to customers' assessments of service value in a local telephone service market in the United States. In addition, 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.

2.6.2 The Relationship between Customer Perceived Value and Customer Satisfaction

Rust and Oliver (1994) argue that customer perceived value, like customer perceived quality, is an encounter specific input to customer satisfaction. Empirical evidence from several previous studies indicates that customer perceived value is one of the determinants of customer satisfaction (Lai et al., 2009; Tung, 2004; Wang et al., 2004; Cronin et al., 2000; Fornell et al., 1996). 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 Chinese mobile communications market.

2.7 Corporate Image

Barich and Kotler (1991) define corporate image as the sum of beliefs, attitudes, and impressions towards an organisation. Gronroos (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 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.

Kennedy (1977) identifies two principal components of corporate image: functional and emotional. The functional component is related to tangible characteristics that can easily be measured; the emotional component is associated with psychological states that are manifested by feelings and attitudes.

Gronroos (1984) claims that 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. Andressen and Lindastad (1998) maintain that corporate image is of vital importance to service organisations, because corporate image becomes an important factor that affects customers' purchase decisions when customers have insufficient information about the service attributes.

2.7.1 The Relationship between Corporate Image and Service Quality

Gronroos (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 Ozer (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 (Lai et al., 2009; Aydin and Ozer, 2005; Bloemer, Ruyter, and Peeters, 1998; Nguyen and LeBlanc, 1998). For example, Aydin and Ozer'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.

2.7.2 The Relationship between Corporate Image and Customer Satisfaction

Nguyen and LeBlanc (1998) argue that customers who perceive service quality over repeated service encounters tend to have an overall favourable image of the firm. However, the authors' findings indicate that customer satisfaction has no significant direct effect on corporate image; in other words, a favourable corporate image does not necessarily result from a high level of customer satisfaction. Correspondingly, Andreassen and Lindestad (1998) state that corporate image also can be established and developed in consumers' minds through communication. The authors also argue that when customers are satisfied with the services they receive from service organisations, their attitudes towards the organisations are improved; and subsequently, these attitudes will have an influence on these customers' satisfaction with the organisations. Thus, Andreassen and Lindestad (1998) claim that corporate image leads to a halo effect on customers' satisfaction judgments.

Several marketing academics support the notion that corporate image is a function of the accumulated effect of customer satisfaction/dissatisfaction (Fornell, 1992; Bolton and Drew, 1991; Johnson and Fornell, 1991; Oliver and Linda, 1981). Corporate image has been empirically demonstrated as having a positive impact on customer satisfaction in several industries such as education, retail and tourism (Clemes et al., 2007; Chang and Tu, 2005; Palacio, Meneses, and Perez, 2002; Andreassen and Lindestad, 1998).

2.8 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.

Burnham, Frels, and Mahajan (2003) identified three types of switching costs:

1. Procedural switching costs, primarily involving the loss of time and effort.
2. Financial switching costs, involving the loss of financially quantifiable resources.
3. Relational switching costs, involving psychological or emotional discomfort due

to the loss of identity and the breaking of bonds.

Lee et al. (2001, pg.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". The authors also argue that switching costs only become important when a few viable alternative service providers exist in the market. Switching costs are not a factor in a monopolistic market, because customers cannot switch their service provider (Lee et al., 2001).

2.8.1 The Relationship between Perceived Switching Costs and Service Quality

Kim et al. (2004) describe switching costs as the perceived risk when customers switch service providers. Sharma, Patterson, Cicic and Dawes (1997) suggest that 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. Sharma and Patterson (2000) maintain that customers tend to perceive a high level of risk regarding a new service provider they have never used. Aydin and Ozer (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.

2.9 Customer Loyalty

Oliver (1997, pg.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 Ozer (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.

Odin, Odin, and Florence (2001) suggest that although the definitions of customer loyalty are divergent, there are at least two basic approaches that are used by marketing academics to conceptualize customer loyalty. One is the stochastic approach, which assumes customer loyalty as a behaviour (Ehrenberg, 1988). The other is the deterministic approach, which assumes customer loyalty as an attitude (Fournier and Yao, 1997).

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). Especially 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; Fornell, 1992).

2.9.1 The Relationship between Customer Loyalty and Customer Perceived Value

Several marketing academics have identified a positive relationship that exists between perceived value and intention to purchase/repurchase (Parasuraman and Grewal, 2000; Dodds et al., 1991). 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 such service settings as electronic commerce (Yang and Peterson, 2004), airline travel, retailing services (Sirdeshmukh, Singh, and Sabol, 2002), and telephone services (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.

2.9.2 The Relationship between Customer Loyalty and Customer Satisfaction

It is generally agreed among marketing academics that satisfied customers tend to have a higher usage level of a product/service (Bolton and Lemon, 1999; Ram and Jung, 1991), a stronger repurchase intention, and a higher level of willingness to recommend the product/service to their friends and associates than dissatisfied customers (Aydin and Ozer, 2005; Zeithaml et al., 1996). Anderson and Srinivasan (2003, pg.125) state 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".

Numerous marketing studies support the general notion that customer satisfaction is a predictor of customer loyalty (Lin and Wang, 2006; Gerpott et al., 2001; Cronin et al., 2000; Fornell et al., 1996). Kim et al. (2004) argue 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.

2.9.3 The Relationship between Customer Loyalty and Perceived Switching Costs

Fornell (1992) notes that switching costs play an important role and 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; in other words, the customers behave loyally. Ruyter, Wetzels and Bloemer (1998) suggest that customers of service industries characterized by relatively high switching costs tend to be more loyal when compared to the customers of service industries characterized by relatively low switching costs. Aydin and Ozer (2005) note that markets with 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.

2.9.4 The Relationship between Customer Loyalty and Corporate Image

Corporate image is believed to serve as an important factor that enhances customer loyalty (Kandampully and Hu, 2007). Dick and Basu (1994) note that a customer's favourable corporate image towards a service provider can lead to repeat patronage. Johnson, Gustafsson, Andreassen, Lervik, and Cha (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 (2001, 1998) empirically demonstrate that corporate image positively affects customer loyalty in the financial, telecommunication, retail, and education service sectors respectively.

Chapter 3
Model and Hypotheses Development

Chapter 3 outlines the development of the conceptual research model used in this study. The research model illustrates the formation of service quality as perceived by customers of the Chinese mobile communication services and the potential relationships that may exist between service quality, customer satisfaction, customer perceived value, corporate image, perceived switching costs, and customer loyalty. The chapter also presents a discussion of the hypotheses that are tested in order to satisfy this study's objectives.

3.1 Model Development

The conceptual research model (See Figure 3.1) was developed using a multidimensional and hierarchical structure and is based on the framework introduced by Brandy and Cronin (2001), and Dabholkar et al. (1996). The conceptual research model suggests that the Chinese mobile communications services users evaluate mobile communications service quality at three ordered and hierarchical levels: an overall level, a primary dimensional level, and a sub-dimensional level. The sub-dimensional level consists of multiple sub-dimensions pertaining to each of the service quality primary dimensions. The primary dimensional level consists of three primary dimensions, interaction quality, physical environment quality, and outcome quality. These three primary dimensions are combined together to reflect customers' overall perceptions of service quality. The model also illustrates the potential relationships that may exist between service quality, customer satisfaction, customer perceived value, corporate image, perceived switching costs, and customer loyalty in the Chinese mobile communications market. Customers' perceptions of service quality are expected to influence customer perceived value, customer satisfaction, corporate image, and perceived switching costs. Customer perceived value is expected to have an influence on both customer satisfaction and customer loyalty. Corporate image is expected to impact on both customer satisfaction and customer loyalty. Perceived switching costs are expected to have an impact on customer loyalty. Customer satisfaction is expected to influence customer loyalty.

3.2 Hypotheses Development

3.2.1 Hypotheses Relating to Research Objective 1

Several factors identified in previous studies may potentially influence global mobile communication service customers' perceptions of interaction quality, physical environment quality, and outcome quality (See, Lu et al., 2009; Lai et al., 2007; Lim et al., 2006; Adyin and Ozer, 2005; Wang et al., 2004). However, Cronin and Taylor (1994) suggest that dimensional structures need to be confirmed for each research setting. Ueltschy and Krampf (2001) also suggest that service quality scales tend to be culturally sensitive. Thus, the sub-dimensions of interaction quality, physical environment quality, and outcome quality are identified in this study through focus group interviews, the literature review, and exploratory factor analysis specifically for customers of mobile communication services in China.

Customers assess each of the primary dimensions of service quality by evaluating the sub-dimensions of service quality that pertain to each of the primary dimensions of service quality (Brady and Cronin, 2001). The sub-dimensions of service quality pertaining to each of the primary dimensions of service quality are hypothesized to have a significant positive relationship with the primary dimensions. Therefore, the following three hypotheses are formulated:

H1: There is a significant positive relationship between the sub-dimensions of interaction quality (H1a, H1b, and H1c) and the interaction quality primary dimension.

H2: There is a significant positive relationship between the sub-dimensions of physical environment quality (H2d, H2e, and H2f) and the physical environment quality primary dimension.

H3: There is a significant positive relationship between the sub-dimensions of outcome quality (H3g, H3h, and H3i) and the outcome quality primary dimension.

Customers assess their overall perceptions of service quality by evaluating each of the primary dimensions of service quality (Interaction Quality, Physical Environment Quality, and Outcome Quality) (Brady and Cronin, 2001). The primary dimensions of service quality as identified in the literature are hypothesized to have a significant positive relationship with customers' overall perceptions of service quality. Therefore, the following three hypotheses are formulated:

H4: There is a significant positive relationship between the interaction quality primary dimension and customers' overall perceptions of service quality.

H5: There is a significant positive relationship between the physical environment quality primary dimension and customers' overall perceptions of service quality.

H6: There is a significant positive relationship between the outcome quality primary dimension and customers' overall perceptions of service quality.

3.2.2 Hypotheses Relating to Research Objective 2

Several previous studies have assessed customers' perceptions of service quality in the mobile communications markets (Lai et al., 2009; Lai et al., 2007; Lim et al., 2006; Adyin and Ozer, 2005). However, the comparative importance of the service quality dimensions in customers' service evaluation has not been clearly identified. Therefore, the following hypotheses are formulated:

H7a: Customers vary in their perceptions of the importance of each of the sub-dimensions.

H7b: Customers vary in their perceptions of the importance of each of the primary dimensions.

3.2.3 Hypotheses Relating to Research Objective 3

Customers' perceptions of service quality are proposed to positively influence customer perceived value (Lai et al., 2009; Lim et al., 2006; Oh, 1999; Sweeney et al., 1999), customer satisfaction (Kim et al., 2004; Wang et al., 2004; Parasuraman et al., 1994; Cronin and Taylor, 1992), corporate image (Lai et al., 2009; Adyin and Ozer, 2005; Bloemer et al., 1998; Nguyen and LeBlanc, 1998), and perceived switching costs (Chou and Lu, 2009; Aydin and Ozer, 2005). Therefore, the following four hypotheses are formulated:

H8: Higher perceptions of service quality positively affect customer perceived value.

H9: Higher perceptions of service quality positively affect customer satisfaction.

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

H11: Higher perceptions of service quality positively affect perceived switching costs.

Customer perceived value is proposed to have a positive influence on both customer satisfaction (Tung, 2004; Cronin et al., 2000; Fornell et al., 1996; Rust and Oliver, 1994) and customer loyalty (Lin and Wang, 2006; Yang and Peterson, 2004; Anderson and Srinivasan, 2003; Bolton and Drew, 1991). Therefore, the following two hypotheses are formulated:

H12: Higher customer perceived value positively affects customer satisfaction.

H13: Higher customer perceived value positively affects customer loyalty.

Corporate image is proposed to positively influence both customer satisfaction (Clemes et al., 2007; Chang and Tu, 2005; Andreassen and Lindestad, 1998; Bolton and Drew, 1991) and customer loyalty (Kandampully and Hu, 2007; Johnson et al., 2001; Nguyen and Leblanc, 2001, 1998). Therefore, the following two hypotheses are formulated:

H14: A higher corporate image positively affects customer satisfaction.

H15: A higher corporate image positively affects customer loyalty.

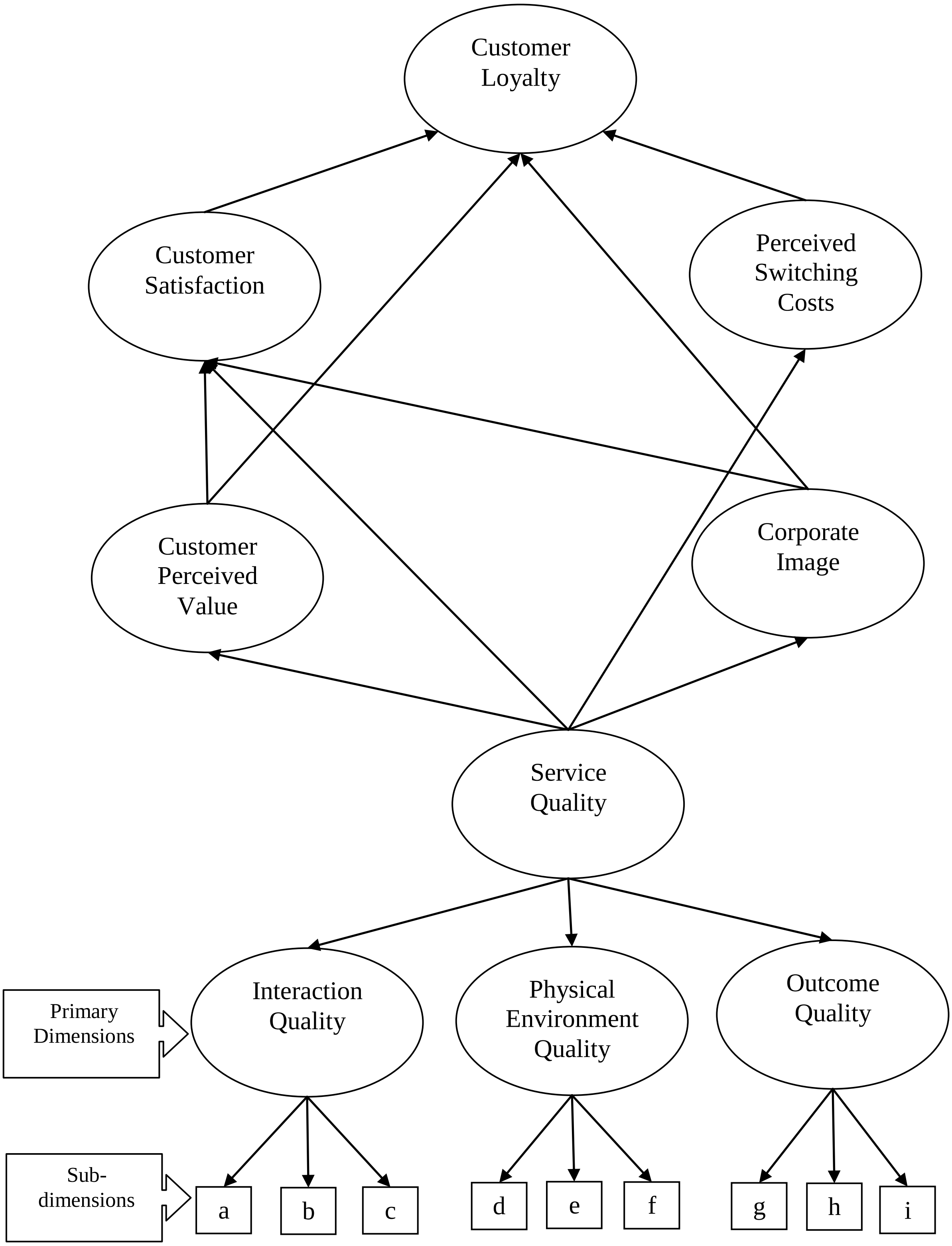
Perceived switching costs are proposed to have a positive influence on customer loyalty (Chou and Lu, 2009; Aydin and Ozer, 2005; Bloemer et al., 1998; Fornell, 1992). Therefore, the following hypothesis is formulated:

H16: Higher perceived switching costs positively affect customer loyalty.

Customer satisfaction is proposed to positively influence customer loyalty (Lai et al., 2009; Lin and Wang, 2006; Yang and Peterson, 2004; Anderson and Fornell, 2000). Therefore, the following hypothesis is formulated:

H17: Higher customer satisfaction positively affects customer loyalty

Figure 3.1: Conceptual Research Model



Chapter 4
Research Design and Methodology

Chapter 4 outlines the research design and methodology used to examine the conceptual research model and the seventeen research hypotheses stated in Section 3.2. Sample derivation, sample size, questionnaire design, the method of data collection, data screening, missing data imputation, outlier detection, normality test, and the data analysis techniques are discussed respectively in this chapter.

4.1 Sample Derivation

The research sample was drawn from the subscribers of China Mobile only as this organization is the market leader in the Chinese mobile communications market and agreed to provide assistance for this research. In addition, China Mobile was the only company that would allow the researcher to survey its customers in a retail environment. China Mobile had over 0.3 billion subscribers as of 30 June, 2007 (See Table 4.1).

Table 4.1 The Number of Subscribers, China Mobile

As of 30 June, 2007			
	Contract subscriber	Prepaid subscriber	Total subscriber
Subscriber number	67,354	265,024	332,378
Net additions	372	5,154	5,526
Cumulative net additions	2,085	29,061	31,146
Subscriber Base (in thousands)			

Source: China Mobile (2007)

The primary data was collected in Jinan, China during the period August 16th to September 16th, 2008. Jinan is the capital city of Shandong province and has a population of over six million (China Daily, 2009b). Customers who have been subscribers of China Mobile for less than six month were excluded from the sample as they may have encountered difficulties in answering certain survey questions, such as the accuracy of monthly billing. Customers who were under eighteen years old were also excluded from the sample as they may have encountered difficulties in interpreting the survey questions.

The research sample was selected using a convenient sampling approach. The convenient sampling approach was used as China Mobile insisted on an interviewing technique that would cause the least interruption to its customers and allowed the data to be collected over the shortest time period possible. The convenient sampling approach is a simple process, saving the researcher's time, money, and effort when a list of all members of a given population is not available, when it is inconvenient to randomly select individuals in a given population, or when it is convenient to select homogenous samples from a given population for observation (Fink and Kosecoff, 1998).

4.2 Sample Size

Two techniques were used for the data analysis in this research; exploratory factor analysis and structural equation modeling. The sample size was determined according to the requirements of the two data analysis techniques.

Hair, Black, Babin, Anderson, and Tatham (2006) suggest a sample size of 100 or larger for factor analysis, with at least five times as many observations as variable to be analysed, and a more acceptable size of ten-to-one. There were 43 variables to be factor analysed in this study, hence the sample size needed to be at least 215 respondents.

Structural equation modeling is a statistical approach that involves developing and estimating the measurement models and the structural equation models. The measurement models can be estimated by performing confirmatory factor analysis. Kline (2005) suggest that it is not entirely appropriate to run exploratory factor analysis and confirmatory factor analysis using the same data, as the results of exploratory factor analysis are subject to capitalization on chance variation, and using confirmatory factor analysis to specify a model based on the results of exploratory factor analysis just compounds this problem. Moreover, sometimes, factor structures identified through exploratory factor analysis may turn out to have a poor fit to the same data when evaluated using confirmatory factor analysis (Kline, 2005). For the aforementioned reasons, the researcher deemed it not appropriate to run exploratory factory analysis and confirmatory factor analysis using same data set in this study. Schumacker and Lomax (2004, pg.108) suggest that "In fact, a researcher could begin model generation by using exploratory factor analysis (EFA) on a sample of data to find the number and type of latent variables in a plausible model. Once a plausible model is identified, another sample of data could be used to confirm or test the model, that is, confirmatory factor analysis (CFA)". As a result, two sub-samples each having a sample size of at least 215 respondents were required for this research. One sub-sample was subjected to an exploratory factor analysis. The second sub-sample was subjected to a confirmatory factor analysis.

For structural equation modeling, in general, a sample size of at least 200 observations is recommended for a structural equation model using Maximum Likelihood Estimation (Kelloway, 1998; Boomsma, 1983). However, Tanaka (1993) suggests that as the sample size becomes large (>400), the structural equation modeling method becomes more sensitive and almost any difference is detected, making goodness-of-fit measures suggest a poor fit. As a result, the ideal sample size used for structural equation modeling in this research should be between 200 and 400 observations.

Accordingly, a total sample size of at least 430 was required for this research in order to satisfy the aforementioned requirements of factor analysis and structural equation modeling. The total sample size was divided into two sub-samples of equal size. The first sub-sample that was subjected to an exploratory factor analysis should consist of at least 215 respondents. The second sub-sample that was subjected to structural equation modeling should also consist of at least 215 respondents.

4.3 Questionnaire Design

4.3.1 Construct Operationalisation

The review of the literature discussed in Section 2.4 identified three primary dimensions of service quality for mobile communication services; Interaction Quality, Physical Environment Quality, and Outcome Quality. However, in order to help identify the sub-dimensions pertaining to the three primary dimensions, three focus group interviews were conducted. Focus groups have been used for a number of years in marketing research to "reveal customer's hidden needs, wants, attitudes, feelings, behaviours, perceptions, and motives regarding services, products, or practices" (Hair, Bush, and Ortinau, 2000, pg.223). In particular, Greenbaum (1998) suggests that focus group interviews are most popular with attitude research, such as service quality evaluations.

Cooper and Schindler (2003) recommend that a focus group interview should consist of 6 to 10 respondents. Hair et al. (2000) suggest that the focus groups should be as homogeneous as possible. Therefore, the three focus groups consisted of participants who were eighteen years or older, and had been a subscriber of China Mobile for at least six months.

The three focus group interviews consisted of five participants, six participants, and nine participants respectively. The first focus group consisted of one female participant and four male participants. The second focus group consisted of four female participants and two male participants. The third focus group consisted of five female participants and four male participants. Overall, twenty participants took part in the three focus interviews, ten female participants and ten male participants.

The domain of the construct was specified to the participants at the start of the focus group interviews, as recommended by Churchill (1979). Participants were asked to explain all the factors that contributed to their perceptions of service quality as subscribers of China Mobile. Moreover, participants were requested to evaluate their overall perceptions or experiences as a subscriber of China Mobile, and not to concentrate on one particular service encounter. Following this discussion, the participants were asked to place the factors that impact on their perceptions of service quality under each of the three pertaining primary dimensions of service quality; Interaction Quality, Physical Environment Quality, and Outcome Quality. At this stage, the participants were also encouraged to list any additional factors that influenced their perceptions regarding interaction quality, physical environment quality, and outcome quality in a recent China Mobile service experience. Finally, the participants were asked to discuss and identify any factors that could not be listed under the three primary dimensions in order to determine if any additional primary dimensions should be considered for inclusion in the conceptual research model.

The findings generated in the three focus group interviews were recorded and transcribed. Subsequently, the findings from the three focus group interviews and the literature review were used to help identify the sub-dimensions in the conceptual research model and to assist with item generation in the questionnaire development process.

4.3.2 Pre-testing Procedures

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. A measurement has face validity when the measurement appears to measure what it is supposed to measure (McDaniel and Gates, 1998). Content validity is the assessment regarding "the extent to which an empirical measurement reflects a specific domain of content" (Carmines and Zeller, 1979, pg.20).

The assessment of face and content validity for the initial version of the survey instrument was performed through a two-step process. The first step involved asking three service marketing experts and two industry experts to review and freely comment on the survey questions. The three service marketing experts and two industry experts also assisted in checking the translation consistency of the questionnaire. The second step involved selecting a small representative group to review the survey questions. A convenience sample was drawn from 30 subscribers of China Mobile who were eighteen years or older, and had been a subscriber of China Mobile for at least six months. Respondents to the pre-test were encouraged to make comments and suggestions on any questions 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 complete.

4.3.3 Design and Layout of the Final Survey Instrument

The final version of the questionnaire (See Appendix 1) was divided into five sections. Sections A, B, and C contained the Interaction Quality, Physical Environment Quality, and Outcome Quality items respectively (See Table 4.2, 4.3, and 4.4). The items were grouped in accordance with each of their pertaining primary dimensions and sub-dimensions. Section D contained the items pertaining to Service Quality, Customer Perceived Value, Customer Satisfaction, Corporate Image, Perceived Switching Costs, and Customer Loyalty (See Table 4.5). Section E contained demographic items (See Appendix 1). In addition, a formal cover letter was attached to the questionnaires in order to explain the research background to the respondents (See Appendix 1).

The questionnaire contained performance-only items, as a number of marketing academics support the use of performance-only measures over difference score measures (Zeithaml et al., 1996; Cronin and Taylor, 1994; Brown et al., 1993; Babakus and Boller, 1992; Parasuraman et al., 1991). Moreover, all items regarding customers' perceptions or experiences were positive worded in the questionnaire, as recommended by Parasuraman et al. (1991) and Carman (1990).

All items in Section A, B, C, and D used a standard seven-point Likert-type scale ranging from Strongly Disagree (1) to Strongly Agree (7). Only the extreme end-points and the neutral point were verbally labelled, 1 representing Strongly Disagree, 4 representing Neutral, and 7 representing Strongly Agree, no verbal labels were used for scale points 2, 3, 5, and 6, as Andrews (1984) suggests that labelling all of the response categories is likely to result in inaccurate responses.

4.3.3.1 Section A

Section A included a total of 13 items for measuring interaction quality; there were three pertaining sub-dimensions. As presented in Table 4.2, there were four items for measuring attitudes, four items for measuring behaviour, three items for measuring expertise, and two items for measuring customer overall perceptions of interaction quality.

Table 4.2 Instrument Items and Sub-dimensions for Measuring Interaction Quality

Attitudes (4 Items)	Att1	The employees of China Mobile are friendly.
	Att2	The employees of China Mobile are polite.
	Att3	The employees of China Mobile are courteous.
	Att4	The employees of China Mobile are patient.
Behaviour (4 Items)	Beh1	The employees of China Mobile are willing to provide me with advice and assistance.
	Beh2	The employees of China Mobile always give prompt services.

	Beh3	The employees of China Mobile care about my concerns.
	Beh4	The employees of China Mobile use the appropriate body language when they interact with me.
Expertise (3 Items)	Exp1	The employees of China Mobile are skilled workers and solve my problems.
	Exp2	The employees of China Mobile are knowledgeable when answering my questions.
	Exp3	The employees of China Mobile are professional and well trained.
Interaction Quality (2 Items)	IQ1	Employees of China Mobile deliver superior services.
	IQ2	Overall, the quality of the interactions with employees of China Mobile is excellent.

4.3.3.2 Section B

Section B included a total of 19 items for measuring physical environment quality; there were four pertaining sub-dimensions. As represented in Table 4.3, there were five items for measuring store atmosphere, six items for measuring physically appealing, three items for measuring customer convenience, three items for measuring social factors, and two items for measuring customers' overall perceptions of physical environment quality.

Table 4.3 Instrument Items and Sub-dimensions for Measuring Physical Environment Quality

Store Atmosphere (5 Items)	Sta1	The temperature in the China Mobile stores is comfortable.
	Sta2	The noise level in the China Mobile stores is reasonable.
	Sta3	The air circulation in the China Mobile stores is good.
	Sta4	The space in the China Mobile stores is adequate.
	Sta5	The lighting in the China Mobile stores is appropriate.
Physically Appealing (6 Items)	Pha1	Materials such as handbooks or brochures associated with the mobile services are visually appealing and easy to access in the China Mobile stores.
	Pha2	The employees of China Mobile are well dressed and neat in appearance.

	Pha3	The China Mobile 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 in the China Mobile stores.
	Pha6	The China Mobile stores are clean.
Customer Convenience (3 Items)	Cuc1	The China Mobile stores have operating hours and locations that are convenient for all of their customers.
	Cuc2	The China Mobile stores have convenient car parking for their customers.
	Cuc3	The China Mobile stores provide adequate physical facilities such as seating or rest rooms for their customers.
Social Factors	Sof1	The attitudes of other customers do not disturb me in the China Mobile stores.
	Sof2	The behavior of other customers do not disturb me in the China Mobile stores.
	Sof3	I am not disturbed when other customers interact with the employees in the China Mobile stores.
Physical Environment Quality (2 Items)	PEQ1	I feel comfortable with the physical environment of the China Mobile stores.
	PEQ2	Overall, the physical environment of the China Mobile stores is excellent.

4.3.3.3 Section C

Section C included a total of 17 items for measuring outcome quality; there were five pertaining sub-dimensions. As presented in Table 4.4, there were three items for measuring network quality, three items for measuring billing system, three items for measuring waiting time, three items for measuring reliability, three items for measuring privacy, and two items for measuring customers’ overall perceptions of outcome quality.

Table 4.4 Instrument Items and Sub-dimensions for Measuring Outcome Quality

Network Quality (3 Items)	Neq1 Neq2 Neq3	The other person's voice is loud and clear. The coverage of network is good. The call quality is always good.
Billing System (3 Items)	Bis1 Bis2 Bis3	China Mobile provides accurate billing. The invoice is clear and easy to understand. Payment of the invoice is convenient (e.g. cash, credit card, bank transfer).
Waiting Time (3 Items)	Wat1 Wat2 Wat3	Problems such as poor network or customer complaint are solved quickly with simple procedures. China Mobile always responds promptly to my requests. China Mobile knows that waiting time is important to me.
Reliability (3items)	Rel1 Rel2 Rel3	China Mobile fulfils its customer commitments. China Mobile continually delivers its services at the times it promises to do so. China Mobile's guarantee is excellent.
Privacy (3 Items)	Pri1 Pri2 Pri3	No one can check my personal information that is associated with China Mobile's services except me. China Mobile does protect my private information. China Mobile knows that my privacy is important to me.
Outcome Quality (2 Items)	OQ1 OQ2	It is always a good experience to use the services of China Mobile. Overall, I receive the desired outcome by using the services of China Mobile.

4.3.3.4 Section D

Section D included a total of 18 items for measuring customers' overall perceptions of service quality, customer satisfaction, customer perceived value, corporate image, perceived switching costs, and customer loyalty. As presented in Table 4.5, there were three items for measuring customers' overall perceptions of service quality, three items for measuring customer satisfaction, three items for measuring customer perceived value, three items for measuring corporate image, three items for measuring perceived switching costs, and three items for measuring customer loyalty.

Table 4.5 Instrument Items for Measuring Service Quality, Customer Satisfaction, Customer Perceived Value, Corporate Image, Perceived Switching Costs, and Customer Loyalty

Service Quality (3 Items)	SQ1	China Mobile delivers superior services in every way.
	SQ2	China Mobile consistently provides high quality service products.
	SQ3	Overall, the service quality of China Mobile is excellent.
Customer Satisfaction (3 Items)	CS1	My choice to be a subscriber of China Mobile is a wise one.
	CS2	I feel delighted with the services and goods delivered by China Mobile.
	CS3	Overall, China Mobile provides a very satisfying experience.
Customer Perceived Value (3 Items)	PV1	The services that I receive from China Mobile provide value for money.
	PV2	Compared to what I have to give up such as money, time, energy, and effort, the services that I receive from China Mobile are excellent.
	PV3	Overall, I feel China Mobile's services and goods are valuable.
Corporate Image (3 Items)	CI1	I have always had a good impression of China Mobile.
	CI2	In my opinion, China Mobile has a good image in the minds of consumers.
	CI3	Overall, I consider that China Mobile has a positive image in the marketplace.
Perceived Switching Costs (3 Items)	SC1	If I switch to a new mobile communication provider, I will be concerned that the services offered by the new mobile communication provider may not work as well as China Mobile's services.
	SC2	I want to remain as a subscriber of China Mobile rather than switch to a new mobile communication provider when I consider money, time, energy, effort, and relations.
	SC3	Overall, it is not worthwhile to switch to a new mobile communication provider.

Customer Loyalty (3 Items)	CL1	I intend to repurchase the services of China Mobile.
	CL2	I will recommend China Mobile to others.
	CL3	Overall, given the other choices of mobile communication provider, I will remain as a subscriber of China Mobile.

4.3.3.5 Section E

Section E (See Appendix 1) included four items for measuring demographic information regarding gender, age, length of subscription, and occupation.

4.4 The Method of Data Collection

A face-to-face survey technique was conducted in a participating China Mobile retail store in Jinan. Customers who were over eighteen years old, and had been a subscriber of China Mobile for at least six months were asked to fill in the questionnaires as they entered or exited the store, and to return the questionnaires immediately when they completed the survey. Respondents could ask the interviewer for assistance if they had difficulties in interpreting the questions. In addition, Willimack, Schuman, Pennell, and Lepkowski (1995) note that a prepaid non-monetary incentive results in a high response rate in a face-to-face survey. The authors also suggest that no increase in measurement error is evident due to the incentive. Therefore, a high quality ballpoint pen was used as an incentive in order to encourage customers to participate in this research. Customers were told that if they completed a questionnaire, they would receive a high quality ballpoint pen as appreciation for providing assistance with the research.

4.5 Data Screening

The collected data was screened in order to ensure that only valid data was used in the data analysis stage of this study. Invalid questionnaires, such as highly incomplete questionnaires, were excluded from the data analysis.

4.6 Missing Data Remedy

Missing data under 10% for an individual case or observation can generally be ignored when the missing data is in a random fashion (Hair et al., 2006). Schumacker and Lomax (2004) suggest that mean substitution is the most applicable approach to remedy missing data when the missing data accounts for a small proportion of the sample data.

4.7 Outlier Detection

Outliers are the extreme values that are unusually large or unusually small values in a data set (Anderson, Sweeney, and Williams, 2009). Standardized values (z-scores) are used to identify outliers in this study. Hair et al. (2006) suggest that for a large sample (more than 80 observations) any data value with a standardized value less than -4 or greater than +4 can be identified as an outlier.

Researchers must decide whether outliers should be deleted or retained as problematic outliers can distort statistical tests (Pallant, 2007). An outlier can be deleted when the outlier is a data entry error or a recording mistake. An outlier can also be deleted when the outlier is an observation that should not be included in the data set. However, an outlier can be retained when the outlier is an observation that has been recorded accurately and represents a valid element of the data set (Anderson et al., 2009).

4.8 Normality Test

Normality refers to the "degree to which the distribution of the sample data corresponds to a normal distribution" (Hair et al., 2006, pg.40). Skewness and kurtosis are two indications of normality. Skewness refers to symmetry of a distribution compared with a normal distribution; kurtosis is used to describe whether the peak of a distribution is taller or shorter than a normal distribution (Morgan and Griego, 1998).

The values of the skewness and kurtosis can be examined to determine whether the observed variables are normally distributed in a large sample (200 or more) (Field, 2009). Kline (2005) suggests that the absolute value of skewness greater than 3 and the absolute value of kurtosis greater than 8 indicate problems with normality.

4.9 Data Analysis Techniques

The data collected from the survey was analysed using the software SPSS 15 and LISREL 8.3. Prior to data analysis, the total sample was randomly divided into two sub-samples of equal size. Two techniques were used in part of the data analysis process: exploratory factor analysis and structural equation modeling. A two-stage process was used in order to perform the data analysis. The first stage involved performing exploratory factor analysis on the first sub-sample to identify the underlying factors that made up the sub-dimensions, which in turn, partially satisfied Research Objective One. The second stage of data analysis (structural equation modeling) involved two steps. The first step involved performing confirmatory factor analysis on the second sub-sample to validate the measurement models developed, and to reassess the results of the exploratory factor analysis, which in turn, satisfied both Research Objective One and Two. The second step involved developing and estimating a structural equation model on the second sub-sample to test the hypotheses regarding the relationships between Service Quality, Customer Satisfaction, Customer Perceived Value, Corporate Image, Perceived Switching Costs, and Customer Loyalty discussed in Section 3.2, which in turn, satisfied Research Objective Three.

4.9.1 Exploratory Factor Analysis

In an exploratory factory analysis, "the researcher explores how many factors there are, whether the factors are correlated, and which observed variables appear to best measure each factor" (Schumacker and Lomax, 2004, pg.155). Kline (2005, pg.71) suggests that exploratory factor analysis refers to "a class of procedures that include centriod, principal components, and principal axis factor analysis, among many others, that differ in the statistical criteria used to derive factors".

Common factor analysis and component factor analysis are two basic modes of exploratory factor analysis used in order to obtain factor solutions (Ho, 2006). The objective of common factor analysis is to explain the interrelationships among the original variables. On the other hand, the objective of component factor analysis is to select the components which explain as much of variance in a sample as possible (Hutcheson and Sofroniou, 1999). Several researchers suggest that there is almost no difference between common factor analysis and component factor analysis, or that component factor analysis is preferable to common factor analysis (Schonemann, 1990; Steiger, 1990; Velicer and Jackson, 1990a; Guadagnoli and Velicer, 1988). Component factor analysis has been extensively used by researchers (Jolliffe, 2002), as applying component factor analysis is less problematic and complicated than applying common factor analysis (Velicer and Jackson, 1990b). As a result, component factor analysis was undertaken in this study.

4.9.1.1 Tests for Determining Appropriateness of Factor Analysis

Prior to performing a factor analysis, researchers must ensure that the data matrix has sufficient correlations to justify the application of factor analysis. Four methods are commonly used by researchers to determine whether a factor analysis can be applied to a data matrix.

1. Examination of the Correlation Matrix
2. Inspection of the Anti-Image Correlation Matrix
3. Bartlett's Test of Sphericity
4. The Kaiser-Meyer-Olkin Measure of Sampling Adequacy

4.9.1.1.1 Examination of the Correlation Matrix

Examination of the correlation matrix enables researchers to determine whether there are sufficient correlations exist in a data matrix. Low correlations throughout a correlation matrix indicate that factor analysis is not appropriate (Stewart, 1981). Hardy and Bryman (2004) suggest that correlations in the range of 0.10 to 0.30 are usually considered verbally as being weak. Pallant (2007) suggests factor analysis is applicable when there are substantial numbers of correlations greater than 0.30 in a data matrix. Otherwise, the data matrix is considered to be inappropriate for factor analysis.

4.9.1.1.2 Inspection of the Anti-Image Correlation Matrix

The anti-image correlation matrix represents the negative value of the partial correlation (Brace, Kemp, and Snelgar, 2006). A partial correlation is an unexplained correlation when the effects of other variables are taken into account. Thus, high partial correlations indicate that the unexplained correlations are high in a data matrix (Hair et al., 2006). In other words, there are no sufficient underlying factors for performing factor analysis (Brace et al., 2006). Small anti-image correlations indicate that a data matrix is appropriate for factor analysis (Field, 2009; Tabachnick and Fidell, 2001).

4.9.1.1.3 Bartlett's Test of Sphericity

The Bartlett's test of sphericity is a statistical test that examines whether a correlation matrix has significant correlations among the variables (Hinton, Brownlow, McMurray, and Cozens, 2004). The Bartlett's test of sphericity is computed by the following formula:

Equation 4.1: Bartlett's Test Sphericity

$$-\left[(N-1)-(\frac{2P+5}{6})\right]Log_e|R|$$

Where:

N is the sample size

P is the number of variables, and

$|R|$ is the determinant of the correlation matrix

Sufficient correlations exist among the variables to proceed with factor analysis in a data matrix when Bartlett's test of sphericity is statistically significant (sig.<0.05) (Pallant, 2007; Hinton et al., 2004). Otherwise, the data matrix is inappropriate for factor analysis.

4.9.1.1.4 Kaiser-Meyer-Olkin Measure of Sampling Adequacy

The Kaiser-Meyer-Olkin measure of sampling adequacy is an index that quantifies the degree of intercorrelations among the variables (Stewart, 1981). The Kaiser-Meyer-Olkin is computed by the following formula:

Equation 4.2: Kaiser-Meyer-Olkin Measure of Sampling Adequacy

$$MSA = \frac{\sum \sum_{j\neq k} r^2_{jk}}{\sum \sum_{j\neq k} r^2_{jk} + \sum \sum_{j\neq k} q^2_{jk}}$$

Where:

q^2_{jk} is the square of the off-diagonal elements anti-image correlation matrix, and

r^2_{jk} is the square of the off-diagonal elements of the original correlations

The Kaiser-Meyer-Olkin measure of sampling adequacy ranges from 0 to 1. Variables are perfectly predicted without error by the other variables when the Kaiser-Meyer-Olkin measure of sampling adequacy reaches 1. Kaiser and Rice (1974) give the following guidelines for researchers to determine whether a data matrix is appropriate for factor analysis using the Kaiser-Meyer-Olkin measure of sampling adequacy: 0.90 or above, marvellous; 0.80 or above, meritorious; 0.70 or above, middling; 0.60 or above mediocre; 0.50 or above, miserable; and below 0.50, unacceptable.

4.9.1.2 Factor Extraction in Principal Components Analysis

The purpose of factor extraction is to extract the smallest number of factors that can be used to best represent the interrelations among a set of variables (Pallant, 2005). Stewart (1981) suggests that the decision regarding the number of factors to be extracted generates more controversy and misunderstanding than any other issues regarding factor analysis. Latent root criterion, percentage of variance criterion, and scree test criterion are three common criteria used by researchers for factor extraction (Hair et al., 2006).

4.9.1.2.1 Latent Root Criterion

The rationale of latent root criterion or the Kaiser's criterion is that "only factors that account for the variance of more than one variable are retained for further analysis" (Bryman and Cramer, 2004, as cited in Hardy and Bryman, 2009, pg.29). Each variable contributes a value of 1 to the total eigenvalue, but only the factors having latent roots or eigenvalues greater than 1 are retained, known as the Kaiser's criterion (Hardy and Bryman, 2004). Child (1990) suggests that the Kaiser's criterion is most applicable when the number of variables in the factor analysis is between 20 and 50.

4.9.1.2.2 Percentage of Variance Criterion

The purpose of percentage of variance criterion is to ensure practical significance for the derived factors by ensuring that they explain at least a specified amount of total variance (Hair et al., 2006). Hair et al. (2006) suggest that in the social sciences, it is common to consider a solution that accounts for 60 percent of the total variance as satisfactory.

4.9.1.2.3 Scree Test Criterion

The scree test involves examining the graph of the eigenvalues and finding the cut-off point where the curve fattens out (Osborne and Costello, 2005). Stewart (1981, pg.58) explains the procedure of scree test as follows: "A straight edge is laid across the bottom portion of the roots to see where they form an approximately straight line. The point where the factors curve above the straight line gives the number of factors, the last factor being the one whose eigenvalue immediately proceeds the straight line".

4.9.1.3 Factor Rotation

The purpose of factor rotation is to achieve simpler and more meaningful factor solutions (Osborne and Costello, 2005). Orthogonal factor rotation and oblique factor rotation are two common rotational methods used by researchers (Bryman and Cramer, 2005). Both factor rotation methods were adopted in this study.

4.9.1.3.1 Orthogonal Rotation

Orthogonal rotations force the factors to be uncorrelated (Bryman and Cramer, 2005; Pallant, 2005; Spicer, 2005). Tabachnick and Fidell (2001) suggest that the output of an orthogonal rotation is easier to interpret. QUARTIMAX, VARIMAX, and EQUIMAX are three common orthogonal methods (Larose, 2006; Kim and Mueller, 1978).

The QUARTIMAX rotational method simplifies the rows of a factor matrix through rotating the initial factor so that a variable loads high on one factor and as low as possible on all other factor (Larose, 2006). The QUARTIMAX rotational method is infrequently used by researchers (Meyers, Gamst, and Guarino, 2006), as the QUARTMAX rotational method has not proven to be very successful in producing simple structures (Harman, 1976).

The VARIMAX rotational method simplifies the columns of the factor matrix (Larose, 2006). Hair et al. (2006, pg.126) explain the logical interpretation of the VARIMAX rotational method as follows: "when the variable-factor correlations are (1) close to either +1 or -1, thus indicating a clear positive or negative association between the variable and the factor; or (2) close to 0, indicating a clear lack of association". The VARIMAX rotational method has proved successful in obtaining an orthogonal rotation of factors (Jobson, 1991), and has been the most frequently used orthogonal rotation method (Meyers et al., 2006).

The EQUIMAX rotational method is a combination of the QUARTIMAX rotational method and the VARIMAX rotational method (Larose, 2006; Meyers et al., 2006). The EQUIUMAX rotational method has not gained a widespread acceptance and is used infrequently (Hair et al., 2006; Meyers et al., 2006).

For the aforementioned reasons, the researcher was deemed appropriate to use the VARIMAX rotational method in this study.

4.9.1.3.2 Oblique Rotation

Oblique rotations and orthogonal rotations often result in similar solutions, but oblique rotations do not require the rotation process to keep the factors uncorrelated and the output of an oblique rotation is more difficult to interpret (Meyers et al., 2006; Tabachnick and Fidell, 2001). Stewart (1981) suggests that oblique rotations are very useful in theory building. Pallant (2005) suggests that many researchers conduct both oblique rotations and orthogonal rotations and then select the best result to interpret. As a result, an oblique rotation was also undertaken in this study.

4.9.1.4 Interpretation of Factors

Factor loadings represent the correlations between factors and variables (Kim and Mueller, 1978). The larger factor loadings indicate the higher degree of correspondence between the variables and the factors. Thus, the larger the absolute value of the factor loadings, the more important the factor loadings in interpreting the factor matrix (Brace et al., 2006). Hair et al. (2006) provide three guidelines for assessing the significant of factor loadings:

1. Factor loadings in the range of ±.30 to ±.40 are considered to meet the minimal level for interpretation of structure.
2. Loadings ±.50 or greater are considered practically significant.
3. Loadings exceeding ±.70 are considered indicative of well-defined structure and are the goal of any factor analysis.

Table 4.6 Guidelines for Identifying Significant Factor Loadings Based on Sample Size (Hair et al., 2006)

Factor Loading	Sample Size Needed for Significance	Factor Loading	Sample Size Needed for Significance
0.30	350	0.55	100
0.35	250	0.60	85
0.40	200	0.65	70
0.45	150	0.70	60
0.50	120	0.75	50

In addition, the significance of factor loadings is dependent on the sample size (Field, 2009). The larger the sample size, the smaller the loadings to be considered statistically meaningful (See Table 4.6).

4.9.1.5 Unidimensionality Analysis

The purpose of unidimensionality analysis is to ensure that the measurement scales are unidimensional. A measurement scale is unidimensional when there is a single factor that underlies all the variables (items) and all variables (items) load on that single factor (Bernard, 2000). Items that highly loaded on more than one factor were eliminated as suggested by Hair et al. (2006) in order to ensure an adequate unidimensionality in this study.

4.9.1.6 Reliability and Validity

Reliability is concerned with the ability of a measure to generate consistent results (Schumacker and Lomax, 2004; Nunnally, 1978). Cronbach's coefficient alpha is the most commonly used measure for examining the scale reliability (Kline, 2005). A Cronbach's coefficient alpha of 0.70 or higher is generally acceptable (Nunnally and Bernstein, 1994).

Pallant (2005) defines validity as the degree to which a scale measures what it should measure. Content validity is a form of validity. Churchill (1979) suggests that a measurement instrument is said to display content validity when the measurement instrument provides an adequate representation of the concept that it is intended to measure.

4.9.2 Structural Equation Modeling

"Structural equation modeling is a statistical methodology that takes a confirmatory (i.e., hypothesis-testing) approach to the analysis of a structural theory bearing on some phenomenon" (Byrne, 2001, pg.3). James, Mulaik, and Brett (1982) recommend a two-step approach for performing structural equation modeling that involves developing and estimating the measurement models and the structural equation models. Anderson and Gerbing (1988) note that the estimation of the measurement models provides an assessment of convergent and discriminant validity, and that the estimation of the structural equation models provides an assessment of predictive validity. Moreover, Mulaik, James, Van Alstine, Bennett, Lind, and Stilwell (1989) suggest assessing the fitness of the measurement models and the structural equation models. Jöreskog and Sörbom (1993, p. 113) state that: "The testing of the structural model, i.e., the testing of the initially specified theory, may be meaningless unless it is first established that the measurement holds, if the chosen indicators for a construct do not measure that construct, the specified theory must be modified before it can be tested. Therefore, the measurement model should be tested before the structural relationships are tested." In agreement with Jöreskog and Sörbom (1993), the measurement models and the structural equation model were developed and estimated in this research. Prior to the structural equation model, the measurement models were developed and estimated first as suggested by Jöreskog and Sörbom (1993).

4.9.2.1 Measurement Models

The measurement models are used to define the relations between observed variables (indicators) and the latent constructs (Byrne, 1998). Measurement models also enable researchers to assess how well the observed indicators work as a measurement instrument for the latent variables by investigating the reliabilities and the validities of the observed variables (Jöreskog and Sörbom, 1989). The confirmatory factor analysis models represented the measurement models that were assessed in this research.

4.9.2.1.1 Confirmatory Factor Analysis

Confirmatory factor analysis is different from exploratory factor analysis. The purpose of confirmatory factor analysis is to tell researchers how well their specification of the factors matches the actual data. With confirmatory factor analysis, researchers specify a certain number of factors, which are correlated, and use the observed variables to measure each factor before results can be generated (Schumacker and Lomax, 2004). This result is achieved by assessing the confirmatory factor analysis models (the measurement models).

A total of nine measurement models were developed and estimated in this research: five first-order confirmatory factor analysis models for measuring Interaction Quality, Physical Environment Quality, Outcome Quality, Service Quality, and the six main constructs (Service Quality, Customer Satisfaction, Customer Perceived Value, Corporate Image, Perceived Switching Cost, and Customer Loyalty), and four second-order confirmatory factor analysis models for measuring Interaction Quality, Physical Environment Quality, Outcome Quality, and Service Quality. The purpose of first-order confirmatory factory analysis model is to test the correspondence between the first-order latent factors and observed indicators. The purpose of second-order confirmatory factory analysis model is to assess whether the second-order latent variable is a multidimensional construct composed of multiple first-order factors, explained by their corresponding observed indicators.

4.9.2.1.1.1 Reflective Versus Formative Factor Models

The measurement models developed and estimated in this research were reflective factor models. Reflective factor models are based on the assumption that latent constructs result in measured variables (indicators). Alternatively, formative factor models are based on the assumption that measured variables (indicators) result in latent constructs (Bollen and Lennox, 1991).

Reflective factor models are different from formative factor models in several aspects. Reflective factor models and formative factor models require different validation process. All indicator items are caused by the same latent construct, and are highly correlated with each other in reflective factor models. The existence of the high correlations among the indicator items make internal consistency and reliability useful validation criterion for reflective factor models (Bollen and Lennox, 1991). On the other hand, all formative indicators do not have to be highly correlated in formative factor models; thus, indicator reliability cannot be assessed empirically in formative factor models (Diamantopoulos and Siguaw, 2006). Diamantopoulos and Winklhofer (2001) maintain that procedures used to assess the validity and reliability of reflective factor models are not appropriate for formative factor models. The authors also suggest that guidelines for validating reflective factor models are more easily determined than guidelines for validating formative factors.

Moreover, a single formative measurement model cannot be tested for model fit using structural equation modeling without some alteration, as a formative factor model is unidentified (Hair et al., 2006). Whereas, reflective factor models can be identified and be directly tested for fit. MacCallum and Browne (1993) suggest that formative factor models present greater difficulties with statistical identification.

Furthermore, dropping indicator items in reflective and formative factor models has different implications. The direction of causality is from indicator items to the latent constructs in formative factor models (Bollen and Lennox, 1991). Indicator items jointly determine the conceptual meaning of the latent constructs (Jarvis, MacKenzie, Podsakoff, 2003). Therefore, dropping indicator items is said to cause changes in the conceptual meaning of the latent constructs (Jarvis et al., 2003; Diamantopoulos and Winklhofer, 2001; Nunnally and Bernstein, 1994). Unlike formative factor models, since indicator items are formed by the latent constructs, dropping indicator items is not accompanied by changes in the conceptual meaning of the latent constructs in reflective factor models (Diamantopoulos and Winklhofer, 2001).

In addition, multicollinearity among indicator items can lead to potential problems in formative factor models (Diamantopoulos and Winklhofer, 2001), as multicollinearity can adversely affect the stability of indicator coefficient (Fornell and Bookstein 1982). Unlike formative factor models, multicollinearity among indicator items is not an issue in reflective factor models (Diamantopoulos, 1999).

Hardin, Chang, and Fuller (2008) conclude that reflective indicators can be added or dropped from measures according to an established reliability and validity metric that does not lead to changes in the conceptual meaning of the latent constructs; thus, properly validated reflective measures are relatively stable across assessments.

In fact, several researchers recommend that reflective factor models are suitable for measuring psychological constructs such as attitudes and personality (Hardin, et al., 2008; Diamantopoulos and Winklhofer, 2001; Bollen and Lennox, 1991; Fornell and Bookstein 1982).

4.9.2.1.1.2 Model Specification

The purpose of model specification is to use all of the available relevant theories, researches, and information to develop a theoretical model (Schumacker and Lomax, 2004). A review of relevant empirical studies on service quality, customer satisfaction, customer perceived value, corporate image, perceived switching costs, and customer loyalty (See Chapter Two), and the findings of exploratory factor analysis were used to specify the measurement models and the structural equation model in this research. Moreover, the models specified in this research satisfied the assumptions of Byrne (2001) and Mueller (1996). The assumptions are as follows:

1. The first of each congeneric set of the indicator are set to 1.0, while all other factor loadings are either freely estimated on a specific factor, or fixed to zero on the other factors.
2. All variance/covariance parameters are correlated and freely estimated in the first-order confirmatory factor analysis, while covariations among the first-order factors are explained fully by their regression on the higher-order factor in the second-order confirmatory factor analysis.
3. Error terms related to each measurement indicator are uncorrelated.

Byrne (2001) and Mueller (1996)

4.9.2.1.1.3 Model Identification

Generally speaking, the problem of model identification is concerned with whether one has sufficient information to derive a unique solution for the parameters to be estimated in a model (Diamantopoulos and Siguaw, 2000). A model is considered as identified if it is theoretically possible to obtain a unique estimate of each parameter (Kline, 2005).

There are three levels of model identification; underidentified model, just-identified model, and overidentified model (Diamantopoulos and Siguaw, 2000). A confirmatory factor analysis model is underidentified when there are more parameters to be estimated than the number of variances and covariances (negative degrees of freedom). An underidentified model indicates that there is not sufficient information to estimate all model parameters. A confirmatory factor analysis model is just-identified when there are just enough variances and covariances to estimate all model parameters (zero degrees of freedom). A just-identified model indicates that there is just enough information to estimate all model parameters. A confirmatory factor analysis model is overidentified when the number of variances and covariances are more than parameters to be estimated (positive degrees of freedom). An overidentified model indicates that there is more than just enough information to estimate all model parameters (Byrne, 2001).

The t-rule is a method of model identification (Kelloway, 1998). The t-rule refers to the requirement that the number of variances and covariances (p[p+1]/2) must be equal to, or greater than, the total number of parameters; where p is the total number of observed variables. A confirmatory factor analysis model is identified when the t-rule is satisfied (Byrne, 2001). The order condition is an alternative method of the t-rule that requires that the net degrees of freedom for a model must be greater than zero. That is, the number of free parameter estimates must be less than or equal to the number of unique covariance and variance terms (Schumacker and Lomax, 2004). A confirmatory factor analysis model is identified when the order condition is satisfied.

4.9.2.1.1.4 Model Fit Indices

A specified model is supported by the sample data when the fit of the model is good (Schumacker and Lomax, 2004). The fit of a specified model to the sample data can be assessed using several model fit indices; normed chi-square (χ^2/df), goodness-of-fit index (GFI), standardized root mean residual (SRMR), comparative fit index (CFI), normed fit index (NFI), and root mean square error of approximation (RMSEA). The recommended thresholds for model fit indices are presented Table 4.7.

4.9.2.1.1.4.1 Normed Chi-square

The normed chi-square (χ^2/df) is a ratio of chi-square (χ^2) to the degrees of freedom (df) for a model. χ^2 is a measure that quantifies the differences between the observed and estimated covariance matrices. df is the amount of mathematical information available to estimate model parameters. A normed chi-square ratio (χ^2/df) less than 3.0 is generally associated with acceptable or good model fit (Kline, 2005; Carmines and Mclver, 1981).

4.9.2.1.1.4.2 Goodness-of-fit Index

The goodness-of-fit index (GFI) represents a weight proportion of variance in the sample covariance accounted for by the estimated population covariance matrix (Tanaka and Huba, 1989), and is analogous to the R^2 in multiple regression (Blunch, 2008; Kline, 2005; Tanaka and Huba, 1989). Kline (2005) suggests that a GFI greater than 0.9 is generally associated with good model fit.

4.9.2.1.1.4.3 Standardized Root Mean Residual

The standardized root mean residual (SRMR) is a measure that quantifies the mean absolute correlation residual derived from the overall difference between the observed and predicted correlations (Kline, 2005). Kline (2005) suggests that a SRMR smaller than 0.10 is generally considered favourable.

4.9.2.1.1.4.4 Comparative Fit Index

The comparative fit index (CFI) is a measure that quantifies the relative improvement in the model fit compared with an independent model (Kline, 2005). Kline (2005), and Hu and Bentler (1999) suggest that a CFI greater than 0.90 is generally associated with a good model fit.

4.9.2.1.1.4.5 Normed Fit Index

The normed fit index (NFI) is a measure that quantifies the differences in the χ^2 value for the fitted model and an independent model divided by the χ^2 value for the independent model (Hair et al., 2006). Kelloway (1998) suggest that a NFI greater than 0.90 is generally associated with good model fit.

4.9.2.1.1.4.6 Root Mean Square Error of Approximation (RMSEA)

The root mean square error of approximation (RMSEA) is a measure that represents how well a model fits a population (Hair et al., 2006). A lower value RMSEA indicates a better model fit. A RMSEA less than 0.08 is generally associated with acceptable model fit (Brown and Cudeck, 1993).

Table 4.7 Model Fit Indices and Recommended Thresholds

Goodness-of-Fit Indices	Recommended Thresholds
Normed Chi-square (χ^2/df)	Less than 3.0
Goodness-of-Fit Index (GFI)	0.9 or larger
Standardized Root Mean Residual (SRMR)	0.10 or less
Comparative Fit Index (CFI)	0.9 or larger
Normed Fit Index (NFI)	0.9 or larger
Root Mean Square Error of Approximation (RMSEA)	0.08 or less

4.9.2.1.1.5 Model Modification

The purpose of model modification is to improve the overall model fit to the sample data by identifying any misspecification that exists in the model (Byrne, 2001). However, attempts to further improve an already well-fitting model through modifications can be very unstable (Diamantopoulos and Siguaw, 2000). Indeed, MacCallum, Roznowski, and Necowhz (1992, p.501) argue that, “when an initial model fits well, it is probably unwise to modify it to achieve even better fit because modifications may simply be fitting small idiosyncratic characteristics of the sample”. Therefore, model modification is necessary only in this study, when a model has a poor fit to a sample data. Two diagnostic measures can be used to perform model modification in this research; modification indices and standardized residuals (Diamantopoulos and Siguaw, 2000).

4.9.2.1.1.5.1 Modification Indices

A modification index (MI) refers to the value of an expected decrease in a model’s chi-squared value if a previously fixed parameter is set free in a subsequent run (Byrne, 1998). Small MIs indicate a good model fit, as a large MI indicates a model fit can be improved by freeing a corresponding path (Hair et al., 2006). The utilization of the modification indices is usually associated with an interpretation of the expected parameter change statistics (EPCs). An EPC refers to an estimated value of a freed parameter (Schumacker and Lomax, 2004).

Saris, Satorra, and Sörbom (1987) suggest that: 1) a fixed parameter with a large MI and a large EPC may be freed, especially when there is a sound theoretical support for doing so; 2) a fixed parameter with a large MI and a small EPC may remain fixed, as the obtained parameter estimate by freeing the fixed parameter is likely to be trivial; 3) a fixed parameter with a small MI and a large EPC may be due to sampling variability, or to insensitivity of the chi-square test to the fixed parameter, while what to do in this situation is ambiguous; 4) a fixed parameter with a small MI and a small EPC may remain fixed.

4.9.2.1.1.5.2 Standardized Residuals

Standardized residuals are residuals divided by their estimated standard errors (Jöreskog and Sörbom, 1993). Byrne (1998) suggests that large residuals, that associate with particular parameters, indicate their misspecification in a model, thereby leading to the overall model misfit. Standardized residual values larger than the critical value of 2.58 suggest a possible misfit in a model (Diamantopoulos and Siguaw, 2000).

4.9.2.1.1.6 Unidimensionality Analysis

Anderson and Gerbing (1991) suggest that a prerequisite for assessment of construct validity and reliability is the unidimensionality of the measure. Byrne (1994) suggest that there is a strong evidence of unidimensionality when a CFI is 0.90 or above for a model.

4.9.2.1.1.7 Reliability and Construct Validity

Reliability and construct validity of the measurement instrument were assessed in the confirmatory factor analysis.

Construct reliability (CR) (also known as composite reliability) was used to assess the reliability of the measurement instrument in this research. The CR is computed by the following formula:

Equation 4.3: Construct Reliability

$$\rho_c = \left(\sum \lambda\right)^2 / \left[\left(\sum \lambda\right)^2 + \sum(\theta)\right]$$

Where:

ρ_c is the construct reliability

λ are the indicator loadings

θ are the indicator error variances

$\sum$ is the summation over the indicators of the latent variable

A CR of 0.70 or higher is generally acceptable (Nunnally, 1978).

Convergent validity and discriminant validity were used to assess the construct validity of the measurement instrument in this research.

Convergent validity refers to "the extent to which independent measures of the same trait are correlated" (Byrne, 1998, pg.213). Factor loadings and the average variance extracted (AVE) were used to assess the convergent validity in this research. There is a strong evidence of convergent validity when standardized factor loadings are statistically significant (t-values > 1.96) (Anderson and Gerbing, 1988), and when factor loadings are above a recommended cut-off point of 0.60 (Bagozzi and Yi, 1988). Moreover, convergent validity was assessed by investigating the AVE. The AVE is computed by the following formula:

Equation 4.4: Average Variance Extracted

$$AVE = \frac{\sum_{i=1}^{n} \lambda_i^2}{n}$$

Where:

λ is the standardized factor loading

i is the number of items

n is the total number of items

A model is said to have a good convergent validity when the AVEs of all constructs are 0.50 or higher, indicating that at least 50 percent of measurement variance is accounted by each of the constructs (Fornell and Larcker, 1981).

Discriminant validity refers to "the degree to which two conceptually similar concepts are distinct" (Hair et al., 2006, pg.137). Discriminant validity can be assessed by investigating the correlation coefficients between different constructs. Kline (2005) suggests that a correlation coefficient less than 0.85 is indicative of acceptable discriminant validity.

4.9.2.2 Structural Equation Model

The structural equation model defines relations among the unobserved variables, and specifies which latent variables directly or indirectly cause changes in other latent variables (Byrne, 1998). A structural equation model was designed to examine the causal relationships among the latent variables (Service Quality, Customer Satisfaction, Customer Perceived Value, Corporate Image, Perceived Switching Costs, and Customer Loyalty) in this research. The specification of the structural equation model was based on a review of relevant empirical studies on service quality, customer satisfaction, customer perceived value, corporate image, perceived switching costs, and customer loyalty (See Chapter Two). The model identification, the model modification, the overall model fit, and the path estimates for the hypothesized relationships (See Chapter Three) were assessed in the structural equation model.

Chapter 5

Results

This chapter presents the results, and discusses the findings of this study. The data set was randomly divided into two sub-samples of equal size: Sample One and Sample Two. Sample One was subjected to an exploratory factor analysis. Sample Two was subjected to structural equation modeling. The results of the data analysis are presented. The seventeen Hypotheses are tested.

5.1 Sample and Usable Responses

Five hundred and twenty three questionnaires were distributed and returned. Seven of the questionnaires were excluded, as they were incomplete. This resulted in a total of 516 useable responses. The mean substitution method was used for the missing data remedy, as the missing data accounted for only a very small proportion of the sample data, and was also missing in a random fashion (Hair et al., 2006; Schumacker and Lomax, 2004). In addition, the 516 useable responses were randomly divided into two sub-samples of equal size: Sample One and Sample Two. Each sub-sample contained 258 useable responses. The size of Sample One was above the minimum sample size of 215 as suggested by Hair et al. (2006) for an exploratory factor analysis. The size of Sample Two was above the minimum sample size of 200 as suggested by Kelloway (1998) and Boomsma (1983) for a structural equation modeling using Maximum Likelihood Estimation. Therefore, the two sub-sample sizes were deemed to be acceptable for the purpose of this research.

5.2 Outliers

Only few outliers were identified in the data set of this study by examining the standardized values of observed variables. However, these outliers were recorded accurately and represented a valid element of the data set. According to Anderson et al. (2009), if outliers do represent an element of the population, these outliers should be retained in order to ensure generalizability to the entire population. Therefore, the outliers identified in this study were retained in the data set.

5.3 Normality Test

Sample One and Sample Two were examined for normality respectively.

The results pertaining to the normality test for Sample One indicated that the maximum absolute values of skewness and kurtosis were 0.93 and 1.34 respectively (See Appendix 2). These values were well below their respective cut-offs of 3 for skewness and 8 for kurtosis as suggested by Kline (2005), implying that the observed variables in Sample One were approximately normally distributed.

The results pertaining to the normality test for Sample Two indicated that the maximum absolute values of skewness and kurtosis were 0.95 and 0.97 respectively (See Appendix 3). These values were well below their respective cut-offs of 3 for skewness and 8 for kurtosis as suggested by Kline (2005), implying that the observed variables in Sample Two were approximately normally distributed.

5.4 Descriptive Statistics

Section E of the questionnaire was designed to capture some basic demographic details of the respondents that participated in this study. The results of the demographic characteristics for the total sample respondents are presented in Tables 5.1 to 5.4.

Table 5.1 Gender Results (Total Sample)

	Frequency	Percent	Cumulative Percent
Male	275	53.3	53.3
Female	241	46.7	100.0
Total	516	100.0	

There were more male respondents than female respondents, 275 and 241 respectively.

Table 5.2 Age Results (Total Sample)

	Frequency	Percent	Cumulative Percent
18-25	237	45.9	45.9
26-35	183	35.5	81.4
36-45	64	12.4	93.8
46-55	19	3.7	97.5
56-65	13	2.5	100.0
Total	516	100.0	

The biggest proportion of the total sample was 45.9%, and was composed of respondents aged between 18 and 25. Respondents aged between 26 and 35 accounted for 35.5% of the total sample, and formed the second biggest proportion of the total sample.

Table 5.3 Results of Subscription Length (Total Sample)

	Frequency	Percent	Cumulative Percent
One year	85	16.5	16.5
Two years	106	20.5	37.0
Three years	114	22.1	59.1
Four years	56	10.9	70.0
Five years	53	10.3	80.2
Six years	40	7.8	88.0
Seven years	22	4.3	92.2
Eight years	23	4.5	96.7
Over eight years	17	3.3	100.0
Total	516	100.0	

The biggest proportion of the total sample was composed of respondents who had been a subscriber of China Mobile for at least three years, 22.1%, followed by respondents who had been a subscriber of China Mobile for at least two years, 20.5%.

Table 5.4 Occupation Results (Total Sample)

	Frequency	Percent	Cumulative Percent
Clerical	81	15.7	15.7
Sales/Service	110	21.3	37.0
Student	117	22.7	59.7
Professional	63	12.2	71.9
Tradesperson	45	8.7	80.6
Unemployed	11	2.1	82.8
Labourer	59	11.4	94.2
Farmer	13	2.5	96.7
Others	17	3.3	100.0
Total	516	100.0	

Student respondents formed the biggest proportion of the total sample, 22.7%, followed by respondents who were employed in retail, or service industries, 21.3%.

The total sample was randomly divided into two sub-samples: Sample One and Sample Two. Gender distribution results of Sample One respondents and Sample Two respondents are presented in Table 5.5.

Table 5.5 Gender Results (Sample One and Sample Two)

	Sample One			Sample Two		
	Frequency	Percent	Cumulative Percent	Frequency	Percent	Cumulative Percent
Male	136	52.7	52.7	139	53.9	53.9
Female	122	47.3	100.0	119	46.1	100.0
Total	258	100.0		258	100.0	

Age distribution results of Sample One respondents and Sample Two respondents are presented in Table 5.6.

Table 5.6 Age Results (Sample One and Sample Two)

	Sample One			Sample Two		
	Frequency	Percent	Cumulative Percent	Frequency	Percent	Cumulative Percent
18-25	116	45.0	45.0	121	46.9	46.9
26-35	97	37.6	82.6	86	33.3	80.2
36-45	31	12.0	94.6	33	12.8	93.0
46-55	9	3.5	98.1	10	3.9	96.9
56-65	5	1.9	100.0	8	3.1	100.0
Total	258	100.0		258	100.0	

The results of the subscription length of Sample One respondents and Sample Two respondents are presented in Table 5.7.

Table 5.7 Results of Subscription Length (Sample One and Sample Two)

	Sample One			Sample Two		
	Frequency	Percent	Cumulative Percent	Frequency	Percent	Cumulative Percent
One year	40	15.5	15.5	45	17.4	17.4
Two years	55	21.3	36.8	51	19.8	37.2
Three years	59	22.9	59.7	55	21.3	58.5
Four years	30	11.6	71.3	26	10.1	68.6
Five years	21	8.1	79.5	32	12.4	81.0
Six years	17	6.6	86.0	23	8.9	89.9
Seven years	12	4.7	90.7	10	3.9	93.8
Eight years	14	5.4	96.1	9	3.5	97.3
Over eight years	10	3.9	100.0	7	2.7	100.0
Total	258	100.0		258	100.0	

The results of the occupation distribution of Sample One respondents and Sample Two respondents are presented in Table 5.8.

Table 5.8 Occupation Results (Sample One and Sample Two)

	Frequency	Percent	Cumulative Percent	Frequency	Percent	Cumulative Percent
Clerical	38	14.7	14.7	43	16.7	16.7
Sales/Service	52	20.2	34.9	58	22.5	39.1
Student	57	22.1	57.0	60	23.3	62.4
Professional	36	14.0	70.9	27	10.5	72.9
Tradesperson	24	9.3	80.2	21	8.1	81.0
Unemployed	2	.8	81.0	9	3.5	84.5
Labourer	31	12.0	93.0	28	10.9	95.3
Farmer	8	3.1	96.1	5	1.9	97.3
Others	10	3.9	100.0	7	2.7	100.0
Total	258	100.0		258	100.0	

The demographic statistics of Sample One and Sample Two indicated that the respondents exhibited similar demographic characteristics (See, Table 5.5 to Table 5.8).

5.5 Exploratory Factor Analysis

The follow sections provide the results of exploratory factor analysis undertaken in this study.

5.5.1 Exploratory Factor Analysis for Interaction Quality

The following sections provide the results of exploratory factor analysis for Interaction Quality.

5.5.1.1 Tests for Determining Appropriateness of Exploratory Factor Analysis (Interaction Quality)

As discussed in Section 4.9.1.1, prior to performing an exploratory factor analysis for Interaction Quality, the Sample One data set was examined in order to ensure the appropriateness of the data set for exploratory factor analysis.

5.5.1.1.1 Examination of the Correlation Matrix (Interaction Quality)

The visual inspection of the correlation matrix (See Appendix 4) showed that there were many substantial correlations above 0.30 as suggested by Pallant (2007), indicating that the data set was appropriate for exploratory factor analysis.

5.5.1.1.2 Inspection of the Anti-Image Correlation Matrix (Interaction Quality)

The visual inspection of the anti-image correlation matrix (See Appendix 5) showed that the majority of the partial correlations were low as suggested by Field (2009), and Tabachnick and Fidell (2001), indicating that the data set was appropriate for exploratory factor analysis.

5.5.1.1.3 Bartlett's Test of Sphericity (Interaction Quality)

Table 5.9 Bartlett's Test (Interaction Quality)

Bartlett's Test of Sphericity	Approx. Chi-Square	1096.683
	df	55
	Sig.	.000

The value of Bartlett's test was statistically significant (sig.<0.05) as suggested by Pallant (2007) and Hinton et al. (2004), indicating that the data set was appropriate for exploratory factor analysis.

5.5.1.1.4 Kaiser-Meyer-Olkin Measure of Sampling Adequacy (Interaction Quality)

The Kaiser-Meyer-Olkin measure of sampling adequacy index was 0.851. Kaiser and Rice (1974) defined this value (0.80+) as "meritorious", indicating that the data set was appropriate for exploratory factor analysis.

5.5.1.2 Results of Exploratory Factor Analysis for Interaction Quality

The results of the tests for determining appropriateness of exploratory factor analysis for Interaction Quality indicated that the Sample One data set was appropriate for exploratory factor analysis. Consequently, principle component factor analysis was conducted on all of the items measuring Interaction Quality that were generated from the information gathered from the focus groups and the literature review.

5.5.1.2.1 Latent Root Criterion (Interaction Quality)

The result of the latent root criterion indicated that 3 dimensions of Interaction Quality should be extracted from the 11 variables submitted for exploratory factor analysis (See Appendix 6).

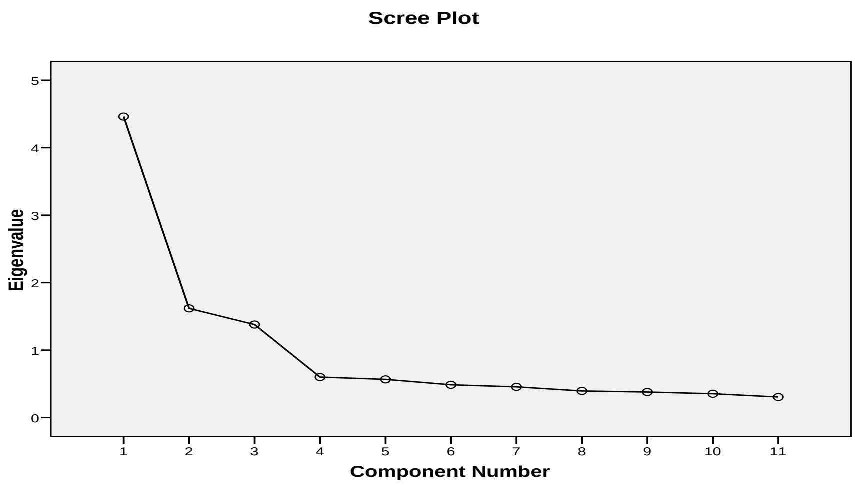
5.5.1.2.2 Percentage of Variance Criterion (Interaction Quality)

The 3 dimensions of Interaction Quality extracted explained approximate 67.80% of the variation in the data set, and was above 60% as suggested by Hair et al. (2006) (See Appendix 6).

5.5.1.2.3 Scree Test Criterion (Interaction Quality)

By laying a straight edge across the bottom portion of the roots, there were 3 dimensions before the curve became approximately a straight line (See Figure 5.1), indicating that the extraction of 3 dimensions was appropriate for this analysis.

Figure 5.1 Scree Plot (Interaction Quality)



5.5.1.2.4 Factor Rotation (Interaction Quality)

Although the significance of the variable loadings changed slightly between the VARIMAX and the Oblique rotations, both the VARIMAX and the Oblique rotations (See Appendix 7 & 8) displayed identical factorial structures. The final factorial structure was based on the VARIMAX rotation results, as the output of an Oblique rotation is more difficult to interpret (Tabachnick and Fidell, 2001).

5.5.1.2.5 Factor Interpretation (Interaction Quality)

All of the 11 items that had significant loadings above ±0.35 were retained in the analysis. The 11 items loaded on 3 factors respectively: Attitudes (4 items), Behaviour (4 items), and Expertise (3 items).

5.5.1.2.6 Unidimensionality Analysis (Interaction Quality)

Any items that highly load on more than one factor should be eliminated in order to ensure an adequate unidimensionality. However, none of items highly loaded on more than one factor, indicating an adequate unidimensionality.

5.5.1.2.7 Reliability and Validity (Interaction Quality)

5.5.1.2.7.1 Reliability (Interaction Quality)

The 11 variables were subjected to reliability tests. Reliability was measured with the Cronbach's coefficient alpha. All factors had a Cronbach's coefficient alpha greater than 0.70 as suggested by Nunnally and Bernstein (1994). The results of reliability tests are summarised in Table 5.10.

Table 5.10 Reliability of Scaled Items for Interaction Quality

Dimensions	Cronbach's Coefficient Alphas	Items Nos.	Rotation Loadings
Attitudes	0.821	Att1	0.818
		Att2	0.796
		Att4	0.750
		Att3	0.744
Behaviour	0.814	Beh4	0.800
		Beh1	0.800
		Beh2	0.741
		Beh3	0.721
Expertise	0.820	Exp3	0.845
		Exp1	0.838
		Exp2	0.796

5.5.1.2.7.2 Validity (Interaction Quality)

The 11 variables loaded on 3 factors respectively as expected from the literature review and the focus group discussions. Therefore, the researcher concluded that the measurement instrument for Interaction Quality used in this study exhibited adequate content validity.

5.5.2 Exploratory Factor Analysis for Physical Environment Quality

The following sections provide the results of exploratory factor analysis for Physical Environment Quality.

5.5.2.1 Tests for Determining Appropriateness of Exploratory Factor Analysis (Physical Environment Quality)

As discussed in Section 4.9.1.1, prior to performing an exploratory factor analysis for Physical Environment Quality, the Sample One data set was examined in order to ensure the appropriateness of the data set for exploratory factor analysis.

5.5.2.1.1 Examination of the Correlation Matrix (Physical Environment Quality)

The visual inspection of the correlation matrix (See Appendix 9) showed that there were many substantial correlations above 0.30 as suggested by Pallant (2007), indicating that the data set was appropriate for exploratory factor analysis.

5.5.2.1.2 Inspection of the Anti-Image Correlation Matrix (Physical Environment Quality)

The visual inspection of the anti-image correlation matrix (See Appendix 10) showed that the majority of the partial correlations were low as suggested by Field (2009), and Tabachnick and Fidell (2001), indicating that the data set was appropriate for exploratory factor analysis.

5.5.2.1.3 Bartlett's Test of Sphericity (Physical Environment Quality)

Table 5.11 Bartlett's Test (Physical Environment Quality)

Bartlett's Test of Sphericity	Approx. Chi-Square	1706.301
	df	136
	Sig.	.000

The value of Bartlett's test was statistically significant (sig.<0.05) as suggested by Pallant (2007) and Hinton et al. (2004), indicating that the data set was appropriate for exploratory factor analysis.

5.5.2.1.4 Kaiser-Meyer-Olkin Measure of Sampling Adequacy (Physical Environment Quality)

The Kaiser-Meyer-Olkin measure of sampling adequacy index was 0.886. Kaiser and Rice (1974) defined this value (0.80+) as “meritorious”, indicating that the data set was appropriate for exploratory factor analysis.

5.5.2.2 Results of Exploratory Factor Analysis for Physical Environment Quality

The results of the tests for determining appropriateness of exploratory factor analysis for Physical Environment Quality indicated that the Sample One data set was appropriate for exploratory factor analysis. Consequently, principle component factor analysis was conducted on all of the items measuring Physical Environment Quality that were generated from the information gathered from the focus groups and the literature review.

5.5.2.2.1 Latent Root Criterion (Physical Environment Quality)

The result of the latent root criterion indicated that 4 dimensions of Physical Environment Quality should be extracted from the 17 variables submitted for exploratory factor analysis (See Appendix 11).

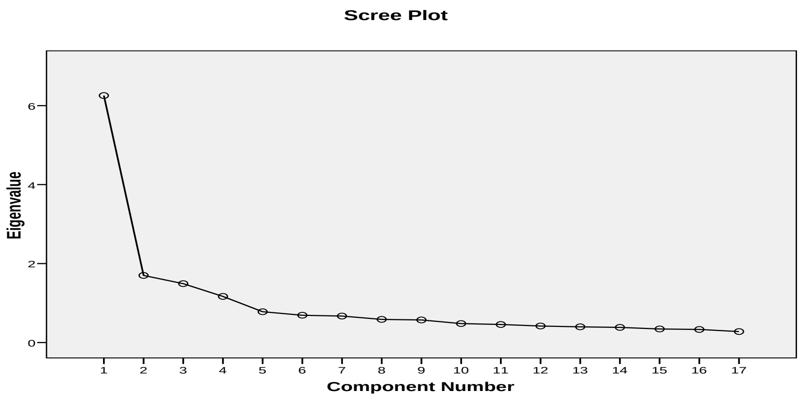
5.5.2.2.2 Percentage of Variance Criterion (Physical Environment Quality)

The 4 dimensions of Physical Environment Quality extracted explained approximate 62.44% of the variation in the data set, and was above 60% as suggested by Hair et al. (2006) (See Appendix 11).

5.5.2.2.3 Scree Test Criterion (Physical Environment Quality)

By laying a straight edge across the bottom portion of the roots, there were 4 dimensions before the curve became approximately a straight line (See Figure 5.2), indicating that the extraction of 4 dimensions was appropriate for this analysis.

Figure 5.2 Scree Plot (Physical Environment Quality)



5.5.2.2.4 Factor Rotation (Physical Environment Quality)

Although the significance of the variable loadings changed slightly between the VARIMAX and the Oblique rotations, both the VARIMAX and the Oblique rotations (See Appendix 12 & 13) displayed similar factorial structures. The final factorial structure was based on the VARIMAX rotation results, as the output of an Oblique rotation is more difficult to interpret (Tabachnick and Fidell, 2001).

5.5.2.2.5 Factor Interpretation (Physical Environment Quality)

All of the 17 items that had significant loadings above ±0.35 were retained in the analysis. The 17 items loaded on 4 factors respectively: Store Atmosphere (5 items), Physically Appealing (6 items), Customer Convenience (3 items), and Social Factors (3 items).

5.5.2.2.6 Unidimensionality Analysis (Physical Environment Quality)

Any items that highly load on more than one factor should be eliminated in order to ensure an adequate unidimensionality. Four items (Sta4, Sta5 Pha2, and Pha5) loaded on two factors. Item Sta4 highly loaded on the Store Atmosphere factor, and moderately loaded on the Social Factors factor. Items Sta5 highly loaded on the Store Atmosphere factor, and moderately loaded on the Physically Appealing factor. Items Sta4 and Sta5 remained as the two variables representing the Store Atmosphere factor, as items Sta4 and Sta5 only highly loaded on one factor. Item Pha2 highly loaded on both the Store Atmosphere and Physically Appealing factors. Item Pha5 highly loaded on both the Physically Appealing and Customer Convenience factors. Items Pha2 and

Pha5 were eliminated, as items Pha2 and Pha5 highly loaded on more than one factor, and could not be considered highly associated with any particular factor (Hair et al., 2006). The outcome of this process resulted in 15 variables that represented 4 factors in the analysis.

5.5.2.2.7 Reliability and Validity (Physical Environment Quality)

5.5.2.2.7.1 Reliability (Physical Environment Quality)

The remaining 15 variables were subjected to reliability tests. Reliability was measured with the Cronbach's coefficient alpha. All factors had a Cronbach's coefficient alpha greater than 0.70 as suggested by Nunnally and Bernstein (1994). The results of reliability tests are summarised in Table 5.12.

Table 5.12 Reliability of Scaled Items for Physical Environment Quality

Dimensions	Cronbach's Coefficient Alphas	Items Nos.	Rotation Loadings
Store Atmosphere	0.815	Sta1	0.794
		Sta3	0.754
		Sta5	0.712
		Sta2	0.614
		Sta4	0.532
Physically Appealing	0.800	Pha4	0.753
		Pha6	0.745
		Pha3	0.712
		Pha1	0.705
Customer Convenience	0.793	Cuc1	0.822
		Cuc3	0.820
		Cuc2	0.763
Social Factors	0.782	Sof2	0.827
		Sof1	0.804
		Sof3	0.749

5.5.2.2.7.2 Validity (Physical Environment Quality)

The remaining 15 variables loaded on 4 factors respectively as expected from the literature review and the focus group discussions. Therefore, the researcher concluded that the measurement instrument for Physical Environment Quality used in this study exhibited adequate content validity.

5.5.3 Exploratory Factor Analysis for Outcome Quality

The following sections provide the results of exploratory factor analysis for Outcome Quality.

5.5.3.1 Tests for Determining Appropriateness of Exploratory Factor Analysis (Outcome Quality)

As discussed in Section 4.9.1.1, prior to performing an exploratory factor analysis for Outcome Quality, the Sample One data set was examined in order to ensure the appropriateness of the data set for exploratory factor analysis.

5.5.3.1.1 Examination of the Correlation Matrix (Outcome Quality)

The visual inspection of the correlation matrix (See Appendix 14) showed that there were many substantial correlations above 0.30 as suggested by Pallant (2007), indicating that the data set was appropriate for exploratory factor analysis.

5.5.3.1.2 Inspection of the Anti-Image Correlation Matrix (Outcome Quality)

The visual inspection of the anti-image correlation matrix (See Appendix 15) showed that the majority of the partial correlations were low as suggested by Field (2009), and Tabachnick and Fidell (2001), indicating that the data set was appropriate for exploratory factor analysis.

5.5.3.1.3 Bartlett's Test of Sphericity (Outcome Quality)

Table 5.13 Bartlett's Test (Outcome Quality)

Bartlett's Test of Sphericity	Approx. Chi-Square	1759.192
	df	105
	Sig.	.000

The value of Bartlett's test was statistically significant (sig.<0.05) as suggested by Pallant (2007) and Hinton et al. (2004), indicating that the data set was appropriate for exploratory factor analysis.

5.5.3.1.4 Kaiser-Meyer-Olkin Measure of Sampling Adequacy (Outcome Quality)

The Kaiser-Meyer-Olkin measure of sampling adequacy index was 0.850. Kaiser and Rice (1974) defined this value (0.80+) as "meritorious", indicating that the data set was appropriate for exploratory factor analysis.

5.5.3.2 Results of Exploratory Factor Analysis for Outcome Quality

The results of the tests for determining appropriateness of exploratory factor analysis for Outcome Quality indicated that the Sample One data set was appropriate for exploratory factor analysis. Consequently, principle component factor analysis was conducted on all of the items measuring Outcome Quality that were generated from the information gathered from the focus groups and the literature review.

5.5.3.2.1 Latent Root Criterion (Outcome Quality)

The result of the latent root criterion indicated that 5 dimensions of Outcome Quality should be extracted from the 15 variables submitted for exploratory factor analysis (See Appendix 16).

5.5.3.2.2 Percentage of Variance Criterion (Outcome Quality)

The 5 dimensions of Outcome Quality extracted explained approximate 74.80% of the variation in the data set, and was above 60% as suggested by Hair et al. (2006) (See Appendix 16).

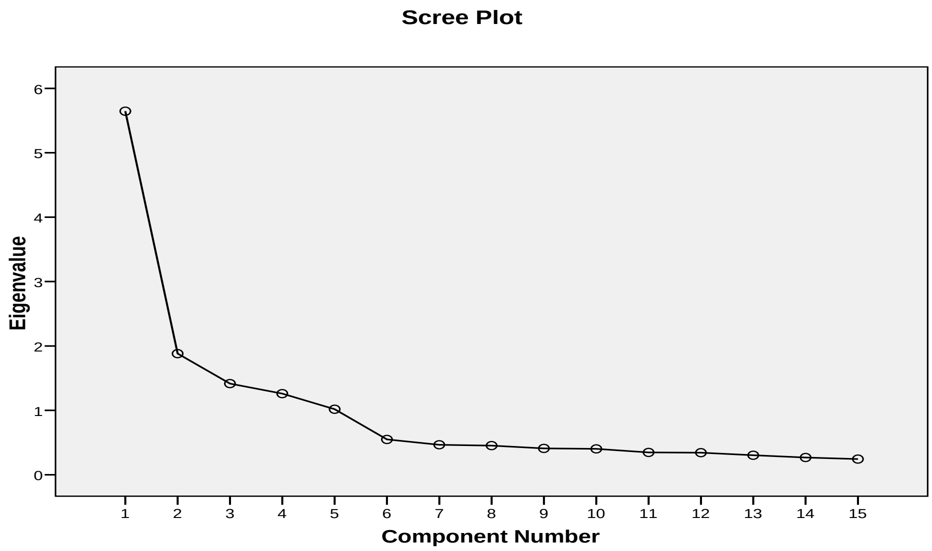
5.5.3.2.3 Scree Test Criterion (Outcome Quality)

By laying a straight edge across the bottom portion of the roots, there were 5 dimensions before the curve became approximately a straight line (See Figure 5.3), indicating that the extraction of 5 dimensions was appropriate for this analysis.

5.5.3.2.4 Factor Rotation (Outcome Quality)

Although the significance of the variable loadings changed slightly between the VARIMAX and the Oblique rotations, both the VARIMAX and the Oblique rotations (See Appendix 17 & 18) displayed similar factorial structures. The final factorial structure was based on the VARIMAX rotation results, as the output of an Oblique rotation is more difficult to interpret (Tabachnick and Fidell, 2001).

Figure 5.3 Scree Plot (Outcome Quality)



5.5.3.2.5 Factor Interpretation (Outcome Quality)

All of the 15 items that had significant loadings above ±0.35 were retained in the analysis. The 15 items loaded on 5 factors respectively: Network Quality (3 items), Billing System (3 items), Waiting Time (3 items), Reliability (3 items), and Privacy (3 items).

5.5.3.2.6 Unidimensionality Analysis (Outcome Quality)

Any items that highly load on more than one factor should be eliminated in order to ensure an adequate unidimensionality. However, none of items highly loaded on more than one factor. Thus, all items were retained. The outcome of this process resulted in 15 variables that represented 5 factors in the analysis.

5.5.3.2.7 Reliability and Validity (Outcome Quality)

5.5.3.2.7.1 Reliability (Outcome Quality)

The 15 variables were subjected to reliability tests. Reliability was measured with the Cronbach’s coefficient alpha. All factors had a Cronbach’s coefficient alpha greater than 0.70 as suggested by Nunnally and Bernstein (1994). The results of reliability tests are summarised in Table 5.14.

Table 5.14 Reliability of Scaled Items for Outcome Quality

Dimensions	**Cronbach's Coefficient Alphas**	**Items Nos.**	**Rotation Loadings**
Network Quality	0.838	Neq3	0.849
		Neq1	0.821
		Neq2	0.758
Waiting Time	0.827	Wat3	0.831
		Wat1	0.814
		Wat2	0.786
Reliability	0.826	Rel3	0.820
		Rel2	0.817
		Rel1	0.764
Billing System	0.821	Bis3	0.875
		Bis2	0.796
		Bis1	0.784
Privacy	0.798	Pri3	0.882
		Pri1	0.782
		Pri2	0.693

5.5.3.2.7.2 Validity (Outcome Quality)

The 15 variables loaded on 5 factors respectively as expected from the literature review and the focus group discussions. Therefore, the researcher concluded that the measurement instrument for Outcome Quality used in this study exhibited adequate content validity.

5.6 Structural Equation Modeling

5.6.1 Measurement Models

The confirmatory factor analysis models represented the measurement models in this study. Nine confirmatory factor analysis models were developed and assessed in this research, including five first-order confirmatory factor analysis models and four second-order confirmatory factor analysis models.

5.6.1.1 Confirmatory Factor Analysis

5.6.1.1.1 Confirmatory Factor Analysis for Interaction Quality

The following sections provide the results of confirmatory factor analysis for Interaction Quality.

5.6.1.1.1.1 First-Order Confirmatory Factor Analysis Model for Interaction Quality

The first-order confirmatory factor analysis model for Interaction Quality was designed to test the relationships between three sub-dimensions of Interaction Quality (Attitudes, Behaviour, and Expertise), and their observed indicators (See Figure 5.4). The model presented 11 observed variables. The number of observed variances and covariances (11[11+1]/2) was 66, and the number of estimated parameters in the model was 25 (8 regression weights, 3 covariances, and 14 variances). Based on the t-rule, the first-order confirmatory factor analysis model for Interaction Quality was overidentified (the number of observed variances and covariances > than the number of estimated parameters), and tested with 41 degrees of freedom (66 – 25).

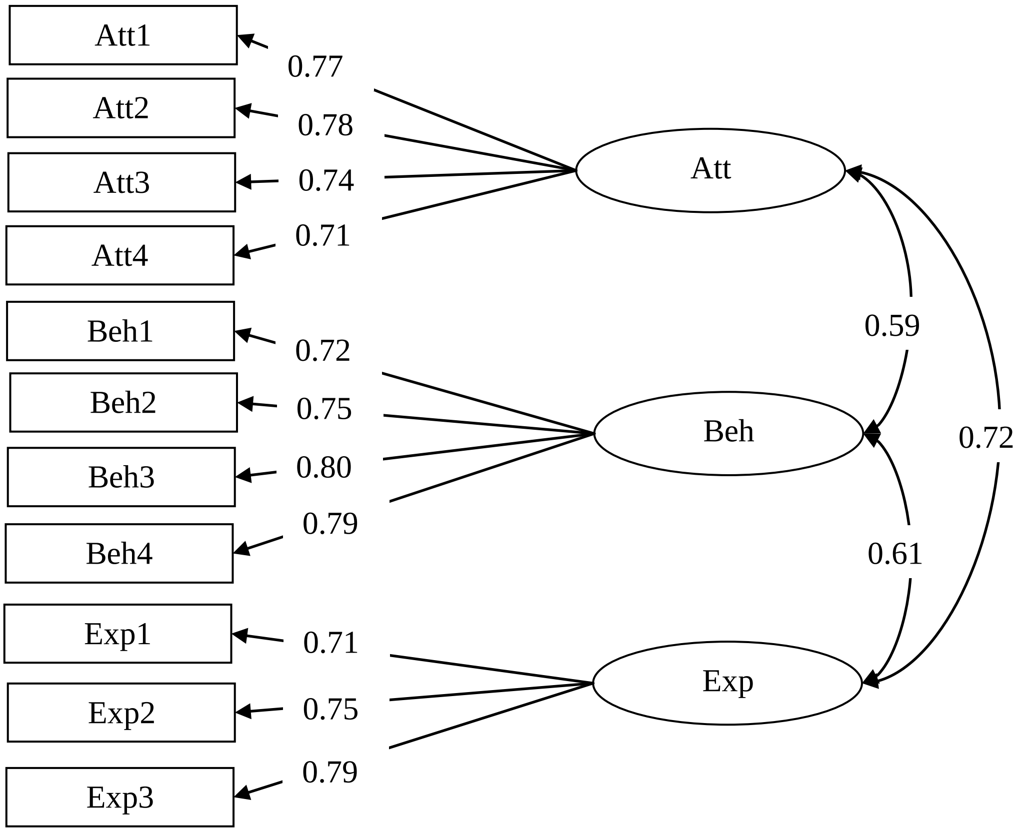
The model fit results for the first-order confirmatory factor analysis model for Interaction Quality indicated a good model fit to the sample data. All model fit indices were sufficiently satisfied with their relative recommended thresholds. Model modification was not necessary, as the first-order confirmatory factor analysis model for Interaction Quality had model fit indices that were more than satisfactory. The goodness-of-fit results of the first-order confirmatory factor analysis model for Interaction Quality are summarized in Table 5.15.

Table 5.15 Goodness-of-Fit Results of First-Order Confirmatory Factor Analysis Model for Interaction Quality

Goodness-of-Fit Indices	Values
Chi-square (χ^2)	105.03(p<0.001)
Degrees of Freedom (df)	41
Normed Chi-square (χ^2/df)	2.56
Goodness-of-Fit Index (GFI)	0.93
Standardized Root Mean Residual (SRMR)	0.047

Comparative Fit Index (CFI)	0.98
Normed Fit Index (NFI)	0.96
Root Mean Square Error of Approximation (RMSEA)	0.078

Figure 5.4 First-Order Confirmatory Factor Analysis Model for Interaction Quality



The standardized solution and the correlation results of the first-order confirmatory factor analysis model for Interaction Quality are summarized in Table 5.16. All standardized factor loading estimates were statistically significant.

Table 5.16 Standardized Solutions and Correlations of First-Order Confirmatory Factor Analysis Model for Interaction Quality

Variable Label	Factor Loading	Correlation
Att1	0.77 ***	Att↔Beh 0.59
Att2	0.78(12.18)***	Beh↔Exp 0.61
Att3	0.74(11.55)***	Att↔Exp 0.72
Att4	0.71(11.01)***	

Beh1	0.72***
Beh2	0.75(11.11)***
Beh3	0.80(11.71)***
Beh4	0.79(11.52)***
Exp1	0.71***
Exp2	0.75(10.35)***
Exp3	0.79(10.77)***

( ) t-value

*** Statistically significant at the 0.001 level (t > 3.291)

** Statistically significant at the 0.01 level (t > 2.576)

* Statistically significant at the 0.1 level (t > 1.645)

The average variance extracted and construct reliability results of the first-order confirmatory factor analysis model for Interaction Quality are summarized in Table 5.17.

Table 5.17 Average Variance Extracted and Construct Reliability Results of the First-Order Confirmatory Factor Analysis Model for Interaction Quality

Variable Label	Construct Reliability	Average Variance Extracted
Att	0.84	0.56
Beh	0.85	0.59
Exp	0.80	0.56

The CFI index was 0.98, above the recommended threshold of 0.90 as suggested by Byrne (1994), indicating that the first-order confirmatory factor analysis model for Interaction Quality exhibited adequate unidimensionality.

The construct reliabilities for the three sub-dimensional factors (Attitudes, Behaviour, and Expertise) ranged from 0.80 to 0.85, which were above the recommended threshold of 0.70 as suggested by Nunnally (1978), indicating that the measures for the three sub-dimensional factors had adequate reliability.

All standardized factor loadings were statistically significant (t-values > 1.96), and ranged from 0.71 to 0.80, which were above the recommended threshold of 0.60 as suggested by Bagozzi and Yi (1988), confirming adequate convergent validity. In addition, the AVEs ranged from 0.56 to 0.59, which were above the recommended threshold of 0.50 as suggested by Fornell and Larcker (1981), indicating that the measures for the three sub-dimensional factors had adequate convergent validity.

The correlation coefficients of the three sub-dimensional factors ranged from 0.59 to 0.73, which were below the recommended threshold of 0.85 as suggested by Kline (2005), indicating that the measures of the three sub-dimensional factors had adequate discriminant validity.

5.6.1.1.1.2 Second-Order Confirmatory Factor Analysis Model for Interaction Quality

The second-order confirmatory factor analysis model for Interaction Quality was design to test the relationships between three sub-dimensions (Attitudes, Behaviour, and Expertise) and one primary dimension of service quality (Interaction Quality) (See Figure 5.5). The model presented 11 observed variables. The number of observed variances and covariances (11[11+1]/2) was 66, and the number of estimated parameters in the model was 25 (11 regression weights and 14 variances). Based on the t-rule, the second-order confirmatory factor analysis model for Interaction Quality was overidentified (the number of observed variances and covariances > than the number of estimated parameters), and tested with 41 degrees of freedom (66 – 25). In addition, Byrne (2001, p.123) suggests that with a second-order model, it is necessary to "check the identification status of the higher order portion of the model". The higher order structure of the second-order confirmatory factor analysis model for Interaction Quality with three first-order factors were just-identified [6 pieces of information (3[3+1]/2) = 6 estimated parameters (three factor loadings and three residuals)] with zero degree of freedom.

To solve this just-identification problem, Rindskopf and Rose (1988) suggest that two of the first-order factor residual variances can be constrained to be equal for model identification. Thus, an equality constraint was used to help insure correct identification. Following the methodology suggested by Byrne (1998), the residual variances of two first-order factors (Attitudes and Behaviour) were forced to be equal.

The selection of the two residual variances was based on the analysis that the variances of these two first-order factors were small and close in size as suggested by Byrne (1998). As a result, the identification status of the higher-order portion was over-identified [6 pieces of information (3[3+1]/2) > 5 estimated parameters (three factor loadings and two residuals)] with one degree of freedom.

The model fit results for the second-order confirmatory factor analysis model for Interaction Quality indicated a good model fit to the sample data. All model fit indices were sufficiently satisfied with their relative recommended thresholds. Model modification was not necessary, as the second-order confirmatory factor analysis model for Interaction Quality had model fit indices that were more than satisfactory. The goodness-of-fit results of the second-order confirmatory factory analysis model for Interaction Quality are summarized in Table 5.18.

Figure 5.5 Second-Order Confirmatory Factor Analysis Model for Interaction Quality

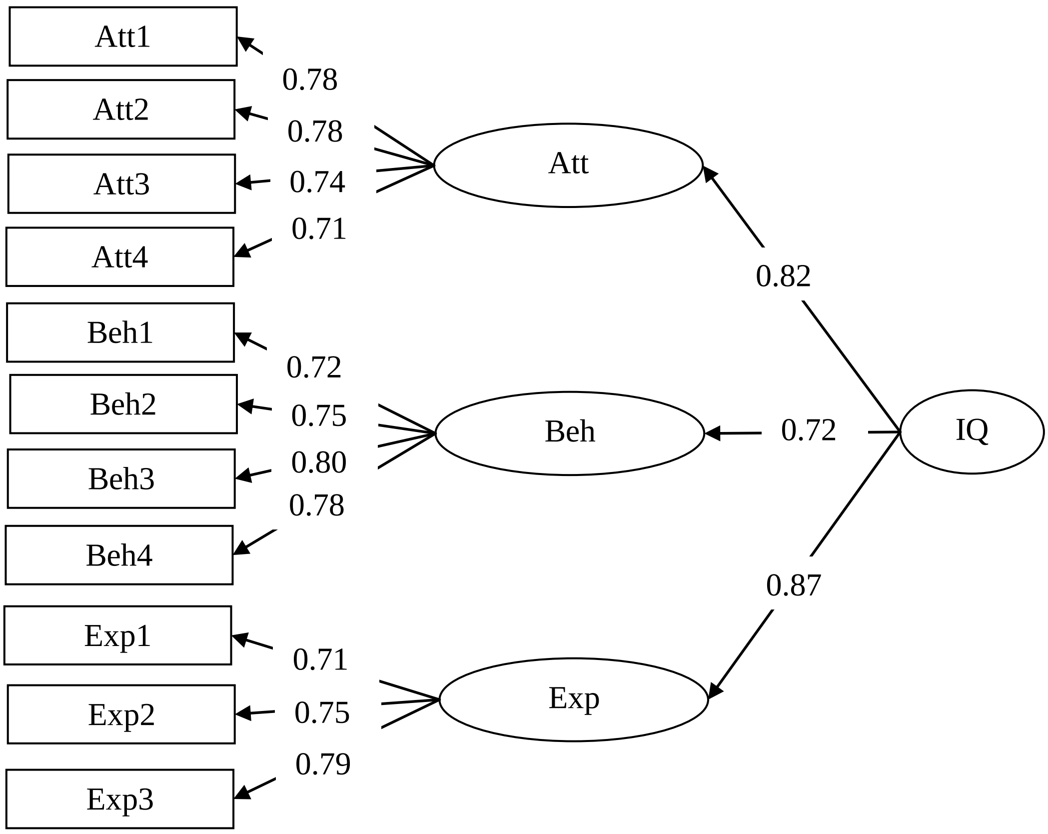


Table 5.18 Goodness-of-Fit Results of Second-Order Confirmatory Factor Analysis Model for Interaction Quality

Goodness-of-Fit Indices	Values
Chi-square (χ^2)	105.03(p<0.001)
Degrees of Freedom (df)	42
Normed Chi-square (χ^2/df)	2.50
Goodness-of-Fit Index (GFI)	0.93
Standardized Root Mean Residual (SRMR)	0.047
Comparative Fit Index (CFI)	0.98
Normed Fit Index (NFI)	0.96
Root Mean Square Error of Approximation (RMSEA)	0.076

The standardized solutions of the second-order confirmatory factory analysis model for Interaction Quality presented in Table 5.19 were reviewed and all estimates in the model were both reasonable and statistically significant. These results supported the reliability and validity of the measures associated with the second-order confirmatory factor analysis model for Interaction Quality. Specifically, the factor loading values associated with the three first-order factors indicated that Expertise (λ = 0.87, t-value = 9.75, p < 0.001) was the strongest indicator of the second-order factor (Interaction Quality), followed by Attitudes (λ = 0.82, t-value = 10.29. p < 0.001), and Behaviour (λ = 0.72, t-value = 8.79, p <0.001).

These results supported Hypotheses H1 and H7a as stated in Chapter 3. Moreover, the second-order latent variable, represented by Interaction Quality, explained 75% of the variance for Expertise, 67% of the variance for Attitudes, and 52% of the variance for Behaviour.

Table 5.19 Standardized Solutions of Second-Order Confirmatory Factor Analysis Model for Interaction Quality

Variable Label	Factor Loading	R^2
Attitudes	0.82(10.29)***	0.67
Behaviour	0.72(8.79)***	0.52

Expertise	0.87(9.75)***	0.75
Att1	0.78***	
Att2	0.78(12.67)***	
Att3	0.74(12.00)***	
Att4	0.71(11.36)***	
Beh1	0.72***	
Beh2	0.75(11.50)***	
Beh3	0.80(12.18)***	
Beh4	0.78(11.94)***	
Exp1	0.71***	
Exp2	0.75(10.35)***	
Exp3	0.79(10.75)***	

( ) t-value

*** Statistically significant at the 0.001 level (t > 3.291)

** Statistically significant at the 0.01 level (t > 2.576)

* Statistically significant at the 0.1 level (t > 1.645)

5.6.1.1.2 Confirmatory Factory Analysis for Physical Environment Quality

The following sections provide the results of confirmatory factor analysis for Physical Environment Quality.

5.6.1.1.2.1 First-Order Confirmatory Factor Analysis Model for Physical Environment Quality

The first-order confirmatory factor analysis model for Physical Environment Quality was designed to test the relationships between four sub-dimensions of Physical Environment Quality (Store Atmosphere, Physically Appealing, Customer Convenience, and Social Factors), and their observed indicators (See Figure 5.6). The model presented 15 observed variables. The number of observed variances and covariances (15[15+1]/2) was 120 data points, and the number of estimated parameters in the model was 36 (11 regression weights, 6 covariances, and 19 variances). Based on the t-rule, the first-order confirmatory factor analysis model for Physical Environment Quality was overidentified (the number of observed variances and covariances > than the number of estimated parameters), and tested with 84 degrees of freedom (120 – 36).

The model fit results for the first-order confirmatory factor analysis model for Physical Environment Quality indicated a good model fit to the sample data. All model fit indices were sufficiently satisfied with their relative recommended thresholds. Model modification was not necessary, as the first-order confirmatory factor analysis model for Physical Environment Quality had model fit indices that were more than satisfactory. The goodness-of-fit results of the first-order confirmatory factor analysis model for Physical Environment Quality are summarized in Table 5.20.

Figure 5.6 First-Order Confirmatory Factor Analysis Model for Physical Environment Quality

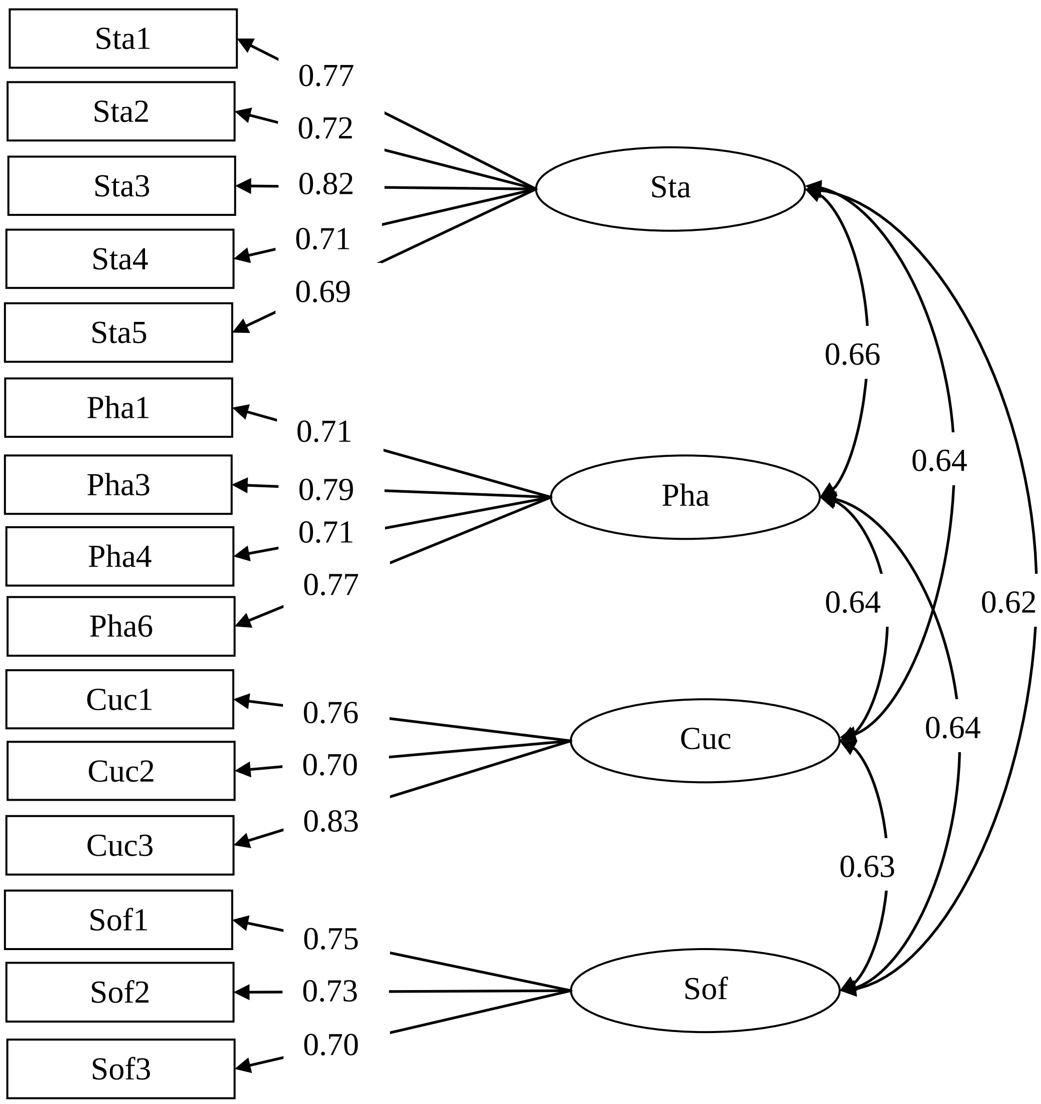


Table 5.20 Goodness-of-Fit Results of First-Order Confirmatory Factor Analysis Model for Physical Environment Quality

Goodness-of-Fit Indices	Values
Chi-square (χ^2)	171.98(p<0.001)
Degrees of Freedom (df)	84
Normed Chi-square (χ^2/df)	2.05
Goodness-of-Fit Index (GFI)	0.92
Standardized Root Mean Residual (SRMR)	0.044
Comparative Fit Index (CFI)	0.98
Normed Fit Index (NFI)	0.96
Root Mean Square Error of Approximation (RMSEA)	0.064

The standardized solution and the correlation results of the first-order confirmatory factor analysis model for Physical Environment Quality are summarized in Table 5.21. All standardized factor loading estimates were statistically significant.

Table 5.21 Standardized Solutions and Correlations of First-Order Confirmatory Factor Analysis Model for Physical Environment Quality

Variable Label	Factor Loading	Correlation
Sta1	0.77 ***	Sta↔Pha 0.66
Sta2	0.72(11.48)***	Pha↔Cuc 0.64
Sta3	0.82(13.15)***	Cuc↔Sof 0.63
Sta4	0.71(11.34)***	Sta↔Cuc 0.64
Sta5	0.69(10.95)***	Pha↔Sof 0.64
Pha1	0.71***	Sta↔Sof 0.62
Pha3	0.79(11.25)***	
Pha4	0.71(10.22)***	
Pha6	0.77(10.94)***	
Cuc1	0.76***	
Cuc2	0.70(10.54)***	
Cuc3	0.83(11.94)***	
Sof1	0.75***	

Sof2	0.73(10.02)***
Sof3	0.70(9.80)***

( ) t-value

*** Statistically significant at the 0.001 level (t > 3.291)

** Statistically significant at the 0.01 level (t > 2.576)

* Statistically significant at the 0.1 level (t > 1.645)

The average variance extracted and construct reliability results of the first-order confirmatory factor analysis model for Physical Environment Quality are summarized in Table 5.22.

Table 5.22 Average Variance Extracted and Construct Reliability Results of the First-Order Confirmatory Factor Analysis Model for Physical Environment Quality

Variable Label	Construct Reliability	Average Variance Extracted
Sta	0.86	0.55
Pha	0.83	0.56
Cuc	0.81	0.59
Sof	0.77	0.53

The CFI index was 0.98, above the recommended threshold of 0.90 as suggested by Byrne (1994), indicating that the first-order confirmatory factor analysis model for Physical Environment Quality exhibited adequate unidimensionality.

The construct reliabilities for the four sub-dimensional factors (Store Atmosphere, Physically Appealing, Customer Convenience, and Social Factors) ranged from 0.77 to 0.86, which were above the recommended threshold of 0.70 as suggested by Nunnally (1978), indicating that the measures for the four sub-dimensional factors had adequate reliability.

All standardized factor loadings were statistically significant (t-values > 1.96), and ranged from 0.69 to 0.83, which were above the recommended threshold of 0.60 as suggested by Bagozzi and Yi (1988), confirming adequate convergent validity. In addition, the AVEs ranged from 0.53 to 0.59, which were above the recommended threshold of 0.50 as suggested by Fornell and Larcker (1981), indicating that the measures for the four sub-dimensional factors had adequate convergent validity.

The correlation coefficients of the four sub-dimensional factors ranged from 0.62 to 0.66, which were below the recommended threshold of 0.85 as suggested by Kline (2005), indicating that the measures of the four sub-dimensional factors had adequate discriminant validity.

5.6.1.1.2.2 Second-Order Confirmatory Factor Analysis Model for Physical Environment Quality

The second-order confirmatory factor analysis model for Physical Environment Quality was design to test the relationships between four sub-dimensions (Store Atmosphere, Physically Appealing, Customer Convenience, and Social Factors) and one primary dimension of service quality (Physical Environment Quality) (See Figure 5.7). The model presented 15 observed variables. The number of observed variances and covariances (15[15+1]/2) was 120 data points, and the number of estimated parameters in the model was 34 (15 regression weights and 19 variances). Based on the t-rule, the second-order confirmatory factor analysis model for Physical Environment Quality was overidentified (the number of observed variances and covariances > than the number of estimated parameters), and tested with 86 degrees of freedom (120 – 34). In addition, Byrne (2001, p.123) suggests that with a second-order model, it is necessary to "check the identification status of the higher order portion of the model". The higher order structure of the second-order confirmatory factor analysis model for Physical Environment Quality with four first-order factors were overidentified [10 pieces of information (4[4+1]/2) > 8 estimated parameters (four factor loadings and four residuals)] with two degree of freedom.

The model fit results for the second-order confirmatory factor analysis model for Physical Environment Quality indicated a good model fit to the sample data. All model fit indices were sufficiently satisfied with their relative recommended thresholds. Model modification was not necessary, as the second-order confirmatory factor analysis model for Physical Environment Quality had model fit indices that were more than satisfactory. The goodness-of-fit results of the second-order confirmatory factor analysis model for Physical Environment Quality are summarized in Table 5.23.

Figure 5.7 Second-Order Confirmatory Factor Analysis Model for Physical Environment Quality

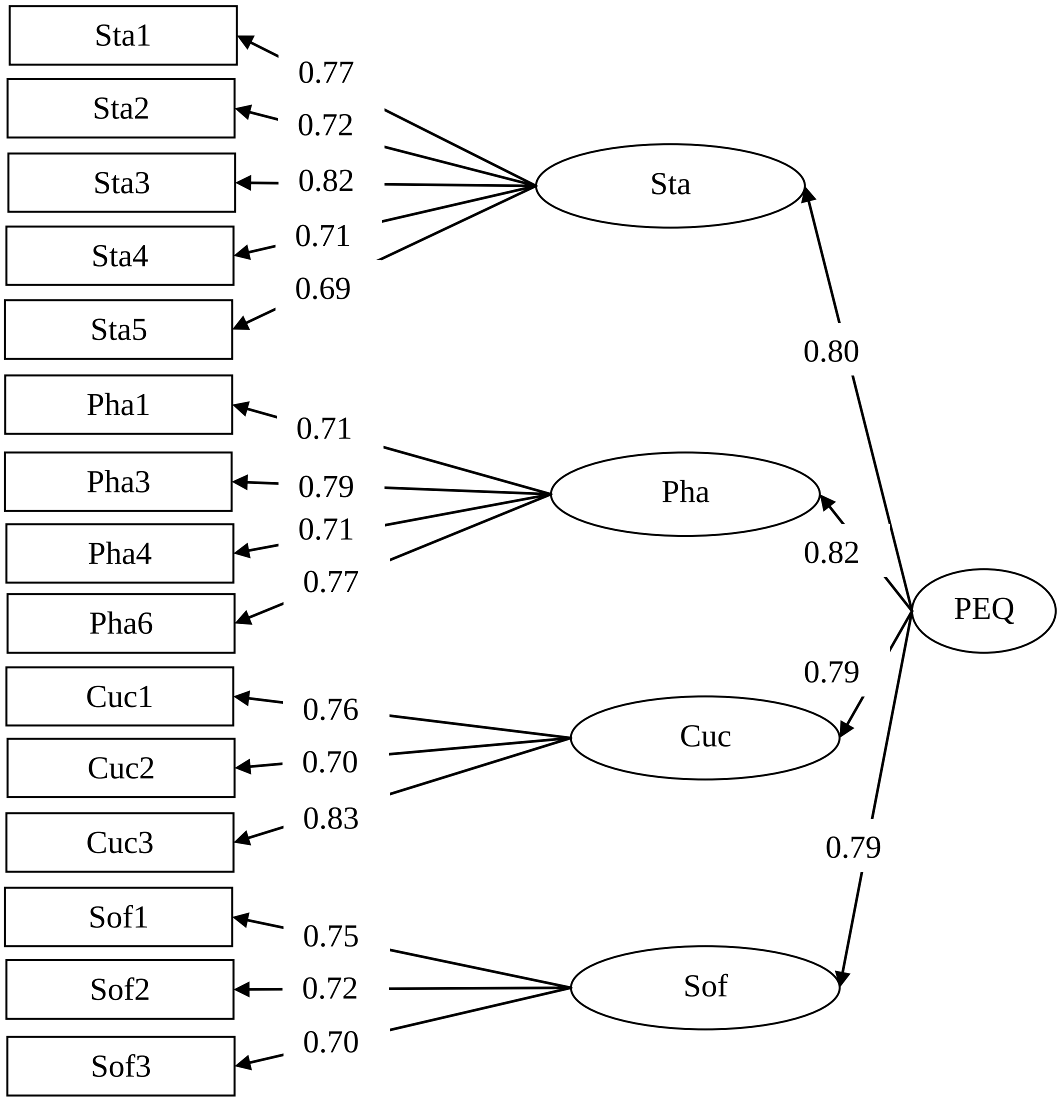


Table 5.23 Goodness-of-Fit Results of Second-Order Confirmatory Factor Analysis Model for Physical Environment Quality

Goodness-of-Fit Indices	Values
Chi-square (χ^2)	172.32(p<0.001)
Degrees of Freedom (df)	86
Normed Chi-square (χ^2/df)	2.00

Goodness-of-Fit Index (GFI)	0.92
Standardized Root Mean Residual (SRMR)	0.044
Comparative Fit Index (CFI)	0.98
Normed Fit Index (NFI)	0.96
Root Mean Square Error of Approximation (RMSEA)	0.062

The standardized solutions of the second-order confirmatory factory analysis model for Physical Environment Quality presented in Table 5.24 were reviewed and all estimates in the model were both reasonable and statistically significant. These results supported the reliability and validity of the measures associated with the second-order confirmatory factor analysis model for Physical Environment Quality. Specifically, the factor loading values associated with the four first-order factors indicated that Physically Appealing ($\lambda = 0.82$, t-value = 9.91, $p < 0.001$) was the strongest indicator of the second-order factor (Physical Environment Quality), followed by Store Atmosphere ($\lambda = 0.80$, t-value = 10.63, $p < 0.001$), Customer Convenience ($\lambda = 0.79$, t-value = 10.13, $p < 0.001$), and Social Factors ($\lambda = 0.79$, t-value = 9.75, $p <0.001$).

These results supported Hypotheses H2 and H7a as stated in Chapter 3. Moreover, the second-order latent variable, represented by Physical Environment Quality, explained 67% of the variance for Physically Appealing, 65% of the variance for Store Atmosphere, 63% of the variance for Customer Convenience, and 62% of the variance for Social Factors.

Table 5.24 Standardized Solutions of Second-Order Confirmatory Factor Analysis Model for Physical Environment Quality

Variable Label	Factor Loading	R^2
Store Atmosphere	0.80(10.63)***	0.65
Physically Appealing	0.82(9.91)***	0.67
Customer Convenience	0.79(10.13)***	0.63
Social Factors	0.79(9.75)***	0.62
Sta1	0.77 ***	
Sta2	0.72(11.49)***	
Sta3	0.82(13.15)***	

Sta4	0.71(11.33)***
Sta5	0.69(10.93)***
Pha1	0.71***
Pha3	0.79(11.24)***
Pha4	0.71(10.21)***
Pha6	0.77(10.93)***
Cuc1	0.76***
Cuc2	0.70(10.54)***
Cuc3	0.83(11.95)***
Sof1	0.75***
Sof2	0.72(10.02)***
Sof3	0.70(9.80)***

( ) t-value

*** Statistically significant at the 0.001 level (t > 3.291)

** Statistically significant at the 0.01 level (t > 2.576)

* Statistically significant at the 0.1 level (t > 1.645)

5.6.1.1.3 Confirmatory Factor Analysis for Outcome Quality

The following sections provide the results of confirmatory factor analysis for Outcome Quality.

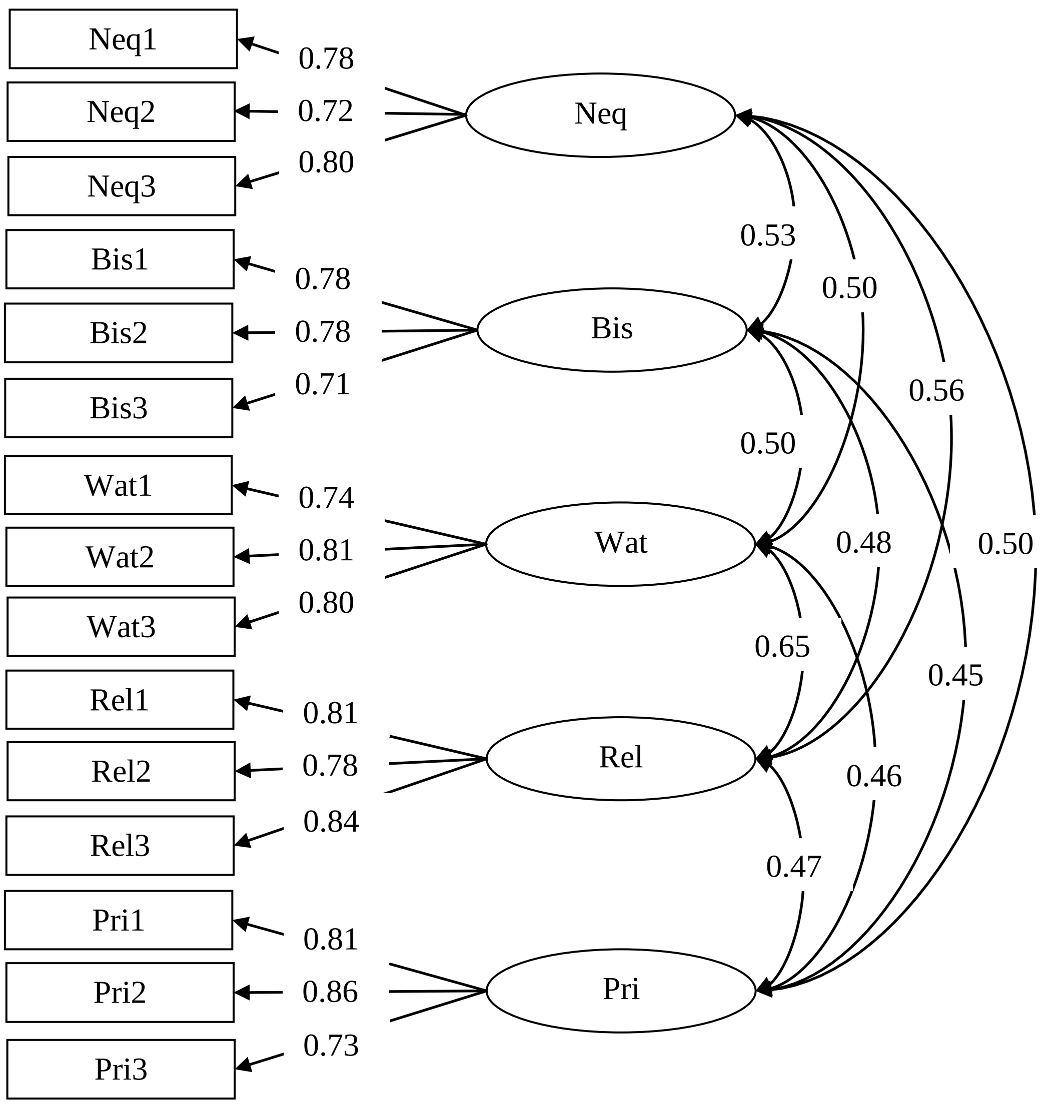
5.6.1.1.3.1 First-Order Confirmatory Factor Analysis Model for Outcome Quality

The first-order confirmatory factor analysis model for Outcome Quality was designed to test the relationships between five sub-dimensions of Outcome Quality (Network Quality, Billing System, Wait time, Reliability, and Privacy), and their observed indicators (See Figure 5.8). The model presented 15 observed variables. The number of observed variances and covariances (15[15+1]/2) was 120 data points, and the number of estimated parameters in the model was 40 (10 regression weights, 10 covariances, and 20 variances). Based on the t-rule, the first-order confirmatory factor analysis model for Outcome Quality was overidentified (the number of observed variances and covariances > than the number of estimated parameters), and tested with 80 degrees of freedom (120 – 40).

The model fit results for the first-order confirmatory factor analysis model for

Outcome Quality indicated a good model fit to the sample data. All model fit indices were sufficiently satisfied with their relative recommended thresholds. Model modification was not necessary, as the first-order confirmatory factor analysis model for Outcome Quality had model fit indices that were more than satisfactory. The goodness-of-fit results of the first-order confirmatory factor analysis model for Outcome Quality are summarized in Table 5.25.

Figure 5.8 First-Order Confirmatory Factor Analysis Model for Outcome Quality



The standardized solution and the correlation results of the first-order confirmatory factor analysis model for Outcome Quality are summarized in Table 5.26. All standardized factor loading estimates were statistically significant.

The average variance extracted and construct reliability results of the first-order confirmatory factor analysis model for Outcome Quality are summarized in Table 5.27.

Table 5.25 Goodness-of-Fit Results of Second-Order Confirmatory Factor Analysis Model for Outcome Quality

Goodness-of-Fit Indices	Values
Chi-square (χ^2)	124.09(p<0.01)
Degrees of Freedom (df)	80
Normed Chi-square (χ^2/df)	1.55
Goodness-of-Fit Index (GFI)	0.94
Standardized Root Mean Residual (SRMR)	0.041
Comparative Fit Index (CFI)	0.99
Normed Fit Index (NFI)	0.97
Root Mean Square Error of Approximation (RMSEA)	0.046

Table 5.26 Standardized Solutions and Correlations of First-Order Confirmatory Factor Analysis Model for Outcome Quality

Variable Label	Factor Loading	Correlation
Neq1	0.78***	Neq↔Bis 0.53
Neq2	0.72(10.82)***	Bis↔Wat 0.50
Neq3	0.80(11.69)***	Wat↔Rel 0.65
Bis1	0.78***	Rel↔Pri 0.47
Bis2	0.78(11.01)***	Neq↔Wat 0.50
Bis3	0.71(10.38)***	Neq↔Rel 0.56
Wat1	0.74***	Neq↔Pri 0.50
Wat2	0.81(11.82)***	Bis↔Rel 0.48
Wat3	0.80(11.76)***	Bis↔Pri 0.45
Rel1	0.81***	Wat↔Pri 0.46
Rel2	0.78(12.99)***	
Rel3	0.84(13.94)***	
Pri1	0.81***	

Pri2	0.86(13.35)***
Pri3	0.73(11.78)***

( ) t-value

*** Statistically significant at the 0.001 level (t > 3.291)

** Statistically significant at the 0.01 level (t > 2.576)

* Statistically significant at the 0.1 level (t > 1.645)

Table 5.27 Average Variance Extracted and Construct Reliability Results of the First-Order Confirmatory Factor Analysis Model for Outcome Quality

Variable Label	Construct Reliability	Average Variance Extracted
Neq	0.81	0.59
Bis	0.80	0.57
Wat	0.83	0.61
Rel	0.85	0.66
Pri	0.84	0.64

The CFI index was 0.99, above the recommended threshold of 0.90 as suggested by Byrne (1994), indicating that the first-order confirmatory factor analysis model for Outcome Quality exhibited adequate unidimensionality.

The construct reliabilities for the five sub-dimensional factors (Network Quality, Billing System, Wait time, Commitment, and Privacy) ranged from 0.80 to 0.85, which were above the recommended threshold of 0.70 as suggested by Nunnally (1978), indicating that the measures for the five sub-dimensional factors had adequate reliability.

All standardized factor loadings were statistically significant (t-values > 1.96), and ranged from 0.71 to 0.86, which were above the recommended threshold of 0.60 as suggested by Bagozzi and Yi (1988), confirming adequate convergent validity. In addition, the AVEs ranged from 0.57 to 0.66, which were above the recommended threshold of 0.50 as suggested by Fornell and Larcker (1981), indicating that the measures for the five sub-dimensional factors had adequate convergent validity.

The correlation coefficients of the five sub-dimensional factors ranged from 0.45 to 0.65, which were below the recommended threshold of 0.85 as suggested by Kline (2005), indicating that the measures of the five sub-dimensional factors had adequate discriminant validity.

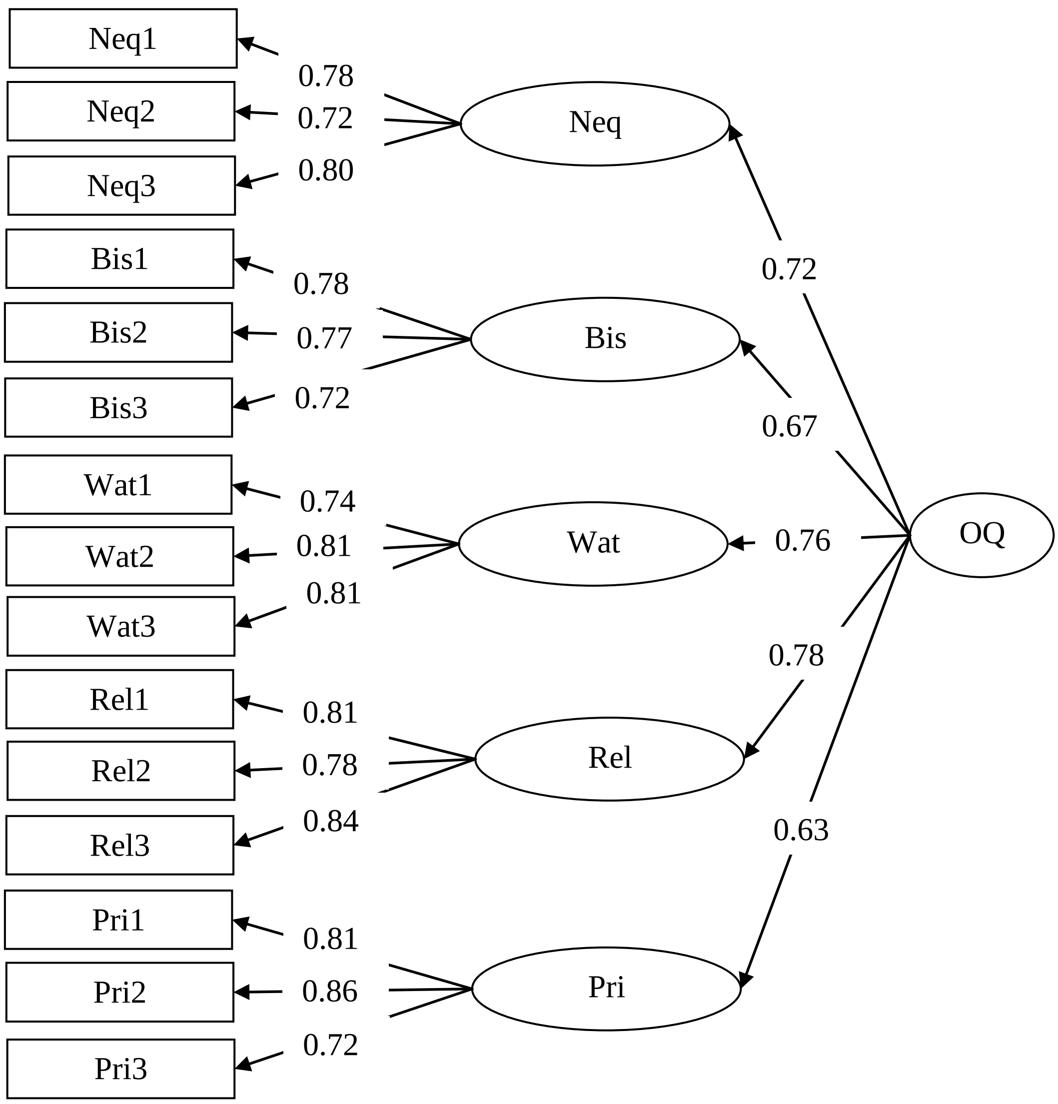
5.6.1.1.3.2 Second-Order Confirmatory Factor Analysis Model for Outcome Quality

The second-order confirmatory factor analysis model for Outcome Quality was design to test the relationships between five sub-dimensions (Network Quality, Billing System, Wait time, Reliability, and Privacy) and one primary dimension of service quality (Outcome Quality) (See Figure 5.9). The model presented 15 observed variables. The number of observed variances and covariances (15[15+1]/2) was 120 data points, and the number of estimated parameters in the model was 35 (15 regression weights and 20 variances). Based on the t-rule, the second-order confirmatory factor analysis model for Outcome Quality was overidentified (the number of observed variances and covariances > than the number of estimated parameters), and tested with 85 degrees of freedom (120 – 35). In addition, Byrne (2001, p.123) suggests that with a second-order model, it is necessary to “check the identification status of the higher order portion of the model”. The higher order structure of the second-order confirmatory factor analysis model for Outcome Quality with five first-order factors were overidentified [15 pieces of information (5[5+1]/2) > 10 estimated parameters (five factor loadings and five residuals)] with five degree of freedom.

The model fit results for the second-order confirmatory factor analysis model for Outcome Quality indicated a good model fit to the sample data. All model fit indices were sufficiently satisfied with their relative recommended thresholds. Model modification was not necessary, as the second-order confirmatory factor analysis model for Outcome Quality had model fit indices that were more than satisfactory. The goodness-of-fit results of the second-order confirmatory factor analysis model for Outcome Quality are summarized in Table 5.28.

The standardized solutions of the second-order confirmatory factor analysis model for Outcome Quality presented in Table 5.29 were reviewed and all estimates in the model were both reasonable and statistically significant. These results supported the reliability and validity of the measures associated with the second-order confirmatory factor analysis model for Outcome Quality. Specifically, the factor loading values associated with the five first-order factors indicated that Reliability (λ = 0.78, t-value = 10.53, p < 0.001) was the strongest indicator of the second-order factor (Outcome Quality), followed by Waiting Time (λ = 0.76, t-value= 9.46. p < 0.001), Network Quality (λ = 0.72, t-value= 9.31, p < 0.001), Billing System (λ = 0.67, t-value= 8.55, p < 0.001), and Privacy (λ = 0.63, t-value = 8.38, p <0.001).

Figure 5.9 Second-Order Confirmatory Factor Analysis Model for Outcome Quality



These results supported Hypotheses H3 and H7a as stated in Chapter 3. Moreover, the second-order latent variable, represented by Outcome Quality, explained 61% of the variance for Reliability, 58% of the variance for Waiting Time, 52% of the variance for Network Quality, 45% of the variance for Billing System, and 40% of the variance for Privacy.

Table 5.28 Goodness-of-Fit Results of Second-Order Confirmatory Factor Analysis Model for Outcome Quality

Goodness-of-Fit Indices	Values
Chi-square (χ^2)	132.59(p<0.001)
Degrees of Freedom (df)	85
Normed Chi-square (χ^2/df)	1.56
Goodness-of-Fit Index (GFI)	0.94
Standardized Root Mean Residual (SRMR)	0.046
Comparative Fit Index (CFI)	0.99
Normed Fit Index (NFI)	0.96
Root Mean Square Error of Approximation (RMSEA)	0.047

Table 5.29 Standardized Solutions of Second-Order Confirmatory Factor Analysis Model for Outcome Quality

Variable Label	Factor Loading	R^2
Network Quality	0.72(9.31)***	0.52
Billing System	0.67(8.55)***	0.45
Waiting Time	0.76(9.46)***	0.58
Reliability	0.78(10.53)***	0.61
Privacy	0.63(8.38)***	0.40
Neq1	0.78 ***	
Neq2	0.72(10.79)***	
Neq3	0.80(11.67)***	
Bis1	0.78***	
Bis2	0.77(10.94)***	
Bis3	0.72(10.42)***	
Wat1	0.74***	
Wat2	0.81(11.75)***	

Wat3	0.81(11.72)***
Rel1	0.81***
Rel2	0.78(13.00)***
Rel3	0.84(13.79)***
Pri1	0.81***
Pri2	0.86(13.35)***
Pri3	0.72(11.72)***

( ) t-value

*** Statistically significant at the 0.001 level (t > 3.291)

** Statistically significant at the 0.01 level (t > 2.576)

* Statistically significant at the 0.1 level (t > 1.645)

5.6.1.1.4 Confirmatory Factor Analysis for Service Quality

The following sections provide the results of confirmatory factor analysis for Service Quality.

5.6.1.1.4.1 First-Order Confirmatory Factor Analysis Model for Service Quality

The first-order confirmatory factor analysis model for Service Quality was designed to test the relationships between three primary dimensions of Service Quality (Interaction Quality, Physical Environment Quality, and Outcome Quality), and their observed indicators (See Figure 5.10). The model presented 6 observed variables. The number of observed variances and covariances (6[6+1]/2) was 21 data points, and the number of estimated parameters in the model was 15 (3 regression weights, 3 covariances, and 9 variances). Based on the t-rule, the first-order confirmatory factor analysis model for Service Quality was overidentified (the number of observed variances and covariances > than the number of estimated parameters), and tested with 6 degrees of freedom (21 – 15).

The model fit results for the first-order confirmatory factor analysis model for Service Quality indicated a good model fit to the sample data. All model fit indices were sufficiently satisfied with their relative recommended thresholds. Model modification was not necessary, as the first-order confirmatory factor analysis model for Service Quality had model fit indices that were more than satisfactory. The goodness-of-fit results of the first-order confirmatory factor analysis model for Service Quality are summarized in Table 5.30.

Figure 5.10 First-Order Confirmatory Factor Analysis Model for Service Quality

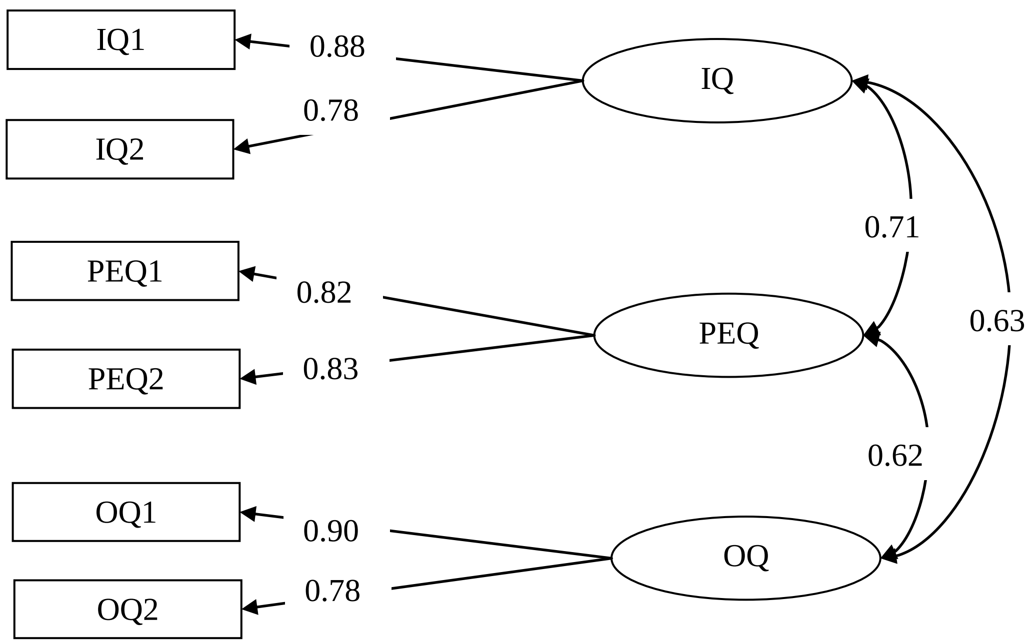


Table 5.30 Goodness-of-Fit Results of First-Order Confirmatory Factor Analysis Model for Service Quality

Goodness-of-Fit Indices	Values
Chi-square (χ^2)	6.13(p=0.409)
Degrees of Freedom (df)	6
Normed Chi-square (χ^2/df)	1.02
Goodness-of-Fit Index (GFI)	0.99
Standardized Root Mean Residual (SRMR)	0.013
Comparative Fit Index (CFI)	1.00
Normed Fit Index (NFI)	0.99
Root Mean Square Error of Approximation (RMSEA)	0.009

The standardized solution and the correlation results of the first-order confirmatory factor analysis model for Service Quality are summarized in Table 5.31. All standardized factor loading estimates were statistically significant.

Table 5.31 Standardized Solutions and Correlations of First-Order Confirmatory Factor Analysis Model for Service Quality

Variable Label	Factor Loading	Correlation
IQ1	0.88 ***	IQ↔PEQ 0.71
IQ2	0.78(11.50)***	PEQ↔OQ 0.62
PEQ1	0.82***	IQ↔OQ 0.63
PEQ2	0.83(11.68)***	
OQ1	0.90***	
OQ2	0.78(10.96)***	

( ) t-value

*** Statistically significant at the 0.001 level (t > 3.291)

** Statistically significant at the 0.01 level (t > 2.576)

* Statistically significant at the 0.1 level (t > 1.645)

The average variance extracted and construct reliability results of the first-order confirmatory factor analysis model for Service Quality are summarized in Table 5.32.

Table 5.32 Average Variance Extracted and Construct Reliability Results of the First-Order Confirmatory Factor Analysis Model for Service Quality

Variable Label	Construct Reliability	Average Variance Extracted
IQ	0.82	0.69
PEQ	0.81	0.68
OQ	0.83	0.71

The CFI index was 1.00, above the recommended threshold of 0.90 as suggested by Byrne (1994), indicating that the first-order confirmatory factor analysis model for Service Quality exhibited adequate unidimensionality.

The construct reliabilities for the three primary dimensional factors (Interaction Quality, Physical Environment Quality, and Outcome Quality) ranged from 0.81 to 0.83, which were above the recommended threshold of 0.70 as suggested by Nunnally

(1978), indicating that the measures for the three primary dimensional factors had adequate reliability.

All standardized factor loadings were statistically significant (t-values > 1.96), and ranged from 0.78 to 0.90, which were above the recommended threshold of 0.60 as suggested by Bagozzi and Yi (1988), confirming adequate convergent validity. In addition, the AVEs ranged from 0.68 to 0.71 which were above the recommended threshold of 0.50 as suggested by Fornell and Larcker (1981), indicating that the measures for the three primary dimensional factors had adequate convergent validity.

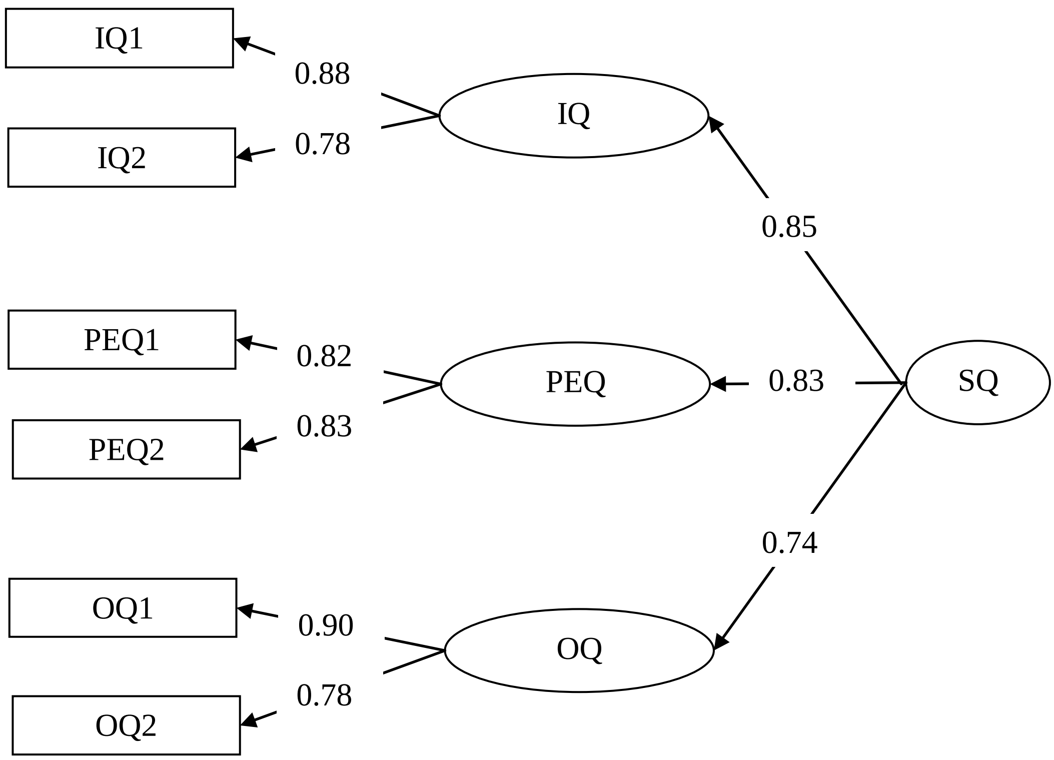
The correlation coefficients of the three primary dimensional factors ranged from 0.59 to 0.75, which were below the recommended threshold of 0.85 as suggested by Kline (2005), indicating that the measures of the three primary dimensional factors had adequate discriminant validity.

5.6.1.1.4.2 Second-Order Confirmatory Factor Analysis Model for Service Quality

The second-order confirmatory factor analysis model for Service Quality was designed to examine the hypothesis that Service Quality is a multidimensional construct composed of three primary dimensional factors (Interaction Quality, Physical Environment Quality, and Outcome Quality). In this model, there were three dependent first-order variables (Interaction Quality, Physical Environment Quality, and Outcome Quality), and one independent second-order variable, Service Quality (See Figure 5.11). The model presented 6 observed variables. The number of observed variances and covariances (6[6+1]/2) was 21 data points, and the number of estimated parameters in the model was 15 (6 regression weights and 9 variances). Based on the t-rule, the second-order confirmatory factor analysis model for Physical Environment Quality was overidentified (the number of observed variances and covariances > than the number of estimated parameters), and tested with 6 degrees of freedom (21 – 15). In addition, Byrne (2001, p.123) suggests that with a second-order model, it is necessary to “check the identification status of the higher order portion of the model”. The higher order structure of the second-order confirmatory factor analysis model for Service Quality with three first-order factors were just identified [6 pieces of information (3[3+1]/2) = 6 estimated parameters (three factor loadings and three residuals)] with zero degree of freedom.

To solve this just-identification problem, Rindskopf and Rose (1988) suggest that two of the first-order factor residual variances can be constrained to be equal for model identification. Thus, an equality constraint was used to help ensure correct identification. As suggested by Byrne (1998) in an example, the residual variances of two first-order factors (Interaction Quality and Physical Environment Quality) were forced to be equal. The selection of the two residual variances was based on the analysis that the variances of these two first-order factors were small and close in size as suggested by Byrne (1998). As a result, the identification status of the higher-order portion was over-identified [6 pieces of information (3[3+1]/2) > 5 estimated parameters (three factor loadings and two residuals)] with one degree of freedom.

Figure 5.11 Second-Order Confirmatory Factor Analysis Model for Service Quality



The model fit results for the second-order confirmatory factor analysis model for Service Quality indicated a good model fit to the sample data. All model fit indices were sufficiently satisfied with their relative recommended thresholds. Model modification was not necessary, as the second-order confirmatory factor analysis model for Service Quality had model fit indices that were more than satisfactory. The goodness-of-fit results of the second-order confirmatory factor analysis model for Service Quality are summarized in Table 5.33.

Table 5.33 Goodness-of-Fit Results of Second-Order Confirmatory Factor Analysis Model for Service Quality

Goodness-of-Fit Indices	Values
Chi-square (χ^2)	6.19(p<0.001)
Degrees of Freedom (df)	7
Normed Chi-square (χ^2/df)	0.88
Goodness-of-Fit Index (GFI)	0.99
Standardized Root Mean Residual (SRMR)	0.014
Comparative Fit Index (CFI)	1.00
Normed Fit Index (NFI)	0.99
Root Mean Square Error of Approximation (RMSEA)	0.000

Table 5.34 Standardized Solutions of Second-Order Confirmatory Factor Analysis Model for Service Quality

Variable Label	Factor Loading	R^2
Interaction Quality	0.85(12.28)***	0.72
Physical Environment Quality	0.83(10.79)***	0.69
Outcome Quality	0.74(10.59)***	0.55
IQ1	0.88 ***	
IQ2	0.78(11.88)***	
PEQ1	0.82 ***	
PEQ2	0.83(11.84)***	
OQ	0.90***	
OQ	0.78(10.95)***	

( ) t-value

*** Statistically significant at the 0.001 level (t > 3.291)

** Statistically significant at the 0.01 level (t > 2.576)

* Statistically significant at the 0.1 level (t > 1.645)

The standardized solutions of the second-order confirmatory factor analysis model for Service Quality presented in Table 5.34 were reviewed and all estimates in the model were both reasonable and statistically significant. These results supported the reliability and validity of the measures associated with the second-order confirmatory factor analysis model for Service Quality. Specifically, the factor loading values associated with the three first-order factors indicated that Interaction Quality (λ = 0.85, t-value = 12.28, $p < 0.001$) was the strongest indicator of the second-order factor (Service Quality), followed by Physical Environment Quality (λ = 0.83, t-value= 10.79, $p < 0.001$), and Outcome Quality (λ = 0.74, t-value = 10.59, $p <0.001$).

These results supported Hypotheses H4 to H6, and H7b stated in Chapter 3. Moreover, the second-order latent variable, represented by Service Quality, explained 72% of the variance for Interaction Quality, 69% of the variance for Physical Environment Quality, and 55% of the variance for Outcome Quality.

5.6.1.1.5 First-Order Confirmatory Factor Analysis Model for the Six Higher Order Constructs (Service Quality, Customer Satisfaction, Customer Perceived Value, Corporate Image, Perceived Switching Costs, and Customer Loyalty)

The first-order confirmatory factor analysis model for the six higher order constructs was designed to examine the relationships that exist between the six higher order constructs (Service Quality, Customer Satisfaction, Customer Perceived Value, Corporate Image, Perceived Switching Cost, and Customer Loyalty), and their observed indicators (See Figure 5.12). The model presented 18 observed variables. The number of observed variances and covariances (18[18+1]/2) was 171 data points, and the number of estimated parameters in the model was 51 (12 regression weights, 15 covariances, and 24 variances). Based on the t-rule, the first-order confirmatory factor analysis model for the six higher order constructs was overidentified (the number of observed variances and covariances > than the number of estimated parameters), and tested with 120 degrees of freedom (171 – 51).

The model fit results for the first-order confirmatory factor analysis model for the six higher order constructs indicated a good model fit to the sample data. All model fit indices were sufficiently satisfied with their relative recommended thresholds. Model modification was not necessary, as the first-order confirmatory factor analysis model for the six higher order constructs had model fit indices that were more than satisfactory. The goodness-of-fit results of the first-order confirmatory factor analysis model for the six higher order constructs are summarized in Table 5.35.

Figure 5.12 First-Order Confirmatory Factor Analysis Model for the Six Higher Order Constructs (Service Quality, Customer Satisfaction, Customer Perceived Value, Corporate Image, Perceived Switching Costs, and Customer Loyalty)

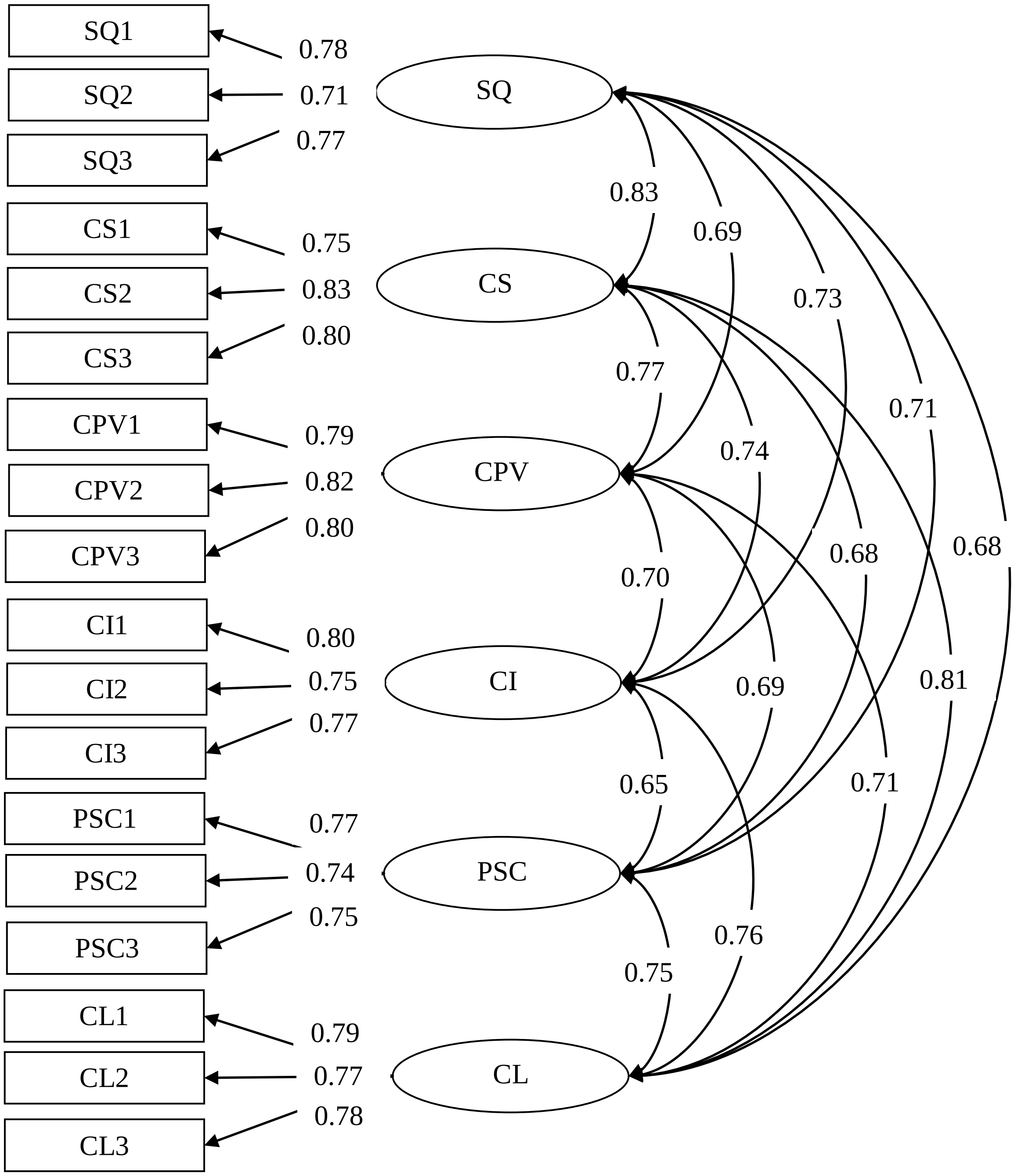


Table 5.35 Goodness-of-Fit Results of First-Order Confirmatory Factor Analysis Model for the Six Higher Order Constructs

Goodness-of-Fit Indices	Values
Chi-square (χ^2)	171.67(p<0.01)
Degrees of Freedom (df)	120
Normed Chi-square (χ^2/df)	1.43
Goodness-of-Fit Index (GFI)	0.93
Standardized Root Mean Residual (SRMR)	0.033
Comparative Fit Index (CFI)	0.99
Normed Fit Index (NFI)	0.98
Root Mean Square Error of Approximation (RMSEA)	0.041

The standardized solution and the correlation results of the first-order confirmatory factor analysis model for the six higher order constructs are summarized in Table 5.36. All standardized factor loading estimates were statistically significant.

Table 5.36 Standardized Solutions and Correlations of First-Order Confirmatory Factor Analysis Model for the Six Higher Order Constructs

Variable Label	Factor Loading	Correlation
SQ1	0.78 ***	SQ↔CS 0.83
SQ2	0.71(11.10)***	CS↔CPV 0.77
SQ3	0.77(12.08)***	CPV↔CI 0.70
CS1	0.75***	CI↔PSC 0.65
CS2	0.83(13.25)***	PSC↔CL 0.75
CS3	0.80(12.72)***	SQ↔CPV 0.69
CPV1	0.79***	CS↔CI 0.74
CPV2	0.82(13.47)***	CPV↔PSC 0.69
CPV3	0.80(13.16)***	CI↔CL 0.76
CI1	0.80***	SQ↔CI 0.74
CI2	0.75(12.10)***	CS↔PSC 0.68
CI3	0.77(12.42)***	CPV↔CL 0.71
PSC1	0.77***	SQ↔PSC 0.71

PSC2	0.74(11.19)***	CS↔CL 0.81
PSC3	0.75(11.31)***	SQ↔CL 0.68
CL	0.79***	
CL	0.77(12.65)***	
CL	0.78(12.79)***	

( ) t-value

*** Statistically significant at the 0.001 level (t > 3.291)

** Statistically significant at the 0.01 level (t > 2.576)

* Statistically significant at the 0.1 level (t > 1.645)

The average variance extracted and construct reliability results of the first-order confirmatory factor analysis model for the six higher order constructs are summarized in Table 5.37.

Table 5.37 Average Variance Extracted and Construct Reliability Results of the First-Order Confirmatory Factor Analysis Model for the Six Higher Order Constructs

Variable Label	Construct Reliability	Average Variance Extracted
SQ	0.80	0.57
CS	0.84	0.63
CPV	0.85	0.65
CI	0.82	0.60
PSC	0.80	0.57
CL	0.82	0.61

The CFI index was 0.99, above the recommended threshold of 0.90 as suggested by Byrne (1994), indicating that the first-order confirmatory factor analysis model for the six higher order constructs exhibited adequate unidimensionality.

The construct reliabilities for the six higher order constructs ranged from 0.80 to 0.85, which were above the recommended threshold of 0.70 as suggested by Nunnally (1978), indicating that the measures for the six higher order constructs had adequate reliability.

All standardized factor loadings were statistically significant (t-values > 1.96), and ranged from 0.71 to 0.83, which were above the recommended threshold of 0.60 as suggested by Bagozzi and Yi (1988), confirming adequate convergent validity. In addition, the AVEs ranged from 0.57 to 0.65 which were above the recommended threshold of 0.50 as suggested by Fornell and Larcker (1981), indicating that the measures for the six higher order constructs had adequate convergent validity.

The correlation coefficients of the six higher order constructs ranged from 0.65 to 0.83, which were below the threshold of 0.85 as suggested by Kline (2005), indicating that the measures of the six higher order constructs had adequate discriminant validity.

5.6.2 Structural Equation Model

The structural equation model presented in Figure 5.13 was designed to test the relationships that may exist between Service Quality, Customer Satisfaction, Customer Perceived Value, Corporate Image, Perceived Switching Costs, and Customer Loyalty. The structural equation model included one exogenous variable (Service Quality), and five endogenous variables (Customer Satisfaction, Customer Perceived Value, Corporate Image, Perceived Switching Costs, and Customer Loyalty). The structural equation model presented 18 observed variables. The number of observed variances and covariances (18[18+1]/2) was 171 data points, and the number of estimated parameters in the model was 46 (22 regression weights and 24 variances). Based on the t-rule, the structural equation model was overidentified (the number of observed variances and covariances > than the number of estimated parameters), and tested with 125 degrees of freedom (171 – 46).

The model fit results for the structural equation model indicated a good model fit to the sample data. All model fit indices were sufficiently satisfied with their relative recommended thresholds. Model modification was not necessary, as the structural equation model had model fit indices that were more than satisfactory. The goodness-of-fit results of the structural equation model are summarized in Table 5.38.

Table 5.38 Goodness-of-Fit Results of the Structural Equation Model

Goodness-of-Fit Indices	Values
Chi-square (χ^2)	198.34(p<0.001)
Degrees of Freedom (df)	125
Normed Chi-square (χ^2/df)	1.59
Goodness-of-Fit Index (GFI)	0.92
Standardized Root Mean Residual (SRMR)	0.040
Comparative Fit Index (CFI)	0.99
Normed Fit Index (NFI)	0.98
Root Mean Square Error of Approximation (RMSEA)	0.048

The standardized solutions of the structural equation model presented in Table 5.39 were reviewed and all estimates in the model were both reasonable and statistically significant. These results supported the reliability and validity of the measure associated with the structure equation model.

Table 5.39 Standardized Solutions of the Structural Equation Model

Variable Label	Factor Loading
SQ1	0.74***
SQ2	0.70(10.71)***
SQ3	0.73(11.20)***
CS1	0.75 ***
CS2	0.83(13.24)***
CS3	0.80(12.73)***
CPV1	0.79***
CPV2	0.82(13.46)***
CPV3	0.80(13.04)***
CI1	0.80***
CI2	0.75(12.08)***
CI3	0.77(12.33)***
PSC1	0.77***
PSC2	0.74(11.07)***

PSC3	0.76(11.35)***
CL1	0.80***
CL2	0.77(12.60)***
CL3	0.77(12.71)***

( ) t-value

*** Statistically significant at the 0.001 level (t > 3.291)

** Statistically significant at the 0.01 level (t > 2.576)

* Statistically significant at the 0.1 level (t > 1.645)

The direct and total effects on each endogenous variable in the structural equation model and the results of hypotheses assessment are summarized in Table 5.40.

Table 5.40 Standardized Causal Effects of the Structural Equation Model and Hypotheses Assessment

Outcome	Determinant	Causal Effects		Hypotheses	Assessment
		Direct	Total		
CS(R^2 = 0.78)	SQ	0.62*** (4.05)	0.62***	H9	Supported
	CPV	0.23* (2.35)	0.23*	H12	Supported
	CI	0.09 (0.84)	0.09	H14	Not Supported
CPV(R^2 = 0.61)	SQ	0.78*** (9.68)	0.78***	H8	Supported
CI(R^2 = 0.63)	SQ	0.80*** (9.88)	0.80***	H10	Supported
PSC(R^2 = 0.61)	SQ	0.78*** (9.47)	0.78***	H11	Supported
CL(R^2 = 0.74)	CS	0.37** (3.03)	0.37**	H17	Supported
	CPV	0.07 (0.78)	0.07	H13	Not Supported

	CI	0.24** (2.73)	0.24**	H15	Supported
	PSC	0.29*** (3.40)	0.29***	H16	Supported

( ) t-value

*** Statistically significant at the 0.001 level (t > 3.291)

** Statistically significant at the 0.01 level (t > 2.576)

* Statistically significant at the 0.1 level (t > 1.645)

The exogenous variables, Service Quality, Customer Perceived Value, and Corporate Image, explained 78% of the variance of the endogenous variable, Customer Satisfaction. The most important determinant of Customer Satisfaction was Service Quality, which had a significant total causal effect of 0.62. The next important determinant of Customer Satisfaction was Customer Perceived Value, which had a total causal effect 0.23. The total causal effect of Corporate Image on Customer Satisfaction was not statistically significant.

The exogenous variable, Service Quality, explained 61% of the variance of the endogenous variable, Customer Perceived Value. Service Quality had a significant total causal effect of 0.78 on Customer Perceived Value.

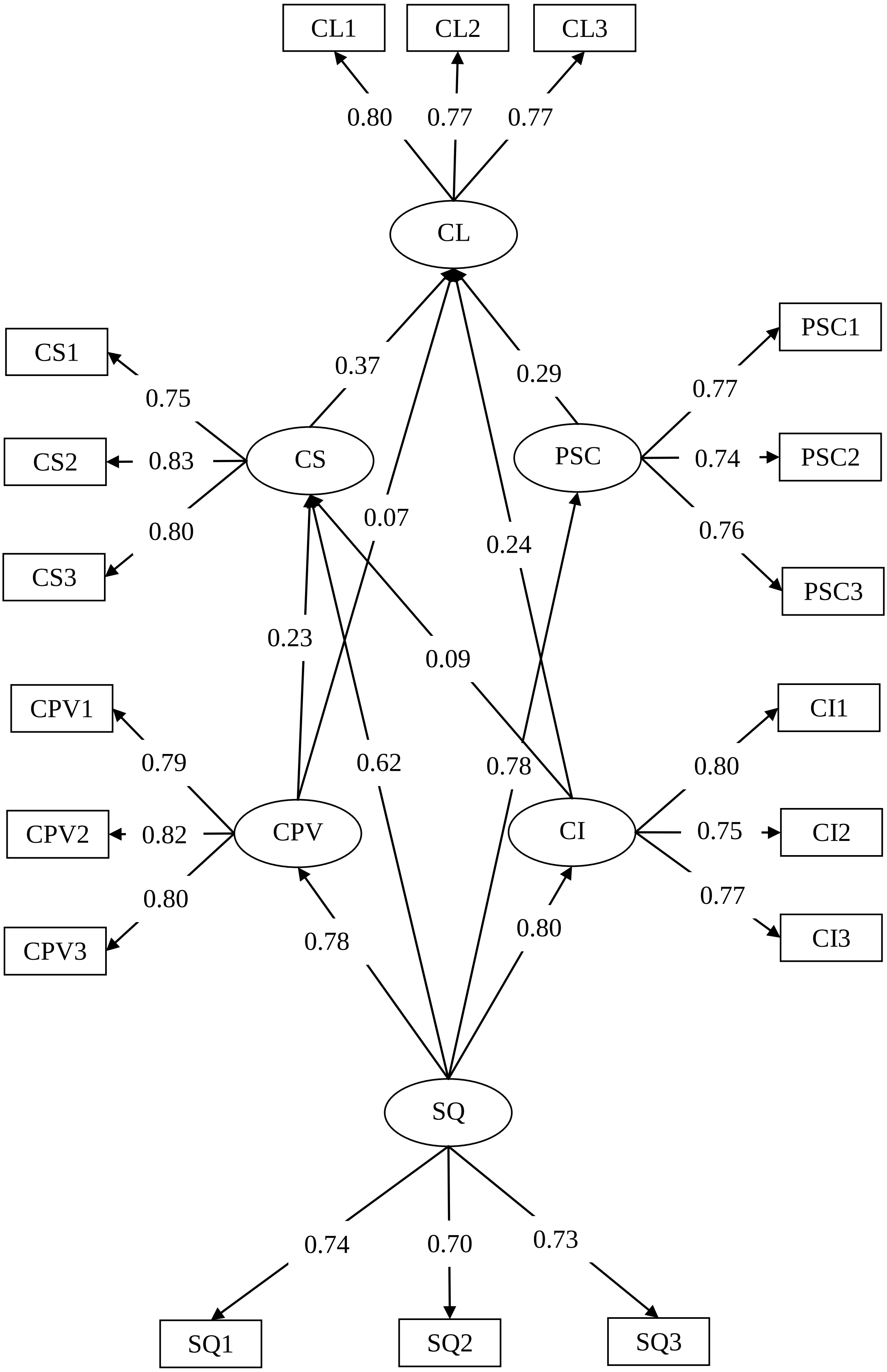
The exogenous variable, Service Quality, explained 63% of variance of the endogenous variable, Corporate Image. Service Quality had a significant total causal effect of 0.80 on Corporate Image.

The exogenous variable, Service Quality, explained 61% of variance of the endogenous variable, Perceived Switching Costs. Service Quality had a significant total causal effect of 0.78 on Perceived Switching Costs.

The exogenous variables, Customer Satisfaction, Customer Perceived Value, Corporate Image, and Perceived Switching Costs, explained 74% of variance of the endogenous variable, Customer Loyalty. The most important determinant of Customer Loyalty was Customer Satisfaction, which had a significant total causal effect of 0.37.

The next important determinant of Customer Loyalty was Perceived Switching Costs, and had a total causal effect of 0.29, followed by Corporate Image, having a total causal effect of 0.24. The total causal effect of Customer Perceived Value on Customer Loyalty was not statistically significant.

Figure 5.13 Structural Equation Model



Chapter 6

Discussion, Implications, Limitations, and Directions for Future Research

In this chapter, first, the results of this study are discussed; second, the theoretical and practical implications of the research findings are explained; finally, the limitations of this study and the directions for future research are provided.

6.1 Discussion

The following sections discuss the results pertaining to the multidimensional and hierarchical model of service quality and the results pertaining to the structural equation model respectively.

6.1.1 Multidimensional and Hierarchical Model

Based on the empirical results of this study, the multidimensional and hierarchical model of service quality consists of twelve first-order dimensions, three second-order dimensions (Interaction Quality, Physical Environment Quality, and Outcome Quality), and one third-order dimension (Service Quality). The twelve first-order dimensions in the model are composed of three measuring Interaction Quality (Attitudes, Behaviour, and Expertise), four measuring Physical Environment Quality (Store Atmosphere, Physically Appealing, Customer Convenience, and Social Factors), and five measuring Outcome Quality (Network Quality, Billing System, Waiting Time, Reliability, and Privacy).

6.1.1.1 Service Quality

The results of the measurement model for Service Quality support Hypotheses H4, H5, H6, and H7b and partially satisfy Research Objectives One and Two. The results confirm 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. The results are consistent with the research conducted by Lu et al. (2009), Clemes, et al. (2007), Dagger et al. (2007), and Brady and Cronin (2001), whose studies also reveal significant positive relationships between the three primary dimensions and customers' overall service quality perceptions. 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.

6.1.1.1.1 Interaction Quality

The results of the measurement model for Interaction Quality support Hypotheses H1 and H7a, and partially satisfy Research Objectives One and Two. The results confirm that there are significant positive relationships between the three sub-dimensions (Attitudes, Behaviour, and Expertise) and their pertaining Interaction Quality primary dimension, indicating that customers evaluate their perceptions of Interaction Quality by assessing the three sub-dimensions. Moreover, in measuring customers' perceptions of Interaction Quality for mobile communication services, Expertise is the most important indicator, followed by Attitudes, and Behaviour.

The Expertise sub-dimension is the most important indicator in measuring customers' perceptions of Interaction Quality in this study. The result confirms that there is a significant positive relationship between the Expertise sub-dimension and the Interaction Quality primary dimension. This result is consistent with the results of the focus group discussions and the research conducted by Lu et al. (2009), Martínez and Martínez (2008), Martínez and Martínez (2007), and Brady and Cronin (2001), whose studies also reveal a significant positive relationship between the Expertise sub-dimension and the Interaction Quality primary dimension. Westbrook (1981) notes that customers are sensitive to how competently service providers deal with problems and customer complaints. Czepiel et al. (1985) argue that skills of employees can significantly influence customers' service quality perceptions. Bitner, Booms, and Tetreault (1990), and Gronroos (1990) maintain that skills of employees are important for customers to be able to perceive and evaluate service quality. Given the importance of the Expertise dimension to customers' perceptions of Interaction Quality in this study, mobile communication service providers must educate, train, and empower their employees.

The Attitudes sub-dimension is the next most important predictor of Interaction

Quality in this study. The result confirms that there is a significant positive relationship between the Attitudes sub-dimension and the Interaction Quality primary dimension. This result is consistent with the results of the focus group discussions and the findings of Lu et al. (2009), Martínez and Martínez (2007), and Brady and Cronin (2001), whose studies also reveal a significant positive relationship between the Attitudes sub-dimension and the Interaction Quality primary dimension. Czepiell et al. (1985) note that employees' attitudinal traits (friendliness, politeness, courteousness, and patience) have significant impacts on customers' perceptions of service quality. Gronroos (2000, 1990) and Bitner (1990) maintain that customers consider employees' attitudes when forming their service quality perceptions. Mobile communication service providers must have employees who have positive attitudes towards their customers based on the importance of the Attitudes sub-dimensions to customers' perceptions of Interaction Quality in this study.

The Behaviour sub-dimension is also significantly predictive of the Interaction Quality primary dimension in this study. The result confirms that there is a significant positive relationship between the Behaviour sub-dimension and the Interaction Quality primary dimension. This result is consistent with the results of the focus group discussions. Moreover, several researchers have suggested the behaviour of employees can significantly shape customers' perceptions and assessment of service quality (Brady and Cronin, 2001; Winsted, 2000; Bitner, 1990; Gronroos, 1990). For example, Winsted's (2000) findings provide empirical evidence for the notion that employee behaviour is important to customers in evaluating two different services (restaurant service and medical service). 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. Therefore, mobile communication service providers must ensure that their employees behave with respect, care, and concern towards their customers.

6.1.1.1.2 Physical Environment Quality

The results of the measurement model for Physical Environment Quality support Hypotheses H2 and H7a, and partially satisfy Research Objectives One and Two. The results confirm that there are significant positive relationships between the four sub-dimensions (Physically Appealing, Store Atmosphere, Customer Convenience, and

Social Factors) and their pertaining Physical Environment Quality primary dimension, indicating that customers evaluate their perceptions of Physical Environment Quality by assessing the four sub-dimensions. Moreover, in measuring customers' perceptions of Physical Environment Quality for mobile communication services, Physically Appealing is the most important indicator, followed by Store Atmosphere, Customer Convenience, and Social Factors.

The Physically Appealing sub-dimension is the most important indicator in measuring customers' perceptions of Physical Environment Quality in this study. The result confirms that there is a significant positive relationship between the Physically Appealing sub-dimension and the Physical Environment Quality primary dimension. This result is consistent with the results of focus group discussions and the research conducted by Clemes et al. (2007), Martínez and Martínez (2007), Ko and Pastore (2005), and Brady and Cronin (2001), whose studies also reveal a significant positive relationship between the Physically Appealing (facility design/tangibles) sub-dimension and the Physical Environment Quality primary dimension. In fact, many researchers have noted 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; Parikh, 2005; Aubert-Gamet and Cova, 1999). The importance of extrinsic cues to customers' perceptions of service quality was also supported in the earlier studies by Dabholkar et al. (1996), Baker, Grewal, and Parasuraman (1994), Bitner (1990), and Gronroos (1990). For example, Dabholkar et al. (1996) suggest that a good general appearance of the store and ample and well maintained public facilities positively influence customers' service quality perceptions. The findings of this study suggest that mobile communications service providers should have an attractive and user-friendly physical environment in all of their retail outlets.

The Store Atmosphere sub-dimension is the next most important indicator in measuring customers' perceptions of Physical Environment Quality in this study. The result confirms that there is a significant positive relationship between the Store Atmosphere sub-dimension and the Physical Environment Quality primary dimension. This result is consistent with the results of the focus group discussions and the research conducted by Martínez and Martínez (2008), Dagger et al. (2007), Ko and

Pastore (2005), and Brady and Cronin (2001), whose studies also reveal a significant positive relationship between the Store Atmosphere (ambient conditions) sub-dimension and the Physical Environment Quality primary dimension. Bitner (1992) and Baker (1986) suggest that non-visual aspects of the service environment such as temperature, lighting, noise, and scent can significantly impact on customers' service quality perceptions. Acting on the aforementioned findings, mobile communication service providers must make efforts to provide a comfortable atmosphere for customers in their retail stores.

The Customer Convenience sub-dimension is the third most important predictor of Physical Environment Quality in this study. The result confirms that there is a significant positive relationship between the Customer Convenience sub-dimension and the Physical Environment Quality primary dimension. This result is consistent with the results of the focus group discussions and the research conducted by Negi (2009), Lai et al. (2007) and Dabholkar et al. (1996), whose studies also reveal that the Customer Convenience factor is an important dimension of service quality. Several researchers have noted the importance of the Convenience factor to customers' service quality perceptions (Martínez and Martínez, 2007; Ko and Pastore, 2005; Howat et al., 1996; Hummel and Savitt, 1988). Parauraman et al. (1985) suggest that approachability and ease of contact, such as convenient operating hours and locations, significantly influence customers' service quality perceptions. According to the findings of this study, customers require that the retail outlets of mobile communications service providers are easy to access, and that the retail outlets provide convenient physical facilities such as rest rooms, ample car parking, and comfortable seating.

The Social Factors sub-dimension is the fourth most important indicator in measuring customers' perceptions of Physical Environment Quality in this study. The result confirms that the Physical Environment Quality primary dimension is positively related to the Social Factors sub-dimension. This result is consistent with the results of focus group discussions and the findings of Clemes et al. (2007), and Brady and Cronin (2001), whose studies also reveal that Social Factors is an important sub-dimension of the Physical Environment Quality primary dimension. 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; Lehtinen and Lehtinen, 1991; Bitner, Booms, and Tetreault, 1990). Grove and Fisk (1997, pg.63) suggest that "the service encounter is often characterized by the condition of multiple customers whose presence may influence each other." Lovelock (1996) considers that, sometimes, it is necessary for service providers to act as a "police officer" in order to ensure proper behaviour among their customers. For example, mobile communications service providers may have security guards in their retail outlets, so they can take actions to stop a customer who has disturbed other customers.

6.1.1.1.3 Outcome Quality

The results of the measurement model for Outcome Quality support Hypotheses H3 and H7a, and partially satisfy Research Objectives One and Two. The results confirm that there are significant positive relationships between the five sub-dimensions (Network Quality, Billing System, Waiting Time, Reliability, and Privacy) and their pertaining Outcome Quality primary dimension, indicating that customers evaluate their perceptions of Outcome Quality for mobile communication services by assessing the five sub-dimensions. Moreover, in measuring customers' perceptions of Outcome Quality for mobile communication services, Reliability is the most important indicator, followed by Waiting Time, Network Quality, Billing System, and Privacy.

The Reliability sub-dimension is the most important indicator in measuring customers' perceptions of Outcome Quality in this study. The result confirms that there is a significant positive relationship between the Reliability sub-dimension and the Outcome Quality primary dimension. This result is consistent with the results of the focus group discussions and the findings of Lai et al. (2007), Tung (2004), and Wang et al. (2004), whose studies also reveal that the reliability factor is an important dimension of mobile communication service quality. Parasuraman et al. (1988, pg.23) define reliability as "ability to perform the promised service dependably and accurately." Dabholkar et al. (1996) consider reliability 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 (Dabholkar et al., 1996; Parasuraman et al., 1994; Cronin and Taylor, 1992; Parasuraman et al., 1988). Based on the results of this study, customers require that mobile communications service providers deliver the services that the providers have committed, promised, and guaranteed.

The Waiting Time sub-dimension is the second most important predictor of Outcome Quality in this study. The result confirms that the Outcome Quality primary dimension is positively related to the Waiting Time sub-dimension. This result is consistent with the results of the focus group discussions and the research conducted by Martínez and Martínez (2008), and Brady and Cronin (2001), whose findings also reveal a significant positive relationship between the Waiting Time sub-dimension and the Outcome Quality primary dimension. Maister (1985) suggests that the uncertainty involved in waiting can result in unpleasant customers. Parasuraman et al. (1985) recognize that customers critically consider service punctuality when they evaluate their service experiences. LeBlanc (1992) identifies that timeliness is an important factor of service quality. Katz, Larson, and Larson (1991), and Taylor and Claxton (1994) provide empirical evidence for the contention that customers' waiting experiences can significantly affect their evaluation of overall service experiences. According to the findings of this study, it is important for mobile communications service providers to be able to deliver prompt and timely services to their customers.

The Network Quality sub-dimension is the third most important predictor of Outcome Quality in this study. The result confirms that the Outcome Quality primary dimension is positively related to the Network Quality sub-dimension. This result is consistent with the results of the focus group discussions and the research conducted by Negi (2009), Kim et al. (2004), and Wang et al. (2004), whose findings also reveal that the Network Quality dimension (network aspects/call quality) is one of the most important dimensions pertaining to customers' quality perceptions of mobile communication services. 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. Mobile communication service providers must provide sound and clear network quality to their customers if they are going to maintain a consistent level of outcome quality.

The Billing System sub-dimension is the fourth most important indicator in measuring customers' perceptions of Outcome Quality in this study. The result confirms that there is a significant positive relationship between the Billing System sub-dimension and the Outcome Quality primary dimension. This result is consistent with the results of focus group discussions and the findings of Lim et al. (2006), whose study also recognizes that the Billing System factor is an important dimension of mobile communications service quality. Lee et al. (2001) note that customers consider precision of billing service as one of the most important service performance attributes. Similarly, the results of Pezeshki, Mousavi, and Grant's (2009) study indicate that the accuracy of billing is one of the major weaknesses in the mobile telecommunication industry that leads to customer dissatisfaction. The results of this study indicate that customers require mobile communications service providers to provide accurate billing, understandable invoice, and convenient payment of invoice as these are important aspects of Billing System.

The Privacy sub-dimension is the fifth most important indicator in measuring customers' perceptions of Outcome Quality in this study. The result confirms that there is a significant positive relationship between the Privacy sub-dimension and the Outcome Quality primary dimension. This result is consistent with the results of the focus group discussions and the findings of Hsu and Hsu (2008), Vlachos and Vrechopoulos (2008), and Parasuraman, Zeithaml, and Malhotra (2005), whose studies reveal that the Privacy factor is an important dimension of service quality in the context of the electronic service environment (e.g. mobile internet services). Parasuraman et al. (2005) suggest that privacy deals with a sense of feeling safe when a customer's personal information is shared with their service provider. In addition, Milne and Rohm (2000, pg.238) note that "marketers continue to build extensive databases and use this information to target and profile consumers, often trading and renting consumer lists to other organizations." Customers tend to be dissatisfied when their privacy is violated (Riel, Liljander, and Jurriëns, 2001). Given the importance of the Privacy dimension to customers' perceptions of Outcome Quality in this study, mobile communication service providers must respect the privacy concerns of their customers. Providers must also ensure that they have security systems that protect their customers' personal information.

6.1.2 The Structural Equation Model

The structural equation model is used as a framework to examine the relationships that may exist between Service Quality, Customer Satisfaction, Customer Perceived Value, Corporate Image, Perceived Switching Costs, and Customer Loyalty. The results attained from the structural equation model support Hypotheses H8, H9, H10, H11, H12, H15, H16, and H17, and satisfy Research Objective Three. Hypotheses H13 and H14 are not supported.

The results pertaining to Hypotheses H8, H9, H10, and H11 indicate that higher perceptions of Service Quality positively contribute to Customer Perceived Value, Customer Satisfaction, Corporate Image, and Perceived Switching Costs in the Chinese mobile communications market. The results provide empirical evidence for the contention that Service Quality is an antecedent of Customer Perceived Value, Customer Satisfaction, Corporate Image, and Perceived Switching Costs. The positive casual relationship between Service Quality and Customer Perceived Value is supported in the studies by Lai et al. (2009), Chi et al. (2008), Wang et al. (2004), and Cronin et al. (2000). Earlier studies by Oh (1999), Sweeney et al. (1999), Andreassen and Lindestad (1998), and Bolton and Drew (1991) also supported this relationship. The positive causal relationship between Service Quality and Customer Satisfaction is supported in the studies by Clemes et al. (2007), Dagger et al. (2007), Wang et al. (2004), and Brady, Cronin, and Brand (2002). The positive effect of Service Quality on Customer Satisfaction was also supported in the earlier studies by Cronin et al. (2000), Spreng and Mackoy (1996), Fornell et al. (1996), and Anderson and Sullivan (1993). The positive causal relationship between Service Quality and Corporate Image is supported in the studies by Lai et al. (2009), Cheng, Lai, and Yeung (2008), Adyin and Ozer (2005), Bloemer et al. (1998). The positive causal relationship between Service Quality and Perceived Switching Costs is supported in the studies by Chou and Lu (2009), Meng and Elliott (2009), and Aydin and Ozer (2005).

The result pertaining to Hypothesis H12 indicates that higher Customer Perceived Value positively affects Customer Satisfaction. However, the result pertaining to Hypothesis H13 indicates that there is no statistically significant positive causal relationship between Customer Perceived Value and Customer Loyalty. The finding suggests that Customer Perceived Value is a key driver of Customer Satisfaction in the Chinese mobile communications market. Customer Satisfaction increases when Customer Perceived Value is increased. The positive causal relationship between Customer Perceived Value and Customer Satisfaction is supported in the studies by Lai et al. (2009), Terblanche (2006), Wang et al. (2004), and Cronin et al. (2000).

The result pertaining to Hypothesis H14 indicates that there is no statistically significant positive causal relationship between Corporate Image and Customer Satisfaction. However, the result pertaining to Hypothesis H15 indicates that a higher Corporate Image positively contributes to Customer Loyalty. The result provides empirical evidence for the notion that customers' favourable Corporate Image towards their current mobile communications service providers can result in Customer Loyalty. The positive causal relationship between Corporate Image and Customer Loyalty is also supported in the studies by Kandampully and Hu (2007), Türkyılmaz and Özkan (2007), Hart and Rosenberger (2004), and Johnson et al. (2001).

The result pertaining to Hypothesis H16 indicates that higher Perceived Switching Costs have a significant positive effect on Customer Loyalty in the Chinese mobile communications market. Customers have a stronger willingness to remain with their current mobile communications service providers when they perceive a high level of switching costs. The result supports the notion that Perceived Switching Costs is one of the key drivers of Customer loyalty. The positive causal relationship between Perceived Switching Costs and Customer Loyalty is also supported in the studies by Chou and Lu (2009), Cheng et al. (2008), Aydin and Özer (2005), and Caruana (2003).

The result pertaining to Hypothesis H17 indicates that higher Customer Satisfaction positively affects Customer Loyalty in the Chinese mobile communication. Customer Loyalty increases when Customer Satisfaction is increased. The empirical finding supports the contention that satisfied customers behave loyally towards their current mobile communications service providers. The positive causal relationship between customer satisfaction and customer loyalty is also supported in the studies by Lai et al. (2009), Cheng et al. (2008), Kandampully and Hu (2007), and Lim et al. (2006).

6.2 Implications

This section provides the implications of this study from both a theoretical and managerial perspective.

6.2.1 Theoretical Implications

The first theoretical implication is the applicability of a hierarchical and multidimensional approach for the conceptualisation and measurement of service quality in the Chinese mobile communications market. This study presents a comprehensive evaluation of customers' perceptions of service quality in the Chinese mobile communications market through developing and estimating a hierarchical and multidimensional model. The conceptualisation and the measurement of customers' perceptions of service quality have given rise to much controversy in the domain of the service marketing literature. However, the results of this study support the use of a hierarchical and multidimensional approach for conceptualising and measuring customers' perceptions of service quality, similar to the models developed by Brady and Cronin (2001), and Dabholkar et al. (1996). The results of the measurement model tests indicate that all eight measurement models for measuring Service Quality and its dimensions have a good model fit. In addition, the results of reliability and validity tests indicate that the measurement scales for measuring Service Quality and its dimensions exhibit adequate reliability and validity. These findings indicate that the hierarchical and multidimensional model developed for this study adequately captures customers' perceptions of service quality in the Chinese mobile communications market.

The second theoretical implication focuses on the primary dimensions of service quality identified for this study. The results of this study confirm that customers evaluate their overall perceptions of service quality by assessing three service quality primary dimensions (Interaction Quality, Physical Environment Quality, and Outcome Quality) as suggested in studies by Lu et al. (2009), Clemes, et al. (2007), Dagger et al. (2007), and Brady and Cronin (2001). In particular, this study identifies the comparative importance of the three primary dimensions in customers' service evaluation in the Chinese mobile communications market. Among the three noted primary dimensions, Interaction Quality is the most important primary dimension of service quality, followed by Physical Environment Quality, and Outcome quality. The results provide empirical evidence for the notions that the interpersonal interactions that occur during service delivery often have the greatest effect on customers' perceptions of service quality (Hartline and Ferrell, 1996; Bitner, Booms, and Mohr, 1994; Surprenant and Solomon, 1987). Further, Surprenant and Solomon (1987) suggest that a customer's perception of service quality is more process-driven (that is how the service is delivered) than outcome-driven (that is what a customer gets after the service delivery process and the buyer-seller interactions).

The third theoretical implication relates to the sub-dimensions of service quality identified for this study. This study identifies twelve sub-dimensions pertaining to the three service quality primary dimensions in the Chinese mobile communications market. The findings indicate that these twelve sub-dimensions are highly important for customers to be able to perceive and evaluate service quality in the Chinese mobile communications market. In particular, this study identifies the comparative importance of the twelve sub-dimensions in customers' service evaluation. Among the twelve sub-dimensions, Expertise is the most important sub-dimension of the Interaction Quality primary dimension, Physically Appealing is the most important sub-dimension of the Physical Environment Quality primary dimension, and Reliability is the most important sub-dimension of the Outcome Quality primary dimension. In addition, several researchers have noted that privacy is an important factor that significantly affects customers' perceptions of service quality in the context of the internet service environment such as internet banking (Khurana, 2009), online auction (Yen and Lu, 2008), and internet retailing (Parasuraman et al., 2005). The results of this study also indicate that Privacy is an important dimension of service quality in the Chinese mobile communications market. A plausible reason for this result is that many mobile phone users in China are also mobile internet users. Vlachos et al. (2008) suggest that privacy concerns have a strong influence on mobile internet users' perceptions of service quality. The number of mobile internet users in China surged 113 percent to approximate 117 million by the end of 2008 (China Daily, 2009a). Further work investigating the impact of Privacy as an important dimension of service quality is needed in the Chinese mobile communications market.

The fourth theoretical implication is the relationships between the six important marketing constructs. In response to the call for more investigations into the complex relationships between important service marketing constructs (Adyin and Ozer, 2005; Caruana, Money, and Berthon, 2000; Nguyen and LeBlanc, 1998; Cronin and Taylor, 1992), this study examines the relationships between Service Quality, Customer Satisfaction, Customer Perceived Value, Corporate Image, Perceived Switching Costs, and Customer Loyalty in the Chinese mobile communications market. The findings indicate that Service Quality is an important determinant of Customer Perceived Value, Customer Satisfaction, Corporate Image, and Perceived Switching Costs in the Chinese mobile communications market. Customer Perceived Value is an antecedent of Customer Satisfaction. Corporate Image, Customer Satisfaction, and Perceived Switching Costs are three key drivers of Customer Loyalty. In particular, the results of this study indicate that both 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. The findings are consistent with the findings of Fornell et al. (1996, pg.7), whose study empirically demonstrates that “customer satisfaction is more quality-driven than value- or price-driven”.

The results of this study indicate that a higher Corporate Image has a positive effect on Customer Satisfaction. However, this effect is not statistically significant. This finding reveals that 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 will be satisfied with the services provided by the mobile communications service provider. This result is inconsistent with the findings of Lai et al, whose studies reveal that corporate image has a statistically significant positive effect on customer satisfaction in the Chinese mobile communications market. A plausible reason for the inconsistent results is that a low customer response rate and a relatively small sample size (120) may create a problem regarding the generalisability of Lai et al.’s (2009) findings on corporate image.

Among the three determinants of Customer Loyalty in this study, Customer Satisfaction is the most important determinant of Customer Loyalty, followed by Perceived Switching Costs, and Corporate Image. The positive effect of Customer Perceived Value on Customer Loyalty is not statistically significant. A plausible reason for this result is that the Chinese mobile communications service providers have adopted price reductions as an important part of their strategic marketing to improve customer perceived value, customer retention, and customer acquisitions (Wang, Lo, and Yang 2004). This results in a low variation of prices being offered by the Chinese mobile communications service providers. Therefore, customers may perceive a similar level of value, regardless of their mobile communications service providers. As a result, Customer Perceived Value has no significant impact on Customer Loyalty in the Chinese mobile communications market. Further, Zins (2001) and Patterson and Spreng (1997) suggest that customer perceived value only has an indirect influence on customer loyalty through customer satisfaction. The investigations of the complex relationships between the six important service marketing constructs in this study may provide additional valuable insights for the future research on these constructs in the Chinese mobile communications market.

6.2.2 Practical Implications

In today's worldwide competitive mobile communications market, mobile communications service providers must retain their customers through superior service performance. This study provides a multidimensional and hierarchical framework that enables mobile communications service providers to identify and assess the dimensions underlying customers' perceptions of service quality in the Chinese mobile communications market. From a managerial perspective, the multidimensional and hierarchical framework developed for this study provides an improved understanding of how customers assess the service quality of mobile communications service providers in the Chinese mobile communications market. Managers of mobile communication companies can use the dimensions of service quality identified in this study as a background for formulating their management strategies in the Chinese mobile communications market. For example, given the importance of Expertise to customers' perceptions of Interaction Quality, launching a regular training programme is a sound management strategy that will enable employees to enhance their own customer service expertise.

Moreover, the multidimensional and hierarchical framework developed for this study enables mobile communications service providers to identify the most and the least important dimensions underlying customers' perceptions of service quality.

According to the comparative importance of the dimensions, managers of mobile communication companies can allocate different weights to the dimensions and efficiently use their limited resources (e.g. human resources and financial resources). For example, the results of this study indicate that customers perceive the Network Quality sub-dimension as a more important sub-dimension of Outcome Quality than the Billing System sub-dimension in the Chinese mobile communications market. Therefore, managers of mobile communication companies should allocate more resources to improve their network quality than update their billing systems.

The measurement scales for measuring Service Quality and its dimensions developed for this study provide managers of mobile communication companies with flexibility in their measurement methods. For example, managers of mobile communication companies can broadly measure their customers' perceptions of service quality at an overall level when their time and budgets are limited. The managers can also measure their customers' perceptions of service quality at a primary level, a sub-dimensions level, or at all three levels depending on the situation. Moreover, from a competitive perspective, managers of mobile communication companies can also use the measurement scales developed in this study to measure the service quality of their competitors.

The findings of this study provide valuable information regarding the complex relationships between Service Quality, Customer Satisfaction, Customer Perceived Value, Corporate Image, Perceived Switching Costs, and Customer Loyalty for practitioners who are already operating in, or preparing to enter, the Chinese mobile communications market. The information may assist mobile communications service providers to develop and implement successful marketing strategies in the Chinese mobile communications market. For example, the findings of this study suggest that Customer Perceived Value is an important determinant of Customer Satisfaction in the Chinese mobile communications market. Mobile communications service providers can enhance Customer Perceived Value through marketing strategies such as discount offers or free minutes rewards, which in turn increases Customer Satisfaction. In addition, Perceived Switching Costs and Corporate Image are two key drivers of Customer Loyalty in the Chinese mobile communications market. Differentiation of services is a sound marketing strategy to increase Perceived

Switching Costs and to create a positive Corporate Image in customers' minds as suggested by Aydin and Ozer (2005). Therefore, mobile communications service providers that are interested in increasing Perceived Switching Costs and enhancing Corporate Image and Customer Loyalty should endeavour to differentiate their services from the services of their competitors.

6.3 Limitations

The first limitation is related to the sample drawn for this study. The sample was drawn form subscribers of China Mobile only. Despite the fact that China Mobile has the largest number of subscribers in the Chinese mobile communications market, the sample of this study does not fully represent all of the Chinese mobile phone users. Customers of several other mobile communications service providers in the Chinese mobile communications market are not represented in this study. Moreover, the sample of this study came from a participating China Mobile store in one of the major cities (Jinan) in China. Therefore, the sample of this study does not fully represent all of China Mobile customers in other geographic areas.

The second limitation is the ability to generalize the findings derived from this study to other industries and countries. The findings of this study are based on the perceptions of customers of the Chinese mobile communications market only. Therefore, the findings may not be able to be generalised for other industries or countries.

Thirdly, this study sought to identify all the factors that impact on customers' perceptions of service quality in the Chinese mobile communications market. However, there may be some other factors influencing customers' perceptions of mobile communications service quality that have not been identified in this study.

The fourth limitation is that although this study examined the complex relationships that may exist between Service Quality, Customer Perceived Value, Customer Satisfaction, Corporate Image, Perceived Switching Costs, and Customer Loyalty, there are some potential relationships that may be omitted from the proposed structural model. For example, several researchers have suggested that customer perceived value has a moderating effect on the relationship between service quality and customer satisfaction (Wang et al., 2004; Caruana et al., 2000), and perceived switching costs have a moderating effect on the relationship between customer satisfaction and customer loyalty (Aydin, Ozer, and Arasil, 2005; Lee et al., 2001; Fornell, 1992). These relationships were not explored in this study.

6.4 Directions for Future Research

Several directions for future research are suggested as a result of this study:

Future researchers should seek to identify any additional factors that significantly impact on customers' perceptions of service quality that have not been identified by this study on the Chinese mobile communications market.

Future researchers that use a hierarchical and multidimensional approach to conceptualise and measure customers' perceptions of service quality in mobile communications markets other than the Chinese mobile communications market should identify their own specific service quality dimensions.

Future researchers may use the current study as a framework and examine whether the hierarchical and multidimensional approach for conceptualising and measuring customers' perceptions of service quality as used in this study is applicable in other industry settings in China or in other countries.

Future researchers may extend the current study and examine the relationships that may exist between Service Quality, Customer Satisfaction, Customer Perceived Value, Corporate Image, Perceived Switching Costs, and Customer Loyalty in the Chinese mobile communications market apart from the relationships identified in this study.

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Appendices:

Appendix 1: Questionnaire

Commerce Division
P O Box 84
Lincoln University
Canterbury 8150
NEW ZEALAND
Telephone 64 03 325 2811
Fax 64 03 325 3630
www. Lincoln.ac.nz

Dear Customer,

I am a Doctor of Philosophy student at Lincoln University in Christchurch, New Zealand. My research project involves asking people about their perceptions of their experiences with the mobile communication services in China. You are invited to participate in this survey.

Attached is a brief questionnaire, which should only take about 10 to 15 minutes, and your answers will be **completely anonymous and confidential**. This research is completely voluntary in nature. However, in order to qualify for this research, you must have been a subscriber of China Mobile for at least three months and be at least eighteen years old. This research has been reviewed and approved by the Lincoln University Human Ethics Committee.

You will receive a high quality ballpoint pen as appreciation for providing assistance with the research. Please return the completed questionnaire to the distributor immediately.

I will be pleased to discuss any concerns you have about your participation in the research. I can be contact by telephoning (0086 0532) 88019236, or by emailing shux3@lincoln.ac.nz. You can also contact my supervisors Mr. Michael D. Clemes and/or Dr. Christopher Gan. Mr. Michael D. Clemes can be contacted at (0064 03) 3252811 (ext 8292) or clemes@lincoln.ac.nz and Dr. Christopher Gan can be contacted at (0064 03) 3252811 (ext 8155) or ganc1@lincoln.ac.nz.

Again, your assistance will contribute greatly to the success of my research. Each and every response is important and I appreciate your willingness to help. Thank you for your co-operation and assistance.

Yours sincerely,

Xin Shu
Doctor of Philosophy Student
Commerce Division
Lincoln University

A Survey of A Hierarchical Model of the Chinese Mobile Communications Market: An Empirical Analysis

QUESTIONNAIRE
FOR POSTGRADUATE RESEARCH

This questionnaire contains 5 sections (A – E). Please answer all the questions in each section. Below are a series of statements that relate to your overall experiences as a subscriber of China Mobile. Please indicate how strongly you agree or disagree with each of the following statements on a scale of 1 to 7. 1 you strongly disagree, 7 you strongly agree, and 4 is neutral. Please circle your answers.

Section A Interaction Quality							
	Strongly Disagree			Neutral			Strongly Agree
Attitudes							
1. The employees of China Mobile are friendly.	1	2	3	4	5	6	7
2. The employees of China Mobile are polite.	1	2	3	4	5	6	7
3. The employees of China Mobile are courteous.	1	2	3	4	5	6	7
4. The employees of China Mobile are patient.	1	2	3	4	5	6	7
Behavior							
1. The employees of China Mobile are willing to provide me with advice and assistance.	1	2	3	4	5	6	7
2. The employees of China Mobile always give prompt service.	1	2	3	4	5	6	7
3. The employees of China Mobile care about my concerns.	1	2	3	4	5	6	7
4. The employees of China Mobile use the appropriate body language when they interact with me.	1	2	3	4	5	6	7
Expertise							
1. The employees of China Mobile are skilled workers and solve my problems.	1	2	3	4	5	6	7
2. The employees of China Mobile are knowledgeable when answering my questions.	1	2	3	4	5	6	7
3. The employees of China Mobile are professional and well trained.	1	2	3	4	5	6	7
Overall							
1. The employees of China Mobile deliver superior services.	1	2	3	4	5	6	7
2. Overall, the quality of the interactions with the employees of China Mobile is excellent.	1	2	3	4	5	6	7

Please turn the page and complete Section B.

Section B Physical Environment Quality							
	Strongly Disagree			Neutral			Strongly Agree
Store Atmosphere							
1. The temperature in the China Mobile stores is comfortable.	1	2	3	4	5	6	7
2. The noise level in the China Mobile stores is reasonable.	1	2	3	4	5	6	7
3. The air circulation in the China Mobile stores is good.	1	2	3	4	5	6	7
4. The space in the China Mobile stores is adequate.	1	2	3	4	5	6	7
5. The lighting in the China Mobile stores is appropriate.	1	2	3	4	5	6	7
Physically Appealing							
1. Materials such as handbooks or brochures associated with the mobile services are visually appealing and easy to access in the China Mobile stores.	1	2	3	4	5	6	7
2. The employees of China Mobile are well dressed and neat in appearance.	1	2	3	4	5	6	7
3. The China Mobile stores are well decorated.	1	2	3	4	5	6	7
4. Goods such as mobile phones are visually appealing and easy to sample.	1	2	3	4	5	6	7
5. There are sufficient counters with clear signs that direct customers, so they can access different services in the China Mobile stores.	1	2	3	4	5	6	7
6. The China Mobile stores are clean.	1	2	3	4	5	6	7
Customer Convenience							
1. The China Mobile stores have operating hours and locations that are convenient for all of their customers.	1	2	3	4	5	6	7
2. The China Mobile stores have convenient car parking for their customers.	1	2	3	4	5	6	7
3. The China Mobile stores provide adequate physical facilities such as seating or rest rooms for all of their customers.	1	2	3	4	5	6	7
Social Factors							
1. The attitudes of other customers do not disturb me in the China Mobile stores.	1	2	3	4	5	6	7
2. The behavior of other customers does not disturb me in the China Mobile stores.	1	2	3	4	5	6	7
3. I am not disturbed when other customers interact with the employees in the China Mobile stores.	1	2	3	4	5	6	7
Overall							
1. I feel comfortable with the physical environment of the China Mobile stores.	1	2	3	4	5	6	7
2. Overall, the physical environment of the China Mobile stores is excellent.	1	2	3	4	5	6	7

Please turn the page and complete Section C.

Section C Outcome Quality							
	Strongly Disagree			Neutral			Strongly Agree
Network Quality							
1. The other person's voice is loud and clear.	1	2	3	4	5	6	7
2. The network coverage is good.	1	2	3	4	5	6	7
3. The call quality is always good.	1	2	3	4	5	6	7
Billing System							
1. China Mobile provides accurate billing.	1	2	3	4	5	6	7
2. The invoice is clear and easy to understand.	1	2	3	4	5	6	7
3. Payment of the invoice is convenient (e.g. cash, credit card, bank transfer).	1	2	3	4	5	6	7
Waiting Time							
1. Problems such as poor network quality or customer complaints are solved quickly with simple procedures.	1	2	3	4	5	6	7
2. China Mobile always responds promptly to my requests.	1	2	3	4	5	6	7
3. China Mobile knows that waiting time is important to me.	1	2	3	4	5	6	7
Reliability							
1. China Mobile fulfils its customer commitments.	1	2	3	4	5	6	7
2. China Mobile continually delivers its services at the times it promises to do so.	1	2	3	4	5	6	7
3. China Mobile's guarantee is excellent.	1	2	3	4	5	6	7
Privacy							
1. No one can check my personal information that is associated with China Mobile's services except me.	1	2	3	4	5	6	7
2. China Mobile does protect my private information.	1	2	3	4	5	6	7
3. China Mobile knows that my privacy is important to me.	1	2	3	4	5	6	7
Overall							
1. It is always a good experience to use the services of China Mobile.	1	2	3	4	5	6	7
2. Overall, I receive the desired outcome by using the services of China Mobile.	1	2	3	4	5	6	7

Please turn the page and complete Section D.

Section D Service Quality, Customer Satisfaction, Customer Perceived Value, Corporate Image, Perceived Switching Costs, and Customer Loyalty							
	Strongly Disagree			Neutral			Strongly Agree
Service Quality							
1. China Mobile delivers superior services in every way.	1	2	3	4	5	6	7
2. China Mobile consistently provides high quality service products.	1	2	3	4	5	6	7
3. Overall, the service quality of China Mobile is excellent.	1	2	3	4	5	6	7
Customer Satisfaction							
1. My choice to be a subscriber of China Mobile is a wise one.	1	2	3	4	5	6	7
2. I feel delighted with the services and goods delivered by China Mobile.	1	2	3	4	5	6	7
3. Overall, China Mobile provides a very satisfying experience.	1	2	3	4	5	6	7
Customer Perceived Value							
1. The services that I receive from China Mobile provide value for money.	1	2	3	4	5	6	7
2. Compared to what I have to give up, such as money, time, energy, and effort, the services that I receive from China Mobile are excellent.	1	2	3	4	5	6	7
3. Overall, I feel China Mobile's services and goods are valuable.	1	2	3	4	5	6	7
Corporate Image							
1. I have always had a good impression of China Mobile.	1	2	3	4	5	6	7
2. In my opinion, China Mobile has a good image in the minds of consumers.	1	2	3	4	5	6	7
3. Overall, I consider that China Mobile has a positive image in the marketplace.	1	2	3	4	5	6	7
Perceived Switching Costs							
1. If I switch to a new mobile communication provider, I will be concerned that the services offered by the new mobile communication provider may not work as well as China Mobile's services.	1	2	3	4	5	6	7
2. I want to remain as a subscriber of China Mobile rather than switch to a new mobile communication provider when I consider money, time, energy, effort, and relations.	1	2	3	4	5	6	7
3. Overall, it is not worthwhile to switch to a new mobile communication provider.	1	2	3	4	5	6	7
Customer Loyalty							
1. I intend to repurchase the services of China Mobile.	1	2	3	4	5	6	7
2. I will recommend China Mobile to others.	1	2	3	4	5	6	7
3. Overall, given the other choices of mobile communication provider, I will remain as a subscriber of China Mobile.	1	2	3	4	5	6	7

Please turn the page and complete Section E.

Section E Demographic Information				
1.	What is your gender?	☐ Male	☐ Female	
2.	What is your age group?	☐ 18-25 ☐ 46-55	☐ 26-35 ☐ 56-55	☐ 36-45 ☐ 65+
3.	How long have you been a subscriber of China Mobile?	________ Years /	________ Months	
4.	What is your occupation?			
	☐ Clerical ☐ Professional ☐ Laborer	☐ Sales/Service ☐ Tradesperson ☐ Farmer	☐ Student ☐ Unemployed	
	Other (please specify)	______________________________		

Thank you very much for your time. Please return the survey to the distributor immediately.
Wishing you a very good day!

Appendix 2: Skewness and Kurtosis (Sample One)

	N	Mean	Skewness	Kurtosis
	Statistic	Statistic		
Att1	258	5.632	-.290	-1.154
Att2	258	5.795	-.495	-.802
Att3	258	5.863	-.853	.175
Att4	258	5.752	-.606	-.366
Beh1	258	5.704	-.379	-.982
Beh2	258	5.721	-.543	-.719
Beh3	258	5.585	-.395	-.714
Beh4	258	5.709	-.339	-1.335
Exp1	258	5.689	-.571	-.152
Exp2	258	5.703	-.336	-1.144
Exp3	258	5.736	-.413	-1.058
Int1	258	5.826	-.698	.184
Int2	258	5.756	-.473	-.005
Sta1	258	5.845	-.481	-.981
Sta2	258	5.729	-.441	-.930
Sta3	258	5.833	-.571	-.583
Sta4	258	5.918	-.587	-.712
Sta5	258	5.729	-.355	-1.163
Pha1	258	5.942	-.630	-.770
Pha2	258	5.911	-.609	-.771
Pha3	258	5.919	-.553	-.890
Pha4	258	6.000	-.761	-.561
Pha5	258	5.814	-.529	-.789
Pha6	258	5.903	-.742	-.541
Cuc1	258	5.760	-.836	.494
Cuc2	258	5.633	-.716	.318
Cuc3	258	5.786	-.929	.539
Sof1	258	5.756	-.380	-1.101
Sof2	258	5.705	-.486	-.372
Sof3	258	5.694	-.514	-.219
Phy1	258	5.744	-.579	.222
Phy2	258	5.837	-.504	-.190
Neq1	258	5.678	-.541	-.417
Neq2	258	5.802	-.700	-.193
Neq3	258	5.818	-.740	.006
Bis1	258	5.755	-.668	-.112
Bis2	258	5.599	-.331	-1.075
Bis3	258	5.756	-.478	-.891
Wat1	258	5.484	-.463	-.397
Wat2	258	5.535	-.581	-.047
Wat3	258	5.593	-.600	.021
Rel1	258	5.527	-.509	-.214
Rel2	258	5.484	-.559	.128
Rel3	258	5.595	-.574	.045
Pri1	258	5.624	-.579	-.236
Pri2	258	5.733	-.805	.119
Pri3	258	5.632	-.717	-.053

Out1	258	5.663	-.292	-.707
Out2	258	5.813	-.424	-.389
Qua1	258	5.733	-.296	-.898
Qua2	258	5.736	-.491	-.285
Qua3	258	5.735	-.322	-.639
Sat1	258	5.640	-.238	-.857
Sat2	258	5.597	-.177	-.991
Sat3	258	5.647	-.172	-.895
Val1	258	5.636	-.382	-.374
Val2	258	5.646	-.199	-.860
Val3	258	5.686	-.231	-.938
Ima1	258	5.752	-.360	-.910
Ima2	258	5.747	-.348	-.957
Ima3	258	5.884	-.408	-.710
Cos1	258	5.694	-.310	-.674
Cos2	258	5.717	-.244	-.897
Cos3	258	5.736	-.617	.866
Loy1	258	5.783	-.257	-.882
Loy2	258	5.748	-.249	-1.002
Loy3	258	5.884	-.486	-.548

Appendix 3: Skewness and Kurtosis (Sample Two)

	N	Mean	Skewness	Kurtosis
	Statistic	Statistic		
Att1	258	5.845	-.755	.009
Att2	258	5.841	-.525	-.696
Att3	258	5.860	-.681	-.321
Att4	258	5.820	-.754	.140
Beh1	258	5.860	-.536	-.696
Beh2	258	5.682	-.676	.089
Beh3	258	5.543	-.534	-.259
Beh4	258	5.787	-.587	-.516
Exp1	258	5.911	-.622	-.554
Exp2	258	5.709	-.586	-.584
Exp3	258	5.609	-.340	-.922
Int1	258	5.891	-.801	.529
Int2	258	5.853	-.710	-.091
Sta1	258	5.733	-.651	-.102
Sta2	258	5.615	-.718	.734
Sta3	258	5.655	-.876	.814
Sta4	258	5.747	-.478	-.530
Sta5	258	5.845	-.557	-.500
Pha1	258	5.833	-.794	.317
Pha2	258	6.012	-.772	-.273
Pha3	258	5.826	-.827	.024
Pha4	258	5.719	-.626	-.118
Pha5	258	5.678	-.897	.971
Pha6	258	6.008	-.815	-.123
Cuc1	258	5.729	-.950	.707
Cuc2	258	5.519	-.802	.314
Cuc3	258	5.671	-.824	.380
Sof1	258	5.531	-.511	-.117
Sof2	258	5.442	-.512	.222
Sof3	258	5.523	-.613	.185
Phy1	258	5.826	-.716	.031
Phy2	258	5.930	-.871	.595
Neq1	258	5.636	-.494	-.676
Neq2	258	5.535	-.330	-.890
Neq3	258	5.655	-.721	.004
Bis1	258	5.740	-.710	-.018
Bis2	258	5.774	-.808	.303
Bis3	258	5.868	-.705	-.368
Wat1	258	5.465	-.744	.693
Wat2	258	5.527	-.481	-.340
Wat3	258	5.553	-.628	.036
Rel1	258	5.609	-.584	-.112
Rel2	258	5.733	-.824	.511
Rel3	258	5.736	-.800	.408
Pri1	258	5.647	-.639	.110
Pri2	258	5.720	-.608	-.070
Pri3	258	5.708	-.756	.516

Out1	258	5.864	-.510	-.495
Out2	258	5.969	-.711	.115
Qua1	258	5.651	-.315	-.395
Qua2	258	5.686	-.262	-.876
Qua3	258	5.779	-.596	.891
Sat1	258	5.868	-.496	-.642
Sat2	258	5.791	-.550	-.064
Sat3	258	5.825	-.450	-.703
Val1	258	5.632	-.419	-.347
Val2	258	5.690	-.491	-.382
Val3	258	5.802	-.653	-.045
Ima1	258	5.767	-.487	-.874
Ima2	258	5.848	-.623	-.455
Ima3	258	5.926	-.882	.618
Cos1	258	5.709	-.552	-.075
Cos2	258	5.760	-.566	.138
Cos3	258	5.698	-.863	.911
Loy1	258	5.876	-.505	-.727
Loy2	258	5.880	-.588	-.657
Loy3	258	6.054	-.821	-.245

Appendix 4: Correlation Matrix (Interaction Quality)

		Att1	Att2	Att3	Att4	Beh1	Beh2	Beh3	Beh4	Exp1	Exp2	Exp3
Correlation	Att1	1.000	.561	.533	.558	.280	.276	.231	.214	.275	.204	.172
	Att2	.561	1.000	.610	.468	.302	.312	.268	.231	.258	.194	.203
	Att3	.533	.610	1.000	.480	.324	.383	.357	.244	.406	.277	.334
	Att4	.558	.468	.480	1.000	.259	.315	.295	.305	.178	.106	.154
	Beh1	.280	.302	.324	.259	1.000	.568	.543	.551	.288	.325	.244
	Beh2	.276	.312	.383	.315	.568	1.000	.487	.534	.300	.365	.311
	Beh3	.231	.268	.357	.295	.543	.487	1.000	.463	.309	.261	.270
	Beh4	.214	.231	.244	.305	.551	.534	.463	1.000	.258	.277	.198
	Exp1	.275	.258	.406	.178	.288	.300	.309	.258	1.000	.599	.646
	Exp2	.204	.194	.277	.106	.325	.365	.261	.277	.599	1.000	.561
	Exp3	.172	.203	.334	.154	.244	.311	.270	.198	.646	.561	1.000

Appendix 5: Anti-Image Correlation Matrix (Interaction Quality)

Att1	.833(a)	-.273	-.173	-.358	-.077	.010	.054	.037	-.091	-.057	.086
Att2	-.273	.855(a)	-.374	-.114	-.064	-.023	.011	-.005	.018	-.002	.002
Att3	-.173	-.374	.866(a)	-.158	-.001	-.114	-.109	.077	-.165	.029	-.075
Att4	-.358	-.114	-.158	.844(a)	.060	-.060	-.080	-.152	.057	.091	-.044
Beh1	-.077	-.064	-.001	.060	.860(a)	-.257	-.286	-.277	-.001	-.083	.021
Beh2	.010	-.023	-.114	-.060	-.257	.888(a)	-.144	-.255	.072	-.136	-.084
Beh3	.054	.011	-.109	-.080	-.286	-.144	.895(a)	-.150	-.075	.041	-.041
Beh4	.037	-.005	.077	-.152	-.277	-.255	-.150	.858(a)	-.067	-.049	.060
Exp1	-.091	.018	-.165	.057	-.001	.072	-.075	-.067	.804(a)	-.336	-.433
Exp2	-.057	-.002	.029	.091	-.083	-.136	.041	-.049	-.336	.844(a)	-.267
Exp3	.086	.002	-.075	-.044	.021	-.084	-.041	.060	-.433	-.267	.808(a)

a Measures of Sampling Adequacy(MSA)

Appendix 6: Factor Extraction Table (Interaction Quality)

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	4.461	40.557	40.557	4.461	40.557	40.557
2	1.618	14.713	55.270	1.618	14.713	55.270
3	1.379	12.534	67.804	1.379	12.534	67.804
4	.601	5.460	73.264			
5	.566	5.150	78.414			
6	.486	4.420	82.834			
7	.455	4.139	86.973			
8	.395	3.593	90.565			
9	.379	3.448	94.013			
10	.354	3.215	97.229			
11	.305	2.771	100.000			

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax.

Appendix 7: Rotated Component Matrix with VARIMAX rotation (Interaction Quality)

	Component		
	1	2	3
Att1	.818		
Att2	.796		
Att4	.750		
Att3	.744		
Beh4		.800	
Beh1		.800	
Beh2		.741	
Beh3		.721	
Exp3			.845
Exp1			.838
Exp2			.796

Appendix 8: Pattern Matrix with OBLIMIN Rotation (Interaction Quality)

	Component		
	1	2	3
Att1	.852		
Att2	.819		
Att4	.766		
Att3	.735		
Exp3		.871	
Exp1		.849	
Exp2		.803	
Beh4			-.851
Beh1			-.829
Beh2			-.741
Beh3			-.734

Extraction Method: Principal Component Analysis.
Rotation Method: Oblimin.

Appendix 9: Correlation Matrix (Physical Environment Quality)

	Sta1	Sta2	Sta3	Sta4	Sta5	Pha1	Pha2	Pha3	Pha4	Pha5	Pha6
Sta1	1.000	.444	.542	.444	.584	.381	.424	.415	.323	.348	.337
Sta2	.444	1.000	.478	.382	.497	.326	.383	.341	.293	.283	.424
Sta3	.542	.478	1.000	.433	.450	.339	.387	.340	.232	.391	.300
Sta4	.444	.382	.433	1.000	.431	.253	.334	.390	.307	.338	.353
Sta5	.584	.497	.450	.431	1.000	.368	.424	.416	.436	.282	.415
Pha1	.381	.326	.339	.253	.368	1.000	.323	.473	.497	.344	.476
Pha2	.424	.383	.387	.334	.424	.323	1.000	.412	.393	.392	.431
Pha3	.415	.341	.340	.390	.416	.473	.412	1.000	.471	.515	.540
Pha4	.323	.293	.232	.307	.436	.497	.393	.471	1.000	.333	.540
Pha5	.348	.283	.391	.338	.282	.344	.392	.515	.333	1.000	.413
Pha6	.337	.424	.300	.353	.415	.476	.431	.540	.540	.413	1.000
Cuc1	.223	.332	.289	.250	.220	.207	.216	.273	.297	.385	.225
Cuc2	.249	.355	.274	.255	.250	.151	.249	.263	.287	.393	.210
Cuc3	.165	.278	.238	.289	.151	.186	.201	.212	.258	.363	.242
Sof1	.184	.324	.246	.404	.210	.223	.288	.192	.272	.255	.310
Sof2	.160	.297	.189	.368	.182	.285	.244	.179	.169	.276	.343
Sof3	.277	.401	.281	.346	.225	.215	.303	.198	.202	.253	.272

	Cuc1	Cuc2	Cuc3	Sof1	Sof2	Sof3
Sta1	.223	.249	.165	.184	.160	.277
Sta2	.332	.355	.278	.324	.297	.401
Sta3	.289	.274	.238	.246	.189	.281
Sta4	.250	.255	.289	.404	.368	.346
Sta5	.220	.250	.151	.210	.182	.225
Pha1	.207	.151	.186	.223	.285	.215
Pha2	.216	.249	.201	.288	.244	.303
Pha3	.273	.263	.212	.192	.179	.198
Pha4	.297	.287	.258	.272	.169	.202
Pha5	.385	.393	.363	.255	.276	.253
Pha6	.225	.210	.242	.310	.343	.272
Cuc1	1.000	.573	.605	.229	.237	.292
Cuc2	.573	1.000	.507	.225	.268	.391
Cuc3	.605	.507	1.000	.160	.153	.189
Sof1	.229	.225	.160	1.000	.567	.528
Sof2	.237	.268	.153	.567	1.000	.541
Sof3	.292	.391	.189	.528	.541	1.000

Appendix 10: Anti-Image Correlation Matrix (Physical Environment Quality)

	Sta1	Sta2	Sta3	Sta4	Sta5	Pha1	Pha2	Pha3	Pha4	Pha5	Pha6
Sta1	.899(a)	-.065	-.240	-.159	-.305	-.123	-.110	-.062	.022	-.056	.040
Sta2	-.065	.923(a)	-.192	-.006	-.219	-.039	-.053	-.011	.091	.103	-.178
Sta3	-.240	-.192	.907(a)	-.157	-.080	-.122	-.091	.036	.117	-.153	.029
Sta4	-.159	-.006	-.157	.904(a)	-.139	.126	.025	-.162	-.044	-.004	.006
Sta5	-.305	-.219	-.080	-.139	.902(a)	-.014	-.095	-.042	-.183	.067	-.057
Pha1	-.123	-.039	-.122	.126	-.014	.883(a)	.035	-.188	-.285	-.034	-.097
Pha2	-.110	-.053	-.091	.025	-.095	.035	.955(a)	-.078	-.115	-.121	-.099
Pha3	-.062	-.011	.036	-.162	-.042	-.188	-.078	.899(a)	-.090	-.281	-.236
Pha4	.022	.091	.117	-.044	-.183	-.285	-.115	-.090	.863(a)	.029	-.275
Pha5	-.056	.103	-.153	-.004	.067	-.034	-.121	-.281	.029	.912(a)	-.098
Pha6	.040	-.178	.029	.006	-.057	-.097	-.099	-.236	-.275	-.098	.901(a)
Cuc1	.001	-.066	-.064	.066	-.008	.012	.049	-.062	-.089	-.076	.077
Cuc2	-.018	-.096	-.004	.057	-.051	.128	.005	-.041	-.119	-.143	.102
Cuc3	.056	-.053	.002	-.186	.094	-.056	-.023	.101	-.016	-.108	-.089
Sof1	.078	-.061	-.042	-.170	.032	.036	-.058	.054	-.144	-.036	-.009
Sof2	.080	.002	.087	-.166	.002	-.191	-.010	.101	.160	-.080	-.172
Sof3	-.094	-.142	-.017	-.030	.072	.005	-.074	.019	.022	.040	.007

a Measures of Sampling Adequacy(MSA)

	Cuc1	Cuc2	Cuc3	Sof1	Sof2	Sof3
Sta1	.001	-.018	.056	.078	.080	-.094
Sta2	-.066	-.096	-.053	-.061	.002	-.142
Sta3	-.064	-.004	.002	-.042	.087	-.017
Sta4	.066	.057	-.186	-.170	-.166	-.030
Sta5	-.008	-.051	.094	.032	.002	.072
Pha1	.012	.128	-.056	.036	-.191	.005
Pha2	.049	.005	-.023	-.058	-.010	-.074
Pha3	-.062	-.041	.101	.054	.101	.019
Pha4	-.089	-.119	-.016	-.144	.160	.022
Pha5	-.076	-.143	-.108	-.036	-.080	.040
Pha6	.077	.102	-.089	-.009	-.172	.007
Cuc1	.851(a)	-.278	-.418	-.030	-.057	-.033
Cuc2	-.278	.863(a)	-.233	.072	-.075	-.215
Cuc3	-.418	-.233	.807(a)	.027	.080	.070
Sof1	-.030	.072	.027	.857(a)	-.331	-.264
Sof2	-.057	-.075	.080	-.331	.807(a)	-.280
Sof3	-.033	-.215	.070	-.264	-.280	.874(a)

a Measures of Sampling Adequacy(MSA)

Appendix 11: Factor Extraction Table (Physical Environment Quality)

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	6.256	36.799	36.799	6.256	36.799	36.799
2	1.700	9.998	46.796	1.700	9.998	46.796
3	1.491	8.772	55.569	1.491	8.772	55.569
4	1.168	6.869	62.438	1.168	6.869	62.438
5	.780	4.587	67.025			
6	.691	4.065	71.089			
7	.670	3.941	75.030			
8	.586	3.448	78.478			
9	.572	3.363	81.840			
10	.480	2.824	84.664			
11	.456	2.684	87.348			
12	.418	2.459	89.808			
13	.397	2.338	92.145			
14	.383	2.255	94.400			
15	.343	2.020	96.420			
16	.331	1.946	98.366			
17	.278	1.634	100.000			

Extraction Method: Principal Component Analysis.

Appendix 12: Rotated Component Matrix with VARIMAX Rotation (Physical Environment Quality)

	Component			
	1	2	3	4
Sta1	.794			
Sta3	.754			
Sta5	.712	.356		
Sta2	.614			
Sta4	.532			.373
Pha2	.449	.438		
Pha4		.753		
Pha6		.745		
Pha3		.712		
Pha1		.705		
Pha5		.482	.434	
Cuc1			.822	
Cuc3			.820	
Cuc2			.763	
Sof2				.827
Sof1				.804
Sof3				.749

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax.

Appendix 13: Pattern Matrix with OBLIMIN Rotation (Physical Environment Quality)

	Component			
	1	2	3	4
Pha4	.789			
Pha6	.759			
Pha1	.726			
Pha3	.706			
Pha5	.427	.381		
Cuc3		.856		
Cuc1		.842		
Cuc2		.768		
Sof2			.855	
Sof1			.825	
Sof3			.746	
Sta1				-.847
Sta3				-.806
Sta5				-.727
Sta2				-.602
Sta4				-.498
Pha2				-.374

Extraction Method: Principal Component Analysis.
Rotation Method: Oblimin.

Appendix 14: Correlation Matrix (Outcome Quality)

	Neq1	Neq2	Neq3	Bis1	Bis2	Bis3	Wat1	Wat2	Wat3	Rel1	Rel2	Rel3	Pri1	Pri2	Pri3
Neq1	1.000	.606	.654	.157	.314	.166	.222	.272	.243	.358	.276	.269	.375	.412	.316
Neq2	.606	1.000	.637	.110	.293	.150	.349	.315	.319	.277	.341	.270	.441	.463	.389
Neq3	.654	.637	1.000	.092	.272	.173	.258	.248	.258	.316	.338	.303	.300	.402	.306
Bis1	.157	.110	.092	1.000	.577	.613	.250	.302	.292	.364	.360	.338	.231	.232	.248
Bis2	.314	.293	.272	.577	1.000	.629	.319	.364	.305	.322	.290	.342	.288	.278	.244
Bis3	.166	.150	.173	.613	.629	1.000	.160	.259	.176	.282	.320	.258	.206	.202	.126
Wat1	.222	.349	.258	.250	.319	.160	1.000	.582	.641	.383	.299	.333	.356	.310	.265
Wat2	.272	.315	.248	.302	.364	.259	.582	1.000	.625	.375	.367	.321	.307	.251	.228
Wat3	.243	.319	.258	.292	.305	.176	.641	.625	1.000	.362	.384	.363	.311	.235	.212
Rel1	.358	.277	.316	.364	.322	.282	.383	.375	.362	1.000	.610	.583	.215	.300	.221
Rel2	.276	.341	.338	.360	.290	.320	.299	.367	.384	.610	1.000	.646	.266	.254	.228
Rel3	.269	.270	.303	.338	.342	.258	.333	.321	.363	.583	.646	1.000	.226	.233	.239
Pri1	.375	.441	.300	.231	.288	.206	.356	.307	.311	.215	.266	.226	1.000	.481	.643
Pri2	.412	.463	.402	.232	.278	.202	.310	.251	.235	.300	.254	.233	.481	1.000	.576
Pri3	.316	.389	.306	.248	.244	.126	.265	.228	.212	.221	.228	.239	.643	.576	1.000

Appendix 15: Anti-Image Correlation Matrix (Outcome Quality)

	Neq1	Neq2	Neq3	Bis1	Bis2	Bis3	Wat1	Wat2	Wat3
Neq1	.836(a)	-.260	-.412	-.030	-.102	.075	.137	-.063	-.002
Neq2	-.260	.885(a)	-.325	.100	-.074	.025	-.107	-.018	-.026
Neq3	-.412	-.325	.843(a)	.134	-.023	-.082	-.026	.038	-.030
Bis1	-.030	.100	.134	.840(a)	-.259	-.380	6.92E-005	.007	-.102
Bis2	-.102	-.074	-.023	-.259	.857(a)	-.421	-.079	-.083	-.006
Bis3	.075	.025	-.082	-.380	-.421	.767(a)	.075	-.060	.086
Wat1	.137	-.107	-.026	6.92E-005	-.079	.075	.850(a)	-.253	-.387
Wat2	-.063	-.018	.038	.007	-.083	-.060	-.253	.896(a)	-.350
Wat3	-.002	-.026	-.030	-.102	-.006	.086	-.387	-.350	.855(a)
Rel1	-.197	.094	.006	-.092	.015	-.010	-.160	-.053	.029
Rel2	.105	-.145	-.087	-.088	.127	-.119	.120	-.080	-.101
Rel3	.003	.038	-.054	-.028	-.131	.060	-.057	.045	-.056
Pri1	-.139	-.119	.104	.039	-.011	-.096	-.117	-.014	-.059
Pri2	-.076	-.127	-.073	-.024	.005	-.058	-.084	.017	.031
Pri3	.058	-.039	-.056	-.149	-.018	.144	.029	-.015	.053

a Measures of Sampling Adequacy(MSA)

	Rel1	Rel2	Rel3	Pri1	Pri2	Pri3
Neq1	-.197	.105	.003	-.139	-.076	.058
Neq2	.094	-.145	.038	-.119	-.127	-.039
Neq3	.006	-.087	-.054	.104	-.073	-.056
Bis1	-.092	-.088	-.028	.039	-.024	-.149
Bis2	.015	.127	-.131	-.011	.005	-.018
Bis3	-.010	-.119	.060	-.096	-.058	.144
Wat1	-.160	.120	-.057	-.117	-.084	.029
Wat2	-.053	-.080	.045	-.014	.017	-.015
Wat3	.029	-.101	-.056	-.059	.031	.053
Rel1	.878(a)	-.325	-.248	.086	-.094	.006
Rel2	-.325	.835(a)	-.412	-.072	.021	.029
Rel3	-.248	-.412	.868(a)	.029	.038	-.071
Pri1	.086	-.072	.029	.840(a)	-.067	-.489
Pri2	-.094	.021	.038	-.067	.903(a)	-.359
Pri3	.006	.029	-.071	-.489	-.359	.784(a)

a Measures of Sampling Adequacy(MSA)

Appendix 16: Factor Extraction Table (Outcome Quality)

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	5.646	37.639	37.639	5.646	37.639	37.639
2	1.881	12.540	50.179	1.881	12.540	50.179
3	1.415	9.435	59.614	1.415	9.435	59.614
4	1.260	8.397	68.012	1.260	8.397	68.012
5	1.018	6.784	74.795	1.018	6.784	74.795
6	.548	3.654	78.450			
7	.466	3.103	81.553			
8	.452	3.015	84.568			
9	.409	2.727	87.295			
10	.402	2.678	89.974			
11	.347	2.312	92.285			
12	.343	2.285	94.570			
13	.303	2.021	96.591			
14	.268	1.784	98.375			
15	.244	1.625	100.000			

Extraction Method: Principal Component Analysis.

Appendix 17: Rotated Component Matrix with VARIMAX Rotation (Outcome Quality)

	Component				
	1	2	3	4	5
Neq3	.849				
Neq1	.821				
Neq2	.758				
Wat3		.831			
Wat1		.814			
Wat2		.786			
Rel3			.820		
Rel2			.817		
Rel1			.764		
Bis3				.875	
Bis2				.796	
Bis1				.784	
Pri3					.882
Pri1					.782
Pri2					.693

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax.

Appendix 18: Pattern Matrix with OBLIMIN Rotation (Outcome Quality)

	Component				
	1	2	3	4	5
Wat3	.868				
Wat1	.850				
Wat2	.816				
Neq3		-.879			
Neq1		-.840			
Neq2		-.740			
Bis3			.914		
Bis2			.808		
Bis1			.773		
Rel3				-.870	
Rel2				-.859	
Rel1				-.788	
Pri3					-.940
Pri1					-.798
Pri2					-.683

Extraction Method: Principal Component Analysis.
Rotation Method: Oblimin.