An IMP Interaction Approach to Modelling

Business-to-Business Professional Service Quality:

The Case of Hong Kong Consulting Engineering Service

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ABSTRACT

In the domain of services marketing, the most researched area is in service quality. Since the pioneering stage of service quality research in the early 1980s, most of the studies have been conducted in the context of consumer services and consumer professional services. The purpose of this study is to bridge the gap in the existing literature to measure service quality of a particular business-to-business professional service industry (i.e., Hong Kong consulting engineering industry).

In this study, three objectives are to be achieved. The first is to compare the relative superiority between two service quality measurement approaches: gap-based (perception-minus-expectation) approach and perception-only approach. The second is to confirm the direction of relationship between service quality and service satisfaction. The last is to assess the feasibility of synthesising the IMP (International/Industrial Marketing and Purchasing Group) interaction model with the existing service quality models in conceptualising business-to-business professional service quality. The hybrid service quality model consists of: (1) transactional quality which is formed through various resource exchanges, (2) relational quality which is established by cooperation and commitment to adaptation, (3) overall atmosphere surrounding the transacting parties, (4) service quality, (5) service satisfaction, and (6) behavioural intention.

Having synthesised the results of literature review (i.e., service quality, professional service quality, IMP works, relationship quality) and exploratory interviews with the industry participants, seven hypotheses are proposed and tested in the context of Hong Kong consulting engineering service. H1 predicts that there is a positive relationship between transactional quality and service quality. H2 predicts that the impact of transactional quality on service quality is mediated by the overall atmosphere. Similar to H1 and H2, H3 predicts a positive relationship between relational quality and service quality whilst H4 predicts that the impact of relational quality on service quality is mediated by the overall atmosphere. H5 predicts that there is a positive relationship between transactional quality and relational quality. H6 concerns (a) a positive relationship between service quality and service satisfaction and (b) a positive relationship between service quality and behavioural intention. The last

hypothesis predicts a positive relationship between service satisfaction and behavioural intention.

Based on the results of structural equation modelling on survey data, the gap-based measurement approach is found to outperform the perception-only measurement approach in terms of relative model fits. The applicability of the gap-based measurement approach is considered to be context specific whether it is for organisation-based or consumer-based service. A high degree of unexplained variance in the construct of atmosphere suggests that additional factors which may influence overall atmosphere have not been accounted for in the model. For example, macro-environmental factors suggested in the IMP interaction model may influence or moderate the overall working relationship.

In relation to the afore-mentioned hypotheses, four of them are supported, including H4, H5, H6a and 6b, and H7. Directions for future studies are then discussed, including (a) to generalise the findings to the other business-to-business professional service industries, (b) to explore other dimensions of relational quality; (c) to investigate the temporal impact on model variables, (d) to explore other gap-based measurement approaches (e.g., direct measurement using "worse/better than expected" wording), and (e) to synthesise business-to-business professional service quality model with the concept of buying centre under different buying situations.

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To my parents

and

my wife Lina

and

children Jonathan and Justin

Without their support and understanding,
this thesis would not be made possible.

CHAPTER ONE:
INTRODUCTION

1.1 DEVELOPMENT OF SERVICE QUALITY RESEARCH

Researching service quality is a growing subject for both academics and practising managers. Interests in service quality research have kept abreast with the explosive growth in services marketing literature during the early 1980s because of the booming service industry in world trade. Fisk, Brown, and Bitner (1993) have identified "the single most researched area in services marketing to date is service quality" (p.77). Notable service quality researchers during the pioneering period, among others, were Christian Grönroos of Sweden and A. Parasuraman, Valarie Zeithaml, and Leonard Berry of United States.

Grönroos (1993) provided an overview of service quality research from the 1980s to early 1990s. He identified three phases in service quality research during that period. The first phase started from the early to mid 1980s with researchers developing a conceptual foundation for understanding service quality based on a static model and describing its variables and the contexts of how the judgement of service quality was formed and managed. The second phase continued from the mid to late 1980s for measuring service quality. The third phase from the early 1990s onwards builds on the findings from the second phase to refine measurement methods and existing static models. Rust and Oliver (1994) also highlight such a phenomenal growth in service quality research in the 1990s with more researchers who are highly trained in quantitative methods, psychology, sociology, or anthropology seeking to establish new and broad approaches in the investigation and measurement of service quality.

Although service quality studies have been conducted on a wide variety of service settings, most of them are related to consumer services. For example, studies have been undertaken on retail banking, credit cards, appliance repair and maintenance, long-distance telephone, securities brokerage (Parasuraman, Zeithaml, and Berry, 1988); electricity and gas utility (Babakus and Boller, 1992); dental clinic, school placement centre, tyre store, and hospital (Carman, 1990). The quality of professional services is,

however, less stressed, let alone business-to-business professional service quality. Venetis (1997) notes that:

> The extensive body of research on service quality perception has been focused mainly on traditional (consumer) services. Professional services in general and professional business services in particular have received little attention so far. This lack of interest is rather surprising, because customer satisfaction and service quality delivery has become a competitive instrument for these businesses as well. (p. 71)

As compared with consumer services, demand for professional service and business-to-business professional service is rising at a rapid pace and the competition within the industry is more intensified than before. Morgan (1991) attributes greater relaxation of regulations, increasing client sophistication, and ever changing business environment as the main factors leading to the competitive nature of professional service. He also notes that the response of many professionals and professional service firms to this new competitive environment has been to look towards marketing as some sort of potential panacea to these problems.

One way to counteract competition is to establish good relationships with clients. There are suggestions that business relationships and inter-organisational interactions should be incorporated in a firm's strategic planning (Turnbull and Valla, 1986) and strategic portfolio management (Turnbull, 1989). Therefore, professional service firms have started to recognise the importance of service quality and clients' relationship as part of the total service offering. These issues are particularly acute for business-to-business professional service firms when they try to forge closer relationship on both personal and organisational levels. The elevation of research interest on professional service quality in general and business-to-business professional service quality in particular starts to gather momentum by both practitioners and academics.

1.2 PURPOSE AND OBJECTIVES OF THE STUDY

Unlike products, there are less tangible cues available for services. Assessment of service quality in general and professional service quality in particular as well as

business-to-business professional service can thus be problematic and subjective. One approach is to identify what a client really expects and perceives across a host of service dimensions and attributes. Business-to-business professional service firms are then able to pinpoint any shortfall between expectation and actual perception for service improvement or recovery. Therefore, the main purpose of this study is to investigate the quality of business-to-business professional service from the clients' perspective in terms their expectations and perceptions.

In the service quality literature, Johnston (1995) recognises that there are five major debates. The first debate concerns the similarities and differences between the constructs of service quality and service satisfaction as they are both performance evaluations. A second debate is about the efficacy of the expectation-perception gap view of service quality that is similar to the disconfirmation theory of customer satisfaction. Both service quality and service satisfaction evaluations result from a comparison of customers' expectations and perceptions although the standards of comparison (i.e., customers' expectations) differ between the two concepts. The third debate concerns the development of models that help understand how the quality gap arises. Since the early 1980s, different researchers have proposed different service quality models, including Grönroos' (1984) technical-functional model, Parasuraman, Zeithaml, and Berry's (1985) "gap" model, and Lehtinen and Lehtinen's (1982, 1991) interactive model. Which model works best in a given situation is yet to be established. The fourth debate is on the zone of tolerance in terms of its definition and application. Parasuraman, Berry, and Zeithaml (1991b) suggest that customers' expectations are dual-levelled involving desired and adequate levels of expectation. However, the zone of tolerance concept has not attracted much research interest in recent service quality studies. The last one is the identification of the determinants of service quality. It is important to both academics and practitioners to identify the dimensions and attributes which customers use to evaluate service performance so that service improvement or recovery can be made in these aspects.

Since the mid 1980s, it seems that many service quality studies have been involved in debating about the usefulness of the expectation-perception gap model and the identification of the service quality determinants for a wide variety of industries. There is no sign showing that these two major debates will die down until conclusive evidence is gathered from more relevant studies.

Apart from the above debates on service quality, there are certain deficiencies in the professional service quality and business-to-business professional service quality literatures. Although there are studies which have been done on, for example, medical practitioners (Brown and Swartz, 1989), architectural design firms (Baker and Lamb, 1993), real estate brokerage firms (Nelson and Nelson, 1995), accounting firms (Bojanic, 1991), consulting engineering firms (Samson and Parker, 1994), and legal advisers (Morgan, 1990), most of these studies only concentrated on how and what clients receive. Very few of them had addressed the impact of client relationship on service quality, client satisfaction, and client behavioural intention (e.g., Crosby and Stephens, 1987). Empirical studies that have gone further to incorporate the relational aspects of business-to-business professional services, which are deemed to be important in building up long-term relationship with clients, are also limited (e.g., Venetis, 1997). Yorke (1990) sets out the future research direction by proposing an interactive approach to the study of professional service. One of the prominent models in addressing these issues is the IMP (International/Industrial Marketing and Purchasing Group) interaction model which draws a distinction between short-term exchange episodes and long-term institutionalisation of these episodes into a relationship (Håkansson, 1982). The application of the interaction model to business-to-business professional service quality is to be explored further in this study.

Within the main purpose of this study as well as contributing to the current debate in the service quality literature and the measurement of business-to-business professional service quality, the study seeks to achieve the following objectives:

1. To demonstrate the robustness of customers' expectations in affecting business-to-business professional service quality. There are studies showing that customers' expectations do not play a part in service quality evaluation (e.g., Cronin and Taylor, 1992). Recent studies tend to compare the two measurement frameworks whether perception-minus-expectation framework or perception-only framework works best (e.g., Bienstock, Mentzer, and Bird, 1997; Gwyne, Ennew, and Devlin, 1999). However, such a comparison on business-to-business professional service quality is scarce.
2. To investigate the similarities and differences between service quality and service satisfaction in terms of their theoretical concepts and

measurements. It has been argued that the two concepts are interrelated, but they are not synonymous (e.g., Crompton and MacKay, 1989; Oliver, 1993). The relationship between service quality and service satisfaction in a business-to-business professional service setting is to be explored.

3. To assess the feasibility of incorporating relational elements in conceptualising and measuring business-to-business professional service quality as relationship is a pre-requisite to client loyalty (e.g., Yorke, 1990). In doing so, different models of service quality and the literature on the IMP interaction model will be reviewed. Existing service quality models and the IMP interaction model will then be synthesised into a single model and tested for its robustness.

1.3 NATURE OF THE STUDY

Although the IMP interaction model was developed in Europe in the late 1970s, its application in North America (e.g., Metcalf, Frear, and Krishnan, 1992) and Asian countries (e.g., Holden, 1988 in Japan) has now been established. Potentially, this makes a cross-cultural comparison of the IMP model more fruitful. However, it is not possible in the current study because, firstly, the IMP model has not been empirically tested in an Asian business-to-business professional service setting. The robustness of the model when applied in an Asian business-to-business professional service setting needs to be explored in the current study. Secondly, the synthesis of service quality models and the IMP model represents another perspective in conceptualising and measuring business-to-business professional service quality. This involves an extension of the existing service quality models by incorporating relational dimensions in the measurement of business-to-business professional service quality. Teasing apart the cultural effect and the effects among the service quality-related variables becomes more difficult in the current study. Instead of a cross-cultural study, a business-to-business professional service industry in a particular Asian country is to be chosen to test the applicability of the synthesised model.

Hong Kong, being one of the fastest growing economies in Asia, has attracted much research interest, particularly in relation to China trade. The consulting engineering industry in Hong Kong has been chosen for the purpose of this study. Since the early 1990s, Hong Kong is having major infrastructure development comprising multi-billion

airport-related projects, port development, and environmental projects. The demand for consulting engineering services has grown rapidly. Therefore, an investigation of the service quality of consulting engineer should contribute not only to the business-to-business professional service quality literature, but also to the profession as a whole towards a greater understanding of service quality issues.

The study is cross-sectional in nature because it represents a one-time data collection and measurement, as opposed to a longitudinal study which involves data collection at several points in time to examine how service quality evaluation changes over time. Although a cross-sectional study only provides a "snapshot" of the business-to-business professional service quality evaluation, it is more appropriate for the current exploratory study as the IMP model has not been applied in a business-to-business professional service setting in Hong Kong. Another problem with longitudinal study is that respondents may leave their companies during the study period since most of them are employed on a contract basis. Even if the respondents stay with the companies, the participation rates and interest in the proposed study may drop with the passage of time. This is a very common problem with longitudinal studies.

Another reason for a cross-sectional study is that because, in most cases, consulting engineers are employed on a continuous basis from project to project, measurement of service quality at a particular moment in time should be able to reflect clients' general attitudes towards performance of consulting engineers. Although it is difficult and sometimes impractical to track down service quality expectations before the commencement of the project and perception of actual performance at its completion as most of the engineering projects span across a long period of time, it is conceived that expectation can be formed from past experience, word-of-mouth communications, personal needs, and service promises made by the service provider (Parasuraman et al. 1985). Furthermore, once a client has committed into a relationship with a service provider, service expectations have developed (Kelley and Davis, 1994). These factors enable simultaneous measurement of clients' expectations and their performance perceptions possible.

Based on the research objectives mentioned earlier and the potential problems with a longitudinal study associated with the unique features of the chosen industry, a cross-sectional study is considered to be a viable choice in this model-testing study.

1.4 DIMENSIONS OF THE STUDY

The study concerns the service quality of professional consulting engineers in Hong Kong from a client's perspective. A survey instrument is developed for this study. A mail survey is used for its relative low costs and time-saving in contacting respondents when comparing to personal interview. The investigation of clients' evaluation of service quality is restricted to two major client sectors: government departments and architectural firms. These two sectors represent a significant source of business to consulting engineering firms in Hong Kong. The other reason for focusing on these two sectors is that there are no public sources (e.g., directories) available to identify target samples in the other sectors (e.g., public utility and contractors). Samson and Parker (1994) also focused on these two client sectors in their service quality study of consulting engineers in Australia. Copies of the survey questionnaire were sent to senior staff (i.e., chief engineer or above in government department and director or above in architectural firm) because they are the likely persons to oversee projects and in a better position to evaluate the service quality of professional consulting engineers.

1.5 STRUCTURE OF THE STUDY

This study follows de Vaus' (1996) logic of the research process as illustrated in Figure 1.1 and is divided into nine chapters. The first chapter has already dealt with the purpose, objectives, and dimensions of the study. In Chapter Two, theoretical aspects of service quality and customer satisfaction together with their relationships are explored. Although these two constructs are conceptually distinct, their differences are not properly accounted for in the existing service quality literature. Therefore, a distinction should be made to address these differences in terms of their conceptual definitions, comparison standards, forms of evaluation, and direction of relationship. In addition, empirical issues for measuring service quality and customer satisfaction are addressed in terms of their measurement approaches, strengths, and weaknesses.

Chapter Three will review the marketing literature on professional service and business-to-business professional service. The review will focus on the concept and characteristics

of quality in the context of professional service in general and business-to-business professional service in particular. The relevance of relationship marketing will also be addressed since the relationship between business-to-business professional service providers and their clients are often long-term in nature in comparison with consumer services and consumer professional services.

Chapter Four will review the development of the IMP research work in terms of criticisms of traditional marketing concept, paradigmatic position of the IMP research, research methodology, and limitations. Such a review is required before synthesising existing service quality models with the IMP interaction model for investigating business-to-business professional service quality in the context of Hong Kong consulting engineering service. In addition, relevant empirical studies are also examined so as to provide insight on how the IMP model constructs are operationalised and the context in which they are used.

Lying at the heart of relationship marketing is relationship quality which represents an outcome variable that is emerging as a central construct in the relevant literature. In Chapter Five, the concept of relationship quality, its relationship with service quality, construct operationalisation and measurement will be discussed in greater detail.

In Chapter Six, a particular business-to-business professional service industry, namely consulting engineering industry in Hong Kong, will be reviewed in order to capture the unique features of the industry before developing a theoretical model and a measurement instrument for the study. In this industry review, the role of consulting engineers in construction projects and their relationships with clients will be examined, followed by an investigation of the supply of and demand for consulting engineering services in Hong Kong.

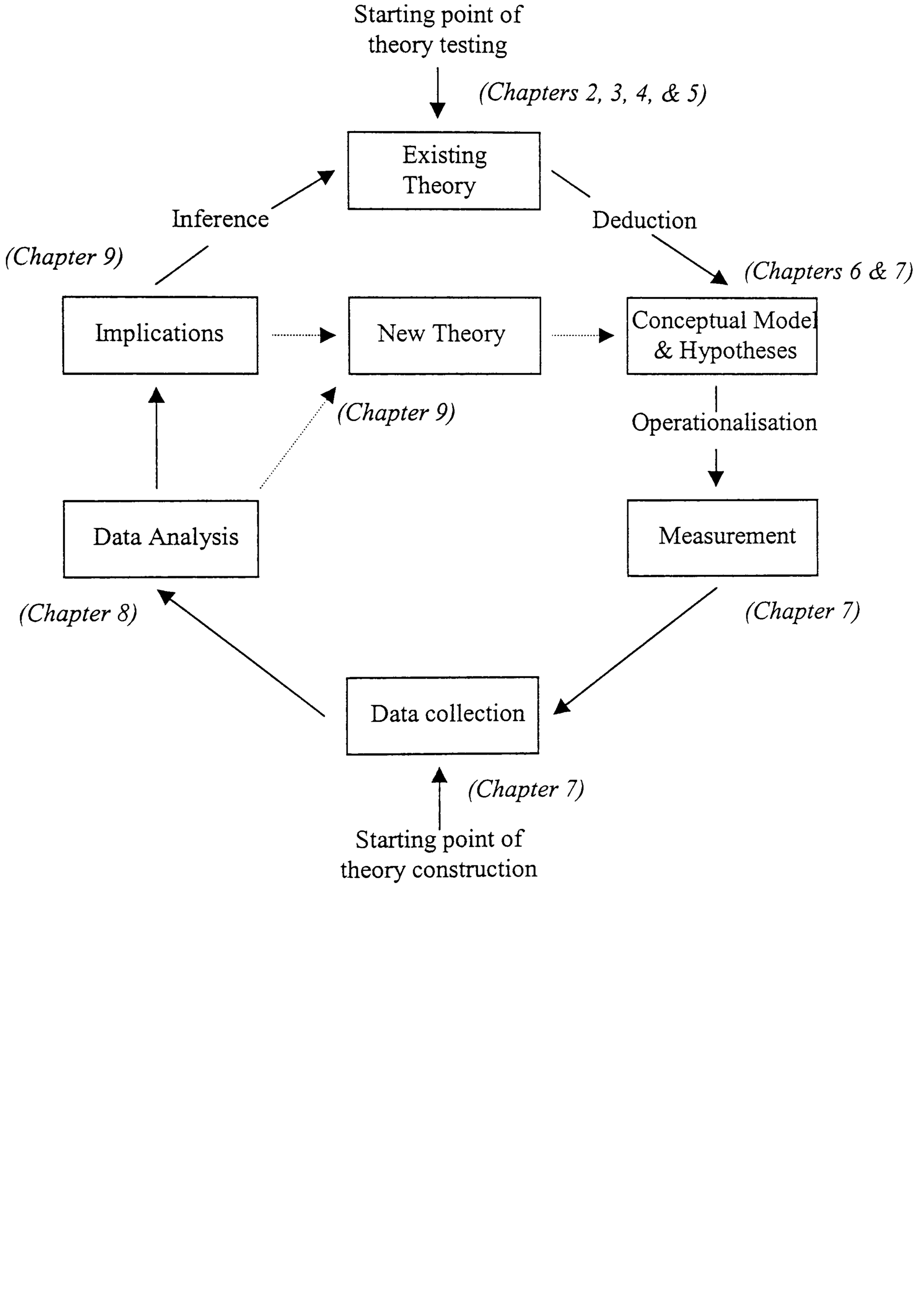
The research design and methodology for an empirical study will be described in Chapter Seven. Based on the literature reviewed in the previous chapters, a theoretical model to conceptualise business-to-business professional service quality in the context of Hong Kong consulting engineering service will be established. A series of in-depth interviews with the industry participants (i.e., consultants and clients) will be conducted so as to provide industry-specific insight into the process of theory building and

measurement scale development. Details about research hypotheses to be tested, data collection procedures, and statistical methods being used for data analysis will also be included in this chapter.

Chapter Eight will comprise the analysis of data. Survey data collected will be subjected to a screening process to ensure data quality before analysis. All the data analysis decisions and procedures will follow those that have been suggested in the literature, in particular about the model estimation approach in relation to the type of data and assessment of measurement reliability and validity. The chapter also presents results of the hypotheses testing.

Chapter Nine will summarise the research findings regarding the viability of the proposed business-to-business professional service quality model when applied in the Hong Kong consulting engineering industry. Other aspects will also be addressed, including a discussion of theoretical implications, possible model extension, managerial implications, limitations of the study, and directions for future research before drawing conclusions from the study.

Figure 1.1: Logic of Research Process



CHAPTER TWO:
REVIEW OF LITERATURE (PART I) -
SERVICE QUALITY AND CUSTOMER SATISFACTION

2.1 INTRODUCTION

In this chapter, the literature on service quality in general will be reviewed. Three main areas of interest are to be explored. Firstly, the construct of service quality is addressed in terms of its various definitions and unique characteristics as compared with product quality. Since the proliferation of service quality research in the early 1980s, different models of service quality have been proposed and empirically tested by different researchers. An overview of these service quality models is indispensable at the outset of this study.

Secondly, a review on the relationship between service quality and customer satisfaction is presented. Such a review becomes critical as there is a growing tendency for researchers and practitioners to equate service quality with customer satisfaction. Although the two constructs are interrelated, they are not synonymous. A need to distinguish these two constructs in terms of their theoretical foundations, use of comparison standards, and direction of relationship is envisaged before attempting to measure service quality.

Lastly, empirical issues of measuring service quality will be examined. This part of the review will focus on how the construct of service quality can be operationalised and measured. In view of the fact that there are more quantitative studies than qualitative studies in researching service quality, more emphasis will be placed on discussing dimensions/attributes of service quality and prevailing quantitative methods of measuring service quality.

2.2 WHAT IS SERVICE QUALITY?

Most of the published works about service quality prior to the early 1980s have come from practitioner sources rather than academic research. Early pioneers in service quality study such as Christian Grönroos of Sweden and A. Parasuraman, Valarie Zeithaml, and Leonard Berry of United States have laid down the building blocks

through their rigorous academic research. Their studies were based on a synthesis of services marketing literature, customer satisfaction research, and the limited writing on services. The following sections will discuss most of the earlier theoretical works on service quality, in particular, the characteristics of service quality, its definitions, and components.

2.2.1 Characteristics of Service Quality

Service quality differs significantly from product quality because of the unique features of services. Earlier works on characterising services have been based on four unique features: intangibility, heterogeneity, inseparability, and perishability (Zeithaml, Parasuraman, and Berry, 1985). Firstly, most services are intangible because they are actions rather than objects and cannot be seen, felt, tasted, or touched as in the same way as products. The nature of intangibility makes it difficult for customers to evaluate service quality even after consumption. Secondly, services are heterogeneous. The quality of a service can vary from service provider to another, from customer to customer, and from time to time. Heterogeneity in service output poses a major problem to most of the labour intensive service industries, in particular professional services. Thirdly, production and consumption of services, in most cases, are inseparable. Assessment of service quality occurs during the process of service delivery, usually in an interaction between customer and the contact person of the service provider. As the degree and style of the participation vary, the control of service quality is more difficult than that of products. Lastly, a service is perishable and cannot be stored. Therefore, it is extremely important for service provider to synchronise demand and supply of service in order to reduce bottle-necks in service delivery.

However, all these unique features of services do not suggest that the concept of service is universal to all kinds of services. For example, the service concept of a budget hotel can be very different from that of a five-star hotel as far as the prices and service elements are concerned. The evaluation of a complicated or technical product can be as difficult as the evaluation of a service (Iacobucci, Grayson, and Ostrom, 1994). In addition, the classifying principle for goods and services should not be simply based on an "either-or" assumption (Williams and Mowen, 1990). What is commonly regarded as a product may be classified as a service or vice versa. For

instance, a haircut is a service. But it is tangible to the extent that the outcome can be readily perceived by the consumer. Therefore, service quality may include elements of product quality. Parasuraman et al. (1985) suggest three themes which relate to the characteristics of service quality:

1. Service quality is more difficult for the consumer to evaluate than goods quality;
2. Service quality perceptions result from a comparison of consumer expectations with actual service performance; and
3. Quality evaluations are not made solely on the outcome of a service; they also involve evaluations of the process of service delivery. (p.42).

2.2.2 Definitions of Service Quality

Because of the unique features of service when compared with products, the concept of quality can be very different. In the domain of services marketing, Parasuraman et al. (1985) consider "quality is an elusive and indirect construct" (p.41). Garvin (1988) also admits that "quality is an unusually slippery concept, easy to visualise yet exasperatingly difficult to define" (p.xi). Reeves and Bednar (1994) suggest that "the search for a universal definition of quality has yielded inconsistent results. Such a global definition does not exist; rather, different definitions of quality are appropriate under different circumstances" (p.419). Reeves and Bednar track down four types of definition of quality: quality as excellence, quality as value, quality as conformance to standards, and quality as meeting/exceeding customers' expectations. The last category of quality definition seems to coincide with what was suggested during the first phase of service quality research in the early 1980s when service quality was defined as meeting and/or exceeding customers' expectations (Grönroos, 1984; Parasuraman et al., 1985). Reeves and Bednar also consider that this definition taken from a customer's perspective is an all-encompassing definition and is seemingly applicable across industries. But this definition is not without weaknesses in that customers' expectations are difficult to measure in particular when customers do not know their expectations. In addition, there is confusion between the constructs of service quality and customer satisfaction. Their similarities, differences, and relationships will be discussed later in this chapter.

The "meeting customers' expectations" definition of service quality seems to have gained wider support from academics. For example, Lewis and Booms (1983) define service quality as a measure of how well the service delivered conforms to customers' expectations on a consistent basis. Parasuraman et al. (1985) define service quality as a global judgement or attitude relating to service that results from comparisons by customers of service expectations with their perceptions of actual service performance. Zeithaml (1988) draws a distinction between "actual" quality and "perceived" quality. The former is related to the superiority or excellence and the latter is a consumer's perception of the actual quality. Perceived service quality in fact first appeared in Grönroos' (1984) work in conceptualising service quality. Such distinction between actual and perceived service quality has far-reaching implications for service providers. It seems that perceived quality is more important than actual quality, because in services, fewer objective measures are available. There is a general agreement in the service quality literature that the best definition of service quality is the customer's definition and the best evaluation of service quality delivered is the customer's evaluation (Berry, Parasuraman, and Zeithaml, 1988). This can be illustrated in the Ozment and Morash's (1994) study that customers' perceptions of service quality in the airline industry were positively related to the level of advertising expenditure and negatively related to passenger congestion as measured by the carrier's load factor. Traditional measures of service quality, like on-time arrivals, problem-free baggage handling, etc. were disregarded. The perceived service quality definition ties in closely with the well-received definition of quality as meeting customer's expectation mentioned earlier in this section.

2.2.3 Models of Service Quality

The earlier work on modelling service quality can be traced back to the work of Swan and Combs (1976) on the two-factor theory of customer satisfaction. In their customer satisfaction research, Swan and Combs found that there are two performance dimensions used by customers to assess their satisfaction in the case of clothing items. They are instrumental performance and expressive performance. Swan and Combs defined these two dimensions as:

> *Instrumental performance* refers to the means to a set of ends, while *expressive performance* is performance that the individual considers to be an end in itself. In the case of clothing, *instrumental performance*

would correspond to the performance of the physical product per se; *expressive performance* would relate to a "*psychological*" level of performance, that is, the user's response to the item of clothing. (p. 26)

Swan and Combs also operationalised these two dimensions as follows:

> All outcomes with reference to the physical product per se were classified as instrumental. Specific instrumental outcomes involved: durability, laundering properties, warm or cool to wear, retention of shape or color, wrinkle resistant, construction, and good or poor fit. All outcomes that referred to performance dimensions other than the physical product per se (without reference to the physical product) were classified as expressive. Specific expressive outcomes included: styling, responses of other people to the item, comfort, and colour. (p. 28)

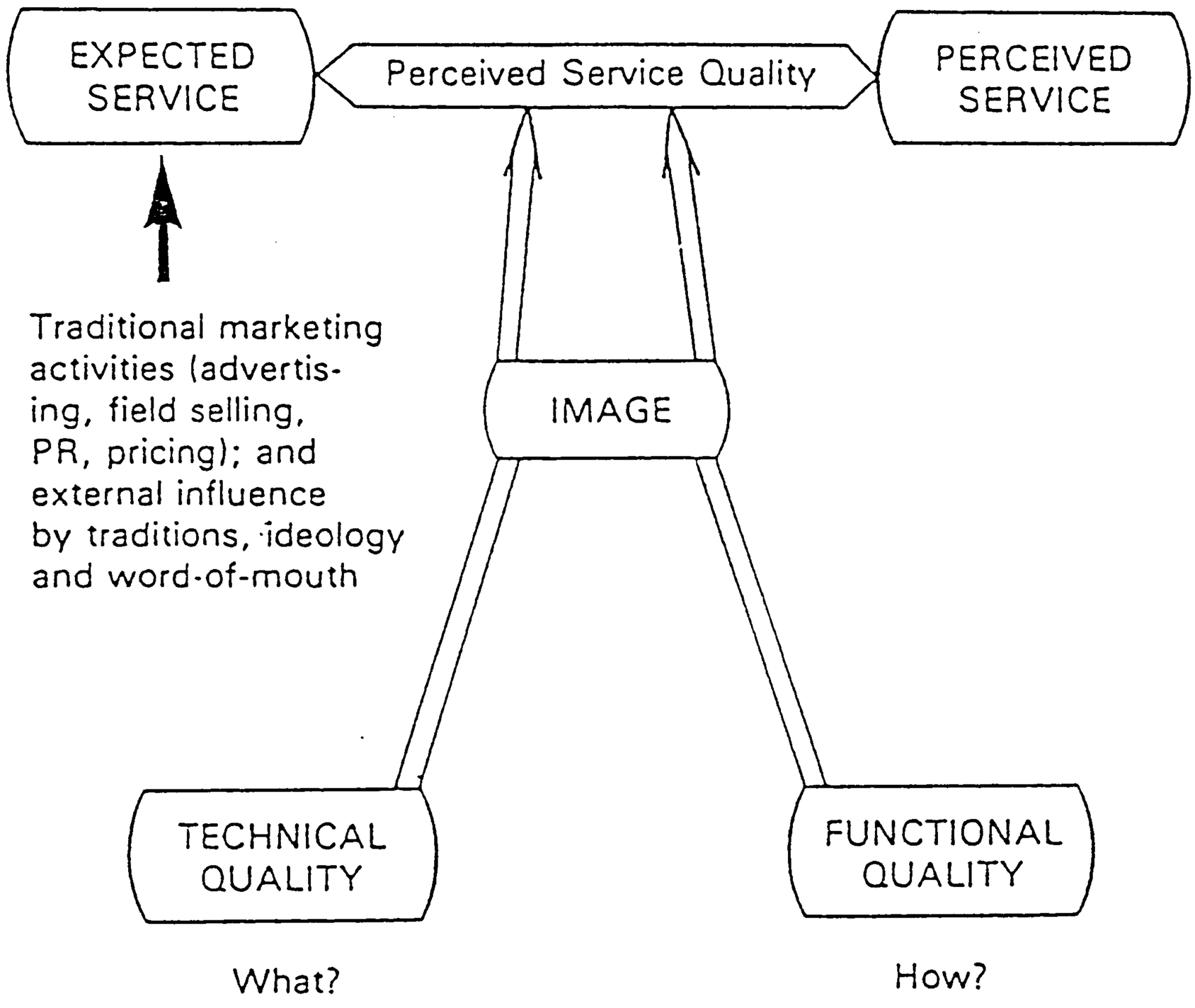
Having synthesised the works of Swan and Combs (1976) and Maddox (1981) on the two-factor theory of customer satisfaction, Grönroos (1984) also postulated that service quality can be divided into two dimensions:

> The *instrumental performance* of a product is the technical dimension of the product. In the context of services, it would be the technical result of a service production process: e.g., a passenger has been transported from one place to another, a medical problem has been attended to in a hospital, financial transactions of a firm have been performed. It is, so to speak, what the customer is left with, when the production process is finished. *Expressive performance* is related to "psychological" level of performance. In a service context, the expressive performance would be related to the buyer-seller interaction, i.e., to the contacts the consumer has with various resources and activities of the service firm, during the service production process when the technical outcome, the instrumental performance, is created. (p. 38)

Grönroos' service quality model is illustrated in Figure 2.1. Grönroos notes that, firstly, functional quality or how the service is performed and delivered, is as

Figure 2.1: Functional-Technical Service Quality Model

(Grönroos, 1984, p. 40)



important as technical quality which represents what the customer actually receives. Secondly, because a customer will be able to see the service firm and its resources during buyer-seller interactions, the image of a service firm is of utmost importance. This is particularly so when a customer perceives a positive image of a service firm but eventually has bad experience. She/he may still find the perceived service quality satisfactory and finds excuses for her/his negative experience. Lastly, the overall perception of service quality is a function of the customer's evaluation of the service and the difference between this evaluation and her/his expectation of the service.

Lehtinen and Lehtinen (1982, 1991) offer a similar service quality model based on a three-dimensional approach. The components involved include physical quality, interactive quality, and corporate quality. Physical quality embraces all tangibles involved in the service delivery and provides a basis for interactive service quality. However, very high quality physical elements do not necessarily raise the standard of service when the interactive quality is not up to the same standard. Interactive quality varies within certain limits, depending on the momentary feeling of interacting persons. Corporate quality is developed during the history of the service organisation. It is symbolic in nature and can be experienced by a customer before participating in the service production process. Corporate quality often develops more incrementally, continuously, and intangibly from the beginning. By contrast, physical quality can be suddenly and sharply improved by such changes as renovations. Lewis and Klein (1987) point out that Grönroos' service quality model is similar in some aspects to Lehtinen and Lehtinen's model.

Lapierre (1993) notes that other researchers have also used a similar dichotomous approach to modelling consumer evaluation of products and services since the pioneering works of Grönroos (1984) and Lehtinen and Lehtinen (1982). For example, Holbrook and Corfman (1985) refer to mechanistic quality and humanistic quality, Berry (1986) to "high tech" and "high touch" categorisation, Parasuraman et al. (1985) to outcome quality and process quality, and Haywood-Farmer (1988) to the dimensions of physical process and people's behaviour. Based on the similarities of these models, they can be classified using two generic dimensions: transaction-oriented dimension and relationship-oriented dimension as shown in Table 2.1.

Table 2.1: A Dichotomous Approach to Service Quality Models

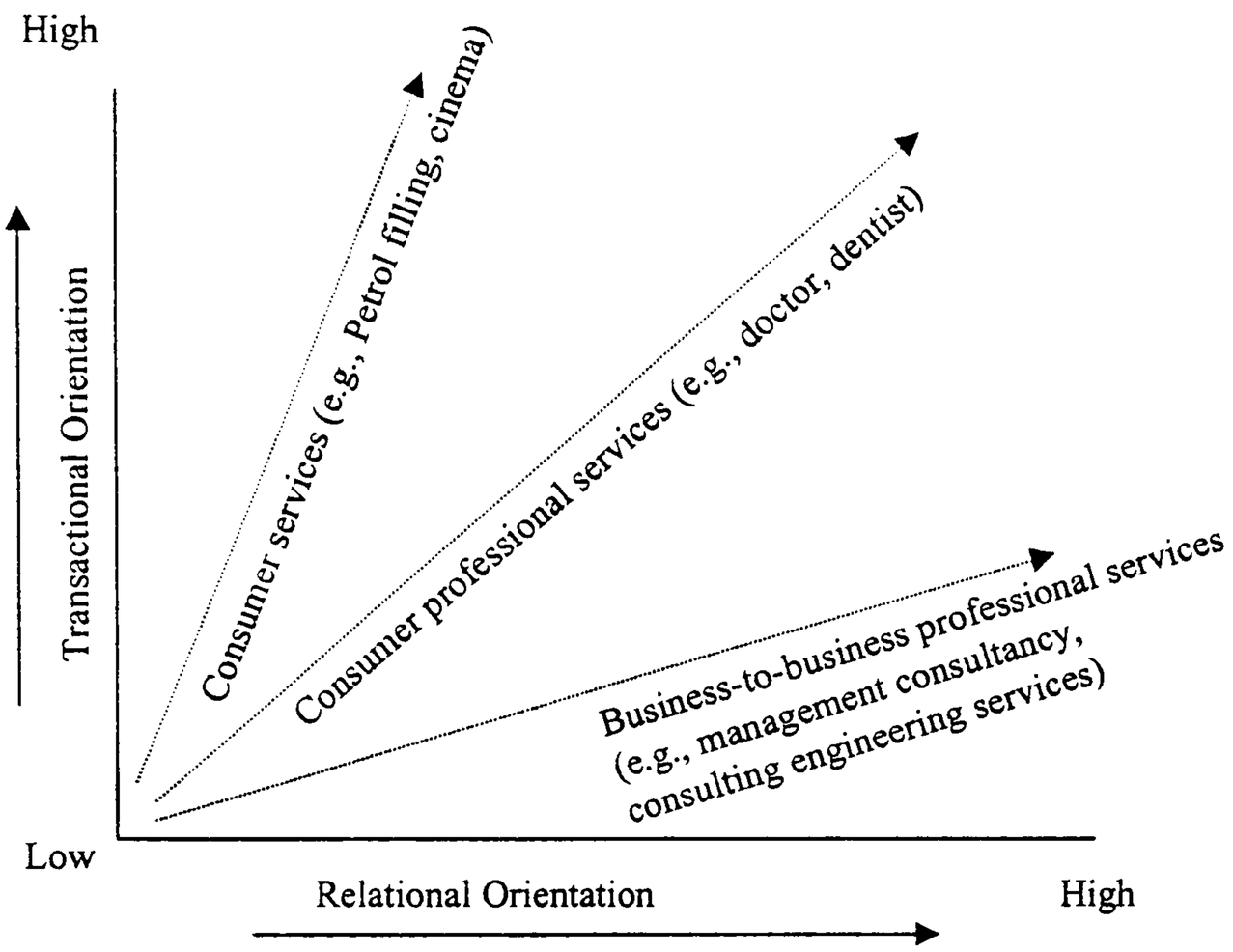
Researcher/(s)	More Transaction-Oriented	More Relationship-Oriented
Swan and Combs (1976)	Instrumental Performance	Expressive Performance
Lehtinen and Lehtinen (1982, 1991)	Physical Quality	Interactive Quality
Grönroos (1984)	Technical Quality	Functional Quality
Holbrook and Corfman (1985)	Mechanistic Quality	Humanistic Quality
Parasuraman, Zeithaml, and Berry (1985)	Outcome Quality	Process Quality
Berry (1986)	"High Tech"	"High Touch"
Haywood-Farmer (1988)	Physical Process	People's Behaviour

The transaction-oriented dimension represents what is to be received by the customer (i.e., the actual service offering) whereas the relationship-oriented dimension represents the interactive element during the service encounter (i.e., the service delivery process). Gummesson (1991) considers the latter as a missing aspect of service quality. He calls it the love factor (or L-factor) which is being characterised by love, compassion, empathy, sense of humour, tacit knowledge, knowledge by acquaintance, and insights. Gummesson considers that the L-factor is of particular significance for quality in certain people-oriented industries, such as hospital and education. Therefore, services could be categorised based on two dimensions as illustrated in Figure 2.2. In consumer services, such as petrol filling and cinema, the tangible elements (e.g., petrol and physical environment) are more transaction-oriented whereas business-to-business professional services are more relationship-oriented, demanding a high level of problem-solving skills and interaction between clients and professional service providers. Consumer professional services, like doctor and dentist, fall into the middle of both dimensions.

On the contributions by different researchers on service quality and service delivery, Lewis and Klein (1987) conclude that:

> Thus, it would seem that we should not really be measuring service quality, per se, but rather the quality in the delivery of the service on at

Figure 2.2: Transactional Orientation versus Relational Orientation of Service Quality



> least two, and very possibly three, dimensions. This may appear, at first glance, to be a fine distinction but, in fact, it is a very important one because it eases our task considerably. The elusive quality now becomes a somewhat less elusive delivery, perhaps still intangible but less abstract. (p. 33)

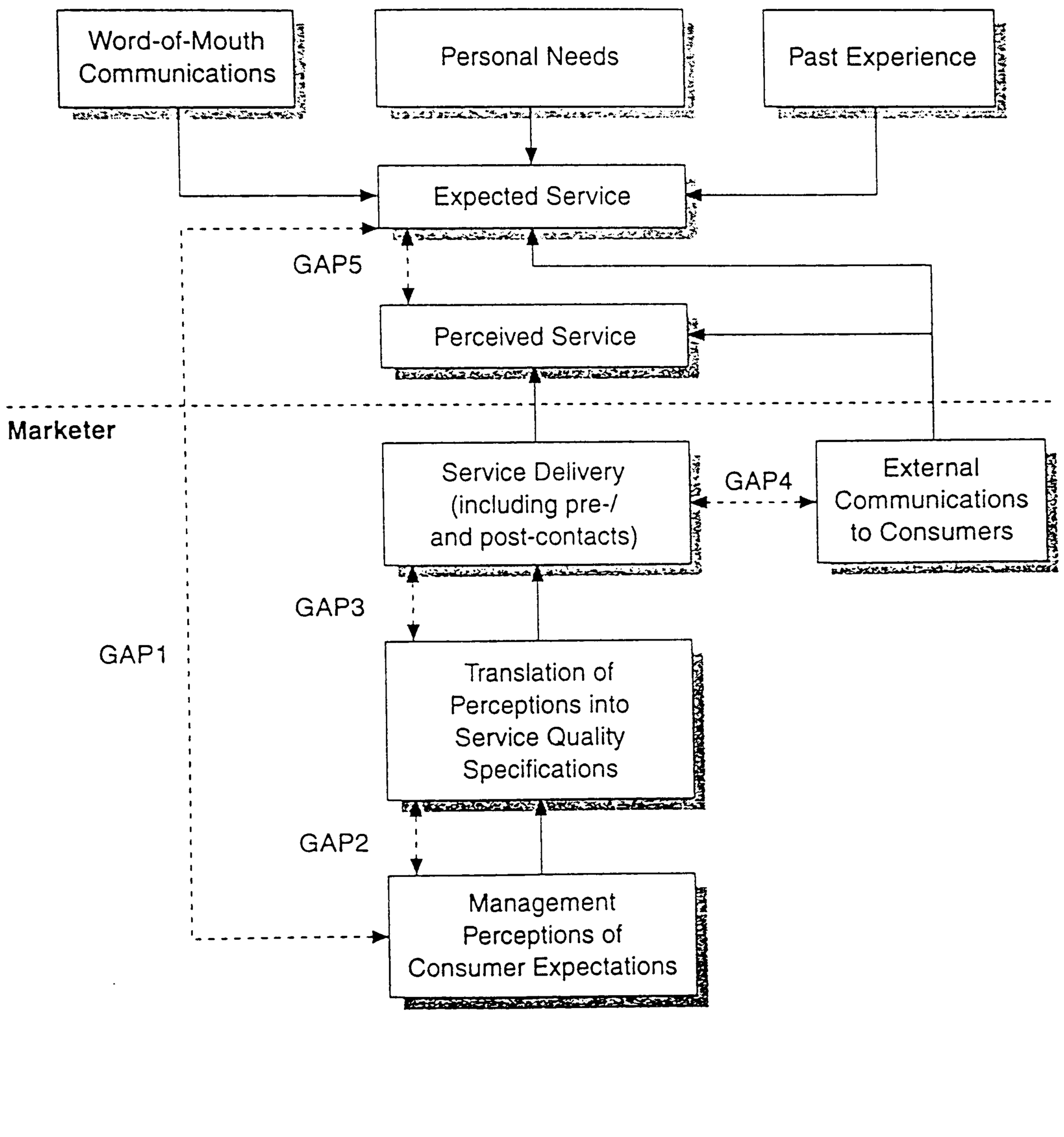
Summing up, in examining the dimensions of service quality, it is necessary to differentiate between the quality associated with the process of service delivery and the quality associated with the outcome of the service.

However, the above-mentioned service quality models lack sufficient detail. In addition to the dichotomous approach to service quality models, American researchers also made further progress in modelling service quality in the mid 1980s. Parasuraman et al. (1985), in their exploratory study, developed the "gap" model of service quality. The "gap" model shown in Figure 2.3 directly addresses not only the measurement question concerning overall quality, but also the component parts of service quality that will ultimately determine overall quality. Parasuraman et al. posit that service quality as perceived by customers is a function of the gap between customers' expectations of the service and their perceptions of the actual service delivered by service providers. The size and direction of this gap is determined by the magnitude and direction of several other gaps which may occur within and beyond the service organisation. Their extensive focus group interviews led to the identification of the following four other gaps:

> Gap 1: the difference between what customers expect of a service and what management perceives customers to expect (i.e., managers may not know what customers want and expect from the organisation).
>
> Gap 2: the difference between what management perceives and customers expect and the quality specification set for service delivery (i.e., even if customers' needs are known, appropriate specification of service may not always be set).
>
> Gap 3: the difference between quality specification set for service delivery and the actual quality of that service delivery, i.e. guidelines may be set, but high quality may not be certain due to, for example, variations in the performance of contact personnel.

Figure 2.3: Service Quality Gap Model

(Parasuraman, Zeithaml, and Berry, 1985, p.44)



> Gap 4: the difference between actual quality of service delivery and the quality of that service delivery as described in the firm's external communications. External communications such as advertising and promotion can influence customers' expectations and perceptions of service delivered.

The strength of this gap model is its parsimony in providing a general theoretical understanding of customer evaluation. However, the model is criticised in that it is based on a comparison between expectation and perceived service performance at a particular point in time. Iacobucci et al. (1994) take the view about the gap model that "whereas the logic of science recognises that no theory is correct and no model complete, researchers can agree that some models are `better' than others, as in being more thorough, more parsimonious, of greater predictive or explanatory utility, and so forth" (p.6). Brown and Swartz (1989) also conclude that :

> Gap analysis is a straightforward and appropriate way to identify inconsistencies between provider and client perceptions of service performance. Addressing these gaps seems to be a logical basis for formulating strategies and tactics to ensure consistent expectations and experience, thus increasing the likelihood of satisfaction and a positive quality evaluation (p.97).

To summarise the contributions of Scandinavian researchers (e.g. Grönroos, 1984; Lehtinen and Lehtinen, 1982, 1991) and American researchers (e.g., Parasuraman et al. 1985) on modelling service quality, Lapierre, Filiatrault, and Perrien (1996), after having reviewed 47 relevant service quality studies, make the following remark:

> Although the majority of studies investigated were empirical in nature, the studies using the Grönroos framework (technical and functional quality dimensions) were more often theoretical (13 out of 22). More empirical work has been accomplished using the Parasuraman et al. framework (21 out of 25). (p.93.)

This is not to say that the gap approach has no problem. It has been criticised extensively (e.g., Buttle, 1996; Carman, 1990; Cronin and Taylor, 1992; Teas, 1993a, 1993b), both

conceptually and empirically. Criticisms about their approach will be addressed in Section 2.4.

2.2.4 Zone of Tolerance in Service Quality

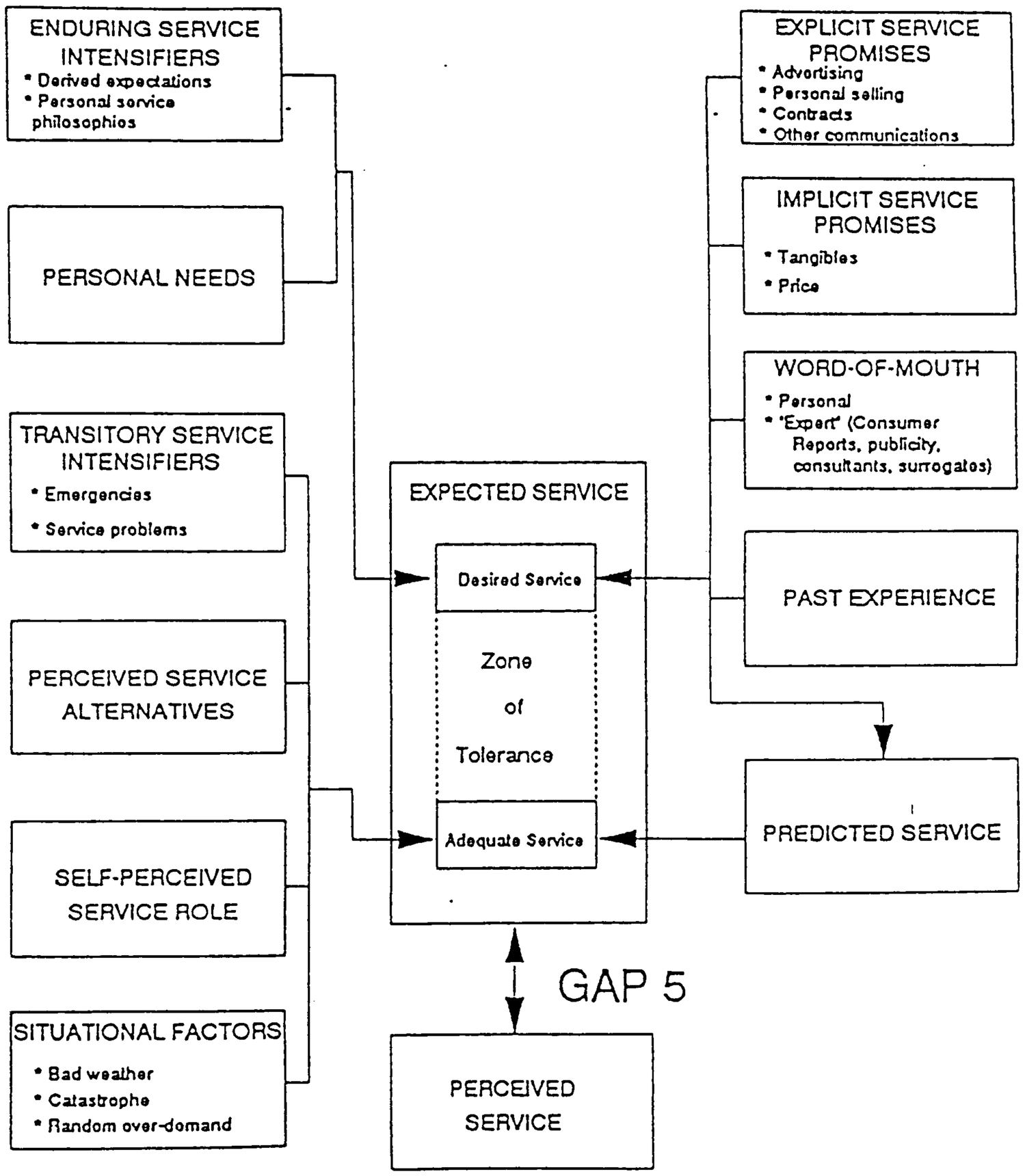
Since the development of the functional-technical model (Grönroo, 1984) and the gap model of service quality (Parasuraman et al., 1985) addressing different components of service quality, there have been concerns about defining service quality as an attitude resulting from a comparison of customers' expectations and perceptions of actual performance. Its validity is questionable when a prospective customer does not have any prior expectation towards a service offering or a customer may have more than one comparison standards in making service quality evaluation.

Parasuraman, Berry, and Zeithaml (1991a) and Zeithaml, Berry, and Parasuraman (1993) therefore suggest that customers' expectations can be dual-levelled and dynamic involving both desired and adequate levels of expectation. The desired level of expectation is the service level that the customer hopes to receive. It is a blend of what the customer believes "can be" and "should be." The adequate service level is where the customer finds acceptable and represents the minimum tolerable level. It is based on the customers' assessment of what the service "will be." In other words, it is the customer's predicted service level. Separating the desired service level from the adequate service level is a "zone of tolerance". The concept of the zone of tolerance is illustrated in Figure 2.4. The use of the zone of tolerance concept in service quality is not only feasible empirically, but also valuable from a diagnostic standpoint in that service companies can understand how well they are at least meeting customers' minimum requirements, and how much improvement is needed before they can achieve service superiority (Parasuraman, 1995).

Strandvik (1994) seems to agree with Parasuraman et al. (1991b) on the zone of tolerance concept by suggesting that "customers may accept variations in service performance within a certain range...The zone of tolerance concept represents an extension of contemporary service quality models by deviating from deterministic comparison of two points, expectations and performance, in predicting service quality" (p.2). Johnston (1995) also applies the zone concept to customer satisfaction. He proposes that there are three interlinked zones of tolerance: (1) in-process evaluation

Figure 2.4: Concept of Zone of Tolerance

(Zeithaml, Berry, and Parasuraman, 1993, p. 5)



zone (i.e., more than adequate performance, adequate performance, and less than adequate performance); (2) expectations zones (i.e., more than acceptable, acceptable, and unacceptable); and (3) outcome zones (i.e., delight, satisfaction, and dissatisfaction). Although the zone of tolerance concept is attractive to delineate customers' expectations into two levels, it seems that so far not many researchers are pursuing in that direction as there are wider criticisms about the usefulness of customers' expectations in forming service quality evaluation (e.g., Carman, 1990; Cronin and Taylor, 1992).

2.3 SERVICE QUALITY AND CUSTOMER SATISFACTION

In the previous section, service quality has been defined as a global attitudinal evaluation resulting from a comparison of customers' expectations and their perceptions of actual performance. This bears close proximity to the construct of customer satisfaction which also uses a similar comparison standard. Although the two constructs are similar, they are not synonymous. In the following sections, the concept of customer satisfaction in terms of its various definitions, perspectives from different researchers, and antecedents will be explained, followed by a discussion of the relationship between customer satisfaction and service quality.

2.3.1 Definition of Customer Satisfaction

Yi (1990) reviewed some of the definitions of customer satisfaction: as "an evaluation rendered that the [consumption] experience was at least as good as it was supposed to be" (Hunt 1977, p.459); as "an evaluation that the chosen alternative is consistent with prior beliefs with respect to that alternative" (Engel and Blackwell 1982, p.501); and as "the consumer's response to the evaluation of the perceived discrepancy between prior expectations [or some norm of performance] and the actual performance of the product as perceived after its consumption" (Tse and Wilton 1988, p.204). A more comprehensive definition is provided by Oliver (1997) who defines satisfaction as "the consumer's fulfillment response. It is a judgement that a product or service feature, or the product or service itself, provided (or is providing) a pleasurable level of consumption-related fulfillment, including levels of under- or over-fulfillment"(p.13). Although different researchers have defined the construct of satisfaction differently, all these definitions signify a profound effect on customer satisfaction management. This can be viewed in four aspects. Firstly, the evaluative process is personal and subjective. The outcome of this process is a perceived

judgement based on a comparison of prior expectation and actual performance. Therefore, the measurement should be based on the customer's perceptions. Secondly, the evaluative process may be on a particular feature of product/service, rather than on the totality of the product/service offering. This suggests that some of the product/service attributes represent the core of the offering. Thirdly, the term "pleasurable fulfillment" is one which, Oliver suggests, does not necessarily relate to the tangible/(s) as in the case of charity donation and volunteerism. Fourthly, there would be an optimal point for customer satisfaction. Dissatisfaction or not having satisfaction can result from under-fulfillment or over-fulfillment.

2.3.2 Perspectives on Customer Satisfaction

As is evidenced from the above various definitions of customer satisfaction, there is no question that customer satisfaction is an evaluative process. This process-oriented approach, as compared to the outcome-oriented approach, seems useful and rigorous in assessing customer satisfaction in that it spans across the entire consumption experience and highlights an important sequence which may lead to customer satisfaction. It also facilitates measurement by capturing distinctive components of each stage of that evaluative process. This process-oriented approach has been widely adopted by many researchers in their attempts to measure customer satisfaction in different industries (e.g., Bearden and Teel, 1983; Oliver, 1981; Oliver and Desarbo, 1988). Recent developments in customer satisfaction research have centred on the customer's evaluative judgement involving both process and outcome, rather than an "either-or" assumption. For example, Oliver (1993) suggests that satisfaction is both an end-state and on-going process (e.g., a satisfying meal).

From an outcome perspective, it is plausible that customer satisfaction can occur at multiple levels in a service organisation, including satisfaction with the contact person, satisfaction with the core services experienced by the customer, and satisfaction with the institution as a whole. For example, Bolton and Drew (1991a) conclude that overall satisfaction is a function of satisfaction with multiple experiences or encounters with the service provider.

Apart from a process-outcome orientation, Anderson and Fornell (1994) offer two different conceptualisations of the satisfaction construct. Firstly, satisfaction is

transaction-specific and is viewed as a post-choice evaluative judgement. Secondly, it is an overall evaluation based on many transient experiences with a product or service over time. Hence, satisfaction is an ongoing evaluation of a product's ability to deliver the benefits which a customer is seeking. Bitner and Hubbert (1994) also make a distinction between service encounter satisfaction and overall service satisfaction. Service encounter satisfaction represents the customer's dis/satisfaction with a discrete service encounter (e.g., an interaction with a dentist). It reflects the customer's feelings about a discrete interaction with the firm and will result from an evaluation of events and behaviours that occur during that definable period of time. It is believed that customers will distinguish their satisfaction with a particular encounter from their overall satisfaction with the firm's services.

2.3.3 Antecedents of Customer Satisfaction

Studying antecedents of customer satisfaction from different domains has long been a subject for consumer research. From the preceding sections, it seems that both the constructs, service quality and customer satisfaction, share some of the commonalities in conceptualisation. Oliver (1993) notes that service quality has fewer antecedents than customer satisfaction. In order to differentiate these two constructs, a review of the antecedents of customer satisfaction is inevitable although they are mainly drawn on the empirical side of relevant studies.

Yau (1994) summarises research on customer satisfaction/dissatisfaction using three main categories : product-specific (e.g., product and service), consumer specific (e.g., socio-economic and demographic variables, psychographics, personality traits, personal values, and cultural values), and situation-specific (e.g., subjective and objective situations). However, most of the studies sought to investigate the antecedents of customer satisfaction tend to be controversial and contradictory with each other.

Research on examining expectations as an antecedent of customer satisfaction forms the bulk of customer satisfaction literature. Expectation is best conceptualised as the customers' beliefs about the range of likely outcomes of a service provision (Oliver and Winer, 1987). Customers often have some sense of the likelihood of various levels of product/service performance before purchase. For example, patients hold

beliefs about the probability of accurate diagnosis from their physicians, investors about the likelihood of profits and losses by their brokers, and restaurant patrons about getting the type of food they want.

The use of expectations in customer satisfaction research has focused on the cognitive processes such as confirmation or disconfirmation of expectations. The operation of the expectancy-disconfirmation paradigm in influencing customer satisfaction is generally seen as two processes consisting of forming predictive expectations (i.e., what will be expected) and a subsequent disconfirmation judgement resulting from a comparison of those predictive expectations against the outcomes. Oliver (1981) suggests that customers judge satisfaction with a product or service offering in comparison with their predictive expectations about the performance. If the performance is above their predictive expectations (i.e., if positive disconfirmation occurs), increases in satisfaction are expected. If the performance is below their predictive expectations (i.e., if negative disconfirmation occurs), increases in dissatisfaction are expected.

Expectation as an antecedent of customer satisfaction has been widely used across various industries, including restaurant dining (Cadotte, Woodruff, and Jenkins, 1987), health care (Oliver, 1980; Oliver and Bearden, 1985) and security transactions (Oliver and DeSarbo, 1988). In sum, customer satisfaction is hypothesised primarily as a function of predictive expectations (i.e., what will be expected) and disconfirmation, with predictive expectations used as standards of comparison. Other researchers have suggested the use of norms as a comparison standard for deriving satisfaction. These norms include ideal and deserved expectations (Miller, 1977) and desired expectation (Spreng and Olshavsky, 1993). These standards refer to what "should be" the performance of the product or service offering. On the contrary, the predictive expectation in the expectancy-disconfirmation paradigm means what "will be" the likely performance.

There are also mixed findings about expectations as an antecedent of customer satisfaction. Customer satisfaction is found to be directly affected by expectations in some studies (Bearden and Teel, 1983; Churchill and Suprenant, 1982 for non-durable products; Oliver, 1980), but not in other studies (Churchill and Suprenant, 1982 for

durable products). For example, Churchill and Suprenant (1982) show that neither disconfirmation nor expectation have any effect on customer satisfaction with durables. Tse and Wilton (1988) also provide theoretical and empirical support for the possibility of dissatisfaction even though expectations are positively disconfirmed (for instance, if low quality is expected but the product is purchased because of restrictive supply). The fact that expectations are positively disconfirmed is not sufficient for satisfaction. Tse and Wilton argue that only perceived performance has a significant effect on customer satisfaction. Some other researchers (e.g., Cadotte et al., 1987) claim that different standards of comparison (e.g. experience-based norms) may be used by customers. For example, Cadotte et al. (1987) suggest that customers use a standard that is a weighted composite of various standards which may be formed from past experience including experience with the focal and competing brands.

Equity theory has also been applied to the study of customer satisfaction (Fisk and Young, 1985; Tse and Wilton 1988). It is based on the relationship between the costs an individual expends in the transaction and the anticipated rewards. Individuals compare their outcome/input ratios with those of others with whom they are having a relationship. The basis for comparison is the degree of equity which customers perceive between what they have received and what the other persons have received relative to their respective inputs. Satisfaction is thought to exist when an individual perceives that the outcome-to-input ratio is fair. A study by Fisk and Young (1985) supported the theory that inequity results in dissatisfaction and reduces the intention of repeat purchase. For example, inequitable waiting and pricing will lead to customer dissatisfaction. However, Tse and Wilton (1988) fail to find evidence that equity produces any direct effect on disconfirmation and indirect effect on satisfaction.

Apart from equity theory, attribution theory has also been proposed and investigated. The theory suggests that a customer may be more or less satisfied with the product/service depending on whom she/he sees is "to blame" for the discrepancy (Folkes, 1984, 1988). Generally, customers are thought to be more satisfied when they attribute favourable outcomes to themselves and unfavourable outcomes to others. Satisfaction may be attributed to the inherent nature of the product, the motivation of the service provider, the customers' own abilities to consume the product properly, or the consumption circumstances.

Although customer satisfaction research has gone through the past several decades, there are still a wide variety of conceptual issues to be dealt with. In summary, Erevelles and Leavitt (1992) conclude that:

> One of the most important directions for future research in consumer satisfaction research may be in determining which models are best applicable in different consumption situations and for different products. While the advances in consumer satisfaction/dissatisfaction literature in the eighties have been quite impressive, it is still not very clear which paradigm may best model customer satisfaction/dissatisfaction judgements in various situations. (p.112)

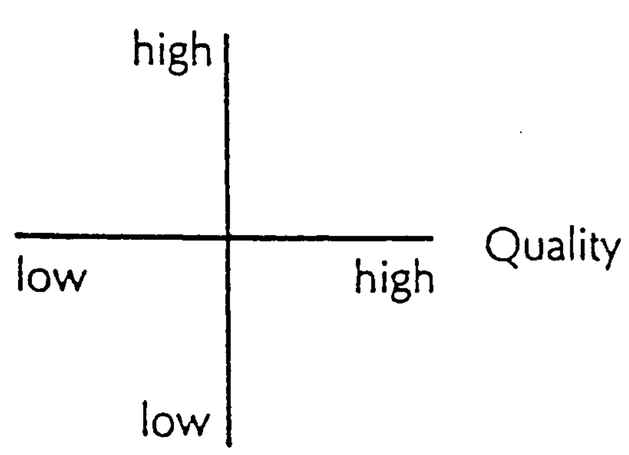
2.3.4 Relationship between Service Quality and Customer Satisfaction

Comparing the use of expectation in customer satisfaction research, there seems to be similarity between the constructs of service quality and customer satisfaction. Because there are commonalities between the two constructs, many researchers have relied on these two constructs to characterise customer assessment of services. Strandvik (1994) argues that service quality and customer satisfaction are concepts overlapping, or at least related to, each other. As revealed in the literature, many academics and practitioners use these two concepts interchangeably. Although a number of researchers (e.g., Bitner, 1991; Parasuraman et al., 1988) have argued for significant differences between service quality and customer satisfaction as applied in the service industry, there does not appear to have conclusive evidence that confirms the differences. Although the two constructs are interrelated, they are not synonymous (Oliver 1993). Iacobucci et al. (1994) list three possibilities about the conceptualisations of the quality-satisfaction relationship: orthogonal constructs, related constructs, and the same construct. They are depicted in Figure 2.5. Iacobucci et al. go on to suggest that the findings of many studies are likely to resemble panel "b" (i.e., related constructs) in the figure.

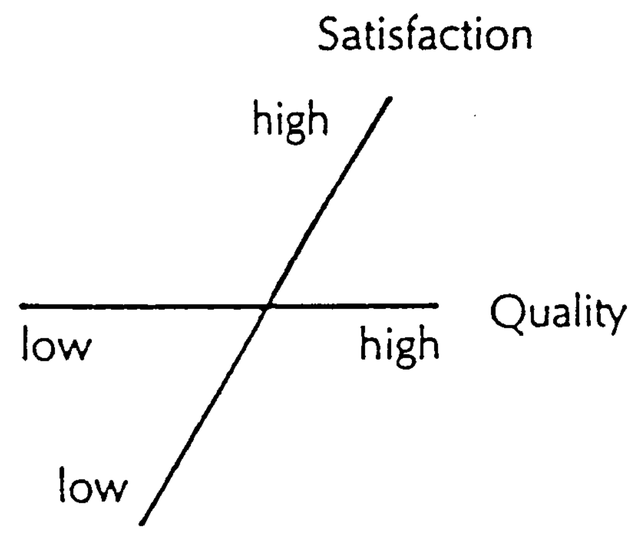
Gummesson (1992) states that “unless one has understood what services and quality are, what to measure cannot be established, much less how to measure it. It is not possible either to ask reasonable questions or to interpret the answers and translate them into actions” (p.202, 204). This is evidenced in a study of service quality of

Figure 2.5: Quality-Satisfaction Conceptualisation
(Iacobucci, Grayson, and Ostrom, 1994, p. 11]

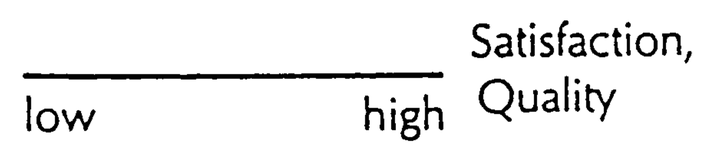
a. Orthogonal Constructs



b. Related Constructs



c. The Same Construct



medical professionals by Brown and Swartz (1989) who used an overall customer satisfaction measure to assess overall quality. Iacobucci et al. (1994) suggest that the constructs of service quality and customer satisfaction have not been consistently defined and differentiated from each other in the literature and these inconsistencies result in conceptual difficulties and confusions which stunt the progress of theoretical development in this area. In view of the differences in concept between service quality and customer satisfaction, there is a need to identify those differences before an empirical study can be undertaken. These differences can be in terms of the form of judgement, comparison standards being used, and the causal link underlying these two constructs.

2.3.4.1 Form of Judgement

As mentioned in the previous section, both service quality and customer satisfaction are evaluations of service performance and, in most cases, are subjective. The basic problem with this subjective approach is the tendency to equate service quality with customer satisfaction. There are arguments for and against whether both service quality and customer satisfaction are in fact a kind of attitudinal judgement. Fishbein (1967) defines attitude as "learned predispositions to respond to an object or class of objects in a favourable or unfavourable way" (p.257). Indeed, during the past three decades, researchers have fairly well converged on a definition of "attitude" as a reaction or predisposition towards an object which contains both cognitive and affective components. Whether the behavioural component is included or not depends on the preference of the researcher. Given the updated criteria, both types of customer evaluation (i.e., service quality and customer satisfaction) may be classified as "attitude." One strategy for theoretical progress is to "restrict their meanings" as Fishbein (1967) suggested by characterising perceived quality as being the more cognitive of the two judgements and customer satisfaction as the more affective evaluation. This is in tune with Zeithaml (1988) who proposes that as the number of search features goes up compared with the number of experience features, judgements of service quality become more cognitive than affective. She further adds that regardless of the evaluative judgement, for either "quality" or "satisfaction", both are more cognitive for simple products and more emotional for complex products. Although quality and satisfaction are both evaluations of performance judged against "standards", the types of standard may differ between the two. The possibility is that

satisfaction is judged by customers against their own internal standards whereas quality would be better defined as a judgement relative to competitive standards. A discussion of the use of comparison standards in service quality research and customer satisfaction research will be addressed in Section 2.3.4.2 of this chapter.

With respect to the conceptualisation of quality and satisfaction, there also appears to be a need for resolving the distinction between quality and satisfaction in terms of "local" or "global" assessment of product or service experience. Certain researchers (e.g., Holbrook and Corfman, 1985; Oliver, 1981; Olshavsky, 1985) have focused on customer satisfaction as an assessment of a specific transaction involving a product or service. This is in stark contrast with service quality studies which examine assessment of the overall excellence or superiority of a service offering (e.g. Parasuraman et al., 1988). Cronin and Taylor (1994), on the other hand, suggest that "service quality perceptions reflect a customer's evaluative perceptions of a service encounter at a specific point in time. In contrast, customer satisfaction judgements are experiential in nature, involving both an end state and a process, and reflecting both emotional and cognitive elements" (p.127). Parasuraman et al. (1985) describe satisfaction as more situation- or service encounter-specific, and quality as more holistic, developed, and maintained over a long period of time during which multiple service encounters are experienced. It is however an untested and arbitrary conceptualisation. For example, a customer can be asked to evaluate quality or satisfaction for both a single service encounter and for a longer-term perception. This point of view that evaluations (of quality or satisfaction) and duration (short-term or long-term) are totally separate issues is consistent with the view expressed by Rust and Oliver (1992) (requoted from Iacobucci et al., 1994). Thus, duration itself does not seem to be a promising candidate for separating quality and satisfaction.

Oliver (1993) also reviews the differences between service quality and customer satisfaction. He notes some distinctions between the meaning of quality and satisfaction. Firstly, the dimensions underlying quality judgement are rather specific in terms of cues or attributes. Satisfaction judgement, however, can result from any dimension, either quality related or not. Secondly, expectations for quality are based on ideal or "excellence" perceptions whereas a large number of non-quality issues, for instance, needs and equity, or "fairness" perceptions help form satisfaction judgement.

Thirdly, quality perceptions do not require experience with the service or service provider. For instance, a five-star hotel is perceived as high quality by customers even though they have never visited it. Satisfaction, on the contrary, is purely experiential. Lastly, quality has fewer conceptual antecedents, although personal and impersonal communications play a major role. But satisfaction is known to be influenced by a number of cognitive and affective processes including equity and attribution mentioned earlier.

Crompton and MacKay (1989) also draw a distinction between the service quality and satisfaction constructs :

> Attributes of service quality can be controlled and manipulated by recreation suppliers assuming that the necessary resources are available. In contrast, level of satisfaction is dependent not only on quality of service attributes but also on the status of a host of variables that may affect the user, such as the climate or the nature of the social group. Such variables are outside a supplier's control and may intervene, so that a perceived high-quality service could result in a low level of satisfaction. Conversely, a high satisfaction outcome may result even when perceived service quality is low because, for example, the social group interactions are sufficiently positive to offset the low quality. (p.368)

Such a distinction seems to highlight the fact that customer satisfaction is subject to certain variables which are beyond the control of service providers. This ties in the view that customer satisfaction is an experiential phenomenon. It is relative to situational expectations and involves non-quality dimensions. For example, it is possible for a customer to be satisfied with a low-quality service encounter if she/he expects minimal performance. In view of the above-mentioned differences, there seems to be wider support that quality and satisfaction are different, but related constructs, with different researchers taking different perspectives. The other best way to disentangle the two concepts is to examine their comparison standards in forming product/service evaluations and their causal relationship.

2.3.4.2 Use of Comparison Standards

Both the gap model for service quality and the disconfirmation paradigm for satisfaction illustrate the relative evaluation of a service experience compared with prior expectations for that service. It has been suggested that the difference between service quality and satisfaction lies in the nature of expectation as a comparison standard. Judgement of service quality is derived from the sum of several dis/satisfactory transactions (Parasuraman et al., 1988). This does not, however, solve the question about services that are consumed only once (e.g., surgical operations) or services that are consumed for the first time. In practice, it would not in these cases be possible to give an evaluation of many transactions, and the only remaining difference between service quality and satisfaction would be the nature of the comparison standard. Within customer satisfaction research, different types of "expectations" have been discussed since late 1970s (e.g., Miller, 1977). But in service quality research, discussion about comparison standards started in the early 1990s when Parasuraman et al. (1991b) proposed the zone of tolerance that involves both desired level and minimum tolerable level of expectations.

Satisfaction judgement is a comparison of predictive will-expectations whereas quality perceptions result from comparing normative should-expectations with service performance. Processes or standards of comparison are more complicated for satisfaction than service quality. Iacobucci et al. (1994) criticise both the gap model of service quality and the disconfirmation paradigm of customer satisfaction because they only use relative evaluations, with no consideration of an absolute level of the prior standards. That is, the models predict that customers evaluate a service favourably as long as their expectations are met or exceeded, regardless of whether their prior expectations were high or low, and regardless of whether the absolute goodness of the product or service performance is high or low. Such prediction is illogical. Firstly, considering that a customer who enters a budget hotel with low expectations, and indeed experiences poor food and rude service, it is unlikely that predicting a favourable evaluation is valid, even though the customer's prior expectations have been met. Secondly, the gap model predicts that if both a five-star hotel and a budget hotel meet (or perform above) their customers' respective expectations, the two types of customers will yield similarly positive evaluations. However, logically it is assumed that the five-star hotel customers will have a "finer"

experience than the budget hotel customers in an absolute sense. Thirdly, a customer of a five-star hotel whose expectations are merely met is likely to have a much finer experience than a customer of budget hotel whose expectations are exceeded. Fourthly, the model predicts that it is easier to please budget hotel customers whose prior expectations are low. However, it does not mean that the service experience is "good", or better than that five-star hotel customers whose expectations may not even have been met. Lastly, a further limitation of the model's relativistic logic is a practical concern when managing customers' expectations, whether to "under-promise, over-deliver" or to maintain high expectations and exceed them.

To conclude, LeBlanc (1992) states, "Even though quality and satisfaction are in theory concerned with the difference between expectations and perceptions, at present no theoretical distinction seems to be made between the two concepts in the literature" (p.15).

2.3.4.3 Direction of Relationship

Examination of the direction of relationship between service quality and customer satisfaction seems to be an empirical issue rather than a theoretical argument, although the causal order of quality and satisfaction has also been a matter of debate conceptually and empirically. Cronin and Taylor (1992) suggest that:

> The service literature has left confusion as to the relationship between consumer satisfaction and service quality. This distinction is important to managers and researchers alike because service providers need to know whether their objective should be to have customers who are "satisfied" with their performance or to deliver the maximum level of "perceived service quality" (p.56).

Bolton and Drew (1991a) assert that quality is a consequence of satisfaction (e.g., "I'm happy, therefore it was good"). They describe quality as a function of satisfaction and the disconfirmation of the prior expectations. In addition, Parasuraman et al. (1988) found that:

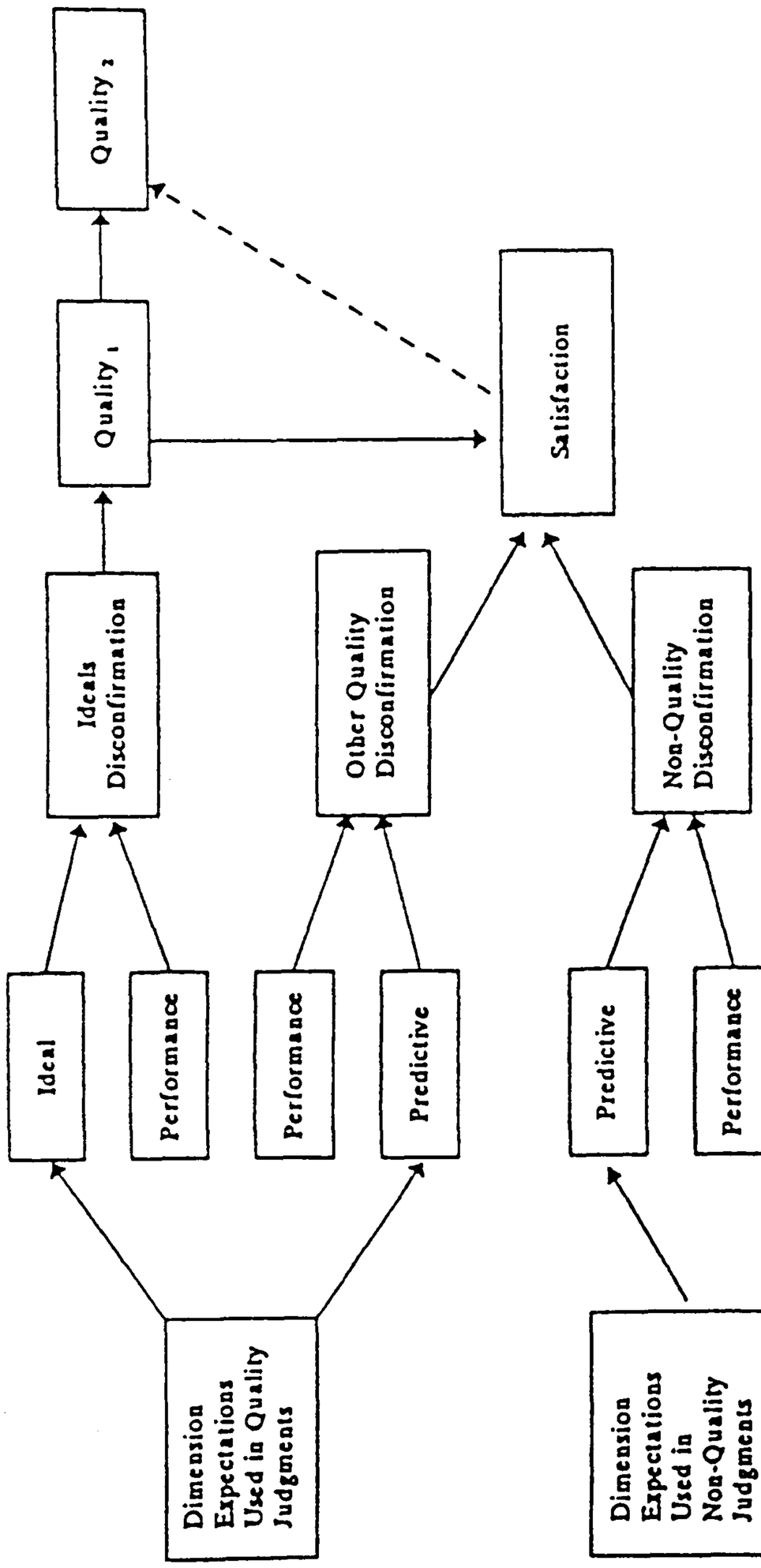
> Indeed, in the twelve focus group interviews included in the exploratory research conducted by Parasuraman, Zeithaml, and Berry (1985), respondents gave several illustrations of instances when they

> were satisfied with a specific service but did not feel the service firm was of high quality. In this way, the two constructs [service quality and customer satisfaction] are related, in that incidents of satisfaction over time result in perceptions of service quality. (p.16)

Parasuraman, Zeithaml, and Berry (1994) subsequently revised their original notion of satisfaction as a precursor to service quality and "posits a customer's overall satisfaction with a transaction to be a function of his or her assessment of service quality, product quality and price. This conceptualisation is consistent with the 'quality leads to satisfaction' school of thought" (p.121). It is thus possible to perceive service quality as good even though one specific transaction may have been unsatisfactory. Rust and Oliver (1994) explain that quality is "one dimension on which satisfaction is based and satisfaction is one potential influence on future quality perceptions" (p.6). Service quality, in other words, affects service satisfaction at the encounter-specific level. Another perspective is offered by Iacobucci et al. (1994) to associate perceptions of service quality as the more cognitive judgement and customer satisfaction as the more emotional evaluation. A judgement of quality is essentially external ("was the experience of high quality?") whereas a judgement of satisfaction is internal, personal, and more involving ("did you like it?"). Applying the sensation-perception analogy, it will have clear implications for the likely directionality between quality and satisfaction. If quality is likened to sensation and satisfaction to perception, the former precedes the latter.

Oliver (1993) adds on his comments that the distinction between service quality and service satisfaction are lacking at the conceptual level. Conceptually, they are separate but related customer judgements. He suggests that quality is viewed as a more enduring construct having quality specific referents whereas satisfaction is a superordinate concept which includes quality influences, is situation- and experience-specific, and involves dimensions and antecedents unique to satisfaction judgements. Allowance should be made for subsequent reinforcing effects of satisfying service encounters on quality perceptions. He charts out the relationship between service quality and customer satisfaction which is illustrated in Figure 2.6.

Figure 2.6: Service Quality and Satisfaction: An Integrative Model (Grönroos, 1993, p. 80)



Summing up the above debate on the directionality of relationship between quality and satisfaction, the quality-leads-to-satisfaction argument seems to receive wider support. More empirical studies are needed to confirm such a causal relationship.

2.4. MEASUREMENT OF SERVICE QUALITY

2.4.1 Operationalisation of Service Quality

It is generally recognised that for any research to be of any value, the underlying construct needs not only to be conceptually defined, but also operationally delineated. The purpose of operationalising service quality is to bridge the gap between theoretical concept of what it is and the reality of how it can be measured. For example, service quality is regarded as a global attitude, an abstraction that cannot be observed and measured directly. Therefore, an operational definition of service quality will transform such a concept into observable events. It also allows the concept of service quality to be "transportable" to other industry settings, uniformly understood, and used by all interested parties. To neglect the operationalisation of service quality is tantamount to overlooking the definition of a problem before attempting to determine a solution to the problem. Since the proliferation of service quality studies in the 1980s, different measurement approaches have been applied. In the following sections, the operationalisation of the service quality construct will be explained in detail under both the qualitative and the quantitative approaches.

2.4.2 Measurement Approaches

Since the exploratory study of service quality by Grönroos (1984), and Parasuraman et al. (1985) in the mid 1980s, the subject has triggered intense interest among academics and practising managers leading to a proliferation of relevant research studies using a wide variety of measurement approaches. Some studies on service quality are geared to comparisons of service quality level in different countries (e.g., Lewis, 1991; Schlegelmilch, Carman, and Moore, 1992) whereas some are undertaken for inter-firm (e.g., Ennew, Reed, and Binks, 1993) or inter-industry comparisons (e.g., Carman, 1990; Cronin and Taylor, 1992; Parasuraman et al., 1988, 1991a). Given the similarity of the concepts between service quality and customer satisfaction, a need to examine the measurement approaches for these two constructs is also important. Selected empirical studies on service quality and customer satisfaction are summarised in Tables 2.2 and 2.3 respectively. Most of the service quality studies from the mid

Table 2.2: Summary of Selected Empirical Studies on Service Quality

	Parasuraman, Zeithaml, and Berry (1985)	Parasuraman, Zeithaml, and Berry (1988)
1. Research Objective	To develop a conceptual model of service quality	To develop a multi-item service quality measurement instrument
2. Research Design	14 in-depth interviews and 12 focus group interviews on retail banking, credit card, securities brokerage, and product repair & maintenance industries	*1st stage :* Survey of 200 respondents of 5 service industries. *2nd stage :* Survey of 200 respondents for each of 4 firms : a bank, a credit card company, an appliance repair and maintenance company, and a long-distance telephone company.
3. Measurement	Open-ended questions	*First stage :* Development of a 97-item instrument to capture expectations and perceptions separately on a 7-point scale from "strongly agree" (7) to "strongly disagree" (1); about half of the statement pairs were worded negatively. *Second stage :* Refinement to a 34-item instrument from stage one and added questions on overall service quality evaluation.
4. Validity, Reliability Evidence	None	Coefficient alpha, content validity, convergent validity
5. Statistical Analysis	None	Factor analysis, ANOVA
6. Major Strengths	1. Use of objective measures. 2. Measures taken from both sides of the dyad. 3. Representative samples	1. Representative sample. 2. Rigorous construct development and measurement 3. Consistent factor structure 4. High reliability (0.87 to 0.90). 5. Strong convergent validity across 4 independent samples.
7. Major Weaknesses	See Teas (1993b) for definitional problems of expectation minus perception	See Babakus and Boller (1992); Brown, Churchill, and Peter (1993); Carman (1990); Cronin and Taylor (1992, 1994); and Teas (1993b) for arguments against the scale measurement
8. Research Findings	Development of the "gap" model and 10 determinants of service quality.	Development of a 22-item measurement instrument (SERVQUAL) to measure service quality across 5 dimensions.

Table 2.2 (cont'd): Summary of Selected Empirical Studies on Service Quality

	LeBlanc and Nguyen (1988)	Carman (1990)
1. Research Objective	To measure service quality of credit unions	To report on the findings of replication studies using SERVQUAL measurement instrument.
2. Research Design	Mail survey of 2,500 members of credit unions. Usable questionnaires: 1,224.	Survey of 200 customers from each of the following service organisations : a dental school patient clinic, a business school placement centre, a tyre store, and an acute care hospital.
3. Measurement	Rating of 45 statements and an overall evaluation on a 7-point Likert scale.	22-item SERVQUAL instrument (Parasuraman, Zeithaml, and Berry, 1988) with modification on wording for each service category.
4. Validity, Reliability Evidence	Coefficient alpha, content validity.	Coefficient alpha, content validity, construct validity, nomological validity, discriminant validity.
5. Statistical Analysis	Factor analysis, multiple regression	Factor analysis
6. Major Strengths	1. Large sample 2. High reliability (0.71 to 0.90). 3. Comprehensive scale measurement instrument.	1. Scales already defined in previous SERVQUAL studies. 2. Construct validity and nomological validity indicated.
7. Major Weaknesses	Seven factors identified only accounted for 58% of total variance.	1. Factors with high reliability inconsistent across different replication studies (0.51-0.87). 2. Questionable discriminant validity. 3. Problem of difference score (See Brown, Churchill, and Peter, 1993).
8. Research Findings	Customer satisfaction was positively related to and had the greatest impact on overall service quality evaluation.	Highlight drawbacks of SERVQUAL instrument : 1. Need to customise SERVQUAL instrument to suit individual settings. 2. Service quality dimensions not generic. 3. Need to account for service quality of multiple service functions separately.

Table 2.2 (cont'd): Summary of Selected Empirical Studies on Service Quality

	Parasuraman, Berry, and Zeithaml (1991a)	Babakus and Boller (1992)
1. Research Objective	To refine the SERVQUAL instrument; and to compare with other studies using SERVQUAL instrument.	To assess the shortcomings of the SERVQUAL instrument (Parasuraman, Zeithaml, and Berry, 1988).
2. Research Design	Mail survey of 1800-1900 customers for each of 5 companies (1 telephone company, 2 insurance companies and 2 retail banks); response rates ranged from 17-25%; aggregate response rate: 21%.	Mail survey of 2,375 users of electricity and gas; usable questionnaires : 689.
3. Measurement	22-item SERVQUAL instrument; "should" terminology changed to "will"; negatively worded items changed to positively worded items; 2 new items under tangibles and assurance substituted; other minor wording adjustments to original SERVQUAL; relative importance of 5 dimensions added by allocating 100 points.	22-pair statements of SERVQUAL with additional questions on complaint behaviour, single-item satisfaction on a 7-point scale, an overall rating of service quality on a 4-point scale.
4. Validity, Reliability Evidence	Coefficient alphas; content and construct validity; predictive validity.	Coefficient alpha, convergent and discriminant validity.
5. Statistical Analysis	Factor analysis, multiple regression.	Confirmatory factor analysis.
6. Major Strengths	1. High reliability and construct validity. 2. Gap scores generated by the revised SERVQUAL fairly stable. 3. Consistent factor structure.	1. Large sample size. 2. Scale measurement already defined in other SERVQUAL studies. 3. High reliability (0.67 to 0.83) across 5 dimensions.
7. Major Weaknesses	1. Interdimensional overlap is greater than the original SERVQUAL scale. 2. See Babakus and Boller (1992); Brown, Churchill, and Peter (1993); Carman (1990); Cronin and Taylor (1992, 1994); and Teas (1993b) for arguments against the scale measurement.	1. See Bolton and Drew (1991a) for concerns for measuring service quality of utility companies. 2. Questionable convergent and discriminant validity.
8. Research Findings	Revised SERVQUAL scale performed better than the original SERVQUAL scale in terms of reliability, factor structure, and validity.	5-dimensional structure of the SERVQUAL instrument not envisaged.

Table 2.2 (cont'd): Summary of Selected Empirical Studies on Service Quality

	Cronin and Taylor (1992)	Brown, Churchill, and Peter (1993)
1. Research Objective	To suggest that SERVQUAL model is inadequate; and to examine the relationships between service quality, customer satisfaction, and purchase intention	To suggest an alternative method (non-difference score) to SERVQUAL instrument to measure service quality of financial institutions.
2. Research Design	Personal interviews of 730 customers (banking 188, pest control 175, dry cleaning 178, fast food 189); usable questionnaires: 660.	2 versions of questionnaire (1 and 2 below) to 230 undergraduate business students. About half of the participants completed each version.
3. Measurement	22-pair SERVQUAL statements; 22 statements on importance measures; 1 statement on purchase intention; 1 statement on overall quality; 1 statement on overall satisfaction; rating on a 7-point semantic differential scales.	*First version:* 22-item statements from SERVQUAL but rephrased to "How"; 7-point scale with verbal descriptors ("much worse than I expected" to "much better than I expected"); single-item to measure overall service quality; 5 global measures to assess 5 dimensions; 3-item behavioural intentions measure. *Second version:* SERVQUAL instrument
4. Validity, Reliability Evidence	Coefficient alpha; content validity convergent validity, discriminant validity	Coefficient alpha, content validity, convergent validity, discriminant validity, nomological validity
5. Statistical Analysis	Factor analysis, multiple regression, structural equation modelling	Correlation, multiple regression.
6. Major Strengths	1. Large sample size. 2. Introduction of performance-based service quality measurement instrument. 3. High reliability (0.85 to 0.96).	1. Introduction of non-difference score approach. 2. High reliability: modified SERVQUAL (0.96); SERVQUAL (0.94).
7. Major Weaknesses	1. Bias on limiting the study to highest market share firms 2. Firms investigated mostly from low involvement service categories.	See Parasuraman, Berry and Zeithaml (1993) for arguments against the psychometric and practical issues of the proposed non-difference score measurement instrument.
8. Research Findings	Performance-based SERVPERF outperformed SERVQUAL; service quality was an antecedent of customer satisfaction and had less effect on purchase intention.	Non-difference score SERVQUAL outperformed difference-score SERVQUAL in terms of reliability, discriminant validity, and variance restriction effects. It also reduced the length of the questionnaire.

Table 2.2 (cont'd): Summary of Selected Empirical Studies on Service Quality

	Bienstock, Mentzer, and Bird (1997)	Durvasula, Lysonski, and Mehta (1999)
1. Research Objective	To develop a valid and reliable scale for measuring physical distribution service quality perception of industrial customers.	To replicate the SERVQUAL instrument in an ocean freight shipping service setting.
2. Research Design	The instrument was pretested to 33 respondents. The refined instrument was mailed to 797 respondents. 446 questionnaires were usable.	Personal interview of 114 shipping managers.
3. Measurement	Both expectation and perception battery of items were included in the questionnaire. The questionnaire contained 36 service quality items, 2 items on overall service quality, and 2 items on purchase intentions. The survey data were divided into halves. The first half was used to further refine the 36 items whereas the second half was used to verify the unidimensionality and reliability of the scale.	The SERVQUAL instrument.
4. Validity, Reliability Evidence	Coefficient alpha, convergent validity, and predictive validity.	Composite reliability, convergent validity, discriminant validity, nomological validity, and predictive validity.
5. Statistical Analysis	Confirmatory factor analysis.	Confirmatory factor analysis and correlation analysis.
6. Major Strengths	1. Moderate sample size. 2. The data analysis compared both the gap and perception-only measurement frameworks. 3. Strong evidence of reliability and validity. 4. Extended the service quality research to a business-to-business setting	1. The data analysis compared both the gap and perception-only measurement frameworks. 2. Strong evidence of reliability and validity. 3. Extended the service quality research to a business-to-business setting
7. Major Weaknesses	Only 27% (gap) and 34% (perception-only) of the variance in overall SQ was accounted for by the SQ items.	Relatively small sample size.
8. Research Findings	The gap-based framework outperformed the perception-only framework in terms of model fitness.	Overall, perception-only measurement achieved better results than the gap-based measurement.

Table 2.3: Summary of Selected Empirical Studies on Customer Satisfaction

	Oliver (1980)	Swan and Trawick (1981)
1. Research Objective	To test the relationships among expectation, disconfirmation, satisfaction, attitude, and intention.	To test the disconfirmation model of satisfaction in a retail service setting through a longitudinal study.
2. Research Design	*First stage :* Mail survey of 2,000 residents and 1,000 university students. Responded : residents (28%), students (45%). *Second stage :* Mail survey to 1st stage respondents on feelings towards the federal flu programme and flu shots. Responded : 291 resident and 162 student "vaccinees"; and 65 resident and 86 student "non-vaccinees".	Self-administered questionnaires to 346 customers aged 15 and above of a restaurant. 243 customers responded.
3. Measurement	*Pre-exposure variables*: Expectations : 5-point scale from "no change" to "certain"; evaluation : 5-point good-bad scale; overall attitude : one-item semantic differential scale; behavioural intention : 11-point scale from "no chance" to "certain." *Post-exposure variables*: Disconfirmation : 2-item overall disconfirmation on a 7-point scale; satisfaction : 6-item Likert scale; behaviour : self-report.	*Before the meal:* Rate the expectation on food and services on seven attributes. To be completed before order was taken. *After the meal:* Rate the evaluation of food and services on the attributes and to measure satisfaction and intentions.
4. Validity, Reliability Evidence	Coefficient alpha.	Split-half sample.
5. Statistical Analysis	Multiple regression	Stepwise regression, structural equation modelling.
6. Major Strengths	High reliability (0.94 for combined sample on pre-exposure variable and 0.82 on post-exposure variables)	1. "Before" measures did not bias the "after" measures through the use of "after only" control group. 2. Longitudinal study rather then cross-sectional study preferable
7. Major Weaknesses	1. Multicollinearity of the complete recursive system for data analysis. 2. Community sample, rather than national sample, was considered nonrespresentative; low response rate.	1. Incentive for recruiting respondents might cause bias. 2. Respondents might interact with each others while completing questionnaires.
8. Research Findings	Disconfirmation was a positive predictor of satisfaction (and attitude and intention). Expectations were also positively related, but disconfirmation had the greatest effect on satisfaction.	Inferred disconfirmation was a positive predictor of satisfaction and had a greater influence on satisfaction than either expectations or perceived disconfirmation. Perceived disconfirmation had the smaller effect on satisfaction for all variables tested.

Table 2.3 (cont'd): Summary of Selected Empirical Studies on Customer Satisfaction

	Churchill and Suprenant (1982)	Cadotte, Woodruff, and Jenkins (1987)
1. Research Objective	To test the interrelationships among expectations, perceived performance, disconfirmation and satisfaction for a durable and a non-durable good.	To propose experience-based norms as the standard for comparison under the confirmation/disconfirmation paradigm.
2. Research Design	Field survey of 126 respondents who were aged 19 to 65 and were recruited at a shopping mall. Incentive was offered. Half for the video disc player (VDP) and half for the hybrid plant.	Two-stage on-site survey (before and after dining) of a consumer panel of 120 persons randomly selected to capture the norms construct in restaurant dining. 87 panel members completed the entire study.
3. Measurement	Three levels of expectation and three levels of performance for two goods. Both attribute-specific and global measures were taken.	*Preconsumption measures :* Product type norm : 5-point rating scales on 9 attributes. Best brand norm: 5-point rating scales on best restaurant. Brand expectations : 5-point rating scales on focal restaurant. *Postconsumption measures :* Performance: composite score on 7 attributes together with a single-item overall measurement; disconfirmation: a single item for each norm/expectation on a 5-point scale; feeling : 12 bipolar 5-point scales.
4. Validity, Reliability Evidence	Coefficient alpha.	Coefficient alpha, convergent validity, discriminant validity, nomological validity.
5. Statistical Analysis	Analysis of variance, structural equation modelling	Structural equation modelling
6. Major Strengths	1. High reliability (ranged from 0.85 to 0.95 for both goods) and convergent validity 2. Research on satisfaction process for durable products. 3. Explored role of performance in determining satisfaction directly.	1. All the constructs (except two) exhibit high reliability (i.e., over 0.70). 2. Measure taken to test the demand effect by including handout/mailback questionnaire to customers.
7. Major Weaknesses	Some constructs were operationalised using a single item or two items.	1. Disconfirmation measure with single-item scale 2. Particular standard used by each respondent not identified.
8. Research Findings	Disconfirmation and performance were both positively related to satisfaction for the plant, but disconfirmation had the greatest effect. For the VDP, only performance had a significant positive impact on satisfaction, accounting for 88% of the satisfaction variation.	Disconfirmation was positively related to satisfaction for all three restaurant settings. Disconfirmation of product norms and best-brand norms was consistently better than brand expectations in explaining satisfaction variation. Performance was positively to disconfirmation.

Table 2.3 (cont'd): Summary of Selected Empirical Studies on Customer Satisfaction

	Tse and Wilton (1988)	Oliver and Swan (1989)
1. Research Objective	To examine the role of perceived performance and compare the effects of alternative disconfirmation and comparison standards.	To study customer perception of equity and satisfaction with the salesperson in an automobile purchase.
2. Research Design	Laboratory experiment of student volunteers from advanced marketing management courses of an university about psychological states towards a new electronic, hand-held, miniature record player. 62 students completed the experiment.	On-site survey of new car buyers on equity consideration towards salesperson and dealer followed by a mail survey on customer feelings of equity towards the transaction with the salesperson. Total responses were 426 from 791 requests. Usable : 415.
3. Measurement	Three comparison standards (expectations, ideal, and equity), four disconfirmation constructs (subjective, perceived-expected, perceived-ideal, and perceived-equitable) together with perceived performance.	Perception of Input and Output: 28 items on 4 elements measured on a 7-point Likert scale; equity : 5 items on a 7-point Likert scale; satisfaction: 6 items with bipolar adjective; disconfirmation : 3 items with "worse than expected" to "better than expected" scale; intention : 4 items bipolar adjective scale.
4. Validity, Reliability Evidence	Discriminant and convergent validity.	Item reliability and convergent validity.
5. Statistical Analysis	2x2 factorial design, pairwise correlation	Structural equation modelling
6. Major Strengths	Extended further the Churchill and Suprenant's (1982) performance-only measurement of customer satisfaction.	1. Multiple items for each construct. 2. Large sample size
7. Major Weaknesses	1. High collinearity among independent variables produced inflated standard errors. 2. Small sample size.	1. Problems of multi-collinearity. 2. Did not consider the various dimensions of equity.
8. Research Findings	Performance and disconfirmation were both positively related to satisfaction, but performance exceeded all the expectation measures and disconfirmation as a predictor of satisfaction.	Disconfirmation was a positive predictor of satisfaction. But fairness had the greatest effect on satisfaction.

Table 2.3 (cont'd): Summary of Selected Empirical Studies on Customer Satisfaction

	Bitner, Booms, and Tetreault (1990)	Halstead, Hartman, and Schmidt (1994)
1. Research Objective	To study critical service encounters in leading customer satisfaction/dissatisfaction.	To examine the relationships among performance, disconfirmation, and satisfaction in a higher education setting.
2. Research Design	Personal interviews of 719 customers of hotels, restaurants, and airlines. Usable responses : 699.	1,223 questionnaires were sent to alumni. 475 usable responses were returned.
3. Measurement	Use of Critical Incident Technique (CIT) to capture a specific instance in which good or poor service interactions occur and to classify the incidents into 12 resulting categories.	Performance: 5 items for intellectual environment, 2 items for employment preparation. Both on a 5-point scale ranging from "very strong" (5) to "very weak" (1). Disconfirmation: 2 items for two performance measures. Satisfaction: 3 items to measure overall satisfaction.
4. Validity, Reliability Evidence	None.	Item reliability, convergent validity, and discriminant validity.
5. Statistical Analysis	Descriptive statistics.	Structural equation modelling.
6. Major Strengths	1. CIT was useful in commercial applications. 2. More than 700 incidents were collected	1. Large sample size to compensate for non-normality of variables through the use of polychoric correlation matrix.
7. Major Weaknesses	Problems with CIT in processing and analysing anecdotal materials (Johnston, 1995)	1. Students' expectations were not accounted for. 2. Single item to measure disconfirmation. 3. Variance explained not mentioned. There might be other antecedents to alumni satisfaction.
8. Research Findings	Identify sources of satisfaction and dissatisfaction.	Confirmed that a performance-disconfirmation model, which contained multiple sources of performance and separate disconfirmation provided a better representation of the satisfaction formation process than the traditional single-source model.

Table 2.3 (cont'd): Summary of Selected Empirical Studies on Customer Satisfaction

	Spreng, MacKenzie, and Olshavsky (1996)	Patterson, Johnson, and Spreng (1997)
1. Research Objective	To test a comprehensive model of the determinants of consumer satisfaction involving two comparison standards.	To examine the determinants of customer satisfaction or dissatisfaction in the context of business professional service.
2. Research Design	207 subjects recruited from a local church to participate in an experiment about camcorder. Subjects were asked about their views on desire, expectation, and perceived performance about the camcorder.	Mail survey of 142 clients of management consulting services. Usable: 128.
3. Measurement	Multi-item scales were developed to measure: (a) desires, expectation, and perceived performance; (b) desires congruency and expectations congruency; (c) information satisfaction; (d) attribute satisfaction; and (e) overall satisfaction.	Multiple items were used to measure the purchase situation variables (novelty, importance, complexity), individual characteristics (uncertainty and stakeholding), expectations, performance, disconfirmation, fairness, satisfaction/dissatisfaction, and repurchase intentions.
4. Validity, Reliability Evidence	Item reliability, discriminant validity.	Reliability, convergent validity, discriminant validity.
5. Statistical Analysis	ANOVA, structural equation modelling	Confirmatory factor analysis, path analysis.
6. Major Strengths	The results provided strong support for the hypotheses and helped clarify the roles of desires, expectations, and performance in the satisfaction formation process.	Longitudinal design.
7. Major Weaknesses	The subjects did not actually purchase the product which might affect the depth or intensity of their satisfaction reactions to some extent.	Small sample size.
8. Research Findings	Confirmed the importance of desires congruency and information satisfaction in the satisfaction formation.	The disconfirmation paradigm could be applied to industrial buying situation.

1980s to mid 1990s were focused on the gap-based (perception minus expectation) measurement framework (e.g., Babakus and Boller, 1992; Carman, 1990; Parasuraman et al., 1988, 1991a) and finding out determinants of service quality (e.g., Bienstock et al., 1997; Parasuraman et al., 1988, 1991a) in accordance with established scale development process (e.g., Churchill, 1979) for different industries. The major strengths of these studies, among others, include using large samples and multiple industries to develop and validate the measurement scales by means of exploratory factor analysis and confirmatory factor analysis (e.g., Babakus and Boller, 1992; Parasuraman, Zeithaml, and Berry, 1988, 1991a). However, generic service quality dimensions and consistent factor structure were not found in replication studies (e.g., Babakus and Boller, 1992; Carman, 1990).

On the other hand, customer satisfaction research during that period was related mostly to investigating multiple comparison standards in satisfaction formation (e.g., Spreng, MacKenzie, and Olshavsky, 1996; Tse and Wilton, 1988). The product-oriented satisfaction research in the 1980s (e.g., Churchill and Suprenant, 1982; Oliver, 1980) was moved to a more service-oriented satisfaction research in the 1990s (e.g., Bitner, Booms, and Tetreault, 1990; Halstead, Hartman, and Schmidt, 1994). This may be attributable to the rapid growth of the service industry in world economy. One of the common features of these studies involves the use of structural equation modelling technique for testing model robustness. Halstead et al. (1994) summarise four major advantages of using structural equation modelling technique: (1) parameter estimates can be made through the use of the weighted least squares method (WLS), even when assumptions of normality have been violated; (2) estimations of latent variables can be made by measuring multiple indicators of latent variables with measurement errors; (3) measurement models can be evaluated for unidimensionality by placing a priori constraints on the off-factor loadings; and (4) competing theoretical models can be systematically evaluated to establish the best representation of the data. These model-testing studies have enriched customer satisfaction literature with a greater understanding on the comparison standards and the satisfaction formation process as well as its consequences.

Also revealed from Table 2.2, the methods used to measure service quality are based on different schools of thought and can be mainly classified into two groups: incident-

and attribute-based methods (Stauss and Hentschel, 1991; Mattsson, 1994). The former method tends to be qualitative and concerns deviations from the normal case whereas the latter is quantitative and forces the respondents to assume a certain level of normal performance. Therefore, these two groups of methods are, in fact, measuring different aspects of quality and processes.

2.4.2.1 Qualitative Approaches

One qualitative approach to measure service quality is by using critical incident technique (CIT) developed by Flanagan (1954). Strauss and Hentschel (1991) consider CIT as essentially a method of collecting and classifying. They refer critical incidents as "specific interactions between customers and service employees that are especially satisfying or especially dissatisfying" (p.29). They also point out four reasons that CIT is particularly useful to measure quality. Firstly, services are process-oriented and the dominating mode of experience within the processes is episodic and not attribute-based. Secondly, services are basically intangible. Therefore, the transformation of concrete incident-based experience in abstract attribute-based evaluations is more difficult than products. Thirdly, the customer is partly involved in the service production process. She/he will experience her/his participation as a sequence of incidents and not as a sum of attributes. Lastly, face-to-face communications are not abstract discussions of service attributes, but of special incidents. These little stories are easy to talk about and attractive because of their authenticity.

Strauss and Hentschel's empirical study using both CIT and attribute-based measurement tended to support the idea that service customers hold a set of critical incidents. Therefore, incident-based measurement of service quality provides more concrete and complete information. However, in a study applying the Herzberg's theory to customer satisfaction using CIT, Maddox (1981) considers the technique as a difficult, time-consuming method of data collection, and interpretation is highly subjective. Johnston (1995) also notes that there are a number of disadvantages of using CIT. For instance, in relation to service quality evaluation, the CIT technique may suffer from the disadvantage that some events may take place between the occurrence of the critical event and the data collection period. In this case, respondents' perceptions may be modified or reinterpreted in the light of these events. In addition, respondents are

required to take time and effort to describe situations in words. Therefore, a low response rate is likely for mail survey.

Other qualitative techniques may include focus group interviews, in-depth personal interviews, and observational methods. Since the proliferation of service quality research in the mid-1980s, focus group interviews and in-depth personal interviews have been primarily used for exploratory study and for development of an attribute-based measurement instrument (e.g., Parasuraman et al., 1985, 1988). About observational methods, Grove and Fisk (1992) claim that:

> [T]hese methods are well suited to capture processual nature of services phenomena due to their ability to examine service interactions unobstrusively as they occur. This is crucial since service quality includes both process and outcome dimension and processes are the `raw material' by which services are constructed" (p.217).

They further stress the advantages of using observational methods as offering an "up-close" view of the phenomena and providing information about phenomena that are gleaned in their natural setting. These methods include content analysis of company documents, print and broadcast advertisement, mystery shoppers, and examination of customer response/comment cards.

Edvardsson and Mattson (1993) and McCormack, Neal, and Triplett (1994) also argue that measurement of service quality should be qualitative in nature rather than quantitative. They consider quantitative techniques to have limited ability to reflect process aspects of service and to capture these contextual process experience data. A qualitative study will engender a formal exchange with customers through interviews, rather than through survey questionnaires in a quantitative study.

The above review on the qualitative approach to the study of service quality suggests that no single technique is ideal as there are both advantages and disadvantages. An appreciation of the strengths and weaknesses of each technique is required to match the situational factors and the unique features of the industry under study. Recent empirical studies on service quality tend to combine both qualitative and quantitative approaches in research design (e.g., Bienstock et al., 1997; Parasuraman et al., 1988). Therefore, an

understanding of the quantitative approach is also required. The following section will address the main features of quantitative approaches.

2.4.2.2 Quantitative Approaches

The quantitative approach to measuring service quality is typically attribute-based. In addition, the investigation of service quality tends to be multi-dimensional because most services are bundled with core, facilitating, and supporting elements. For example, airline service includes core element (transportation), facilitating elements (check-in procedures), and supporting elements (in-flight meals). The use of a single statement, for example, rated on a poor-to-excellent scale, is conceptually unreliable in view of complex consumer behaviour and of less value to the management in shaping service delivery strategy. A number of empirical studies have used multi-item instruments to measure service quality.

For quantitative studies, Crompton and Love (1995) identify that there are five alternative operationalisations of quality, including: (1) attribute expectations; (2) attribute expectations and attribute importance; (3) attribute performance and attribute importance; (4) attribute performance and attribute expectations; and (5) attribute performance, expectations, and importance. These operationalisations together with others are summarised in Table 2.4. The operationalisation of the service quality concept in most of the empirical studies (e.g. Avkiran 1994, Brown and Swartz, 1989; Carman, 1990; Durvasula, Lysonski, and Mehta, 1999; Lewis, 1991; Parasuraman et al., 1988, 1991a) tends to adopt a P-E (perception minus expectation) measurement framework although Cronin and Taylor (1992) argue that there is little theoretical or empirical evidence supporting the relevance of the P-E as the basis for measuring service quality.

Underlying this P-E operationalisation, perceived service quality is assumed to increase as the differences between P and E increase across various service quality attributes. It is important to note that this P-E service quality concept is different from the expectancy-disconfirmation paradigm in traditional customer satisfaction/dissatisfaction models. Firstly, the P-E gap concept represents a comparison with a norm (i.e., expectation-as-ideal standard), as opposed to the predictive standard used in customer satisfaction research. In this case, what a

Table 2.4 : Current Operationalisations of Service Quality

Operationalisation	Researcher/(s)	Primary Characteristics
Perception-Expectation (Ideal) Model	Carman (1990), Babakus and Boller (1992), Parasuraman, Zeithaml, and Berry (1985, 1988).	To model service quality as a function of ideal standard of expectation and perceived performance. Service quality judgement depends on the size and magnitude of the gap between perceived performance and expectation. With expectation of service held constant, the higher the perception is, the higher the service quality will be.
Perception-Expectation (Prediction) Model	Parasuraman, Zeithaml, and Berry (1991a)	To model service quality as a function of predictive standard of expectation and perceived performance. Unlike the perception-expectation (ideal) model, this approach emphasises the expectation-as-prediction as a comparison standard which is realistic in most of the service encounters.
Performance Disconfirmation Model	Bolton and Drew (1991a)	To model service quality as a function of perceived service performance for the prior period and the level of (dis)satisfaction with the current level of service performance.
Evaluated Performance Model	Teas (1993b)	To model service quality as a function of the probability of optimal performance. This model posits that the perception of service quality is positively related to the maximum likelihood that the performance is close to the optimal point.
Perceived Performance Model	Cronin and Taylor (1992)	To model service quality as a function of current perceived performance. Service quality is solely determined by the level of performance.
Importance-Performance Model	Ennew, Reed, and Binks (1993)	To model service quality as a function of importance and perceived performance.

customer wants is in an ideal sense and unrelated to what is reasonable or feasible. Secondly, the method of operationalising the P-E gap is to obtain perception and expectation scores for each attribute and calculate the overall service quality index.

Bolton and Drew (1991a) propose another perspective to the comparison standard. They postulate that service quality is a function of a customer's disconfirmation experiences, expectations, and perceived performance levels. Their research results confirm the importance of performance and disconfirmation experience in the quality evaluation of telephone service whereas expectation does not play a part. However, when service quality researchers have applied the disconfirmation paradigm of customer satisfaction, there may be a problem that, apart from expectations as the standard of comparison, other types of standard may have been used. Although conceptual and empirical works (e.g., Boulding, Kalra, Staelin, and Zeithaml 1993) continue to add to the understanding of comparison standards and how these standards influence customers' assessment, the issues of comparison norms and their interpretations have not been resolved fully yet. On the other hand, the role of performance has received increasing attention in service quality research. For example, Babakus and Boller (1992) and Cronin and Taylor (1992) have found a stronger correlation between the performance of the service and service quality than disconfirmation of desired service and service quality.

It has also been suggested that expectations for a continually consumed product or a product with which the customer has much experience will be equal to perceptions of the actual performance of the product (Strandvik, 1994). Despite the divergence in perspective, the P-E model has been widely used and is regarded as a dominant operationalisation of the service quality construct. Although there are some studies undertaken to compare the relative robustness of the P-E model and the P-only model as summarised in Table 2.5, there is no definitive study to confirm which model works better. As revealed in Table 2.5, it seems that the P-E model outperforms the P-only model in high involvement services, in particular business-to-business services (e.g., Bienstock et al., 1997; Durvasula et al., 1999) whereas the P-only model works better in the context of low involvement or consumer services (e.g., Babakus and Boller, 1992; Brown, Churchill, and Peter, 1993; Crompton and Love, 1995; Cronin and Taylor, 1992). The result of a recent longitudinal study by Gwynne et al. (1999) on consumer banking service also suggests that the P-only approach works better than

Table 2.5: Summary of Selected Empirical Studies on Comparing P-E and P-only Service Quality Measurement Approaches

	Cronin and Taylor (1992)	Babakus and Boller (1992)	Crompton and Love (1995)
Study Context	Banking, pest control, dry cleaning, and fast food	Electric and gas utility	Leisure and tourism
Research Design	Measurement: 22-item SERVQUAL scale, one item on overall quality, one item on satisfaction, and one item on purchase intention. Sample: 660 customers, being 188 for banking, 175 for pest control, 178 for dry cleaning, and 189 for fast food (usable responses)	Measurement: 22-item SERVQUAL scale, one item on overall quality, one item on satisfaction with complaint resolution. Sample: 689 customers (usable responses)	Measurement: 22-item non-SERVQUAL scale, one item on overall quality. Expectations were captured prior to service delivery. Sample: 418 visitors (usable responses)
Data Analysis	Confirmatory factor analysis, stepwise regression analysis, and correlation analysis	Exploratory factor analysis, confirmatory factor analysis, correlation analysis	Correlation and regression analyses
Reliability and Validity Evidence	Reliability, convergent validity, and discriminant validity	Reliability, convergent validity, discriminant validity, and concurrent validity	Convergent validity and predictive validity
Findings	P-only measurement outperformed P-E measurement in terms of stronger construct validity and higher % of variance explained in service quality. Expectation might not play a role in low-involvement service industries.	No comparison was made between the two measurements in terms of reliability and construct validity, except concurrent validity. P-only measurement provided stronger evidence in concurrent validity. Expectation did not play a role in continuously providing services.	P-only measurement achieved better convergent validity and predictive validity than the P-E measurement. Expectations were considered as pre-purchase choice criteria whereas perceptions were considered as post-purchase evaluative choice criteria. Assimilation/contrast theory might have worked. Including expectations only introduced redundancy.

Table 2.5 (continued): Summary of Selected Empirical Studies on Comparing P-E and P-only Service Quality Measurement Approaches

	Brown, Churchill, and Peter (1993)	Bienstock, Mentzer, and Bird (1997)	Durvasula, Lysonski, and Mehta (1999)
Study Context	Financial services	Physical distribution	Ocean freight shipping service
Research Design	Measurement: 22-item SERVQUAL scale, one item on overall quality, three items on behavioural intentions and several items on recommendation and consumer discontent. Sample: 230 undergraduate students (usable responses)	Measurement: 36-item non-SERVQUAL scale, two items on overall quality, two items on purchase intention. Sample: 446 purchasing managers (usable responses)	Measurement: 22-item SERVQUAL scale, one item on overall satisfaction. Sample: 114 shipping managers (usable responses)
Data Analysis	Correlation analysis	Exploratory factor analysis, confirmatory factor analysis, and path analysis	Confirmatory factor analysis and correlation analysis
Reliability and Validity Evidence	Reliability, convergent validity, discriminant validity, and nomological validity	Reliability, convergent validity, discriminant validity, and predictive validity	Reliability, convergent validity, discriminant validity, and predictive validity
Findings	P-only measurement achieved better results in terms of reliability and discriminant validity, but not convergent validity. Both measurements performed equally well in terms of nomological validity. Difference score measures were a threat to discriminant validity.	In two confirmatory analyses (using split-half samples), P-E measurement achieved better fit indices. In path analysis, P-only measurement explained slightly more variance than P-E measurement.	P-E measurement achieved better fit in tests of dimensionality whereas P-only measurement provided stronger evidence in reliability and predictive validity. Overall, P-only scores provided a better measure of service quality than P-E scores.

the P-E approach in determining service quality. More studies on business-to-business professional service quality are needed to substantiate the difference.

Although there is no clear indication about the relative superiority between the P-E approach and the P-only approach, the process of operationalising service quality tends to be fairly similar. The process of operationalising service quality involves three independent but related stages, including identifying service quality dimensions and attributes, specifying importance or weighting of service quality dimensions, and determining how each dimension is to be measured. These issues will be discussed in the following sections.

2.4.2.3 Dimensions/Attributes of Service Quality

As mentioned in the previous section, consumer research findings suggest that customers do not view quality as a unidimensional concept, but comprised of multiple dimensions. In deriving dimensions and attributes for measuring service quality, care should be taken to differentiate those which are purely choice criteria and those which are purely service quality drivers. In the customer satisfaction literature, Oliver (1997) distinguishes dimensions/attributes into choice criteria, satisfaction drivers, and dual-influence features. Schlegelmilch et al., (1992) researched the choice criteria and perceived quality of family practitioners. The choice criteria like "responsiveness to questions" and "caring attitude of practitioners" are also service quality drivers, but are excluded from the attributes for service quality measurement. Therefore, there is a need for researchers to identify service quality drivers for the industry under study.

Garvin (1987), for example, lists eight different dimensions of quality, including performance, features, reliability, conformance, durability, serviceability, aesthetics, and perceived quality. He suggests that these dimensions are generalisable to all goods and services. Grönroos (1984) classifies service quality dimensions into three categories: technical, functional, and image qualities. This classification also parallels the description of Lehtinen and Lehtinen (1982, 1991) who use a threefold categorisation: physical, interactive, and corporate qualities. The physical (technical) qualities are the actual visible components of the service offering. The interactive service (functional) is the expressive performance of the service whereas the corporate (image) qualities are symbolic in nature, representing the dimension of

quality developed during the history of the service organisation. Zeithaml (1988) asserts that dimensions of quality are more meaningful when generalised only to a certain categories of products (e.g. durable goods, packaged goods, services) rather than to all products in general. In service quality, Grönroos (1990) provides six dimensions under three categories. As shown in Table 2.6, the three categories include those which are outcome-related, process-related, and image-related. These categories are consistent with his technical-functional model mentioned earlier in the chapter. The six service quality dimensions across the three categories are considered to be universal to most of the service industries.

Table 2.6: Six Service Quality Dimensions

Outcome-related :	Professionalism and skills (knowledge and skills to solve problem)
Process-related :	Attitudes and behaviour (friendly and spontaneous)
	Accessibility and flexibility (easy to get access with service provider)
	Reliability and trustworthiness (acting in the best interest of customers)
	Recovery (remedy in case of service breakdown)
Image-related :	Reputation and credibility : trust and value for money

Parasuraman et al. (1985), in their exploratory study of service quality, also found that customers evaluate ten dimensions as shown in Table 2.7. In their subsequent service quality study, Parasuraman et al. (1988) tested the variables in four industries (i.e., banking, credit card, appliance repair and maintenance, and long distance telephone service) and reduced these ten dimensions to five: tangibles, reliability, responsiveness, assurance (combining communication, credibility, security, competence and courtesy), and empathy (combining understanding and knowing the customer with accessibility). These dimensions represent the way customers organise information about service quality in their minds and the bundles of attributes that form the meaning of service quality to customers. These dimensions were also found applicable in tertiary education (Soutar, McNeil, and Lim, 1994) and the hotel

Table 2.7: Determinants of Service quality (Parasuraman, Zeithaml, and Berry, 1985)

1.	Reliability involves consistency of performance and dependability : • the firm performs the service right the first time • accuracy in billing • keeping records correctly • performing the service at the designated time
2.	Responsiveness concerns the willingness or readiness of employees to provide service : • timeliness of service • mailing transaction slips immediately • calling the customer back quickly • giving prompt service
3.	Competence means possession of the required skills and knowledge : • knowledge and skills of the contact employees • knowledge and skills of operational support personnel • research capability of the organisation
4.	Access involves approachability and ease of contact : • the service is easily accessible by telephone • waiting time to receive service is not extensive • convenient hours of operation • convenient location of service facility
5.	Courtesy involves politeness, respect, consideration and friendliness of contact personnel : • consideration for the consumer's property • clean and neat appearance of public contact personnel
6.	Communication means keeping customers informed in language they can understand and listening to them : • explaining the service itself • explaining how much the service will cost • explaining the trade-offs between service and cost • assuring the customers that a problem will be handled
7.	Credibility involves trustworthiness, believability, honesty and having the customer's best interests at heart : • company name • company reputation • personal characteristics of the contact personnel • the degree of hard sell involved in interactions
8.	Security is the freedom from danger, risk or doubt : • physical safety • financial security • confidentiality
9.	Understanding/Knowing the Customer involves making the effort to understand the customer's needs: • learning the customer's specific requirements • providing individualised attention • recognising the regular customer
10.	Tangibles include physical evidence of the service: • physical facilities • appearance of personnel • tools or equipment used to provide the service • physical representations of the service (cards, etc.) • other customers in the service facility

industry (Saleh and Ryan, 1991). However, service quality dimensions/attributes as suggested by other researchers (e.g., Carman, 1990) should be industry-specific, rather than generic. For example, high involvement services such as health care or professional services may have different service quality dimensions as compared with low-involvement services such as fast food or dry cleaning.

The role of price as a quality dimension is not very clear and evidence of a generalised price-quality relationship is inconclusive. Customers operating on a price-quality schema are likely to rely on a well-known brand name as an indicator of quality without actually relying directly on price *per se* (Lichtenstein, Ridgway, and Netemeyer, 1993). In the service quality literature, the role of price is not discussed very much (Grönroos, 1990). One of the possible reasons is that price is considered more as a choice driver than a service quality driver. Only Steenkamp and Hoffman (1994) hypothesise that price is positively correlated with service quality having drawn on economic literature in product markets.

2.4.2.4 Elicitation of Dimension/Attribute Importance Weights

In classical multiattribute modelling, it is assumed that not all attributes are likely to be considered equally important. This also applies to service quality measurement. The function of weights is to express the importance of each attribute relative to all others. Taylor (1995) notes that existing literature about the operationalisation of the service quality construct appears difficult to reconcile with general attitudinal models even though the construct is conceptualised as an attitude. The basis for this difficulty is largely related to how attribute weights are treated in different service quality models. Existing models of service quality assume that the service quality construct, as an attitude, is of compensatory form because, firstly, the number of attributes making up the domain of service quality as an attitude, at a minimum, exceeds two or three attributes generally found in noncompensatory models. Secondly, existing measurement scales (e.g., the SERVQUAL scale which will be mentioned in the next section) assume a compensatory attitudinal model by summing-and-averaging the scores into a single service quality index. However, McDougall and Levesque (1992) argue that service quality judgements are not compensatory as some service dimensions or attributes represent core elements. For example, reliability of transactions in retail banking cannot be traded off by other service quality attributes like courtesy of staff.

The existing literature offers two methods in deriving importance weights. The first method is direct and involves customers' self-reporting importance weights. The second method is indirect and involves statistically deriving importance weights by regression analysis or similar techniques (e.g., structural equation modelling). The self-estimate of importance weights may include an 1-7 rating method, simple rank order, ratio weighting, and the point allocation method in which subjects allocate 100 points among dimensions to indicate their relative importance. Parasuraman et al. (1991a) also suggest the use of attribute weights:

> In our original study, estimates of the importance of the five SERVQUAL dimensions were derived indirectly in the form of regression weights (Table 6, Parasuraman, Zietham, and Berry, 1988). However, direct measures of the importance of various service attributes are also useful, particularly for combining individual attribute ratings to obtain a composite, weighted estimate of overall service quality. (p.424)

Taylor (1995) considers that the use of self-reported (explicit) importance weights may be a suspect practice in measuring service quality because of the sources of variance in importance ratings and judgement heuristics. Sources of variance may come from differences in perceptions of the construct among respondents, differences among value systems among respondents, response bias differences among respondents, and reliability. About judgement heuristics, it is likely that customers may simplify cognitive processes used in deriving overall perceptions of constructs such as service quality by using equal weights for all attributes under investigation. Regarding the indirect approach, Cronin and Taylor (1992) have measured the importance of individual items using weighted individual-item scores in regression analysis. But such an approach has been challenged by Parasuraman et al. (1994) that using weighted item scores as independent variables in regression analysis is not meaningful because the primary purpose of regression analysis is to derive the importance weights indirectly (in the form of beta coefficient) by using unweighted or "raw" scores as independent variables. Therefore, using weighted scores as independent variables can be regarded as a form of "double counting."

The arguments for and against measuring importance weights intensify. Lambert and Lewis (1990) illustrate that the meaning of importance and expectation are

synonymous. They reported the findings that questions on expectation and importance are interpreted in the same way by respondents and conclude that either an expectation or importance score may be used when measuring service quality. McDougall and Levesque (1992) also found a 0.65 correlation between measures of importance and expectations. In a survey of 50 respondents asking for the interpretation of expectations, Teas (1993a) concluded that a relatively large number of respondents interpret the expectation question to involve a question about attribute importance, "forecasted" or "predicted" performance level. He suggests to consider modifying the perceived service quality framework by eliminating the expectations measure and to rely on the "perceptions" component alone or by using "terrible/excellent" scales, "very good/very poor" scales, and "better/worse than expected" scales.

The latest argument for using an indirect approach is offered by Oliver (1997). He considers that importance is an ambiguous and unreliable concept in self-reports. Firstly, different groups of customers would attach different personal definitions of importance. Some might interpret importance as essential, then all requisite features of the product or service become very important. However, some might interpret importance as referring to a special need, then certain features would be singled out to the exclusion of others. Secondly, it is not clear whether a feature is important for its presence or its absence when a customer scales the feature as important. For example, the no-smoking policies in restaurant are extremely important to both smokers and non-smokers, but for entirely different reasons. Lastly, there might be less diagnostic value to management when importance changes after the survey administration. He suggests relying on the statistical coefficients generated in a multiple regression. Because importance is already factored into the attribute ratings, the coefficients will implicitly take into account both the importance and the ratings of the attributes. The issue of multicollinearity among the attributes which hampers the regression analysis can be solved through increasing sample size and/or dropping or combining one of the predictive variables in the regression equation.

2.4.2.5 Direct Measurement

There are basically two major quantitative methods of measuring service quality. It can be a direct measure or an inferred measure. In a direct measure, the customer is

asked to compare the performance with his/her expectations on a scale from "worse than expected" to "better than expected." For example, Avkiran (1994) used a 5-point Likert scale from “much worse than I expected” to “much better than I expected” to measure service quality of retail banking. However, Oliver (1997) suggests that such a practice (i.e., using better/worse-than-expected (disconfirmation) scales as proxies for quality measures) is misguided unless the research is sampling global quality where overall satisfaction and global quality take on similar properties.

When an inferred measure is employed, evaluations of comparison standards may be collected either before or after the consumption of the product or service. For service quality studies, expectation as a comparison standard is to be measured at the same time as performance. In measuring customer satisfaction, Oliver (1977, 1981) proposes that customers make “better-than-expected/worse-than-expected” judgements on the basis of a comparison of product performance to expectations in the determination of customer satisfaction. But he cautions that although conceptually customers can make arithmetical or calculated comparison between expectation and performance, there is concern that such an approach may not work when performance dimensions cannot be quantified, in particular related to aesthetics and pleasure. Elliott and Roach (1993) warn that there may be a systematic distortion in service quality measurement. For example, a person may bias his/her evaluation of another individual by distorting interrelationships among various behavioural characteristics. Such systematic distortion hypothesis may be due to pre-existing ideas of "what goes with what", retrieving conceptually affiliated memory items which are easier to remember than individual memory items, or both. Their findings on measuring the perceived conceptual similarity of six service attributes of airlines indicate that a respondent's evaluation of airline service attributes may be biased by pre-existing ideas as to what attributes tend to go together.

2.4.2.6 Inferred Measurement

Regarding inferred measures, the score for expectation is subtracted from the score for perception. The history of inferred measures can be traced back to the origin of the gap model of service quality. The SERVQUAL scale, as a service quality measurement instrument, was developed after an extensive study of different industries by Parasuraman et al. (1988) based on their prior research on the service

quality gap model (Parasuraman et al., 1985). The scale represents one of the major outcomes in their quest for service quality measurement. The rigorous development of the instrument was adhered to the suggestions by Churchill (1979) for developing marketing constructs.

In its original form (Parasuraman et al., 1988), the SERVQUAL instrument contains 22 pairs of 7-point SA/SD (strong agree/strongly disagree) Likert scale statements measuring expectations in general and perceptions of actual performance of a specific service provider across various attributes in five service quality dimensions (i.e., tangibles, reliability, responsiveness, assurance, and empathy). Service quality is measured by calculating the difference scores between corresponding items (i.e. perceptions minus expectations). An example of the statements is as follows:

Expectation (E) : "Excellent companies should have up-to-date equipment."

Perception (P) : "XYZ Co. has up-to-date equipment."

In response to criticisms from other researchers, the SERVQUAL instrument has been refined by the original developers to eradicate certain confusions in wording (e.g., adjectives used and negatively worded items). The perception-minus-expectation approach to measure service quality and the SERVQUAL instrument have been widely used by researchers (e.g. Brown and Swartz, 1989; Nel and Pitt, 1993; Saleh and Ryan, 1991).

2.4.2.7 SERVQUAL Instrument

Parasuraman et al. (1991a) assert that the SERVQUAL instrument is a concise multi-item scale to be applicable across a broad spectrum of service industries. It can be used to understand better service expectations and customers' perceptions. The SERVQUAL developers also stress the practical and diagnostic value of capturing both expectations and perceptions for the sake of identifying service shortfalls rather than explaining variance in an overall measure of perceived service quality by simply using performance-based measurement. Pitt, Oosthuizen, and Morris (1992) also tested the SERVQUAL scale in a high-tech industrial setting and found that it is a reliable and valid instrument amid the concerns that the five factor solution is not evidenced and the factor structure is not generic.

As shown in Table 2.8, the results of SERVQUAL replication studies show that the scale possesses moderately high reliability in terms of coefficient alpha which serves as a benchmark of internal consistency. As a concluding remark, Lewis and Mitchell (1990) consider that "in the meantime, SERVQUAL remains the most reliable tool available for the measurement of service quality in the 1990s" (p.16).

Despite all these strengths, the SERVQUAL instrument has come under much criticism in the areas of conceptual foundation and operational difficulties. Carman (1990) has questioned the replication of service quality dimensions under the SERVQUAL methodology across a number of different service industries without modifying wording and adjusting number of items which are unique to certain industry settings. Brensinger and Lambert (1990) also failed to find the SERVQUAL scale to be applicable to business-to-business services as it accounts for less than 40 per cent of the variance in overall perceived service quality.

Another criticism levied by Cronin and Taylor (1992) centres on the conceptual basis of the SERVQUAL scale which confounds service quality with customer satisfaction. Their empirical work supported a performance-based conceptualisation of service quality in which perceived service quality depends on customer perceptions of performance rather than the "gap" between perception and expectation. They opine that their SERVPERF scale, having recast the 22-item SERVQUAL scale into performance-based items, provides a better measurement of service quality. Table 2.9 summarises some of the major criticisms and suggestions for improvements of the SERVQUAL instrument. In response to the major criticism that most of the studies did not find the five-factor structure, Parasuraman et al. (1994) suggest an intriguing approach to identify dimensions by asking customers to sort the SERVQUAL items into the dimensions on the basis of each item's content. Therefore, the pattern of correct and incorrect classifications could reveal potentially confusing items and the need to reword the items and/or dimensional definitions.

Teas (1993b) admits that the development of the service quality gap framework represents a significant contribution. But the validity of the "perception-minus-expectation" measurement framework for perceived service quality is questionable. Although some of the findings indicate evidence of generally high reliability

Table 2.8: Summary of Reliability and Validity of P-E Service Quality Research

Researcher/(s)	Reliability	Face Validity	Content Validity	Criterion-related Validity		Construct Validity		Measurement Instrument
				Predictive Validity	Concurrent validity	Convergent Validity	Discriminant Validity	
Parasuraman, Zeithaml and Berry (1988)	Internal consistency : Coefficient Alpha (0.87 - 0.90)	Rigorous literature review. Conceptualisation based on disconfirmation of expectation paradigm.	Extensive focus group interviews of service providers and customers (Parasuraman, Zeithaml, and Berry, 1985) and followed procedures described by Churchill (1979). Results lead to current scale measurement.	Examination of overall service quality rating with the answer on "Recommend, Yes/No". Result substantiated.	Examination of overall service quality rating with the answer on "Problem, Yes/No". Result substantiated.	Examination of R^2 between SERVQUAL gap scores with overall quality rating. Result substantiated.	Not reported. But as is evidenced from distinctive factor loadings and structure, result substantiated.	22-item instrument on a 7-point "Strongly agree/disagree" scale. For example : Expectation : "They [firms offering __services] should have up-to-date equipment". Perception : "XYZ has up-to-date equipment".
Parasuraman, Zeithaml and Berry (1991a)	Internal consistency : Coefficient Alpha (0.80 - 0.93)	A follow-up study of Parasuraman, Zeithaml, and Berry (1988)	A follow-up study of Parasuraman, Zeithaml, and berry (1988)	Examination of overall service quality rating with the answer on "Recommend, Yes/No". Result substantiated.	Examination of overall service quality rating with the answers on "Problem, Yes/No" and "Resolved, Yes/No". Result substantiated.	Examination of R^2 between SERVQUAL gap scores with overall quality rating (10-point scale). Result substantiated.	Not reported. But as is evidenced from distinctive factor loadings and structure, result substantiated.	22-item instrument on a 7-point "Strongly agree/disagree" scale. For example : Expectation : "Excellent firms [firms offering __services] will have modern-looking equipment". Perception : "XYZ has modern-looking equipment".
Taylor, Sharland, Cronin and Bullard (1992)	Internal consistency : Coefficient Alpha (0.47 - 0.87)	Literature review of the concept of service quality and recreational service industry.	A replicated study of SERVQUAL. Factor structure not matched with original SERVQUAL (Parasuraman, Zeithaml, Berry, 1988).	Not reported.	Not reported.	Examination of R^2 between SERVQUAL gap scores with satisfaction rating. Result substantiated.	Not reported.	22-item instrument on a 7-point "Strongly agree/disagree" scale and 7-point "Very important/unimportant" scale For example : Expectation : "They [firms offering __services] should have up-to-date equipment and technology". Perception : "XYZ has up-to-date equipment and technology".

Table 2.8 (cont'd): Summary of Reliability and Validity of P-E Service Quality Research

Researcher/(s)	Reliability	Face Validity	Content Validity	Criterion-related Validity		Construct Validity		Measurement Instrument
				Predictive Validity	Concurrent Validity	Convergent Validity	Discriminant Validity	
Babakus and Boller (1992)	Internal consistency : Coefficient Alpha (0.67 - 0.83)	Literature review of the concept of service quality.	A study using modified SERVQUAL measurement instrument. Factor structure not matched with original SERVQUAL.	Not reported.	Not reported.	Examination of R^2 between SERVQUAL gap scores with overall satisfaction rating and overall quality rating. Result substantiated.	Not reported.	SERVQUAL.
Pitt, Oosthuizen and Morris (1992)	Internal consistency : Coefficient Alpha (0.58 - 0.88)	Literature review of the concept of service quality.	A replicated study of SERVQUAL.	Not reported.	Not reported.	Examination of R^2 between SERVQUAL gap scores with overall quality rating. Result substantiated.	Examination of inter-correlation among items across various dimensions. Result substantiated.	SERVQUAL.
Avkiran (1994)	Internal consistency : Coefficient Alpha (0.94 overall)	Literature review of the concept of service quality.	Followed procedures as described by Churchill (1979) and Parasuraman, Zeithaml, and, Berry (1988)	Examination of overall service quality rating with the answer on "Recommend, Yes/No". Result substantiated.	Examination of overall service quality rating with the answer on "Complaint, Yes/No". Result substantiated.	Examination of R^2 between service quality scores with overall quality rating. Result substantiated.	Not reported.	22-item instrument on a 5-point "Much worse than I expected/Much better than I expected" and importance on 5-point "important/ not important" scale. For example : "Willingness of branch staff to help me".

Table 2.9: Weaknesses of the SERVQUAL Instrument

Weaknesses of SERVQUAL		Suggestions for Improvement	
1.	SERVQUAL treats all 22 items in the scale equally important.	1. 2.#	Introduction of weighting (Carman, 1990; Lewis and Mitchell, 1990). Point allocation across 5 dimensions (Parasuraman, Zeithaml, and Berry, 1991a).
2.	Negatively worded items create difficulties to respondents (e.g., more time to read, more comprehension mistakes, and more likely to attach negative emotional connotations).	1. 2.#	Use of warning to the respondents on the existence of negative/positive wording in the instruction section (Babakus and Boller, 1992). All negatively worded items to be changed to positively worded items (Parasuraman, Zeithaml, and Berry, 1991a).
3.	The word "should" in the expectation statements is unrealistic and causes confusion.	1.#	"Should" expectation changed to "would" expectation (Parasuraman, Zeithaml, and Berry, 1991a).
4.	Separate lists of statement may be less accurate than comparisons made at almost the same point in time.	1. 2.	Comparison of expectation and perception measures at the same time using bipolar semantic differential graphical scale (Lewis and Mitchell, 1990). Use of direct measurement. For example, "The visual appeal of XYZ's physical facilities are (much better, better, about the same, worse, much worse) than I expected" (Carman, 1990).
5.	Restricting customers' responses to a 7-point mask subtle variation in their expectations and perceptions.	1.	Use of graphical scale (Lewis and Mitchell, 1990).
6.	Adjectives used in the scale cause ambiguity (e.g. How "up-to-date" is it?)	1. 2.#	Use of bipolar semantic differential scale (Lewis and Mitchell, 1990). Certain items to be modified. For example, "up-to-date" was changed to "modern-looking" (Parasuraman, Zeithaml, and Berry, 1991a).
7.	Increased length of the questionnaire.	1.	Expectation and perception measures to be combined by using bipolar semantic differential graphical scale (Lewis and Mitchell, 1990) or using direct measurement approach (e.g., "The visual appeal of XYZ's physical facilities are (much better, better, about the same, worse, much worse) than I expected" (Carman, 1990)).

under the reexamination and refinement of the SERVQUAL instrument by original developers.

Table 2.9 (cont'd): Weaknesses of the SERVQUAL Instrument

8.	Dimensionality of 22-item instrument not generic.	1.	Number of items and wording for particular service setting to be modified (Carman, 1990).
9.	Measure should account for multiple service functions.	1.	Measures for each service function (Carman, 1990).
10	Problems of operationalising service quality as a difference score (e.g. psychological constraint and unstable factor structure).	1. 2.	Use of performance-based SERVPERF (Cronin and Taylor, 1992). Use of non-difference score by rephrasing each item in the form of "how" e.g. "How willing employees are to help me: much wore than I expected to much better than I expected (Brown, Churchill, and Peter, 1993).
11	Only focuses on the process quality attributes.	1.	Outcome quality attributes to be included (Richard and Allaway, 1993).
12	Questionable reliability, convergent and discriminant validity.	1. 2.	Convergent and discriminant validity to be strengthened with additional more stringent evaluation criteria (Babakus and Boller, 1992). Use of non-difference score to improve reliability and discriminant validity (Brown, Churchill, and Peter, 1993).
13	Problems in dealing with finite ideal point attributes (i.e. one on which customers' ideal point is at a finite level and therefore, performance beyond which will displease the customers e.g. friendliness of a salesperson in a retail store).	1.	Need to evaluate the models in situation which there is a high incidence of finite ideal point attributes (Teas, 1993b).

exceeding 0.70 (Parasuraman et al., 1988), other findings indicate evidence of mixed reliability--reliability coefficients ranging from 0.64 to 0.93 for performance measures and from 0.48 to 0.55 for expectation measures (Brown and Swartz, 1989).

Measuring service quality by means of comparing expectation and perception of actual performance with separate batteries of statements as in the SERVQUAL scale renders the measurement unreliable (Brown et al., 1993; Prakash, 1984). The problem with this approach is not a conceptual one, but related to the measurement. Statistically, as cited by Prakash (1984), the score on one variable (i.e., expectation) is subtracted from the score on another variable (i.e., perception) to form the score on the variable of interest (i.e., service quality), there is a potential threat of low reliability of the difference score variable. The reliability of the difference score decreases as the variance of either measure decreases. The reliability of the difference score measure also decreases as the correlation between the two component measure increases. This would lead to a paradox. With lower correlation between the two measures, a researcher will have less assurance that the same attribute, or set of attributes, is actually being measured. Low reliability obscures the true validity of the construct. Most often, it reduces the observed validity of a construct. Even though the use of difference score as a way of capturing disconfirmation of expectation has been criticised in both the customer satisfaction and service quality literature, it is of diagnostic value to management in shaping marketing strategy (Parasuraman, Zeithaml, and Berry, 1993). As is evidenced from service quality studies shown in Table 2.6, a reliability of over 0.6 is commonplace and this signifies that the proposition of having low reliability when using difference score is not substantiated.

Carman (1990) also questions the practical significance of the "expectations" component. He comments that expectations should not be measured when customers do not have "well formed expectations." Vogels, Lemmink, and Kasper (1989) call for concerns about the validity of expectation questions particularly about the use of a 7-point Likert scale to capture expectations. Their research findings suggest that when customers cannot express increased expectations because of greater competition and choice, they will adjust down perception scores. The increased expectations of customers will result in lower scores on the perception questions. Therefore, for longitudinal analysis, the expectation questions are only helpful in the short-term, but

not in the long-term. Hubbert, Sehorn, and Brown (1995) make the point that measuring expectations and perceived performance after service delivery will induce recall bias. Data is further confounded because it is likely that expectations assessed after product exposure have been swayed by the perceived level of product performance. Clow and Vorhies (1993) also demonstrate that the current practice of administering a questionnaire that measures both expectations and experience simultaneously will yield biased results. For example, customers who have a negative experience with the service tend to overstate their expectations, thus creating a larger gap. For those who have a positive experience tend to understate their expectations resulting in a smaller gap. They suggest to measure expectations prior to the service and experience after the service. However, such a practice seems to pose challenge to the conceptual definition of service quality as an attitudinal judgement.

Lewis, Orledge, and Mitchell (1994) also express concern about the SERVQUAL scale in that respondents may be over-using the extremes of the scales which have verbal anchors and the 7-point scale may camouflage subtle variations in customers' expectations and perceptions. They call for the use of graphical scale with bi-polar adjectives in view of the benefits that it overcomes the problem of having separate lists and enables respondents to visualise the distance. Their study results support that the graphic scaling technique is a better prediction of overall service quality than the SERVQUAL scale. The semantic-differential scale format used by Teas (1993b) in his service quality measurement is also an attractive alternative to the Likert scale.

Discussion on the usefulness of the SERVQUAL scale continued when Teas (1993b) draws a distinction between vector attributes and ideal point attributes. For vector attributes, the customer's ideal point is at an infinite level. That means higher performance is always better. For example, lottery winnings and investment returns may qualify without running into the "too much of a good thing" ceiling. But for ideal point attributes, increasing P-E scores may not necessarily reflect continuously increasing levels of perceived quality, as the SERVQUAL framework implies. Teas raises possible concerns of ideal point where the level of performance beyond expectation will displease the customer. Sweetness in beverages, courtesy or attention of waitpersons, and length of movies are common examples. But he concludes in his study that all SERVQUAL attributes are much more likely to be vector attributes than

ideal point attributes. In handling ideal point attributes, Grapentine (1994) suggests one approach to use a scale that measures performance on an evaluative continuum, such as poor performance versus excellent performance. In this scale, the assumption is made that infinite ideal points are involved and excellent performance can be assumed to be preferred over poor performance.

The other issue is on measuring overall service quality. In the SERVQUAL scale, Parasuraman et al., (1988, 1991a) incorporated a single-item to measure overall quality. Oliver (1997) comments that the use of single item for global level measurement, as in the case of the SERVQUAL scale, is unreliable. He suggests that reliable global scales should have multiple items, at least a minimum of two, so that a statistically reliability coefficient can be calculated. He used six items on a five-point scale (i.e., poor-excellent, one of the worst-one of the best, inferior-superior, poor value-good value, low standard-high standard, and high quality-low quality) and achieved a reliability coefficient of 0.90. Teas (1993b) used a two-item quality scale (i.e. one for overall quality and one for customer service) and achieved a reliability coefficient of 0.83.

In brief, there is no lack of literature expressing criticisms of the SERVQUAL scale. A compendium of these criticisms can be found in the studies by Smith (1995) and Buttle (1996). To serve as a concluding remark on the SERVQUAL scale, Faulds and Mangold (1995) point out that all these findings do not negate the SERVQUAL's usefulness as a conceptual and analytical tool. Rather, they provide a framework for understanding its usefulness and limitations.

2.5 CHAPTER REVIEW

This chapter has outlined the conceptual framework of service quality and its related construct, customer satisfaction, as well as their theoretical relationship. In addition, empirical issues about measuring service quality and customer satisfaction were examined. To conclude, there is no complete agreement that customer satisfaction and service quality are either the same or different constructs. Even if there are differences, some researchers feel that the differences are not significant or they are not aware that there are differences. Clarifying the conceptual differences between these two constructs is in many ways relatively easier than teasing apart the empirical

differences. Although the current literature seems to put more emphasis on the quantitative approach to measuring service quality, qualitative techniques, in particular focus group interviews and in-depth personal interviews, are a useful approach to uncover service quality dimensions and attributes before designing a quantitative study. In the following chapter, the literature on professional service quality will be explored before formulating a theoretical model for this study of business-to-business professional service quality.

CHAPTER THREE:
REVIEW OF LITERATURE (PART II):
PROFESSIONAL SERVICE QUALITY

3.1 INTRODUCTION

The previous chapter provided an eclectic review of the concept of service quality and empirical issues of how service quality can be measured. The relationships between the constructs of service quality and customer satisfaction were also discussed. Most of the literature that was reviewed in Chapter Two was related to consumer service but there is a need to look at relevant issues in the context of professional service in general and business-to-business professional service in particular. It is widely accepted that a relationship approach in studying the evaluation of business-to-business professional service quality is important for several reasons. Firstly, a considerable proportion of business services are bought and sold within established client-provider relationships. Secondly, building an exchange relationship can be a crucial means of meeting the objectives of the parties. Thirdly, the nature of professional services, in particular business-to-business professional services, as a highly intangible and complex performance makes the relationship approach especially relevant. Lastly, the relationship approach provides a natural framework for dyadic investigations in terms of the interactions between clients and service providers.

This chapter will address the concept of service quality and its measurements in the context of professional services. The review will encompass the literature both from the domain of professional service and business-to-business professional service. As mentioned earlier, it is important to adopt a relationship approach in examining professional service. By the same token, it is equally important to investigate professional service quality in the context of relationship between client and service provider. Therefore, the relevance of relationship marketing will also be addressed in the last part of this chapter since the relationships between business-to-business professional service providers and their clients are often long-term in nature in comparison with consumer services.

3.2 QUALITY IN THE CONTEXT OF PROFESSIONAL SERVICE

Existing studies on professional service quality in comparison with consumer services tend to be limited because of the unique features of professional services (Lapierre and Filiatrault, 1996; Venetis, 1997). In the following sections, the nature of professional service and the concept of professional service quality will be discussed.

3.2.1 What is Professional Service?

According to Crane (1993), no generally accepted definition of what constitutes a professional or a professional service is available in the relevant literature. Professional services can be referred as the provision of services by one or more persons who are considered competent in a certain field of knowledge, acquired by prolonged training, and have the skills to apply this knowledge in practice (Mills and Morris, 1986). According to Gummesson (1978), professional services can be defined based on the following four criteria:

1. The service should be provided by qualified personnel known for their specific knowledge;
2. it should be advisory and focused on problem-solving;
3. the professional should have an identity; and
4. the service should be an assignment given from the buyer to seller.

In general, professionals possess a common identity, like physicians, lawyers, accountants or engineers, and are regulated by traditions and codes of ethics. The service offered involves a professional in taking on assignments for the client and those assignments are themselves the limit of the professional's involvement. Such assignments are not undertaken to merely sell hardware or other services. It seems that the key operational concepts of this definition are the problem-solving and advisory roles that must be played by professional service firms.

To draw a dividing line between what professional service is and what is not can be difficult for some service categories. For example, Turnbull and Moustakatos (1996) classify investment banking services as a kind of professional service. Halinen (1996) regards advertising agency as a kind of professional service provider. Traditionally, a profession is referred to a field that require an individual to have certain relevant certification and to practise with a code of ethics. Violation of the code of ethics

prohibits a professional from further practice. Yorke (1990) summarises past studies on professional services and briefly suggests a number of criteria by which professional services can be distinguished from other services. These are listed below:

1. Professional services are advisory and focused on problem solving;
2. they are provided by a qualified and independent person known for a specific skill;
3. scope of work is centred on an assignment requested; and
4. the conduct of professionals is governed by an association which attempts to lay down requirements or competence and to enforce a code of ethics.

Another perspective on professional services is offered by Broekhuis (1991) who looks at the characteristics of professional services from the domain of services marketing beyond the unique features of services as mentioned in the previous chapter. Firstly, it is hard for management to manage professionals, in particular, to set specific goals for employees and to co-ordinate demand and supply. It is also difficult to routinise the conversion process because of high input uncertainty. Secondly, professional culture is characterised by a strong professional identity and a weak organisational identity. Lastly, professionals possess a high degree of freedom to fit clients' problems into their expert knowledge and skills.

In an operational perspective, Ritsema van Eck-van Peet (1991) characterises professional services in terms of output, production, and culture. Regarding output, professional service providers only guarantee to a limited degree as services are heterogeneous in nature and not in a standardised form. There are a few tangible elements involved. Services largely cannot be corrected before delivery and stored. For production aspects, the process can be standardised to a limited degree only. Professional and client have direct contacts but with a high degree of dominance of the professional for his knowledge and skills. In terms of culture, there is a weak organisational identity but with high individualism and autonomy. In general, technology-push attitudes dominate. To conclude, it can be argued that the nature of professional services is different from consumer services. As compared with consumer services, professional services possess a high degree of credence properties. Such a difference warrants another perspective to examine the concept of professional service quality.

3.2.2 Concept and Models of Professional Service Quality

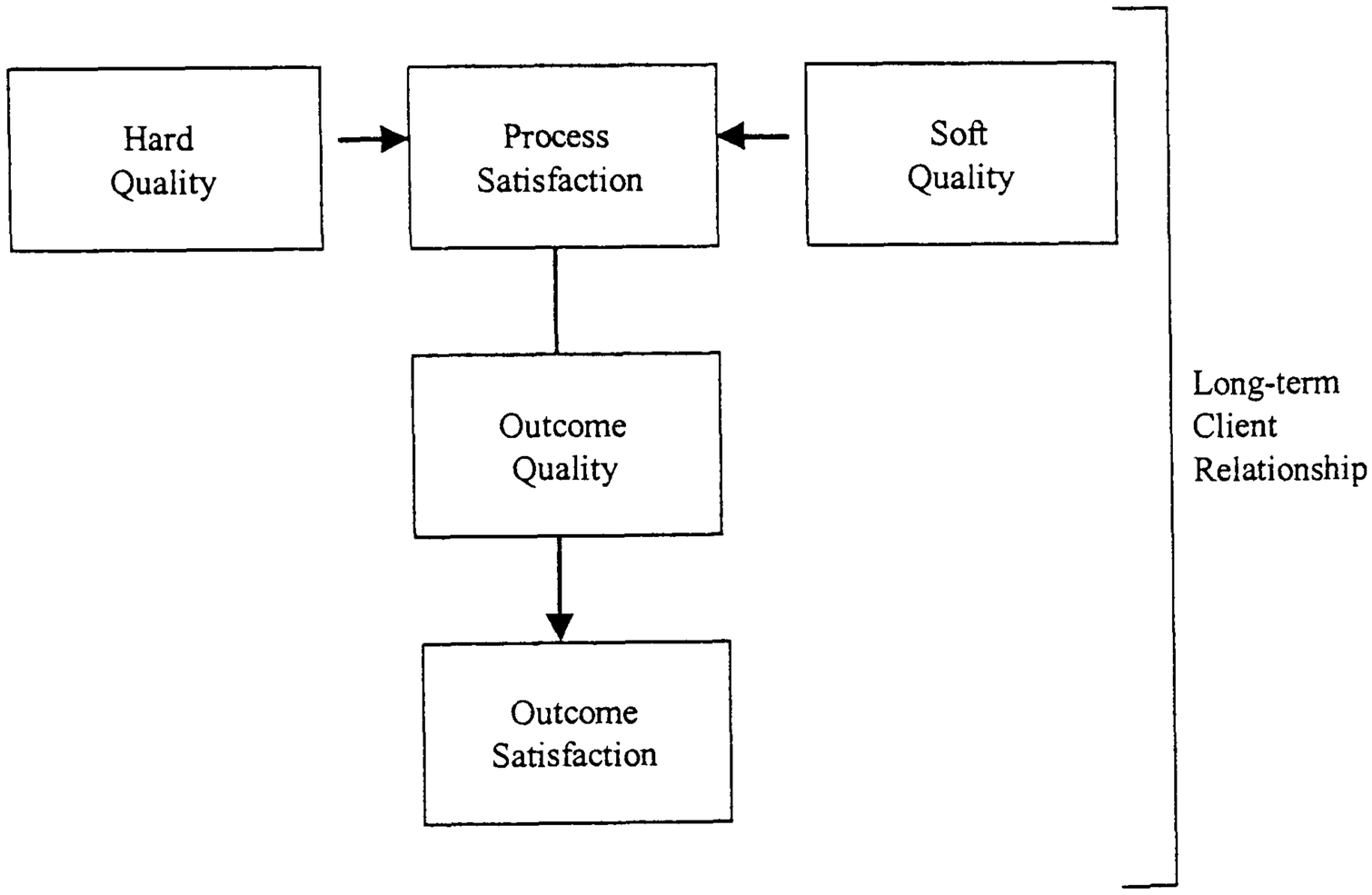
Broekhuis (1991) also puts forward the concept of quality in a professional service context by highlighting a reciprocal interdependence that exists between the professional and the client. Because a client takes an active part in the production process, quality gets meaning through the professional-client relationship and interaction. Aspects of evaluating professional service quality include the chosen working domain, the package of products, services, and the production process. The evaluation can also be viewed as a continuing tuning process between individual professional and the client, between management of client organisation and professional firm, and between professional firm and other stakeholders (e.g., pressure groups).

The client's power is evident in the expendability of many business-to-business professional service providers (Patterson, 1995). For example, management consultants, project managers, engineering services, and so on, are hired on a project basis. They are highly expendable especially when clients are able to choose different consultants for different assignments. In order for professionals to maximise their chances of gaining repeat business and developing longer-term relationships with clients, management of service quality and client satisfaction has become a high priority. In this regard, the establishment of relationship between clients and professionals is a pre-requisite to achieving superior professional service quality.

In Chapter Two, the dichotomous approach to modelling service quality by different researchers was reviewed. Lapierre and Filiatrault (1996) conducted an extensive review of the literature on consumer services and professional services based on Grönroos' (1984) technical-functional service quality model and found that five out of the 13 studies, either empirical or theoretical, were undertaken in a professional service setting. The original technical-functional service quality model was also applied both in a business-to-business and business-to-business professional service settings. Szmigin (1993) proposes a theoretical model as depicted in Figure 3.1 to include hard and soft quality elements in the process-outcome model. The hard and soft quality components refer to those quality elements identified by Grönroos as technical and functional. The outcome quality is the result of the relationship. Szmigin suggests that:

> Outcome quality is different from hard quality in as much as a company may perform excellently in the hard area and still not achieve the desired

Figure 3.1: Szmigin's Quality Model for Business-to-Business Services (Szmigin, 1993)



> goal or outcome...One of the important aspects that differentiates outcome quality from the other two areas of quality mentioned is that it cannot always be controlled by the companies in the relationship (p. 9).

For example, a consulting engineer may achieve good performance in delivering what client expects (i.e., the structure of a building) but with cost overrun due to sudden weather change.

Based on the works of Grönroos (1984) and Lehtinen and Lehtinen (1991), Halinen (1996) proposed another service quality model. The model as illustrated in Figure 3.2 takes into account the temporal dimension by identifying the ultimate service outcome as a separate component in the evaluation of service quality. For professional services in general and business-to-business professional services in particular, the final outcome of a service can only be evaluated some time after the service delivery. Having drawn on a similar research vein, Venetis (1997) also presents a process-outcome quality model for business-to-business professional service. The process quality dimension in the model shown in Figure 3.3 extends into two distinct process dimensions: hard process (technical) and soft process (relational). This can be reasoned by the fact that clients not only experience the professionalism and the technical way in which the provider reaches a solution, but also the way in which the provider interacts and deals with the client within the service delivery process. Regarding service outcomes, they are also decomposed into two dimensions: immediate outcome and final outcome. After the service delivery process, a solution is offered to the client's problem. This is the immediate outcome of the service delivery process (e.g., the structure of a building). Often this solution is not an end in itself, but a means to reach the results the client initially wanted. The eventual results of this solution are the final outcome of the delivered service (e.g., post construction-commissioning of the building).

To sum up, Grönroos' (1984) technical-functional theoretical model and Lehtinen and Lehtinen's (1982, 1991) interactive-outcome model provide insight for researchers when investigating business-to-business service quality and business-to-business professional service quality. As mentioned in Chapter Two, the technical quality dimension is more transaction-oriented whereas the functional quality dimension is relationship-oriented. Further extension of the technical-functional model to a transaction-relationship model is

Figure 3.2: Model of Perceived Service Performances within an Existing Exchange Relationship (Halinen, 1996, p. 321)

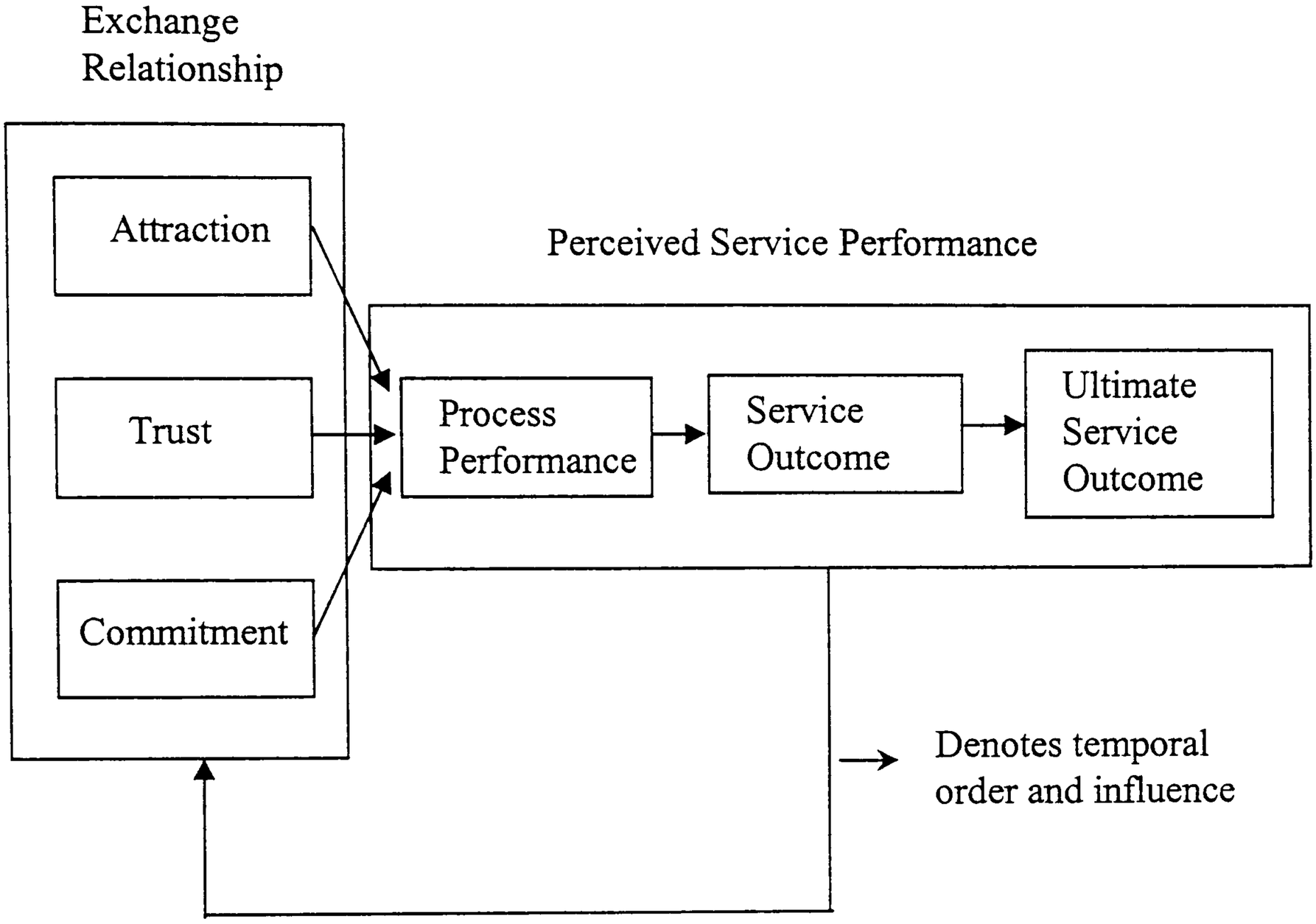
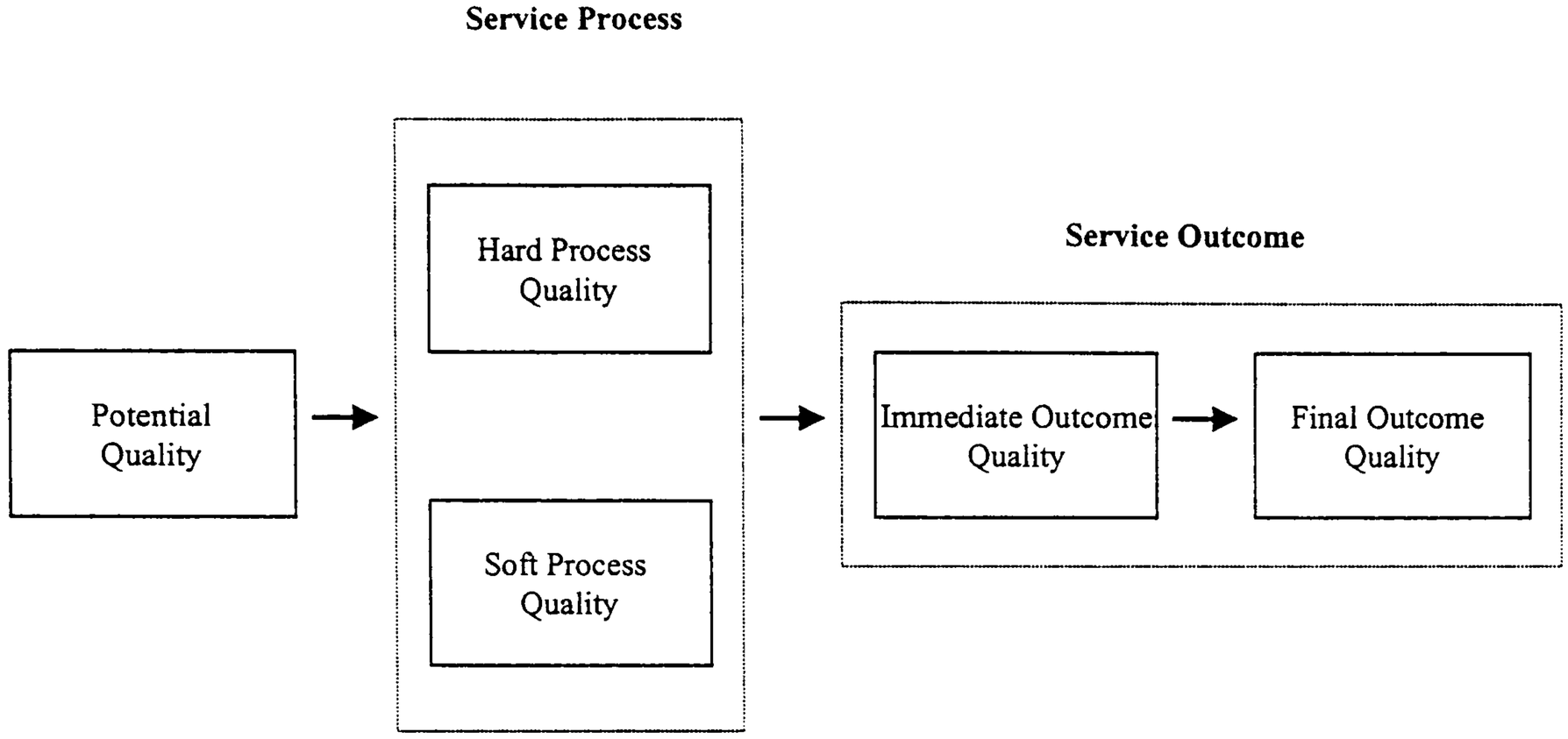


Figure 3.3: Venetis' Quality Model for Business-to-Business Professional Services (Venetis, 1997, p.74)



a possible research avenue for modelling and measuring business-to-business professional service quality.

3.2.3 Measurement of Professional Service Quality

In general, assessing professional service quality and business-to-business professional service quality can be problematic because different professionals and different clients have different views regarding what constitutes quality. For example, no simple indexes or surveys are available to tell how a lawyer defended a client or how good the advice was of a management consultant. Professional services tend to exhibit a high degree of credence properties as a result of which, clients may find it difficult to evaluate the service quality even after purchase and consumption. But this does not bar any attempt to measure service quality. Quality of professional service can consist of outcome and process quality as in the dual-quality model mentioned in the previous section. In many cases, clients perceive the outcome dimension of service quality to be the most important, for example the final structure in a construction project. Clients, however, are sometimes unable to evaluate the technical quality of the outcome in the short-term as in the case of health care. The technical quality can only be evaluated after the lapse of a certain period. This point is consistent with Venetis' (1997) service quality model which decomposes outcome quality into immediate outcome quality and final outcome quality. In this situation, clients must rely on the process dimension as an indicator. Depending on the nature of professional service, there is in fact no established literature to suggest that process quality has a relatively greater role than outcome quality and image quality. Clients can be dissatisfied with a service when they perceive the outcome to be unsatisfactory but the process satisfactory. Image quality as suggested by Grönroos (1984) can have an impact on service quality perception even though clients do not have any experience. For example, a client may believe that the advice of a well-known and reputable lawyer is better quality than that of a little known lawyer. This is consistent with what Oliver (1993) suggests that quality perceptions do not require experience with the service or service providers mentioned in Section 2.3.4.1 of Chapter Two.

In general, clients evaluate professional service quality across a number of dimensions and attributes. In Chapter Two, a number of studies using different dimensions and attributes to measure service quality were reviewed. These studies are mostly based on

the five generic service quality dimensions proposed by Parasuraman et al. (1988). In a comparative analysis of service quality dimensions shown in Table 3.1 by Lapierre and Filiatrault (1996) in order to bridge the gap between the Nordic (i.e., technical and functional dimensions) and the American schools of thought (i.e., five generic dimensions), they found that the two dimensions of quality, competence and reliability, are particularly problematic in the case of the quality of professional services. Their explanation on the competence dimension is as follows:

> According to Grönroos (1988), there is only one dimension in technical quality: professionalism and skills. When examining the model proposed by Parasuraman, Zeithaml, and Berry in 1985, we find that the competence dimension corresponds to Grönroos' professionalism and skills dimension. However, in the models of Parasuraman et al. (1988,1991a,1993,1994), the competence dimension has become part of the assurance dimension, and thus, relates to functional rather technical quality. In our opinion, this does not reflect the reality of professional services..." (p. 103)

With respect to the reliability dimension, Lapierre and Filiatrault (1996) examined the operationalisation of the individual statements in the SERVQUAL scale and found that:

> If we look at the statements included in the SERVQUAL measuring scale, we see that some statements clearly have a technical connotation, while others have a functional one. Indeed, analysis of the five statements relating to the customer's perceptions of service reliability, shows that statements 7 and 9 have a technical quality connotation, whereas statements 5, 6, and 8 have a functional quality connotation. (p. 104)

Although there are differences between the Nordic and the American schools on the issue of service quality dimensions, a synthesis of these two schools of thought is fruitful to capture the essence of professional service quality. For example, Baker and Lamb (1993) used the SERVQUAL dimensions as a starting point and interviewed eleven clients of architectural design firms and found that process quality dimensions include:

Table 3.1: Comparison of Service Quality Dimensions (Lapierre and Filiatrault, 1996, p. 102)

Grönroos (1984)	Parasuraman, Zeithaml, and Berry (1985)	Parasuraman, Berry, and Zeithaml (1991a)	Grönroos (1988)
• Technical quality (what)	• Competence • Reliability (technical)	• Assurance • Reliability (technical)	• Professionalism and skills
• Functional quality (how)	• Reliability (functional)	• Reliability (functional)	• Reliability and trustworthiness
	• Responsiveness • Courtesy	• Responsiveness • Assurance	• Attitudes and behaviour
	• Security • Tangibility	• Assurance • Tangibility	• Accessibility and flexibility
	• Accessibility • Communication • Understanding	• Empathy	
			• Recovery
• Image	• Credibility	• Assurance	• Reputation and credibility

1. Tangibles (verbal presentation, physical facilities and staff, support materials);
2. reliabilities (timeliness, budget, accurate records, dependable);
3. responsiveness (prompt service, willingness to help, flexibility);
4. assurance (knowledgeable, inspire trust/confidence, support of employees); and
5. empathy (listen to/communicate with client, adaptability, having the client's best interests at heart, having client's best interests at heart, giving individual/personal attention)

As for the outcome quality of architectural design services, it includes function, appearance, maintenance, and others. With respect to the relative importance of the process and outcome dimensions in their in-depth interviews with clients, Baker and Lamb also found that when dissatisfaction occurs, it is more frequently due to process factors rather than outcome factors. In their study, one interviewee indicated that he perceived the outcome potential of many firms to be homogeneous. But there were a lot of variabilities among firms in terms of process quality. The reasons were that firstly, only firms that are perceived to be capable of doing the job well are considered in the initial screening process. Secondly, the interactive process between clients and design firms throughout the project ensures enough client involvement to produce a satisfactory final product. Lastly, the focus of most design firms is on output so they are more likely to perform satisfactorily regarding this dimension. Clients also indicated they would not always be willing to pay more for higher perceived quality because it may costs more, except in relation to large and longer contracts.

The issues of process quality and outcome quality are addressed in a handful of professional service quality studies. Selected empirical studies measuring professional service quality and business-to-business professional service quality are summarised in Tables 3.2 and 3.3 respectively. Although a wide variety of issues are addressed including exploring industry-specific service quality determinants, cross-cultural comparison of professional service quality, and the relative importance of process-outcome quality dimensions, these studies in general suffer from less rigorous scale development and research methodology as compared with service quality studies conducted in the context of consumer services. For example, the studies by Morgan

Table 3.2: Summary of Selected Empirical Studies on Professional Service Quality

	Brown and Swartz (1989)	Schlegelmilch, Carman, and Moore (1992)
1. Research Objective	To measure professional service quality of physicians using the gap model	To compare choice and service quality of family practitioners in the UK and the US.
2. Research Design	Mail survey of 13 physicians and their 2,414 patients; usable questionnaires: 1,096 patients and 12 physicians.	Survey of university students; usable questionnaires: US: 48, UK: 63.
3. Measurement	Development of 65 statements capturing expectation and perception; rating on 5-point Likert scale: strongly disagree to strongly agree; one additional item to measure overall satisfaction.	*Choice :* 14 statements on a 6-point scale from "very important to "very unimportant"; *Service quality:* 23 statements on a 6-point scale from "definitely applies" to "definitely does not apply"
4. Validity, Reliability Evidence	Coefficient alpha, content validity.	Coefficient alpha, content validity.
5. Statistical Analysis	Factor analysis, regression analysis	Chi-square, t-test, principal component analysis, multiple discriminant analysis.
6. Major Strengths	1. Large sample. 2. High reliability in experience measurement (0.64 to 0.93).	1. Rigorous review of patient satisfaction studies. 2. High reliability (0.61 to 0.86).
7. Major Weaknesses	1. lack of one-to-one correspondence between expectation and experience measures 2. Low reliability in expectation measurement (0.48 to 0.55) 3. Service quality was operationalised as "customer satisfaction."	1. Small sample size. 2. Student sample might have little exposure of health care. 3. Tangible dimension of service encounter was excluded. 4. Disadvantages of even scale (e.g. forcing a choice may lead to non-response).
8. Research Findings	Significant perceptual gaps between professionals and clients. Physician interaction factor had the greatest impact on overall satisfaction evaluation.	No significant difference in patients' perceptions of service quality of primary care providers in the US and UK.

Table 3.2 (cont'd): Summary of Selected Empirical Studies on Professional Service Quality

	Taylor and Cronin (1994)	Walbridge and Delene (1993)
1. Research Objective	To measure service quality and consumer satisfaction in a health care setting.	To measure service quality determinants of physicians.
2. Research Design	First study: 116 personal interviews. Second study: 227 personal interviews	Mail survey of 212 physicians
3. Measurement	Modified SERVQUAL scale, and multi-items scale for disconfirmation measures, overall service quality measures, and satisfaction measures.	Largely based on SERVQUAL attributes. 37 attributes were rated on a 5-point importance scale.
4. Validity, Reliability Evidence	Coefficient alpha and predictive validity.	Coefficient alpha.
5. Statistical Analysis	Exploratory factor analysis and two-stage least squares regression.	Correlation analysis.
6. Major Strengths	Use of multiple samples to cross-validate model.	The incorporation of process attributes and outcome attributes into the measurement.
7. Major Weaknesses	Use of regression methods did not account for the shared variance inherent between the constructs which might lead to biased parameter estimates.	The research process was not rigorous in terms of the estimation of nonresponse bias and evidence of validity.
8. Research Findings	Performance perceptions influenced service quality as well as disconfirmation and satisfaction judgements.	Process quality determinants were rated higher in relative importance by physicians than outcome quality determinants.

Table 3.3: Summary of Selected Empirical Studies on Business-To-Business Professional Service Quality

	Morgan (1990)	Bojanic (1991)
1. Research Objective	To measure quality perceptions of clients towards law firms.	To examine service quality perceptions of professional CPA firms.
2. Research Design	Mail survey of 600 business organisations; usable questionnaires : 151.	Mail survey of 130 clients of a CPA firm. 32 responses were received.
3. Measurement	Rating of 9-statement instrument about quality perceptions on a 5-point scale ranging from "true" to "false".	Rating of 12-statement instrument based on the SERVQUAL dimensions on a 5-point scale ranging from "excellent" to "poor".
4. Validity, Reliability Evidence	Coefficient alpha, modest content validity, convergent validity	Reliability and validity not reported.
5. Statistical Analysis	Mean score, simple regression.	Correlation analysis.
6. Major Strengths	1. Representative sample 2. High reliability (0.84).	Attempt to measure service quality of CPA firms.
7. Major Weaknesses	1. Low validity for certain items (<0.6). 2. Quality measurement excluded expectation.	1. Small sample size 2. Research methodology was not rigorous (e.g., issues of reliability and validity not accounted for) 3. Service quality measures confounded with satisfaction measures
8. Research Findings	No significant relationship between client size and quality perceptions. Strong correlations between perceived quality and staff competence.	Responsiveness was the most important dimension whereas tangible was the least important dimension.

Table 3.3 (cont'd): Summary of Selected Empirical Studies on Business-To-Business Professional Service Quality

	Baker and Lamb (1993)	Samson and Parker (1994)
1. Research Objective	To determine service quality determinants in a commercial architectural design context.	To measure service quality of consulting engineers.
2. Research Design	In-depth interviews with 11 subjects who were key decision-makers in the selection of commercial architectural design firms.	Client survey: mail survey of 320 clients; 107 responses received. Consulting engineers: mail survey to all member firms of ACEA; 71 responses received.
3. Measurement	Open-ended questions.	Rating of 33-statement instrument about expectations and perceptions.
4. Validity, Reliability Evidence	Not reported.	Not reported
5. Statistical Analysis	NA	Comparison of gap scores.
6. Major Strengths	Identification of service quality determinants of commercial architectural design firms.	Measurement of service quality of consulting engineering firms.
7. Major Weaknesses	Results might be biased as clients from the public sector were not included.	Research methodology was not rigorous (e.g., issues of reliability and validity not accounted for)
8. Research Findings	Identified 71 attributes relating to process quality and 17 attributes for outcome quality.	Gaps 1 and 5 existed between clients and consulting engineers.

Table 3.3 (cont'd): Summary of Selected Empirical Studies on Business-To-Business Professional Service Quality

	Witt and Stewart (1996)	Lapierre (1998)
1. Research Objective	To measure service quality of solicitors.	To examine the relative impact of quality attributes on the evaluation of consulting engineering services.
2. Research Design	Mail survey of 160 corporate clients. 61 responses were received. 58 responses were considered usable.	Mail survey of 1,230 organisations having more than 200 employees. 342 responses were received.
3. Measurement	Modified SERVQUAL with 34 items. Expectation battery contained measures using 7-point Likert scale ranging from "not at all important" to "very important". Perception battery contained the same measures with 7-point scale ranging from "strongly disagreed" to "strongly agreed".	23-item instrument across 5 dimensions: competence, reliability, communication, customer participation, perceived quality, and image.
4. Validity, Reliability Evidence	Not reported	Coefficient alpha, convergent validity, discriminant validity
5. Statistical Analysis	Comparison of gap scores.	Structural equation modelling
6. Major Strengths	Measurement of service quality of solicitors.	Large sample
7. Major Weaknesses	Research methodology was not rigorous (e.g., issues of reliability and validity not accounted for).	The hypothesised model was not compared with competing models.
8. Research Findings	Significant service quality shortfalls existed.	Outcome-related dimensions (i.e., competence and reliability) had a significant direct effect on perceived quality.

Table 3.3 (cont'd): Summary of Selected Empirical Studies on Business-To-Business Professional Service Quality

	Freeman and Dart (1993)	Turner, Aldhizer, and Shank (1999)
1. Research Objective	To examine the perceived quality of professional accounting services.	To examine the service quality perceptions of management advisory services provided by professional accountants.
2. Research Design	Mail survey of 550 business owners. Usable: 217 replies.	Mail survey of 4000 company controllers. Usable: 305 replies.
3. Measurement	Modified SERVQUAL instrument.	13-item instrument which was adapted from Parasuraman, Zeithaml, and Berry (1988). Items on overall quality, recommendation, and repurchase intention were included.
4. Validity, Reliability Evidence	Coefficient alpha, convergent validity.	Coefficient alpha, convergent validity.
5. Statistical Analysis	Exploratory factor analysis, one-way ANOVA.	Confirmatory factor analysis, correlation analysis, regression, ANOVA.
6. Major Strengths	Incorporation of "Fee Related" dimension which was not investigated in past service quality studies.	The relationship between service quality and cost overrun was examined.
7. Major Weaknesses	1. Use of convenience sample. 2. One factor "Exception" could not be interpreted.	Use of single item for measuring overall evaluation.
8. Research Findings	The Tangibles dimension was not as important as the other dimensions. Three important factors emerged in the study, including Timeliness, Fee Related, and Professionalism.	The responsiveness and reliability dimensions were important in explaining a significant portion of variation in service quality in both the cost overrun and no cost overrun regression models.

(1990), Samson and Parker (1994), and Witt and Stewart (1996) did not address the issues of scale reliability and validity. A comparison of the P-E and P-only measurement frameworks is also lacking in the professional service and business-to-business professional service literature.

The SERVQUAL scale mentioned in the previous chapter has also been tested in a professional service setting, for example, medical practitioners (Brown and Swartz, 1990), real estate brokerage firms (Nelson and Nelson, 1995), professional accounting firms (Bojanic, 1991), and consulting engineering firms (Samson and Parker, 1994). Haywood-Farmer and Stuart (1988) address the difficulties when applying the SERVQUAL instrument in measuring professional service quality. They argue that the SERVQUAL scale only embraces peripheral service elements without emphasising core service elements. Reliability of service has been regarded as a core service element in past service quality studies (Parasuraman et al., 1998, 1991a). But Haywood-Farmer and Stuart consider professionalism as a core dimension of professional service quality, comprising attributes like job autonomy, knowledge base, societal impact/view, and own superiority. Their empirical results show that professionalism differs among industries. In another study by Haywood-Farmer and Stuart (1988), they also adopted the SERVQUAL scale in a medical setting using eight service quality dimensions comprising tangibles, reliability, responsiveness, assurance, empathy, customisation, knowledge, and core service. They found that the SERVQUAL scale is flawed because the factors are not indicated (i.e., the eight-factor solution did not emerge). It may be due to inappropriate modification or methods that did not work well in this professional service category.

Patterson (1995) postulates that for business-to-business professional services, the perceived risk is high and the outcome is critical to future business success. Therefore, perceptions of performance are likely to override all other considerations. In other words, the higher the involvement, the more intense is customers' post-purchase evaluation of performance. In several client interviews, Patterson found that decision makers with little experience in commissioning consultants have difficulty articulating their expectations. Their expectations seem passive rather than active. These suggest that the two-battery SERVQUAL scale is inappropriate to measure business-to-business

professional service quality as far as the unique features of the service and the relationship elements are concerned.

Halinen (1996) makes the point that high quality service performance offers an opportunity to build up a strong exchange relationship and customer retention. This point has also been the underlying idea in most research studies. In order to measure the strength of relationship between professionals and clients, Czepiel (1990) suggests that service marketers need to study economic exchange and social exchange. He also notes that three of the five dimensions of service quality captured by the SERVQUAL scale (i.e., responsiveness, assurance, and empathy) only measure aspects of encounter performance. What is lacking is a good conceptualisation of the kinds (or styles) of interaction that clients look for in making their evaluations. He sees there is only little work that links encounter performance to the development of a relationship and little is known about how either firms or clients characterise the status or strength of the exchange relationships in which they are involved.

Crosby, Evans, and Cowles (1990) point out that service quality can be considered as a necessary, but not a sufficient, condition for building good relationship quality. Only successful exchange episodes can eventually lead to an enduring professional-client relationship providing that both parties to that relationship properly manage these episodes. Of particular relevance is the concept of relationship marketing and the IMP interaction model that highlight key variables to the establishment of long-term relationship between business-to-business professional service providers and clients. De Búrca (1995) suggests that the development of the IMP interaction model has provided a rich source of new ideas in the domain of services marketing, in particular to business-to-business marketing. The concept of relationship marketing will be explained in the following section whilst the IMP interaction approach will be discussed in more detail in the next chapter.

3.3 RELATIONSHIP MARKETING IN BUSINESS-TO-BUSINESS PROFESSIONAL SERVICE

Long-term relationships between professionals and clients have received limited attention in past research, attributable to the assumption that in traditional economic theory, the discrete-transaction paradigm was considered to be efficient in describing

market transactions. However, this paradigm has been questioned since the 1980s in particular for organisational type of marketing activities, leading to a shift from a transaction-based to a relationship-based marketing paradigm. Möller and Wilson (1988) emphasise that since the mid 1980s, there has been a shift in the domain of business marketing and purchasing from single transaction-oriented, market mechanism-based buying/selling perspective to a buyer-seller relationship-based perspective of business exchange with focus more on the long-term contractual relationships. Literature on relationship marketing has grown rapidly as is evidenced from a number of books (e.g., Buttle, 1996; Payne, 1995; Sheth and Parvatiyar, 2000) and articles about relationship marketing in general (e.g., Grönroos, 1994), relationship marketing of services (e.g., Berry, 1995; Palmer and Bejou, 1994), and business-to-business relationship marketing (e.g., Blois, 1996; Wilson, 1995).

Grönroos (1989) also echoes the importance of relationship marketing to establish, maintain, enhance, and commercialise customer relationships which are often long-term in nature so that the objectives of the parties involved are met. This can be achieved by a mutual exchange and fulfilment of promises. Morgan and Hunt (1994) sum up the functions of relationship marketing to include all marketing activities directed towards establishing, developing, and maintaining successful relational exchange. They note that these activities are intended to cover all forms of relational exchange and to focus on the process of relationship marketing. From a theoretical perspective of relationship marketing, process-related (functional) quality may be more important than the output-related (technical) quality building on the assumption that relational exchange is a prerequisite to a successful long-term relationship.

Issues of relationship marketing in a service setting have become more acute in the 1990s. Palmer and Bejou (1994) list out several criteria for the application of relationship marketing to services. Firstly, the services should be complex and involve a high degree of uncertainty, for example, when the market environment is turbulent. This is particularly true for business-to-business professional services when a client is unable to evaluate the technical aspect of the provision. A positive outcome from relational exchange has become a primary indicator for repeat business. Secondly, a stream of service benefits should be produced and consumed over a period of time. This factor ties in with the enduring nature of certain service categories. For example, consulting

engineers provide consultancy services which span across the entire construction process. Frequent contacts between professionals and clients gradually build up relationship over time. Thirdly, relationships can be strengthened when significant transaction costs with multiple service offerings are involved. These three pre-conditions are also supported by Crosby et al. (1990) who stress that relationship marketing is critical when the service is complex, customised, and delivered over a continuous stream of transactions, and involving many buyers who are relatively unsophisticated about the service. Halinen (1996) also puts forward a number of arguments in favour of the use of a relationship approach in studying the quality of professional business services. Firstly, a considerable proportion of business services are bought and sold within established buyer-seller relationships. Secondly, building an exchange relationship can be a crucial means of meeting the objectives of the parties involved and satisfying their requirements concerning service performances. Thirdly, the nature of professional services as intangible and complex performances makes the relationship approach especially relevant. Lastly, the relationship approach provides a natural framework for dyadic investigations in terms of the interactions between clients and service providers.

The benefits of relationship marketing include reduced uncertainty, managed dependence, exchange efficiency, social satisfaction, joint payoffs (Dwyer, Schurr, and Oh 1987), and serving as a "barrier to entry" (Wilson and Mummalaneni, 1986). However, the costs may involve: (1) economic and psychic resources in conflict and haggling processes; and (2) opportunity costs of foregone exchange with alternative partners. From a client's standpoint, anticipation of high switching costs gives rise to the interest in maintaining a quality relationship with a professional service provider. Therefore, relationships can be regarded as an investment in time and money. It may not necessarily produce immediate results. It is unlikely for customers to switch service providers because of short-term competitive advantage. Once a relationship has been developed, there may be less information available to judge a partner's performance simply because there are no other similar professional service firms with which to compare. This may lead to an acceptance of lower quality output (Szmigin, 1993). Crosby et al. (1990) suggest that the concept of service quality has particular relevance to both a transactional nature of marketing based on the impersonal, discrete, and episodic exchange, and a relational exchange framework characterised by close,

enduring, and interdependent associations. These qualities of relationship collectively determine the probability of continuing exchange in the future. About continuing exchange, the IMP interaction model, as compared with the existing models in the domains of professional service quality and business-to-business professional service quality which have already been discussed earlier in this chapter, offers another and detailed breakdowns of various short-term exchanges and long-term relationship maintenance variables. The IMP interaction model will be introduced and further discussed in the following chapter.

3.4 CHAPTER REVIEW

This chapter examined the concept and models of professional service quality as well as some of the empirical issues of how professional service quality in general and business-to-business professional service quality can be measured. The existing quality models applied in the context of consumer professional services and business-to-business professional services are largely based on the Nordic school (technical-functional model) and the American school (gap model and the SERVQUAL scale). Recent suggestions are put forward by service quality researchers to incorporate relational elements in modelling and measuring service quality. The incorporation of the IMP interaction model to the conceptualisation of business-to-business professional service quality should provide a better understanding of the service quality evaluation by clients. The following chapter will review the literature on the IMP interaction model in terms of its history, structure of the model, operationalisation, and its relevancy to the chosen research context (i.e., consulting engineering services).

CHAPTER FOUR:
REVIEW OF LITERATURE (PART III):
IMP INTERACTION APPROACH

4.1 INTRODUCTION

The nature of business-to-business professional services, quality models, and measurement issues were examined in the previous chapter. Very few studies in the literature of business-to-business professional service quality have provided a comprehensive model to account for the interactive/relational elements between professional service providers and clients. Synthesising models from the other domains of marketing should be able to make contribution. One of the most established and comprehensive models in explaining discrete exchange and relational exchange between transacting parties in a business-to-business context is the IMP (International Marketing and Purchasing Group or Industrial Marketing and Purchasing Group, depending on audience) interaction model.

The interaction model or approach, represented in the work of the IMP group and developed from Inter-organisational Theory and New Institutional Economic Theory, challenges the traditional views about industrial marketing and purchasing by placing more emphasis on the interdependence and the long term interactive nature of relationships between buyers and sellers. The importance of long-term exchange relationships is greatly stressed in the interaction model. Business relationships are no longer considered to be passive, episodic, or transaction-based, but long-lasting and durable. The main themes underlying the interaction model are the concept of short-term exchange episodes and the linkage between these short-term exchange episodes and the long-term relationship.

Parallel to the development of the IMP research work, another track of study has been underway to examine the relational issues from a network perspective which goes beyond the principal transacting parties. The network approach stresses the embeddedness of dyadic relationships within industrial networks consisting of, for example, government, suppliers, and customers' customers. Although the network approach is not the main focus of this study, it provides another view to the study of

inter-firm relationships. Therefore, a model for examining business-to-business professional service quality can be enriched. This chapter will explore in more detail the development of the IMP work, the interaction model, the network approach, and major empirical issues related to construct operationalisation.

There will be four main parts in this chapter. The first part will trace back the history of the IMP research project. Five areas will be addressed, including the IMP group composition, criticisms of traditional marketing concept, paradigmatic position, theoretical foundation of the IMP research work, and its research methodology. The second part will review the IMP interaction model by focusing on the concepts of interactions and exchanges as well as their components. Limitations of the model will also be examined before proceeding to the discussion of the network approach in terms of model development, assumptions, and research methodology. The last part of the chapter will review past empirical studies using the IMP interaction model constructs in examining buyer-seller relationship.

4.2 DEVELOPMENT OF IMP RESEARCH

4.2.1 IMP Group Composition

The International Marketing and Purchasing (IMP) Group (or Industrial Marketing and Purchasing Group) was formed in 1978 with the objective of examining the issues of interaction and relationship between buyers and sellers in business markets. A pan-European project, better known as the IMP project, was carried out by research teams based in France (IRE, Groupe ESC Lyon), Germany (Munich University), Italy (ISVOR-FIAT, Turin), Sweden (University of Uppsala), and the UK (UMIST and the University of Bath). Although the researchers during that time came from different countries with different cultural values and backgrounds, they shared a common interest in developing a conceptual framework for the entire research project. The researchers also shared a strong empirical tradition--"that is better to spend lots of time listening to managers and developing ideas rather than assembling a towering edifice of quantitative analysis on the basis of a mailed questionnaire" (Ford, 1990, p.2).

In the following sections, the conceptual foundation of the IMP research project will be explained. This part of the literature review will focus on the criticisms of the traditional

marketing concept, the paradigmatic position, and the theoretical framework underlying the IMP research project.

4.2.2 Criticisms of Traditional Marketing Concept

4.2.2.1 Sources of Criticisms

The traditional view of marketing as a business function was increasingly criticised in the mid-1960s and early 1970s because the exchanges between buyers and sellers were conceptualised as largely transaction-oriented. The traditional marketing concept which was based on the marketing mix paradigm (i.e., McCarthy's (1960) 4Ps or variants thereof) or consumer marketing related theories was questioned as unrealistic in a real-life business environment, in particular in the area of business marketing when the relational elements mattered most in the overall buyer-seller encounter.

In the late 1970s and early 1980s, a new exchange paradigm was suggested to place more emphasis on understanding the relational dimension of exchange. As set out in Table 4.1, O'Neal (1995) draws a distinction between transactional type of exchange and relational type of exchange. It is clear that they differ a lot in terms of time horizon of exchange (short-term versus long-term) and focus of exchange (price versus value-added elements). The change of focus from exchange transaction to exchange relationship was noted by Möller and Wilson (1995a) who identify a number of sources for the change. The change of focus can be traced back to the following sources:

1. Behavioural-channels research which emphasises the understanding and management of inter-organisational relationships of channel members.
2. The political-economy framework which provides a strong impetus for more holistic inter-organisational channel research.
3. The resource-dependency theory which provides a profound rationale for exchange relationship as a form of managing a firm's resource dependencies when its environment is composed of other organisations.
4. The transaction cost theory which suggests that there is a need to distinguish between different forms of transactions, as defined by their transaction properties, and to match the types of transactions with efficient governance structures. Transaction cost approach will be further discussed in Section 4.2.4.2.

Table 4.1: Comparisons of Transactional and Relational Exchanges (adapted from O'Neal, 1995, p. 201)

	Form of Exchange Relationship	
	Market	Relational
Time horizon of exchange	Short-term	Moderate to long-term
Focus of exchange	Price of core product	Emphasis on core product, with some attention to value-added services
Number of inter-organisational linkages	Few	Moderate
Frequency of communications	Low; tends to be formal only	Moderate; both formal and informal
Nature of information exchanged	Limited to transaction	Transaction and some long-term planning
Frequency of shipments	Low and irregular	Moderate and regular
Number of suppliers	Many	Moderate number
Transaction costs	Low	Moderate
Socialised investments	Low, if any at all	Moderately low
Functional interdependence	Low and limited to delivery system	Moderate and involves only a few functional areas
Level of risk	Low	Moderate
Problem-solving orientation	After the fact and reactive	Largely reactive

5. The social exchange theory which helps explain how channel relationship develops and how ongoing relationship works.
6. The IMP interaction approach which helps understand and explain dyadic behavioural processes between buyers and sellers.

Apart from Möller and Wilson (1995a), Tikkanen (1998) also notices that the growing criticisms towards the marketing mix paradigm principally came from three sources. These sources include North American academicians in services and industrial marketing (e.g., Berry, 1986; Bonoma and Johnston, 1978), North European researchers in services marketing (e.g., Grönroos, 1984; Lehtinen and Lehtinen, 1982, 1991), and interaction/network researchers related to the IMP group. The first two groups of services marketing researchers were introduced in both Chapters Two and Three and they found that customers not only want transactional exchange, but also relational exchange. Relationship with customers is an important factor in the overall service delivery. Having discussed the sources of criticisms towards the traditional view of marketing, the nature of these criticisms will be fully explained in the following section.

4.2.2.2 Nature of Criticisms

The criticisms towards the traditional view of marketing can be divided into two aspects. The first aspect as mentioned earlier relates to the deficiency of the marketing mix paradigm developed in the mid-1960s in the field of consumer marketing and applied in an industrial marketing setting. This is reflected by Mazet, Salle, and Spencer (1995) who point out that industrial or business marketing was at one stage considered to be virtually an extension of consumer marketing, applying a "stimulus-response" model with the use of various marketing mix variables (i.e., product, price, place, and promotion). However, the "stimulus-response" model was invalid in that business buyer-seller interactions are not necessarily initiated by the seller. Rather, the active role is played by both buyer and seller. Cheung and Turnbull (1998) also make the point that the marketing mix theory has drawn heavily on research and experience in the field of consumer marketing and is limited in value as far as the specific nature of industrial marketing is concerned. They criticise the marketing mix approach in several ways. Firstly, the concept itself lacks a theoretical foundation to explain and characterise the marketing mix elements specified in the model. Secondly, it fails to incorporate the

interactions among the marketing mix elements. Thirdly, the marketing mix theory lacks the capacity, flexibility, and responsiveness which are fundamental requirements of marketing in general and industrial marketing in particular. Lastly, the concept is also criticised as being production-oriented, rather than market- or consumer-oriented.

The second aspect of criticism relates to the deficiency of the traditional industrial marketing theories itself. In terms of industrial marketing theories proposed well before the 1970s, some important criticisms were put forward by Bonoma and Johnston (1978). They claimed that prior research work in industrial marketing failed to have an impact on marketing thought and practice because a number of assumptions underlying traditional research were faulty. For example, the assumption that industrial buying could be studied in isolation from the other aspects of marketing behaviour (e.g., selling) was deficient. This can be illustrated in the study of organisational buying behaviour by Robinson, Faris, and Wind (1967) and Webster and Wind (1972). Another assumption that organisational buying behaviour could be studied as a stimulus-response process mentioned earlier in this section was also considered dubious. In addition, prior studies on organisational buying behaviour were mostly based on discrete transactions while the existence of repeated transactions in business markets was largely neglected.

The IMP group also put forward a number of challenges to the traditional way of examining industrial marketing and purchasing. These challenges are as follows:

> Firstly, we challenge the concentration of the industrial buyer behaviour literature on a narrow analysis of a single discrete purchase…Secondly, we challenge the view of industrial marketing as the manipulation of the marketing mix variables in order to achieve a response from a generalised, and by implication passive market…Thirdly, we challenge the view which implies an atomistic structure in industrial markets…Fourthly, we challenge the separation which has occurred in analysing either the process of industrial purchasing or of industrial marketing. (Håkansson, 1982, p. 1)

In response to these challenges, the IMP group therefore focused on the importance of relationship and active interaction between buyers and sellers. It was reasonably

expected that separate analysis of the marketing and purchasing processes was deficient in explaining the reality of business marketing. The reality is that business markets or industrial markets are characterised by a high degree of stability instead of change, long lasting relationships instead of short business transactions, and closeness instead of distance between sellers and buyers (Håkansson, 1982). These markets do not consist of a large number of individually insignificant customers. In most cases, organisational buyers vary widely in size and purchasing requirements. Some of them are even bigger than their suppliers. These buyers do not buy what they see from an advertisement on television. In addition, business markets consist of both active sellers and active buyers. Sellers and buyers in business markets do not simply meet, do a deal, and then never see each other again. Most of the relationships in business markets are close, complex, and long term. The process is not one of action and reaction. It is one of interaction. The development of the IMP research project with an attempt to understand business markets then started as a result of a realisation that the prevailing literature in the 1970s did not seem to relate closely to what really happened in business markets. As shown in Table 4.2, the research orientation was shifted from market transaction to short-term dyadic relationships and then to long-term relational exchange. In terms of the explanatory mechanism, the focus was also shifted from a stimulus-response model to an interaction model.

To conclude, the traditional view of marketing (i.e., marketing mix paradigm and early literature on industrial marketing) is considered to be deficient in explaining the reality of business markets. What matter most in business marketing are the exchange process and the adaptive behaviour of both parties taking place through organisational interaction over time. These are the main reasons why the IMP group put forward a number of challenges against the traditional view of marketing. The following section will follow through this line of thought and trace back the paradigmatic position of the IMP research framework.

4.2.3 Paradigmatic Position of IMP Research

The IMP research project was undertaken in response to the criticisms towards the traditional approach to understanding business marketing. The marketing mix paradigm

Table 4.2: Classification of Exchange Relationships (adapted from Möller and Wilson, 1995a)

Characteristic	Market Transactions	Short-Term Dyadic Relationships	Long-term Relational Exchange
Unit of analysis	Seller of buyer	Buyer/seller exchange relationship	Buyer/seller relationship
Time perspective	Short	Short	Medium to long
Explanatory focus	Explain and predict a particular transaction	Explain and predict supplier choice; understand choice process	Understand the development and functioning of a relationship
Explanatory mechanism	Stimulus-response	Interaction and stimulus-response	Interaction
Marketing management perspective	Managing the marketing mix based on segmentation and positioning	Winning the order or contract through manipulating product/supplier elements	Establishment and management of relationships
Organisational perspective	Mainly functional	Marketing/selling "centres"	Emphasis on inter-functional relationships

was also considered to be inadequate to explain the reality of business markets. Wilkinson and Young (1997) clearly point out that:

> [T]he integrated relationship orientation is not encompassed by some extension of the marketing mix paradigm, such as adding another P for people or politics, or by a more sensitive application of existing elements of the mix. It calls for us to stop "P-ing" on the customer and to focus instead on interacting and cooperating with them" (p. 94).

In Chapter Three, the concept of relationship marketing was introduced. The importance of relationship development, bonding, and maintenance should not be overlooked in business markets, in particular business-to-business professional service industry. But can one make a conclusion that there is a paradigm shift from transactional marketing to relationship marketing? The answer to this question can be varied, depending on the perspective of researchers. Coviello, Brodie, and Munro (1997) note that the concept of relationship marketing seems to offer a "new paradigm" suggested by Sheth (1995), Grönroos (1994), and Kotler (1992). But this is not the case in reality. A paradigm shift from transactional marketing to relationship marketing implies that a fundamental change in world view and underlying assumptions. Coviello et al. then argue for the possibility that transactional marketing and relationship marketing might be practised simultaneously. If this is the case, the two general perspectives are not mutually exclusive. Rather, they should be part of the same paradigm which allows both transactional marketing and relationship marketing to coexist. Pels (1999) also takes this stance. She suggests that exchange situations can be of a transaction, a relationship, or a hybrid type. She observes that academics and researchers follow one of the following three alternatives:

1. The first group of scholars consider that, by adding a relationship dimension to the marketing mix management approach, the "anomalies" identified by the relationship marketing literature can be assimilated into the traditional marketing paradigm.
2. The second group of scholars consider that relationship marketing can be categorised as a new paradigm. The shift of paradigm from transactional marketing to relationship marketing offers a better explanation of the phenomena under investigation.

3. The last group of scholars recognise that transactional marketing and relationship marketing are different marketing paradigms and can coexist.

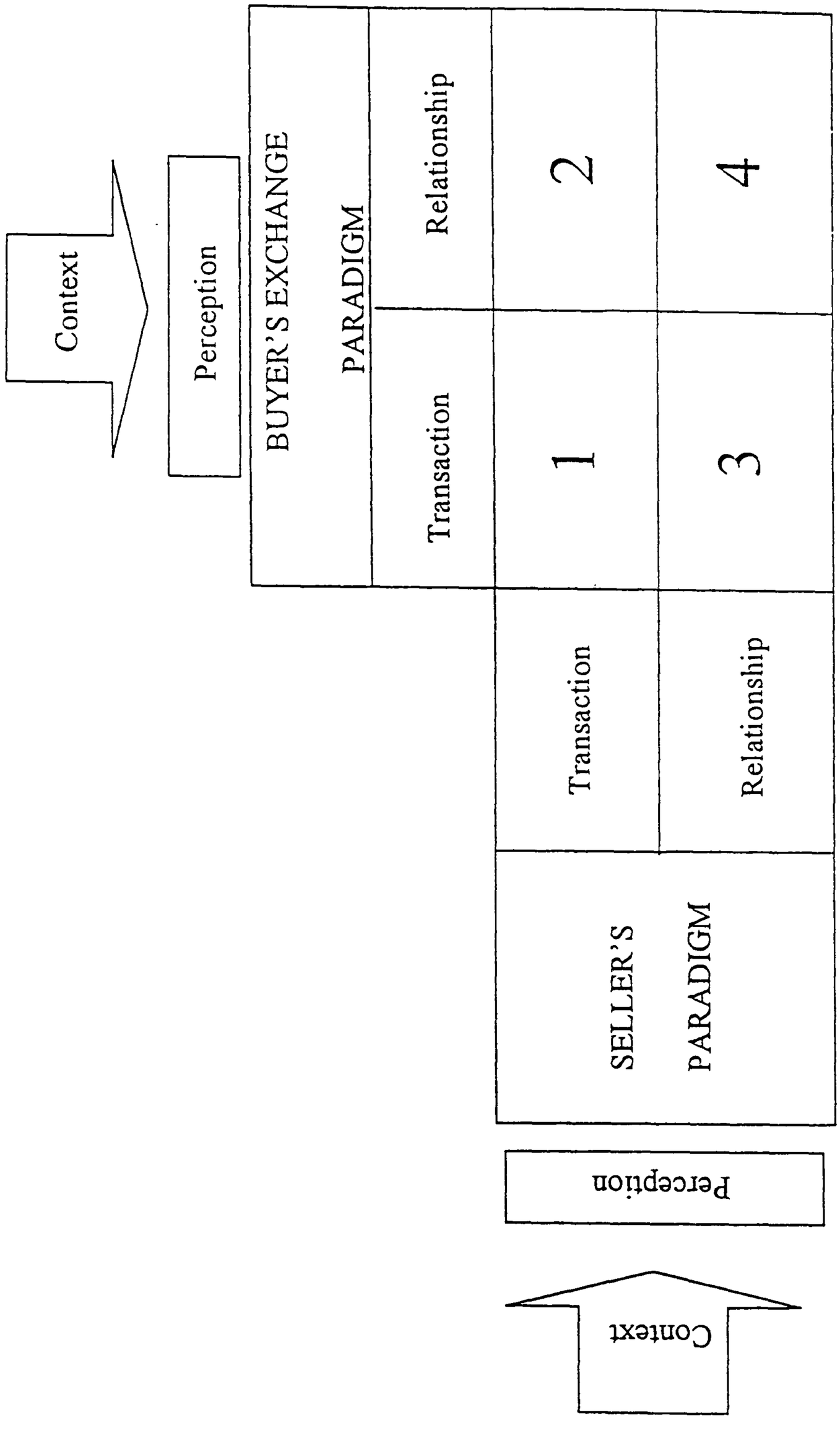
Pels believes that the marketing mix model with a relationship dimension is too limited to deal with all types of exchanges whereas the shift to a relationship paradigm (i.e., by going to the other extreme) may run the risk of marketing myopia. She maintains that exchange transactions and exchange relationships are different types of exchanges based on different exchange paradigms as evidenced from the following concluding remark:

> Academics and managers in marketing should not be discussing whether marketing is about exchange transactions or exchange relationships. Marketing is about both! The challenge of the future will be to understand that in the same product/service industry, firms will be competing using different conceptual paradigms. Consequently, it will be necessary to analyse the alternative exchange situations from various viewpoints in order to understand and manage them successfully (Pels, 1999, p. 32).

Pels' remark is significant in that there should be a match of exchange situations between buyer-seller as shown in Figure 4.1 in order to obtain the best marketing results.

As mentioned earlier, the business markets consist of active buyers and sellers (Håkansson, 1982). Based on that premise, the relationship marketing approach may not be able to provide a full explanation of activities between buyers and sellers. Ford (1997) reasons that relationship marketing is still largely a one-sided process with an active seller and a passive buyer in that the task of marketers is to maximise the firm's return on its client base over time. The major difference between relationship marketing and conventional marketing thought is the former's emphasis on repeated purchases by an identifiable customer. Ford goes on to hint that "relationship marketing may be perfectly appropriate in consumer markets, but is inappropriate as a description of what happens in business markets…we are concerned with marketers and purchasers who are both active within relationships" (p. xv).

Figure 4.1: Buyer-Seller Exchange Situation Matrix (Pels, 1999, p. 32)



To conclude, although more and more researchers are putting greater emphasis on the relational exchange, there is not a definite consensus that there is a paradigm shift from transactional marketing to relationship marketing. Instead, it is likely that the coexistence of both paradigms seems to receive greater support in the academic community. The paradigmatic position of the IMP research project is in line with this prevailing marketing thought. Having discussed the paradigmatic position of the IMP research work, its theoretical foundation will be described in the following section.

4.2.4 Theoretical Foundation

The theoretical foundation underlying the IMP research project can be traced back to two major theoretical models from outside the marketing literature. They are the Inter-organisational Theory as represented by the distributive and social systems perspective and the New Institutional Economic Theory as represented by the transaction cost approach of Oliver Williamson (1975).

4.2.4.1 Inter-organisational Theory

Regarding Inter-organisational Theory, much of it involves attempts to apply relevant concepts from intra-organisational studies to business problems in which several organisational units are involved. Therefore, the focus of attention is on the relationships between organisations, rather than within each individual organisation. The IMP group identified three categories of inter-organisational literature: organisation based studies, studies based on several organisations, and studies of the organisation in a societal context (Håkansson, 1982). For the first category, organisation based studies view the environment as an external limitation for the organisation, and the organisation is dependent on its environment for resources. These studies have contributed to the "managerial" approach to marketing through an "open system" perspective. Underlying this perspective, the characteristics of the environment will influence the shape of internal organisational structure. Business marketers are therefore concerned with the marketing mix variables so as to optimise desired market responses. It is implicit in this perspective that buyers are passive and only react to the stimuli of the seller by buying or not buying. The selling firm is the active party in the buyer-seller relationship. The IMP group makes it clear that:

> ...the first group of studies [organisation based studies] includes two distinct and *separate* approaches to the study of what occurs in industrial markets. On the one hand, there is an analysis of the manipulation of marketing variables by the seller to achieve a desired market response. On the other hand, there is the separate analysis of a single buying process and the factors which affect that process, from which lessons can be drawn for marketing. (Håkansson, 1982, p.11)

For the second category of organisational studies, the organisation is seen as part of a group of interacting units. These studies recognise the "distributive systems" approach through which the organisation is required to develop a network of relationships with a number of other organisations in order to obtain necessary resources. Therefore, the focus of this line of study is broader than the first category of organisation based studies by concentrating on the nature of the functions being performed by the network and on the structure, performance, and inter-relationships of the organisations comprising the network.

The third category of organisational studies takes the perspective that the organisation is seen as an integrated part of a social system. The main function of an organisation is to facilitate the society's needs for efficient and effective exchange of values. However, the view of marketing from a social system perspective is little developed (Håkansson, 1982). Among these three categories of organisation based studies, the IMP research seems to pursue its research direction based on the second category (i.e., network of relationships).

4.2.4.2 New Institutional Economic Theory

Another major model for the study of inter-organisational relationships outside the marketing literature is provided by the "New Institutional Approach" to economic theory and particularly the transaction cost approach (TCA) of Oliver Williamson (1975). Given the fact that there is vast literature on the topic of TCA in general (e.g., Furubotn and Richter, 1998; Menard, 1997; Williamson, 1985, 1990) and in particular in business strategy (e.g., Williamson, 1999) and in marketing (e.g., Rindfleisch and Heide, 1997),

this section only focuses on some of the basic principles of TCA which are relevant to the IMP research work.

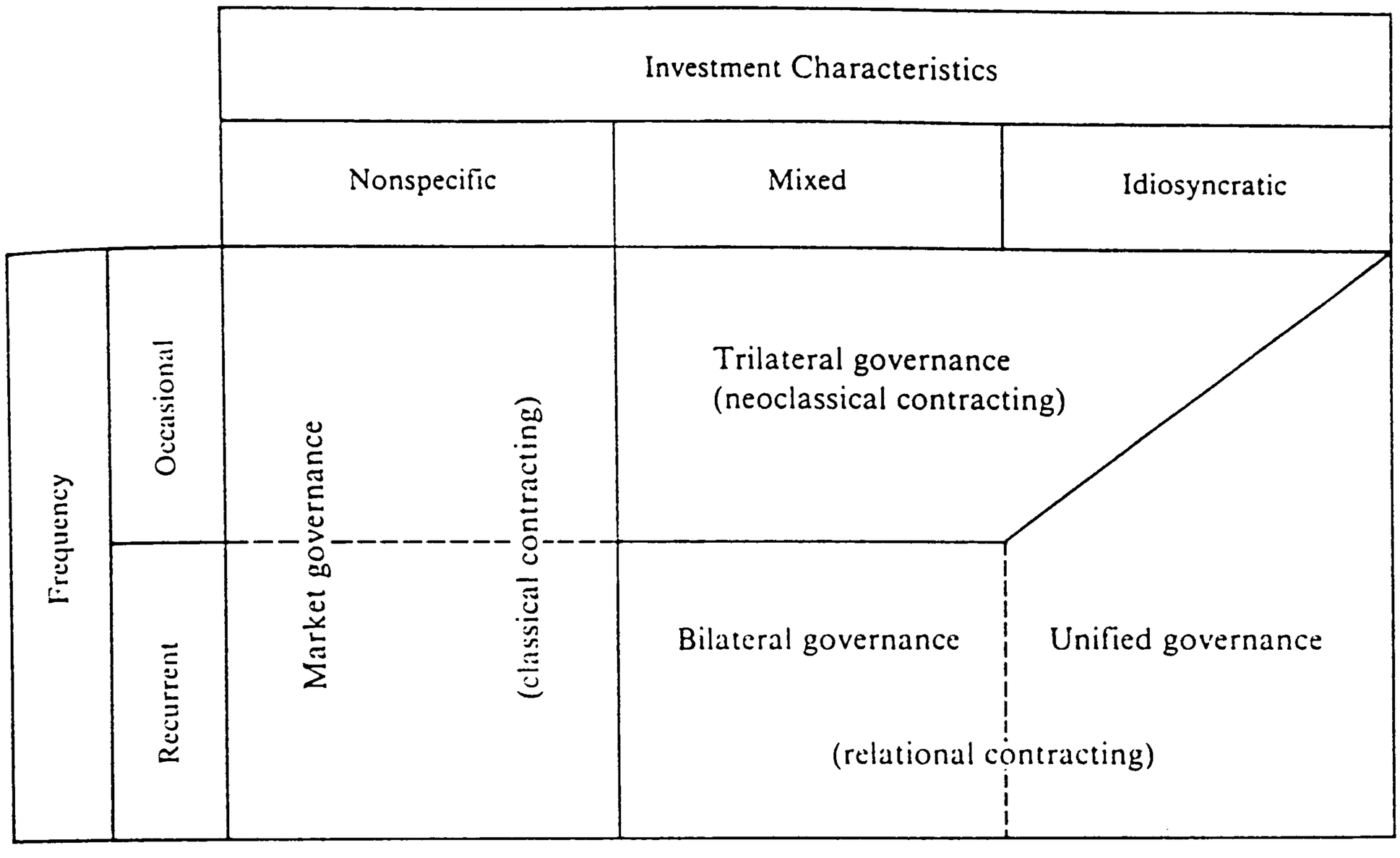
Williamson (1985) posits that transaction costs are central to the study of economics in that if transaction costs are ignored, the issue of choice of economic organisation or governance structure is irrelevant. Governance structure refers to the institutional framework within which the integrity of a transaction is decided (Williamson, 1979). Williamson (1985) suggests that the exchange between organisations can be handled under different market conditions which are characterised by the following transaction attributes:

1. The specificity of the investments (asset specificity) required to conduct the transaction;
2. the frequency with which similar transactions occur and the duration or period of time over which they are repeated;
3. the complexity of the transaction and the uncertainty about what performance will be required;
4. the difficulty of measuring performance in the transaction; and
5. the connectedness of the transaction to other transactions involving other people.

Among these five conditions, Williamson (1985), in explaining how firms are likely to organise their business relationships, points out that asset specificity and the frequency of transactions are two major factors in determining the choice of governance structure. He suggests that, depending on the particular frequency-investment configuration, four distinct types of governance structure can be identified as shown in Figure 4.2. These four types of governance structure are as follows:

1. Market governance. This approach is regarded as the main governance arrangement for non-specific transactions of both occasional and recurrent contracting. For purchase and supply of standard products/services, arrangements can be easy to work out by the transacting parties.
2. Trilateral governance. This approach is desirable when transactions are occasional and of the mixed or highly specific type. In these situations,

Figure 4.2: Efficient Governance (Williamson, 1985, p.79)



reliance on markets alone is not adequate or satisfactory because substantial costs are associated with the switching of business partners. Third-party assistance (e.g., arbitration), instead of court litigation, is used for resolving disputes and evaluating performance.

3. Bilateral governance. This approach is desirable when transactions are recurring and supported by investments of the mixed and highly specific kinds. Although the autonomy of the respective trading partners is maintained, continuity of the trading relation is highly valued.

4. Unified governance. This is the case of vertical integration. Vertical integration is desirable when transactions are recurring and of highly specific type. According to Williamson (1979), the advantage of vertical integration is that adaptation can be made in a sequential way without the need to consult, complete, or revise interfirm agreements.

The critical determinant of the form of governance structure between market governance and unified governance adopted is the relative cost advantage between internalisation of resource production (by means of vertical integration) and discrete market transaction. In the continuum between market governance and unified governance, trilateral governance (i.e., with third party assistance) and bilateral governance are two other possible alternatives. Williamson argues that the form of organisation will be the one which seeks to minimise the sum of production costs and governance costs. The general principle is that the greater the specificity of investments, the further away is the chosen organisational structure from market governance. Möller and Wilson (1995c) praise the transaction cost approach for its simplicity and for providing a strong and elegant contingency model for investigating governance structures or control systems between transacting organisations. However, the approach is not without criticisms. Möller and Wilson comment that:

> An obvious restriction is that the TCA does not tell us anything about the firm's capability to carry out transactions or employ specific governance solutions. Nor does it say anything about the processual development of relationships. One has to recognise, however, that these issues are beyond the cognitive goals of the TCA programme, which aims at explaining the economic efficiency motivation behind existing and emerging basic types

> of governance, as well as prescribing governance under the assumed contingency context. (p. 601)

Despite the deficiencies of the transaction cost approach to the study of inter-organisational relationships, the approach represents a significant input to the theoretical development of the IMP research project in that, firstly, the discrete transaction paradigm was no longer applicable to business market. Secondly, the transacting parties in business market require frequent exchange of resources and some kind of idiosyncratic investment to be made in the form of adaptation. The concepts of exchange and adaptation will be explained in Sections 4.3.2 and 4.3.5 respectively. The next section will address the IMP research methodology in investigating buyer-seller interactions in business markets.

4.2.5 IMP Research Methodology

As mentioned earlier, the process of selling and buying in business markets is not one of action and reaction. It is one of interaction (Ford, 1998). This means that each business transaction is just a single episode among many in a relationship between buying and selling organisations. Numerous episodes, whether they are transactional or relational in nature, become part of a business relationship through the passage of time. Rather than focusing on individual purchase or selling activities, the early work by the IMP group took the relationship as the unit of analysis. This research perspective was not just an academic device. It was based on the belief that the critical task for business marketers is to develop and manage customer relationships. On a theoretical level, the IMP group intended to develop concepts and models that could be used to describe and understand buyer-seller relationship and the factors influencing it. At the empirical level, the IMP study aimed to present data about buyer-seller relationship in a form which was useful for analysis, as well as forming a reference for management (Håkansson, 1982). In addition to focusing on the relationship between buying and selling organisations, the research project also examined the international dimension of buyer-seller relationship, the technological conditions surrounding the parties, and the social and psychological factors which might have an impact on the relationship. In sum, the IMP project intended to investigate both generalised and specific perceptions of relationship.

The research approach to the study of relationship underlying the IMP project was based on a qualitative framework. Brennan and Turnbull (1998) comment that "the methods characteristic of IMP research are eclectic, but with a preference for qualitative methods employing an inductive logic" (p. 406). They further remark that over twenty years on from the publication of the original IMP study (Håkansson, 1982), the bulk of the work published within the IMP tradition remains qualitative. Möller and Wilson (1995c) draw a distinction between the European style of the IMP tradition and the American style of research tradition in that:

> European researchers, prominent in network and partly interaction approaches, embrace the understanding ontology and methodology, leading to description through idiographic methods. Americans…subscribe to the objectivist orientation, providing propositions and models that are empirically tested through nomothetic measurement and analysis (p.608).

No research is perfect and the IMP project is no exception. The IMP research approach is subject to certain criticisms. For example, Easton (1995) questions the epistemological basis of the IMP research tradition, claiming that the typical IMP approach fails to specify a sampling frame or sampling method. Also, researchers frequently draw their conclusions on the basis of single company case studies. There is evidence showing that case study approach as a research strategy can focus on understanding the dynamics present within single settings and can accomplish various research aims, including theory generation and testing (e.g., Eisenhardt, 1989; Miles and Huberman, 1994). To the IMP researchers, the use of case method, a preference for in-depth interviewing over detailed survey and a tolerance of inductive logic, is the principal characteristic of the IMP research approach, rather than a manifestation of the immaturity of an emerging paradigm (Brennan and Turnbull, 1998).

Because the research approach is qualitative in nature, data are principally collected through a semi-structured questionnaire administered personally to a sample of purchasing and marketing managers. In the IMP research project, the sample, however, was not "matched" in the sense that there was no attempt by the researchers to interview interacting pairs of individuals. This can be explained by the fact that the task of

managing a buyer-seller relationship is essentially similar for both buyer and seller. In addition, each organisation has a portfolio of buying and selling relationships, rather than a single relationship.

Through personal interviews, empirical data were collected on over 1,000 relationships in certain European markets. The initial focus on the European markets was not without reason. Ford (1990) points out that the relationships between buyers and sellers are likely to be closer than their counterpart relationships in North America. In addition, the structure of smaller markets in Europe, the relative absence of strong anti-trust laws, and the growth in ideas on systems selling have supported a culture of less antagonistic relations with suppliers than may occur in, for example, North America. Therefore, the initial focus on European markets provided a better starting point to investigate buyer-seller relationships. The results of the IMP study identified several critical variables in the interaction between buying and selling organisations. These critical variables were embraced in an interaction model proposed subsequently by the IMP researchers. This model and its constituents will be explained in the next section.

4.3 IMP INTERACTION APPROACH

In the previous sections, the assumptions underlying the IMP work were derived from the arguments against the traditional marketing mix approach and the deficiency of industrial marketing theories prevailing in the literature in the 1970s. From the IMP perspective, the marketplace is limited by the number of buyers and sellers. Both buyers and sellers are active and they expect to develop long-term relationships with each other. In terms of long-term relationship, the IMP work intended to refute the logic whereby the transactions between buyers and sellers were treated as discrete events. The IMP researchers explicitly incorporated the "time" dimension which spanned across each individual transaction over time and took into consideration the inter-dependency of organisations in a market flooded with heterogeneous offerings. The results of the IMP project demonstrated the importance of interaction and the existence of stable long-term buyer-seller relationships. Researchers developed a model and identified four groups of variables that explain and influence the interaction between buying and selling organisations. These variables describe the parties involved, the elements and process of interaction, the atmosphere affecting and being affected by the interaction, and the

environment within which the interaction takes place. In the following section, the interaction model will be discussed in greater depth.

4.3.1 IMP Interaction Model

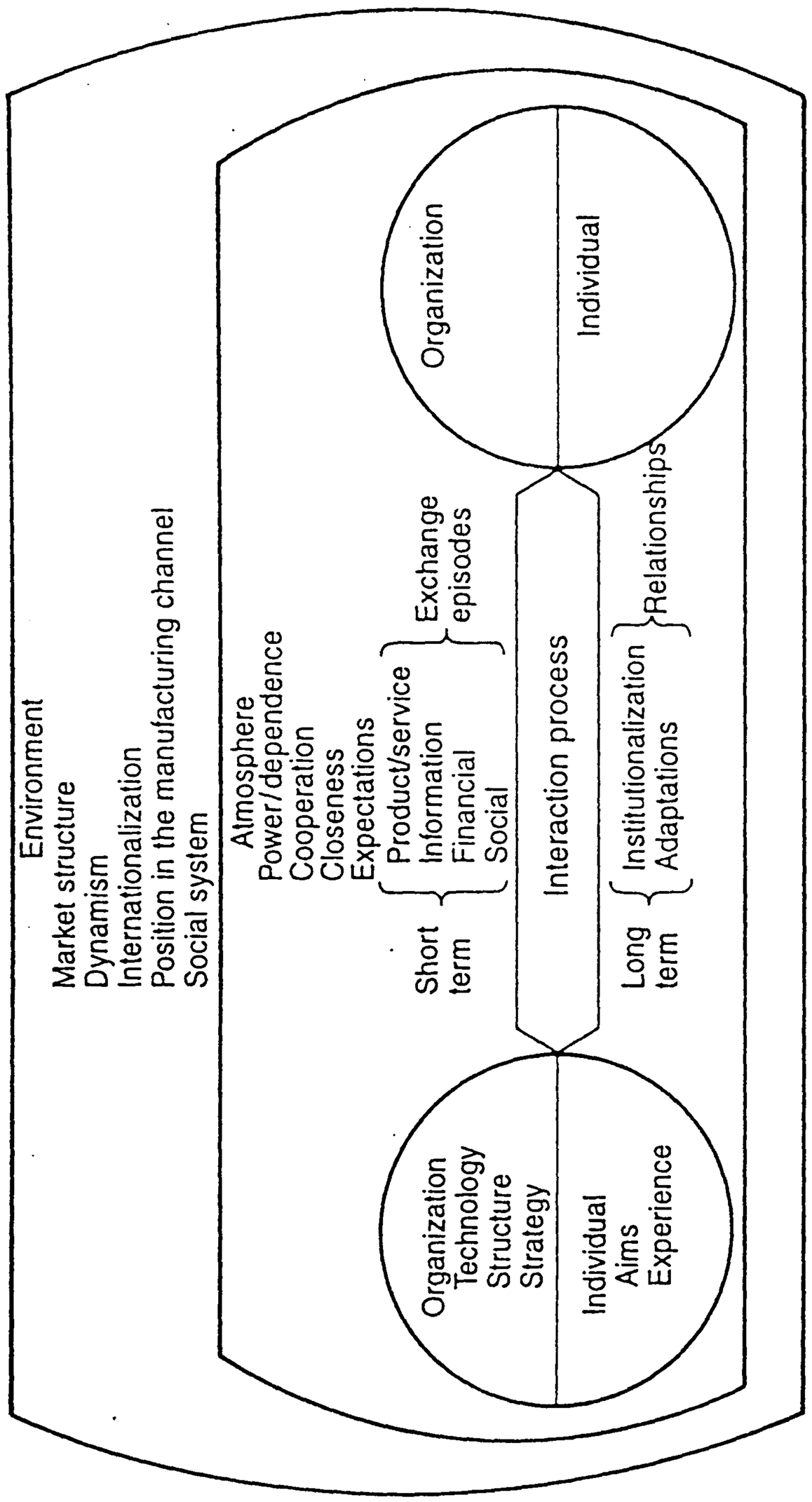
The relationship that develops over time as a result of investment between a buyer and a seller involves exchanges of various kinds relating to technical, information, financial, and social aspects, and relationship atmosphere which together form a core element of business-to-business marketing theory and practice. The interaction process is regarded as a comprehensive description of buying and selling which is more than a coinciding process. It is reciprocal. The model underlying the IMP interaction approach is illustrated in Figure 4.3. The model represents a new twist to the traditional business marketing thinking in that it, as Brennan and Turnbull (1998) suggest, intends to:

1. Retain important conceptual building blocks from the earlier works on organisational buying behaviour (e.g., Webster and Wind's (1972) concept of buying centre);
2. Reject Bonoma and Johnston's (1978) stimulus-response model of buying behaviour; and
3. Apply what, during that period, were emerging theories in the field of economics (i.e., transaction cost economics) and sociology (i.e., Inter-organisational Theory) to buyer-seller relationships in business markets.

Metcalf et al. (1992) make the point that the interaction model seems to be the best equipped to deal with the various issues pertaining to buyer-seller relationships. In the interaction model, four groups of variables are identified that describe and influence the interaction between buying and selling firms. These variables include:

1. The interaction process. The process contains two distinctive constituents. They are the short-term exchange episodes (e.g., placing an order or obtaining information) and the long term relationship which develops as a result of the individual episodes. In terms of short-term exchange episodes, they consist of a number of elements which are being exchanged, including product/service exchange, information exchange, financial exchange, and social exchange;

Figure 4.3: IMP Interaction Model (Håkansson, 1982, p. 24)



2. The atmosphere affecting/affected by the interaction. The atmosphere of a relationship is described as a product of the relationship which is influenced by a group of variables internal to that relationship. These variables include power/dependence, closeness/distance of relationship, cooperation/conflict, and mutual expectations;
3. The participants in the interaction process. The IMP group also observed that it is not only the elements of the interaction which influence the interaction process, but also the characteristics of the organisations and the people that represent them. These characteristics are peculiar to the technology adopted, organisational characteristics, and the individuals involved; and
4. The environment within which the interaction takes place. The IMP group recognised that the interaction between buying and selling organisations cannot be considered in isolation, it must be addressed in a wider context. Such an environment encompasses external factors, including market structure, dynamism, degree of internationalisation, position in the manufacturing channel, and the social system.

Although these four groups of variables play an important role in explaining the process of interaction and the relationship building patterns between organisations, only the first two groups of variables (i.e., the interaction process and the atmosphere surrounding the parties involved) will be further examined in this study. The reasons are, firstly, the concept of environment in the interaction approach can be problematic because it is an aggregated environment and does not really give explicit consideration to the individual environments of the buying and selling organisations (Campbell, 1985). Secondly, the interaction process and the atmosphere surrounding the parties involved are considered as the basic building blocks providing tangible and intangible cues to clients for evaluating professional service quality in a business-to-business setting. It is more fruitful to examine the core interaction elements and their impact on service quality evaluation before proceeding to a complex model in which the influence of these core interaction elements may not be easily observed. In the next section, the concept of interaction and its various components will be reviewed.

4.3.2 Concepts of Interaction and Exchange

The main thrust of the IMP research is on the buyer-seller interaction with relationship as the unit of analysis. The fundamental characteristic of interaction is that it is at least bilateral (Halinen, 1997). A number of writers have suggested that there is a close connection between interaction and exchange. For example, Möller and Wilson (1995b) refer interaction process factors to the basic processes through which the exchange of resources is carried out and controlled. Halinen (1997) also points out that the exchange processes form the core phenomenon of interaction. These writers seem to agree that the concept of interaction is more embracing than the concept of exchange with interaction consisting of a number of exchanges. But what does exchange really mean? Cook (1977) defines exchange as "an act consisting of a voluntary transaction and involving a transfer of resources between two actors for mutual benefit" (p.64, requoted from Halinen, 1997). Hallén, Johanson, and Seyed-Mohamed (1991) describe that "exchanges in social relationships are viewed as interaction processes where the interaction is any set of observable behaviour on the part of at least two individuals when there is reason to believe that some parts of these individuals are responding to each other" (p. 29).

To conclude, the concepts of interaction and exchange are interrelated. Exchange processes are the basic building blocks of interaction. In the following section, the focus will be on the elements of exchange and the linkage between these exchange elements and the long-term relationship.

4.3.3 Elements of Interaction and Exchange

Although the exchange concept had traditionally been seen as the hub of the marketing discipline (Bagozzi, 1975), its context was largely confined to economic exchange as a unit of analysis. Coviello et al. (1997) reviewed the relevant literature (e.g., Grönroos, 1995; Sheth, Gardner, and Garrett, 1988) and concluded that the concept of exchange had moved from the functionalist school of thought (Parvatiyar and Sheth 1994). Such a move revealed the fact that the interactions may or may not include economic exchange between the parties involved in a relationship. Rather, both buyers and sellers seek to attain mutual benefit through shared activities. As a result, the economic exchange *per se* should not be the fundamental unit of analysis in

marketing. Apart from economic exchange, there are other types of exchanges which are in place during the interaction between buying and selling organisations.

In the IMP interaction model, elements of interaction are classified into two types: short-term exchange episode and long-term relationship. The former embraces product/service exchange episode, information exchange episode, financial exchange episode, and social exchange episode whereas the latter embraces institutionalisation and adaptation. Halinen (1997) considers that a buyer-seller interaction can be described via three basic processes: exchange process, coordination process, and adaptation process. A similar perspective is also shared by Möller and Wilson (1988) in that buyer-seller interaction includes resources exchange, adaptation, and coordination. These elements of interaction will be further discussed in the following sections:

4.3.4 Short-Term Exchange Episodes

Exchange or episode is used interchangeably by the IMP researchers. But Möller and Wilson (1995b) define episodes as "actions or outcomes of actions performed by the organisations or their representatives--that is, episodes have a specific content and time frame" (p. 26). They suggest that typical episodes in an early part of an exchange relationship are exchanging information, visiting the participant's plant, and discussing technical issues concerning focal products/services, as well as procedural issues such as conducting product trials. These exchange episodes will then be institutionalised into long-term relationships through mutual adaptation and cooperation.

In the original IMP interaction model (Håkansson, 1982), there are four types of exchange episode in the interaction between buying and selling organisations:

1. Product or service exchange. It represents the core of the exchange, including all the salient characteristics of the product/service, and thus has a significant effect on the whole relationship building process;
2. Information exchange. It concerns the content, width, depth, means, and formality of information to be transmitted between the parties;
3. Financial exchange. It relates to the quantity of money exchange and the exchange uncertainties; and

4. Social exchange. It is particularly important when the parties involved experience spatial or cultural distance. Social exchange is to bridge this distance and build up mutual trust.

In addition to the IMP perspective, similar categorisations are offered by other researchers. For example, Johanson and Mattsson (1987) divide exchange processes into social, business, and information exchanges. Möller and Wilson (1988) divide exchange processes into resources exchange and social exchange. In general, resources refer to the physical, technological, financial, and informational or know-how resources whereas social exchange refers to the human communication through which meanings are communicated and values potentially interpreted and learned (Möller and Wilson, 1995b). Social exchange is expected to evolve in a slow process, starting with minor transactions in which little trust is required because little risk is involved and in which both parties can prove their trustworthiness, enabling them to expand their relations and engage in major transactions (Håkansson and Sharma, 1996)

Apparently, the IMP perspective is closely tied in with Möller and Wilson's (1988) classification of exchange elements in that product/service exchange, financial exchange, and information exchange are categorised as resources exchange. Ford, McDowell, and Tomkins (1996) further widen the boundary of resources exchange to include network resources, technology, and financial resources. Network resources, according to Ford et al. consist of a company's portfolio of relationships and reputation, rights, and limitations on behaviour and obligations it has acquired over time. Regarding the technology aspect, it can be decomposed into (1) product technology which consists of the ability to design products or services, (2) process technology which comprise the ability to manufacture or produce these products or services, and (3) marketing technology which consists of the ability to analyse the requirement of others and to relate the company's resources to that of other organisations for mutual advantage.

Based on the above exchange element categorisations, several points are worth mentioning. Firstly, these exchanges represent a broad spectrum of business- or non-business related activities to be performed by the representatives of both buying and selling organisations. Secondly, there is no doubt that product or service exchange is

important in a business interaction as it represents the core of the offering. Thirdly, social exchange is essential in communicating values, attitudes, and meanings between the firms. It may be purely business-related (e.g., discussing the effectiveness of a business proposal) or quite personal (e.g., having a beer with one's colleague after office-hours). Lastly, the relative importance among exchange elements is determined by the industry context. For example, in a business-to-business professional service setting, Halinen (1997) considers that information is the fundamental raw material of professional service firms. It is what the service provider works on in order to generate the service. Much of this information is secured directly from clients. It is not only exchanged in face-to-face contact, but also through technical devices such as telephone, fax and computer network.

Ford (1980) tries to build a causal link between short-term individual exchange episodes and the overall long-term relationships. He posits that each episode can affect the strength of the overall relationship and a single episode can change it radically. Failure in a relationship is more likely to be the culminating effects from exchange episodes in a worsening situation. Therefore, for a stable relationship to last, how to manage exchange episodes is of paramount importance to business marketers. These short-term exchange episodes are atoms of long-term relationship. Having discussed the short-term exchange episodes, the following section will focus on the elements of long-term relationship.

4.3.5 Long-Term Relationship

In the IMP interaction model, two elements are regarded as important ingredients for establishing and maintaining long-term buyer-seller relationship: institutionalisation and adaptation. However, no formal definition was offered by the IMP group. Halinen (1997) considers institutionalisation as a dimension of the coordination process. He defines institutionalisation as "the process through which various forms--patterns of behaviour and expectations of behaviour on the part of others--become established. It refers to the emergence of various rules, customs, and standard operating procedures in a business relationship" (Halinen, 1997, pp. 49-50). He also suggests that exchange, coordination, and adaptation processes are strongly interrelated activities in the way that intensive business exchanges require more social exchange and coordinating

efforts which collectively promote stronger reasons for adaptations. Adaptation and coordination, in return, pave the way to further exchanges. However, the concepts of adaptation and coordination are not fully explained in the original IMP work. There is a need to examine these two concepts from the other sources. The following section summarises the essence of these two concepts from the other sources.

4.3.5.1 Coordination/Cooperation

Other researchers use the term "cooperation" instead of coordination. This is reflected in the statement by Young and Wilkinson (1997) that "all activity undertaken jointly or in collaboration with others which is directed towards common interests or achieving rewards may be defined as cooperation" (p.55). They propose that cooperation contains sentiments and expectations of future behaviour as well as behavioural elements. In a buyer-seller relationship, cooperative behaviour includes the coordination of tasks which are undertaken jointly and singly to pursue common and/or compatible goals and activities undertaken to develop and maintain the relationship.

Anderson, Håkansson, and Johanson (1997) offer another interpretation of cooperation as similar or complementary coordinated activities performed by firms in a business relationship to produce superior mutual outcomes or singular outcomes with expected reciprocity over time. In that sense, the meaning of cooperation seems to be more embracive than coordination. They also acknowledge that cooperation has seldom been studied explicitly as a construct. They reviewed relevant literature and proposed that several processes and studied constructs can be construed as compatible with the concept of cooperation. They are as follows:

1. Cooperation can be viewed as a process in which value-creating exchange occurs (Zajac and Olsen, 1993).
2. Cooperation can be viewed as a process in which two firms engage in mutually pre-agreed activities which require resources (Ring and Van de Ven, 1994).
3. Cooperation is a part of the initiation and expansion phases in the relationship development (Dwyer et al., 1987).

4. The construct of cooperation can be studied as the construct of joint action in which two firms in a close relationship carry out "focal activities in a cooperative or coordinated way" (Heide and John, 1990, p. 25).
5. The construct of cooperation can be studied using the constructs of specific investments (Heide and John, 1990) and idiosyncratic investments (Anderson and Weitz, 1992) which can be interpreted as dedicated activities and resources employed in cooperation between firms.

Easton and Araujo (1992) also suggest that cooperation occurs when two or more parties have objectives which are mutually dependent. Two types of cooperation are identified by Easton (1990): formal cooperation and informal cooperation. Formal cooperation is overt, planned, and managed form of activity whereas informal cooperation is random and unplanned. Möller and Wilson (1995b) suggest that conflict resolution mechanisms can also be included under the cover of the cooperation/coordination process.

In a service setting, Mills (1986) points out that service emerges from the coordination efforts of both service employees and clients. In this coordination process, the learned service scripts, according to which the parties behave, as well as mutual adjustments, play an important role.

To conclude, the concepts of coordination and cooperation are similar. But researchers seem to suggest that the construct of cooperation is wider in scope than the construct of coordination by embracing coordinated activities jointly performed by both buying and selling organisations. The following section will examine the concept of adaptation as the other element of long-term relationship.

4.3.5.2 Adaptation

As mentioned earlier in Section 4.2.4.2 about transaction cost approach, the importance of idiosyncratic investment is stressed in a non-market governance structure (e.g., bilateral and trilateral governance structures). Depending on the

frequency of transaction, it is in the interests of both buyers and sellers to sustain the relationship when significant idiosyncratic investment is involved. In the IMP model (Håkansson, 1982), the concept of adaptation is also stressed as an important aspect of buyer-seller relationship. Adaptations as idiosyncratic investments in specific exchange episodes may be made in order to modify the overall relationship (Ford, 1990). Brennan and Turnbull (1998) consider the concept of adaptation as a new concept in the fields of marketing and strategic management. Nevertheless, they recognise that little attempt was made to define adaptation and most of the studies were undertaken in the manufacturing sector only. In a loose sense, adaptation means "one or other party may make in either the elements exchanged or the process of exchange" (Håkansson, 1982, p.18). Examples include adaptations in product, production process, information dissemination, and financial management. A more detailed definition is offered by Brennan and Turnbull (1998) who define buyer-seller adaptation as "behavioural or structural modifications, at the individual, group or corporate level, carried out by one organisation, which are initially designed to meet specific needs of one other organisations" (p.31). Although this definition encompasses both marketing and purchasing actions as well as all conceivable types of adaptation, Brennan and Turnbull admit that it offers little impression of what form adaptations take in practice.

The emphasis of adaptation on buyer-seller relationship is not without reasons. Hallén et al. (1991) state that inter-firm adaptations warrant study for several reasons. Firstly, inter-firm adaptations imply considerable investments by one or both of the firms. Secondly, they may be of critical importance for the supplier's possibilities of conducting business with the specific customer or for the customer's possibilities of securing needed products. Thirdly, the investments made in inter-firm adaptations often cannot be transferred to other business relationships. Consequently, the parties become tied together. Lastly, the adaptations may have important consequences for the long-term competitiveness of the firms.

In terms of the dimensions of adaptation, Brennan and Turnbull (1998) list out five types of taxonomies provided in the earlier work of the IMP group:

1. High resource commitment versus low resource commitment.

2. Proactive adaptation versus reactive adaptation.
3. Voluntary adaptation versus coerced adaptation.
4. Reciprocal adaptation versus unilateral adaptation.
5. Informal adaptation versus formal adaptation.

In an exploratory study of managerial perceptions of the concept of buyer-seller adaptation, Brennan and Turnbull (1998) found out that some adaptations tend to be substantial, unilateral, formal, and coerced by the other party. On the other hand, some adaptations tend to be minor, unilateral, informal, proactive, and volunteered. These types of taxonomies are however incomplete with focus only on the outcome of adaptation behaviour, rather than the process of adaptation or the motivation for adaptation.

Although little is known about the process of adaptation or the motivation for adaptation, some researchers propose to use the extent of adaptation as a relationship benchmarking. For example, Brennan and Turnbull (1998) suggest that adaptations can be used as the defining characteristic of a relationship. The presence of adaptations between two parties indicates the existence of a relationship whereas the absence of adaptations indicates a transactional approach to purchasing and marketing. In order words, adaptations are both a necessary and a sufficient condition for the existence of a relationship. Håkansson and Sharma (1996) also propose that adaptations are important in coping with future contingencies. Hallén et al. (1991) also echo that when two interacting persons face various contingencies, they have to modify their resources to match each other's needs. In most cases, exchange and adaptation, at least in a dynamic setting, are closely related processes. The more intensive the exchange process among firms, the stronger will be the reasons to make adaptations (Easton, 1992).

To sum up, the concept of adaptation is rather new to business marketing, in particular business-to-business professional service, as many studies are geared to the manufacturing industry. However, its significance as a relationship benchmark cannot be under-estimated, in particular, for business-to-business professional services because business-to-business professional services are customised to the requirements

of individual clients. Therefore, the degree of adaptation by business-to-business service providers becomes a critical issue in service quality management. Apart from cooperation and adaptation as the two important elements of long-term relationship, the concept of atmosphere is also mentioned in the IMP literature as it mediates the influence of the groups of exchange variables. The concept of atmosphere and its importance in buyer-seller relationship will be addressed in the next section.

4.3.6 Atmosphere as a Mediating Variable

In the IMP literature, the importance of overall atmosphere surrounding buyers and sellers is also addressed in the way that it mediates the influence of the groups of exchange variables (i.e., product/service exchange, financial exchange, information exchange, and social exchange). Similar to adaptation as a relationship benchmark, atmosphere also represents the state of a relationship (Ford et al., 1996).

The original IMP work described the construct of atmosphere in terms of the power-dependence relationship between buyer and seller, the state of conflict or co-operation, overall closeness or distance of the relationship, and the mutual expectations between the parties (Håkansson, 1982). Easton (1992) adds his particular comment on the conflict-cooperation dimension of the atmosphere construct that the tension between conflict and cooperation is inherent in any relationship. It is inherent because in any relationship, the parties involved will consider whether they are receiving an equitable share of the benefits which accrue from the existence of the relationship. Conflict may arise from the absence of mutuality because of changes in the objectives of either party or because of the changes in processes which are not being managed to the satisfaction of one or both parties.

Although there are efforts by the IMP researchers to define the term atmosphere in the context of business marketing, Young and Wilkinson (1997) comment that this term has been defined quite broadly to include a variety of constructs used by researchers to characterise dimensions of a relationship. They consider that a central aspect of the concept of atmosphere is the cooperative and competitive norms of the firms involved. These norms include trust and opportunism. The atmosphere is shaped by the ongoing patterns of interaction taking place in a particular environmental context together with

their associated outcomes. In a similar fashion, Proença and Castro (1998) also characterise atmosphere in terms of the state of conflict or cooperation and overall closeness or accessibility of the relationship, as well as by the trust and commitment involved in the relationship.

Another way of describing the atmosphere of a relationship is provided by Ford (1989). He uses the concepts of width, depth, and closeness in relationship assessment. The width of a relationship is a measure of the range of activities that it comprises either in a narrow relationship (e.g., simple transaction) or in a wider relationship (e.g., complex transaction). The depth of a relationship is a measure of which of these activities are done together (e.g., joint product development). Closeness refers to the extent of mutual understanding and predictability of behaviour that exist between the two parties.

There is no doubt that to address the issues of interaction between buyers and sellers, different elements of exchange and the atmosphere surrounding the parties involved should be taken into consideration. Although the IMP model provides another perspective to examine buyer-seller relationship, it is not without limitations. These limitations will be discussed in the following section.

4.3.7 Limitations of Interaction Model

The IMP work and the interaction approach are not without criticisms. Many of the constructs mentioned earlier (e.g., cooperation and coordination) are not well defined and researchers do not share common construct definitions. In addition, some of the constructs (e.g., atmosphere) are defined very broadly.

Even the IMP researchers also admit the deficiency of the interaction approach. For example, Ford (1997, 1998) admits that the interaction approach has over-emphasised the closeness and cooperative aspects of business relationships. In reality, an organisation's best interests can be best served by working against the other party. This can be illustrated by the possibility that business purchasing may be about seeking advantage over suppliers and playing one off against the other for short-term price reduction.

A number of other researchers, for example, de Búrca (1995), de Búrca and McLoughlin (1998), and Tikkannen (1998), also note that the interaction approach is narrow in scope and only focuses on single dyadic relationships, providing a partial view of how organisations interact. The attention on single dyadic relationships overlooks the fact that organisations are embedded in a range of relationships with third parties, such as customers, customers' customers, suppliers' customers, consultants, competitors, and the general public. Therefore, the problem lies with the IMP research framework with relationship as the unit of analysis. It is not possible to examine relationship within the context of a single relationship or a portfolio of relationships. Very often, each organisation is involved in a web of relationships with the other organisations. In order to understand what goes on inside an organisation, it is necessary to understand the network in which the organisation is involved. The network approach to the investigation of inter-firm relationships was then developed. Although the network approach is not the main focus of this study, it is better to trace back its development and theoretical foundation. This not only helps provide another perspective to the study of inter-firm relationship, but also enriches the theoretical development of a model for this study of business-to-business professional service quality. The following section will explain the model development, theoretical assumptions, and research methodology of the network approach.

4.4 NETWORK APPROACH

4.4.1 Model Development

Discussion on the dyadic relationships in the IMP interaction model now shifts to the totality of relationships in a market or industry. It is said that the market is perceived as a process of networking, linking together different market actors, activities, and resources (Tikkanen, 1998). Marketing in this context becomes the creation, utilisation, and maintenance of the network (Gummesson, 1994).

Parallel to the development of the IMP interaction approach, the network approach is the outcome of a fairly broad research programme originated at the University of Uppsala in the mid-1970s in the study of business markets. Cook and Emerson (1984) simply describe a network as sets of connected exchange relationships between actors controlling business activities.

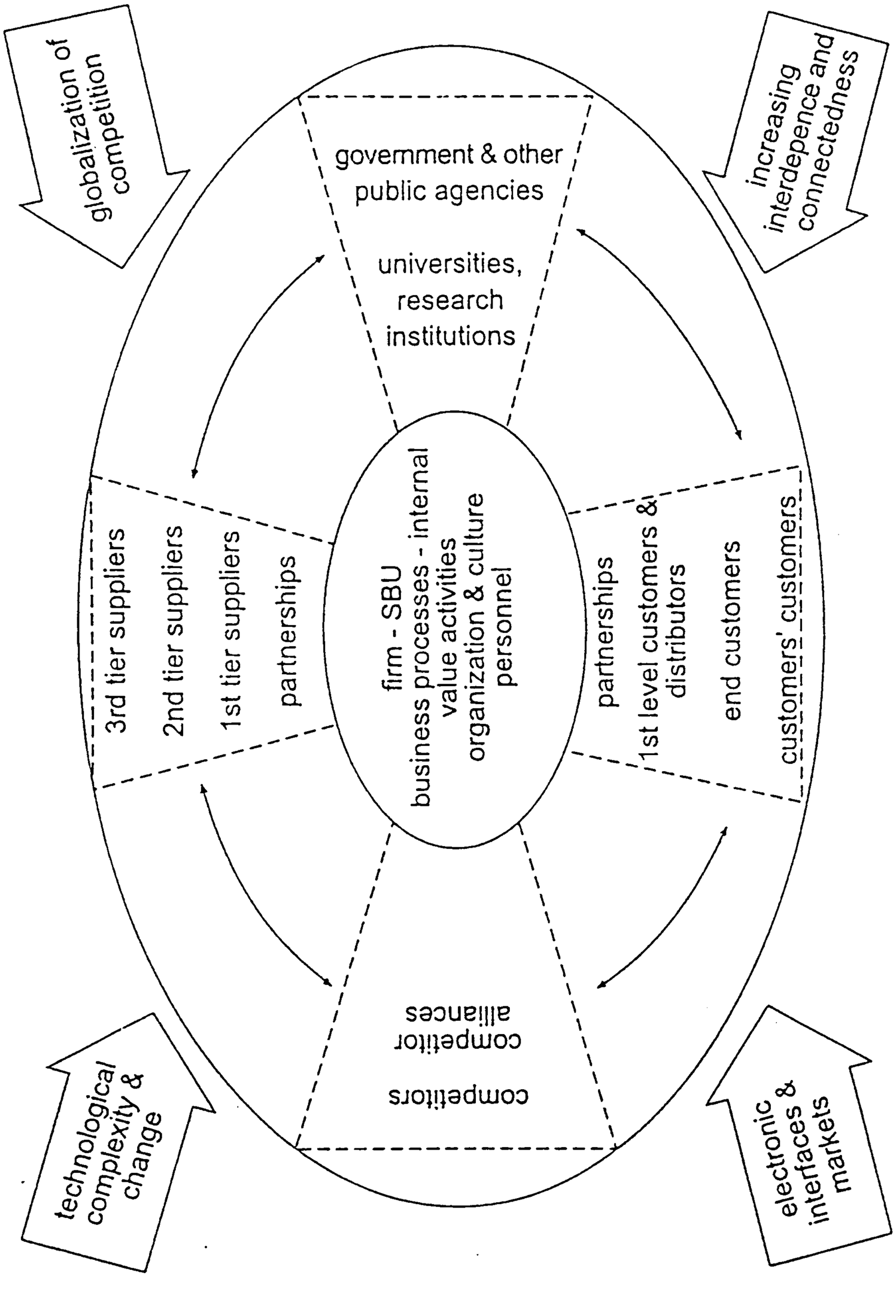
Easton (1992) states that industrial network, by definition, comprises many relationships and so any account of them not only has to scarify some of the descriptive richness of the IMP interaction approach, but also to concentrate on those aspects which have particular implications for network operation. Mazet et al. (1995) also point out that the network approach is not only based on the IMP model, the principles of market heterogeneity, and organisational inter-dependency; but also extending the model to include actors other than the buying and selling organisations. Möller and Halinen (1999) provide a schematic diagram about the possible parties involved in a network. As shown in Figure 4.4, these parties include suppliers at various tiers, government and research institutes, competitors and competitor alliances, distributors, and customers at various levels.

Similar to the development of the IMP interaction approach, the network approach was derived from a synthesis and integration of theories in related studies or other disciplines. In a literature review, Araujo (1989) (requoted from Cheung and Turnbull, 1998) identified the following five major sources of the network approach as being:

1. theories of marketing and distribution channels;
2. study of internationalisation of firms and international industrial marketing and purchasing;
3. organisational theories, including resource-dependency theory (Pfeffer and Salancik, 1978), inter-organisational theory (Aldrich and Whetten, 1981) and the functionalist approach in organisational theory (Thompson, 1967);
4. exchange theory (Cook and Emerson, 1984); and
5. marketing theory which has a mixed economic and behavioural approach (Reve and Stern, 1985).

The synthesis of theories from various disciplines provides another perspective to the study of inter-organisational relationships. The main objectives of the network approach are to provide understanding and description of industrial markets as a complex network of organisational relationships. To this end, the network approach is primarily descriptive to help researchers understand systems of relationships from both the perspective of a particular focal firm (i.e., focal firm perspective) and from the perspective of a network

Figure 4.4: Business Relationships and Networks–A Focal Firm Perspective (Möller and Halinen, 1999, p. 415).



(i.e., holistic perspective). The concept of the network approach differs significantly between the European school of thought (or Uppsala Tradition) and the American school of thought. The former perceives networks as the outcomes of interaction process, not as constructs formed by any individual actor (Tikkanen, 1998). On the other hand, the American school of thought focuses on the "strategic networks" that are set up by a single actor, or the hub firm.

Although the network approach provides another perspective to the study of inter-organisational relationship, as noted by Cheung and Turnbull (1998), there are two main problems confronting effective research on inter-organisational relationships. Firstly, there is an imprecise definition about the nature of inter-organisational relationships. Many studies offer different and yet incomplete interpretations of the nature of inter-organisational relationships. Secondly, the definitions, if there are any, are set too broadly to be able to account adequately for the variables that govern the character of inter-organisational relationships. They also fail to identify the effects brought about by the character of inter-organisational relationships. Therefore, Cheung and Turnbull comment that these problems create difficulties in examining relational issues stemming from inter-organisational relationships and interactions. It is only in recent years that considerable academic research efforts were committed to the analysis of the nature and operation of networks.

4.4.2 Assumptions

Despite the divergent approaches to the study of networks (i.e., European versus American approaches), researchers seem to share some common underlying assumptions about the nature of contemporary business environment and the behaviour of business organisations. De Búrca and McLoughlin (1998) suggest that one of the basic assumptions in the network approach to the study of inter-organisational relationships is the dependency of resources controlled by the other firms. These inter-dependencies exist in three areas:

1. Activity. The activities in two different relationships can complement each other, or they may be in competition.

2. Resources. Resources used, accessed, or exchanged in one relationship can complement or compete with those used, accessed, or exchanged in another relationship in which the organisation is involved.
3. Actors can use the existence of complementarity or competitiveness in their relationships in different ways when they interact with one another.

Therefore, the network perspective places more emphasis on the contextuality and time than the IMP interaction approach. The network approach assumes that business takes place in a network setting where different business actors are linked to each other through direct or indirect relationships. The network of relationships is the unit of analysis, as opposed to the IMP interaction approach in which the relationship is the unit of analysis. The network approach also assumes that there is no distinct boundary between the firm and its environment. The environment is not transparent to managers.

Another basic assumption is that networks are essentially heterogeneous in nature based on the fact that managers are required to match heterogeneous resources to heterogeneous demand derived from different individual firms. Each firm is individual in terms of structure, history, resources, and its role in the environment.

In addition to the above-mentioned assumptions underlying the network approach, Håkansson and Snehota (1997) put forward four propositions:

1. Business organisations often operate in a context in which their behaviour is conditioned by a limited number of counterparts, each of which is unique and engaged in pursuing its own goals.
2. Relationships within a network enable actors to access and exploit the resources of other parties and to link the parties' activities together.
3. The distinctive capabilities of an organisation and its identity are developed through its interaction in the relationships with the other parties.
4. Since the other parties to the interaction also operate under similar conditions, an organisation's performance is conditioned by the totality of the network.

It is expected the network approach to the examination of inter-organisational relationships will become more popular as researchers become more aware about the existence of other parties other than the buying and selling organisations. The following section provides a summary of research considerations when studying networks of relationships.

4.4.3 Research Methodology

Like most of the IMP research works, the research approach to network analysis is largely qualitative and case-based. Araujo and Easton (1996) compare the two types of research process for network analysis: analytical versus metaphorical dichotomy. The former category is mainly used in the social network analysis paradigm which is best described as a set of mathematical techniques. However, the limitations of social network analysis for business networks are twofold. Firstly, the social concepts employed spring from the techniques rather than vice versa. This is considered to be a grave constraint on theory development. Secondly, limited access to relevant data imposes another constraint. Large and complete data sets of nodes (i.e., business firms) and their links (i.e., exchanges and ties) are required but are rarely available from secondary sources. In collecting primary data, the process is prohibitively expensive, time-consuming, and sometimes impossible when confidential data are taken into account. The alternative methodology is based on a qualitative approach. But such an approach to examining network process cannot handle large data sets, is time-consuming, may not be accepted by positivists, and can be faulted on its ability to allow generalisation. Araujo and Easton (1996) conclude the research approach of network analysis in that:

> Clearly, the research questions should dictate methodology but economic and access constraints cannot be ignored, and there is always a temptation to work along the fault lines of the research phenomena, looking for the easy and convenient rather than appropriate route (p.106).

In summary, the development of the network approach parallels the IMP research work in business markets but on a different route (i.e., relationship as a unit of analysis versus a network of relationships as a unit of analysis). As far as the nature of this study is concerned, the network approach to examine business-to-business

professional service quality is not considered appropriate for two reasons. Firstly, as mentioned in Chapter Two, service quality is conceptualised as a comparison between customers' expectations and their perceptions of actual performance. From this perspective, service quality evaluation involves only two principal parties in an interaction--the customer and the service provider. This can be reflected in a number of service quality models mentioned in Chapter Two, including technical-functional model (Grönroos, 1984), gap model (Parasuraman et al., 1985), interactive-physical model (Lehtinen and Lehtinen, 1982, 1991) and some of the professional service quality models mentioned in Chapter Three, including, hard-soft model (Szmigin, 1993), process-outcome model (Halinen, 1996), and immediate-final outcome model (Venetis, 1997). The dyadic relationship between a buyer and a seller (or between a client and a professional service provider) can be best observed with the IMP interaction approach (de Búrca, 1995; de Búrca and McLoughlin, 1998; Tikkannen, 1998).

Secondly, it is not always possible, in particular for doctoral study, to investigate a network of relationships without heavy investment in time and effort in collecting data as highlighted by Araujo and Easton (1996). The access to data is also a major concern to network researchers. These are the reasons why the network approach was not used in this study. Instead, the IMP interaction approach to examine dyadic relationship was taken to develop a theoretical model of business-to-business professional service quality.

The following section will return to the IMP interaction approach by reviewing certain empirical studies using the IMP model variables. Such a review is indispensable to examine how the variables in the interaction model are operationalised and the context in which they are used. These will help develop a measurement instrument for this study.

4.5 EMPIRICAL STUDIES USING IMP INTERACTION MODEL

As mentioned earlier in Section 4.2.2, the philosophy underlying the interaction approach is that both buyer and seller are active participants in the market. Relationships are long-term, close, and involve a complex pattern of interaction

between buying and selling organisations. The links between buyer and seller often become institutionalised into a set of rules that each party expects the other to perform in terms of adaptation, mutual co-operation, and conflict handling. As far as the interaction process is concerned, it can be broken down into short-term exchange episodes and long-term relationships. For the exchange episodes, they include product and/or service exchange, information exchange, financial exchange, and social exchange. These short-term exchange episodes will form the basis for building up long term buyer-seller relationships. Routinisation of these exchange episodes over time will lead to clear expectations about the roles and responsibilities of both transacting parties. Wilson and Mummalaneni (1986) comment on the strengths and weaknesses of the interaction approach. They note that the model introduces interaction variables, the issue of long-term relationship, and the mechanism through which such a relationship comes to exist. They also comment that the model is applicable only to a European setting because a majority of the literature concerning the model originates in Europe. But this point can be challenged by the fact that a number of studies had been undertaken in North America (e.g., Frear and Metcalf, 1988; Metcalf et al., 1992) and in Asia (e.g., Holden, 1988 in Japan) and the interaction model was found to be equally applicable.

Difficulty in collecting data can be a major hurdle when applying the IMP interaction model to other countries. For example, in an empirical study of China trade involving a survey of 199 chief executives of Hong Kong companies, Leung, Wong, and Tam (1995) support the view that adaptation depends on the degree of understanding between buyer and seller, and on the frequency of information exchange between buyer and seller, but not on the extent of relationship between buyer and seller. Other variables on interaction parties, interaction environment, and atmosphere in the interaction model, however, are excluded because it is difficult to collect these kinds of data in mainland China. How the model can be applied in the other countries remains to be tested in future studies.

In addition, there is not adequate understanding about the variables in terms of their operationalisation. Tables 4.3 and 4.4 provide a summary of some empirical studies on how the IMP interaction model variables can be operationalised. It is evident that

Table 4.3: Operationalisation of IMP Interaction Variables

	Håkansson (1982)	Hallén, Johanson, and Seyed-Mohamed (1987)
Product/Service Exchange	• ease of specifications • complexity and performance • frequency of delivery • delivery timing • product essentiality • reduction of uncertainty • fulfilment of needs	• product complexity • delivery frequency
Information Exchange	*contact pattern* • involvement/intensity, • no. of person • forms (visit, fact-to-face, company magazine) • frequency • scope and depth • level of formality *topic/contents* • type of information requested and provided • width of information • depth of information	• no. of persons having contacts • frequency of meetings
Financial Exchange	• need to exchange money • value • volume • exchange rate	
Social Exchange	• open and friendly • personal and business relationships • existence of mutual trust and confidence • social contacts in the dealings • reduction of cultural differences	
Cooperation	• joint technical problem-solving • continuity • reciprocity	
Adaptations	• product modification (e.g., stocking policies and pricing) • technical (e.g., maintenance) • administrative • marketing • information dissemination and routines • lead time and scheduling • location • solving specific problems • financial arrangement (e.g., credit) • social relations	• product modifications • production • routines

Table 4.3 (cont'd): Operationalisation of IMP Interaction Variables

	Metcalf, Frear, and Krishnan (1992)	Rice (1992)
Product/Service Exchange	• product quality • product reliability • product service • technical assistance • product essentiality	
Information Exchange	• technical documentation • technical information	• seminars & lectures • product presentations
Financial Exchange		• negotiation of contract • signing of contract
Social Exchange	• like dealing with them • understanding problems • confidence in information • poor understanding • difficult to make friends	• formal level • informal level
Cooperation	• marketing co-operation • call frequency • request salesperson • product use	
Adaptations	• joint product development • technical solutions • co-ordinate production	

Table 4.3 (cont'd): Operationalisation of IMP Interaction Variables

	Leung, Wong, and Tam (1995)	Cannon and Perreault (1999)
Product/Service Exchange		
Information Exchange	• market information exchange (e.g., competitors) • economic information exchange (e.g., exchange rate) • organisational information exchange (e.g., change of management)	
Financial Exchange		
Social Exchange		
Cooperation		• joint responsibilities • concern with profitability • not to take advantage • willingness to make cooperative changes • working together to be successful • owing favours
Adaptations	• technical features • production capacity • distribution channels • techniques	• product features • personnel • inventory and distribution • marketing • capital goods and tools

Table 4.4: Operationalisation of IMP Atmosphere Variable

Håkansson (1982)	Young and Wilkinson (1997)	Ennew and Binks (1999)
• power-dependence relationship • state of conflict or cooperation • overall closeness or distance of the relationship • mutual expectations between the parties	• Power-dependence relationship (relative influence of the firm over specific relationship issues) • Closeness or distance in the relationship (existence of close personal relations with members of the other firms • Relationship satisfaction	• Conflict-cooperation (the extent of which bank policies helped or harmed customers' businesses).

relevant studies are very limited and most of them are qualitative rather than quantitative. Tyler (1996) also makes the point that studies which focus on exchange relationship are scarce. For example, she reviewed the relevant literature and found that there were only 18 studies of relationship dynamics in industrial sectors during the period from 1975 to 1995 and only seven related studies in service sectors during the period from 1980 to 1995. Some studies were related to financial services (Turnbull and Moustakatos, 1996a, 1996b; Tyler, 1996). More studies are needed to apply the exchange variables to different industries, in particular business-to-business professional service industries.

Also revealed from the empirical studies in Table 4.3, the attributes underlying respective exchange dimensions appear to be applicable to the business-to-business professional service and in some way have been incorporated in certain business-to-business professional service quality studies. For example, service exchange and social exchange were addressed in the study of consulting engineering services by Samson and Parker (1994) and Lapierre (1998). Service exchange includes the attribute of whether the design proposal or the final structure meets clients' requirements. Social exchange is featured by the attribute whether the consultants are easy to make friends. In the studies of professional business service by Freeman and Dart (1993) and Turner, Aldhizer, and Shank (1999), items related to information exchange and financial exchange were also included in the measurement instrument. These items were related to the communications dimension and fee-related dimension. The remark by Yorke (1990) as well as the results from the IMP theoretical and empirical studies mentioned earlier provide a basis that the application of the interaction model to conceptualising business-to-business professional service quality is a plausible research direction.

4.6 CHAPTER REVIEW

This chapter has provided a summary of the development of the IMP interaction approach and the network approach. Both transactional exchange and relational exchange are important ingredients of long-term buyer-seller relationship. There is a clear indication that long-term relationship between buying and selling organisations hinges on the performance of short-term exchange episodes. The incorporation of the IMP interaction model to the conceptualisation of business-to-business professional

service quality should provide a better understanding of the service quality evaluation by clients.

The review on transactional exchange in this chapter covers most of the service dimensions (e.g., process and outcome dimensions) which were already discussed in both Chapters Two and Three. But as far as the discussion on relational exchange is concerned, it is only limited to the IMP literature. There is a need to explore the subject in greater depth before synthesising all the relevant literature to establish a theoretical model for this study. Related studies can be found in the subject of relationship quality which is regarded as the central construct of relationship marketing and is derived from relational exchange between buyers and sellers. The next chapter will review the concept of relationship quality, its relationship with service quality, dimensions, and measurement.

CHAPTER FIVE:
REVIEW OF LITERATURE (PART IV):
RELATIONSHIP QUALITY

5.1 INTRODUCTION

In Chapters Three and Four, the concept of relationship marketing and the theoretical foundation of the IMP interaction approach were respectively reviewed. It is widely accepted by researchers that business marketers have to manage various exchanges with their customers for the long-term survival in the marketplace. The practice of relationship marketing is significant to business marketers, in particular business-to-business professional service providers as most of their services are intangible in nature and with a high degree of credence properties. Lying at the heart of relationship marketing is the relationship quality, an outcome variable that is emerging as a central construct in the relevant literature. As mentioned in Chapter Two, service quality is a global evaluation of a service offering. Such an evaluation involves assessment of both transactional exchanges and relational exchanges that were addressed in Chapter Four. Based on this conceptualisation, relationship quality is considered to be an antecedent of service quality and there should be a positive association between relationship quality and overall service quality. A review of the relationship quality literature should provide further insight of relational exchanges beyond the IMP perspective. However, there is a paucity of relationship quality studies, both conceptual and empirical, undertaken in the past decade.

This chapter will review relationship quality research by focusing on its development, definitions of relationship quality, dimensions, models, relationship with service quality, and how the construct of relationship quality is operationalised and measured.

5.2 DEVELOPMENT OF RELATIONSHIP QUALITY RESEARCH

Relationship quality lies at the heart of relationship marketing, just as product quality for product marketing and service quality for services marketing (Page, Sharp, and Rungie, 1997). But in terms of the number of studies, both conceptual and empirical, it is lagging

far behind those conducted in the areas of service quality and product quality. In the early 1990s, researchers started to realise the importance of relationship marketing in particular in the services industry (e.g., Crosby et al., 1990; Czepiel, 1990). Crosby et al. (1990) mention that effective relationship selling is most critical when:

1. The service is complex, customised, and delivered over a continuous stream of transactions;
2. Many buyers are relatively unsophisticated about the service; and
3. The environment is dynamic and uncertain in ways that affect future needs (demand) and offerings (supply).

In addition, they emphasise the importance of relationship quality by suggesting that:

> Salespeople involved in the marketing of complex services often perform the role of "relationship manager." It is, in part, the quality of the relationship between the salesperson and the customer that determines the probability of continued interchange between those parties in the future (Crosby, Evans, and Cowles, 1990, p. 68).

Similar comments are offered by Storbacka, Strandvik, and Grönroos (1994) who conceive that:

> In order to enable a firm to capitalise on available customer relationship economics opportunities and manage its customer relationships at a profit, the dynamic nature of such relationships has to be understood. The more or less static conceptual and measurement models of service quality of today have to be geared to this long-term perspective and towards a relationship quality notion. (p. 35.)

Although the concept of relationship quality is important in the relationship marketing literature and in the service quality literature, there are not many studies which focus on studying relationship quality. This phenomenon can be reflected in Naudé and Buttle's

(2000) comment that within the rapidly expanding literature of business-to-business marketing, supply-chain management, relationship marketing, and customer relationship management, there is relatively little attention paid to the issue of relationship quality. Smith (1998a) also observes that:

> Despite more than a decade of effort, relationship marketing research is considered to be nascent and in its very early stages of development. Particularly problematic is a lack of agreement on concept definitions, measures, or labels, and a significant overlap in the meaning of constructs. This is particularly true of relationship quality, an outcome variable that is emerging as a central construct in the relationship marketing literature (p. 4).

The pioneering study on relationship quality in the early 1990s was by Crosby et al. (1990) who developed a model explaining the antecedents and consequences of relationship quality. Their relationship quality model is regarded as an important study in the areas of relationship marketing and services in terms of the number of citations in studies of buyer-seller relationships (Boles, Johnson, and Barksdale, 2000). Since then, a few studies which aimed at developing relationship quality models from different perspectives were proposed and tested. These models will be discussed in Section 5.5.

Summing up, although relationship quality studies conducted in the past decade are limited as compared to those in the areas of service quality and product quality, a review of these studies is indispensable to capture the essence of the relationship quality concept and related measurement issues. This review is also critical to forge a link between relationship quality and service quality when developing a conceptual model for this study. The following section will discuss definitions of relationship quality before proceeding further to examine its dimensions, models, and measurement issues.

5.3 DEFINITIONS OF RELATIONSHIP QUALITY

As mentioned earlier, there is a lack of conceptual definitions of relationship quality (Smith, 1998a). As a matter of fact, only a handful of researchers who have attempted to define relationship quality. Hennig-Thurau (2000) tries to offer one of the possible reasons for the deficiency. He notes that researchers tend to assume that everyone has some kind of intuitive understanding of what relationship quality involves. As a consequence, sophisticated discussion of this issue is rare. A review of the literature only provides a few definitions of relationship quality. They are as follows:

1. Relational quality is "a concept which has been formed to stress that skilled handling of relations between buyer and seller is part of customer-perceived quality. High relational quality contributes to positive customer-perceived quality and thus enhances the changes for a long-term business relationship" (Gummesson, 1987, p. 19).
2. Relationship quality is defined as when "the customer is able to rely on the salesperson's integrity and has confidence in the salesperson's future performance because the level of past performance has been consistently satisfactory." (Crosby et al., p. 70).
3. Relationship quality is "an overall assessment of the strength of a relationship and the extent to which it meets the needs and expectations of the parties based on a history of successful or unsuccessful encounters or events" (Smith, 1998b, p.78).
4. Relationship quality "describes the overall depth and climate of the interfirm relationship" (Johnson, 1999, p.6).

Based on the above definitions, a few issues are worth addressing. First, relationship quality is part of the overall quality perception. There should hypothetically be a positive association between relationship quality and overall quality perception. Second, the definition of relationship quality can be industry-specific. For example, in the definition by Crosby et al. (1990), the focus is on the salesperson's integrity and future performance in the insurance industry. Hennig-Thurau (2000) comments that the approach by Crosby et al. in defining relationship quality is limited in terms of general applicability because it

is predominately based on customer-company relationships in the life insurance sector where the primary goal is the reduction of customer uncertainty. Last, relationship quality is a multidimensional construct. For example, Crosby et al. suggest salesperson's integrity as part of relationship quality. Smith (1998b) however considers meeting the needs and expectations of the parties as part of the relationship quality assessment. A detailed examination of the dimensions of relationship quality will be provided in the next section.

5.4 DIMENSIONS OF RELATIONSHIP QUALITY

The previous section reviewed a few definitions of relationship quality. There is no dispute that relationship quality, like service quality, is a higher-order construct. Leuthesser (1997) comments that "in the area of relationship marketing, the primary emphasis of studies to date has been on understanding the factors that influence relationship quality" (p. 246). Crosby et al. (1990) are the earliest researchers to identify and empirically examine dimensions of relationship quality. They suggest that relationship quality, as a higher-order construct, consists of at least two dimensions: trust in the salesperson and satisfaction with the salesperson. Trust, in a relational sales context, can be defined as "a confident belief that the salesperson can be relied upon to behave in such a manner that the long-term interest of the customer will be served" (Crosby et al., 1990, p. 70). In terms of satisfaction, it is “an emotional state that occurs in response to an evaluation of the interaction experience with the salesperson" (Westbrook, 1981, requoted from Crosby et al., 1990, p. 70). Some researchers have used these two dimensions for studying relationship quality. For example, in their neural network analysis, Wray, Palmer, and Bejou (1994) used trust and relationship satisfaction as two indicators of relationship quality. Leuthesser (1997) also considers relationship quality as a composite measure including both buyer satisfaction and buyer trust.

In some studies, researchers explore other dimensions on the basis of the dual dimensions of relationship quality developed by Crosby et al. (1990). For example, Smith (1998a, 1998b) conceptualises relationship quality as being manifest in at least three related constructs: trust, satisfaction, and commitment. Hennig-Thurau (2000) also

conceptualises relationship quality as a three dimensional construct, including performance-related quality, trust, and commitment.

Some other researchers extend the two or three dimensional structure of relationship quality by including more dimensions. For example, Kumar, Scheer, and Steenkamp (1995) define relationship quality as being manifest in several distinct, though related constructs, including conflict, trust, commitment, willingness to invest in the relationship, and expectation of continuity. Johnson (1999) includes trust, fairness, and absence of opportunism as important components of relationship quality. Dorsch, Swanson, and Kelly (1998) emphasise the importance of trust, satisfaction, commitment, minimal opportunism, customer satisfaction, and ethical profile. Naudé and Buttle (2000), in their group discussion with 40 executives, found five attributes of relationship quality: trust, power, integration, mutual understanding of needs, and profit. The most extensive qualitative study in identifying elements of relationship quality was undertaken by Page et al. (1997). After over one hundred in-depth interviews and some focus group discussions with business customers across various business sectors, including computer software, direct marketing, charity, financial services, telecommunications, Page et al. uncovered the following 11 elements of relationship quality:

1. Understanding. Customers want to be understood by suppliers and service providers.
2. Social bonds. They represent the degree to which providers and customers like each other as people.
3. Effort and "values us". Effort represents how much the customer feels the provider is making for them. "Value us" relates to a feeling of importance and the provider is committed to the business and is interested in producing and keeping satisfied clients.
4. Power. Most customers like to feel they have a degree of control in an exchange relationship.
5. Trust. Its meanings include: (a) the ability to share confidential information, (b) to be open and be able to disclose sensitive information, (c) to feel secure in letting the provider carry out tasks without

supervision, and (d) to be confident that the provider would not exploit the relationship through negative activity such as breaching confidentiality or overcharging.

6. Ethical behaviour. Some customers feel that meeting the agreed standards, including trading policies and terms of reference satisfies the ethical requirement. Another explanation of ethics relates behaving in a legal, non-fraudulent manner that does not deliberately disadvantage the other party.
7. Information sharing (from and to the supplier)
8. Time
9. Conflict
10. Switching costs

Summing up the above studies, relationship quality is regarded as a higher-order construct. There is no limit as to the number of dimensions and no obvious agreement on the dimensions that make up the construct of relationship quality. At its least, it is composed of two dimensions: trust and relationship satisfaction. Although these two dimensions are commonly used in relationship quality studies, they may not be equally applicable in a business-to-business professional service setting as they were developed in the context of customer-company interaction. Another direction for future research is to explore other dimensions other than the dimensions of trust and satisfaction. One option is to incorporate the relational exchange elements (i.e., cooperation and adaptation) of the IMP interaction model as these exchange elements have been extensively researched in the area of business marketing. The perceptions of these relational exchange elements may be a better approximation of relationship quality when examining business-to-business interactions.

5.5 MODELS OF RELATIONSHIP QUALITY

Apart from examining the dimensional structure of relationship quality, studies have been underway to develop different models of relationship quality, including those investigating the antecedents and consequences of relationship quality as well as the

relationship between sex-type and relationship quality. This section will discuss some of these relationship quality models.

In Chapters Two and Three, different models of service quality and professional service quality were reviewed respectively. It is evident that different researchers, based on different conceptual backgrounds, developed different models of service quality and professional service quality. The same situation also applies to relationship quality as shown in Table 5.1. There are three issues worth mentioning. First, most of the models are related to the identification of antecedents and consequences of relationship quality (e.g., Boles et al., 2000; Crosby et al., 1990; Lagace, Dahlstrom, and Gassenheimer, 1991; Leuthesser, 1997). Second, only one replication study was undertaken in the past decade. The relationship quality model developed by Crosby et al. (1990) was replicated and extended by Boles et al. (2000). Last, the conceptual model of Storbacka et al. (1994) seems to be incompatible with what Gummesson (1987) proposes about the relationship between service quality and relationship quality. Put more explicitly, Storbacka et al. (1994) state that high service quality will lead to favourable relationship quality perceptions in terms of relationship strength, longevity, and profitability. But Gummesson (1987) proposes the other way round in that "relational quality is a concept which has been formed to stress that skilled handling of relations between buyer and seller is part of customer-perceived quality" (p. 19). Gummesson's line of thought is more consistent with the service quality literature when service quality is defined as a global evaluation of a service offering. The debate concerning the direction of relationship between relationship quality and service quality seems to be similar to the debate between service quality and customer satisfaction mentioned in Chapter Two. The relationship between relationship quality and service quality needs to be addressed theoretically and empirically in future studies. In this study, relationship quality is considered to be an antecedent of service quality.

Also shown in Table 5.1, the earliest work on modelling relationship quality can be traced back to the work of Crosby et al. (1990) who identified structural characteristics (antecedents and consequences) of enduring sales relationships in services selling. Their

Table 5.1: Summary of Selected Studies on Modelling Relationship Quality

Researcher/(s)	Conceptual / Empirical	Main Relationships Hypothesised/Confirmed
Crosby, Evans, and Cowles (1990)	Empirical	Salespersons characteristics (e.g., integrity) and relational selling behaviour have positive effects on relationship quality which in turn affects anticipation of future interaction.
Lagace, Dahlstrom, and Gassenheimer (1991)	Empirical	Ethical selling behaviour and expertise have positive effects on relationship quality.
Storbacka, Strandvik, and Grönroos (1994)	Conceptual	Service quality and customer satisfaction will have positive effects on relationship quality.
Liljander and Strandvik (1995)	Conceptual	Relationship quality can be determined by direct or inferred disconfirmation or by relationship performance alone. Relationship quality can affect commitment directly or through perceived relationship value.
Kumar, Scheer, and Steenkamp (1995).	Empirical	Resellers' perceptions of both supplier distributive and procedural fairness enhance their relationship quality, although these effects are moderated by the level of outcomes and environmental uncertainty.
Leuthesser (1997)	Empirical	Relational behaviours (e.g., proactive effort, information exchange, interaction frequency) have a significant influence on relationship quality which, in turn, has a significant influence on the share of business.
Smith (1998a)	Empirical	Same-sex relationships, personality similarity, and supplier representative expertise have significant effects on relationship quality.
Smith (1988b)	Empirical	Social bonds and relationship investment have positive effects on relationship quality.
Johnson (1999)	Empirical	Continuity expectation has a positive effect on relationship quality.
Hennig-Thurau (2000)	Empirical	Customer skills (i.e., skills attribution, skills level, and skills specificity) have a significant effect on relationship quality (i.e., perceived product quality, trust, and commitment)
Boles, Johnson, and Barksdale (2000)	Empirical	Crosby, Evans, and Cowles' (1990) relationship quality model was replicated and extended. Equity has a positive effect on relationship quality.

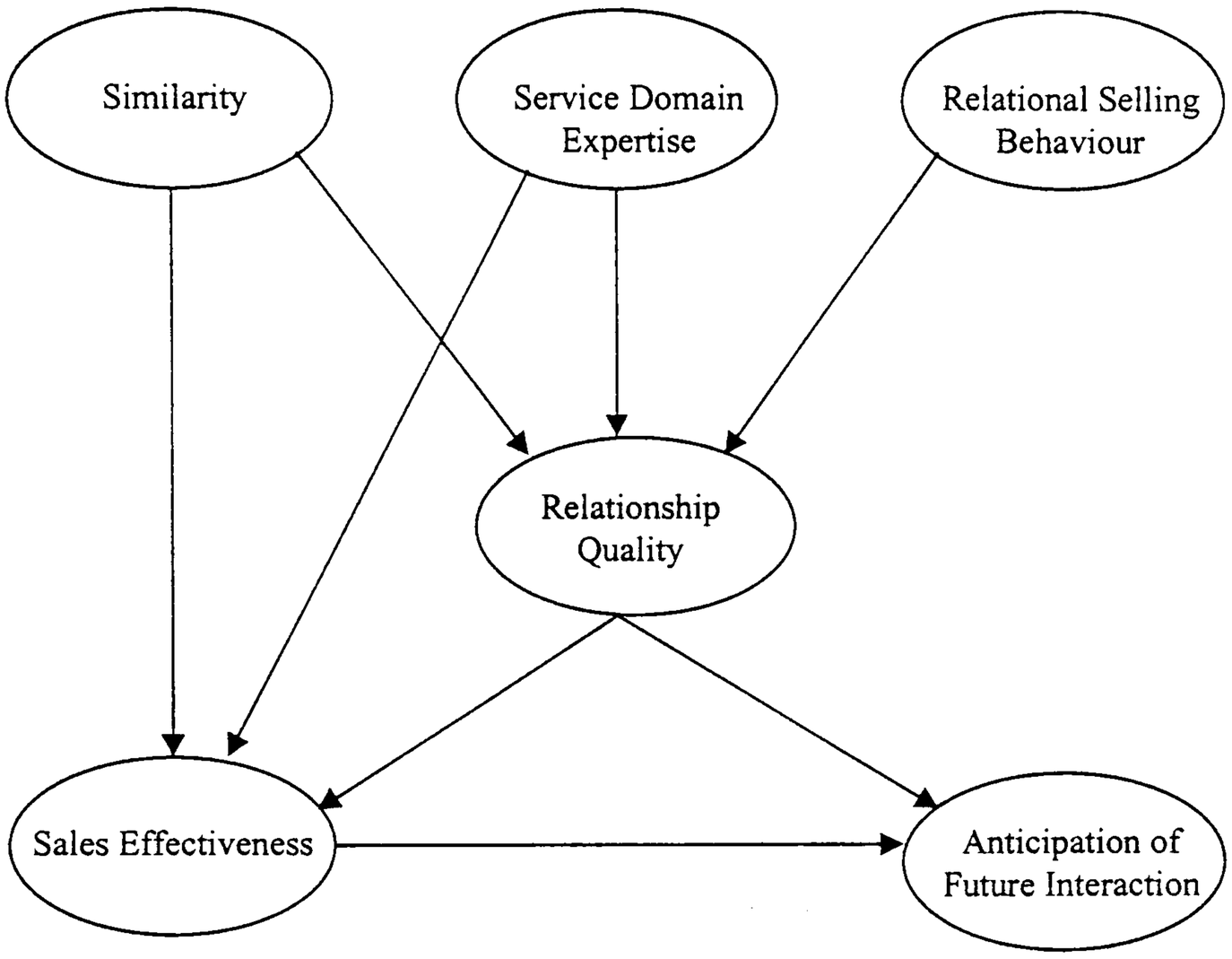
relationship quality model is depicted in Figure 5.1. In the model, the formation of relationship quality perception is likely to be affected by salesperson attributes (e.g., expertise and similarity) and relational selling behaviour (e.g., contact intensity, mutual disclosure, and cooperative intentions). The outcomes of relationship quality are sales effectiveness (e.g., account penetration, cross-selling) and anticipation of future interaction. The model was then tested using structural equation modelling on survey data from life policy holders. The developers of the model however failed to find a relationship between relationship quality and sales effectiveness. Ten years later, the relationship quality model developed by Crosby et al. (1990) was replicated and extended by Boles et al. (2000) in a business-to-business setting. Boles et al. consider that the work of Crosby et al. represents a contribution to the relationship marketing literature in that:

> Undoubtedly, Crosby, Evans, and Cowles (1990) is an important study in the areas of relationship marketing and services. Since its publication, the Crosby and colleagues' study has been referenced extensively in other research examining buyer-seller relationships (over 37 citations in 5 years) in some of the leading marketing journals…This indicates that it is a study worth replicating in a different setting (p. 76).

In the study by Boles et al. (2000), equity as an antecedent of relationship quality was added. Using business customers as the sample and structural equation modelling for data analysis, Boles et al. found that six out of eight common relationships between original study and replication study were confirmed. In addition, the findings indicate that equity is also a significant predictor of relationship quality. About the robustness of the relationship quality model developed by Crosby et al. (1990), Boles et al. conclude that:

> Our study was conducted with customers of firms that sold a service to businesses; whereas, the original study used a consumer sample of life insurance purchasers. The differences that were discovered are likely to be a function of the different sales environment being studied and, perhaps, indicate that business buyer-salesperson relationships may have some different antecedents and consequences form those found in a consumer

Figure 5.1: Crosby, Evans, and Cowles' (1990) Relationship Quality Model



sales setting. However, the model did have a number of linkages that were significant in both settings. (p.80)

From the above concluding remark, it is clear that the relationship quality model developed by Crosby et al. (1990) can only be applied in some industry settings. Although the model is well-established in the relationship marketing literature, it does not bar researchers from attempting to develop relationship quality models from other perspectives. In the past ten years of relationship quality research, some other models were proposed and empirically tested. Table 5.2 provides a summary of selected empirical studies. Most of them are quantitative studies using survey data and sophisticated data analysis approaches (e.g., neural network analysis by Wray et al., (1994); conjoint analysis by Naudé and Buttle (2000); and structural equation modelling by Hennig-Thurau (2000)). Two more studies (i.e., Leuthesser, 1997; and Smith, 1998b) are to be further discussed for the reason that the developers of these models undertook an in-depth literature review of relationship marketing and business marketing. In addition, these models were rigorously tested using survey data from business respondents.

Regarding Leuthesser's (1997) relationship quality model, it identifies a number of antecedents of relationship quality and the relationship between relationship quality and performance outcome in a business-to-business setting. These antecedents include:

1. Initiating behaviour. It refers to the extent to which a supplier proactively initiates efforts to better understand a buyer's needs and requirements, and helps the buyer become more competitive.

2. Signalling behaviour. It refers to the extent to which a supplier provides advance information about intended changes in its marketing programmes (e.g., product design, pricing structure, billing procedures, and so on).

3. Disclosing behaviour. It refers to the extent to which a supplier is perceived to provide sensitive information about itself.

Table 5.2: Summary of Selected Empirical Studies on Relationship Quality

	Crosby, Evans, and Cowles (1990)	Lagace, Dahlstrom, and Gassenheimer (1991)
1. Research Objective	To examine the nature, consequences, and antecedents of relationship quality.	To extend the Crosby, Evans, and Cowles' relationship quality model to include ethical salesperson behaviour.
2. Research Design	Mail survey of 469 insurance policyholders. 151 usable responses were used.	Mail survey of 90 medical doctors. All doctors completed and returned the survey questionnaires.
3. Measurement	Items were developed for all the constructs: "similarity," "service domain expertise," "relational selling behaviour," "relationship quality," "sales effectiveness," and "anticipation of future interaction."	All items were borrowed from existing scales and then modified to reflect relevant characteristics of pharmaceutical sales. Relationship quality was measured using 10 items: 5 items for "trust" and 5 items for "satisfaction with exchange."
4. Validity, Reliability Evidence	Construct validity and composite reliability.	Content validity and coefficient alpha.
5. Statistical Analysis	Structural equation modelling.	Correlation analysis and regression analysis.
6. Major Strengths	1. To propose a relationship quality model. 2. Measures were developed specifically for the study as no established scale was available for most of the constructs under study.	To extend Crosby, Evans, and Cowles' relationship quality model to include ethical behaviour.
7. Major Weaknesses	1. Did not follow the scale development guideline suggested by Churchill (1979). 2. Possible non-response bias as no follow-up action taken for non-respondents.	1. Small sample size. 2. Single-item measures were used for operationalising "duration of relationship" and "frequency of interaction."
8. Research Findings	Relationship quality had a significant influence on the customer's anticipation of future interaction with the salesperson. Relationship quality, however, was not found to affect sales effectiveness significantly.	Ethical behaviour had a strong positive impact upon the level of salesperson trust and satisfaction with the exchange.

Table 5.2: Summary of Selected Empirical Studies on Relationship Quality

	Wray, Palmer, and Bejou (1994)	Leuthesser (1997)
1. Research Objective	To apply neural network analysis to the study of relationship quality.	To examine the influence of relational behaviours on relationship quality.
2. Research Design	Telephone survey of 1944 customers of financial services. 564 usable responses were used in the study.	Mail survey of 800 purchasing managers. 454 usable responses were used in the study.
3. Measurement	Multi-item scales were used for the constructs: "selling orientation," "customer orientation," "ethics," "expertise," "trust," "relationship duration," and "satisfaction."	Sources of the scales were not mentioned. Relationship quality is a higher order construct of the following behavioural constructs: "initiating," "signalling," "disclosing," "interaction frequency," and "interaction richness."
4. Validity, Reliability Evidence	Content validity, convergent validity, and reliability	Content validity
5. Statistical Analysis	Neural network analysis.	Structural equation modelling
6. Major Strengths	Neural network analysis outperforms regression analysis in that (1) no prior knowledge of underlying relationships between variables is required; (2) it is more robust to missing and inaccurate data; and (3) it can handle multi-collinearity problem.	To propose other dimensions of relationship quality.
7. Major Weaknesses	In the study, only one industry was used. Research findings might not be generalised to other industries.	1. Sources of scales or scale development process not mentioned. 2. Possible non-response bias as no follow-up action taken for non-respondents. 3. Assessment of construct validity and reliability was not provided.
8. Research Findings	Neural network analysis was significantly better to explain the relationship between relationship quality and its antecedents. Selling orientation was negatively related to satisfaction. Relationship duration was positively related to trust.	Initiating, signalling, and disclosing behaviours and frequency of interaction appeared to be strongly related to relationship quality which in turn had a positive influence on supplier share of business.

Table 5.2: Summary of Selected Empirical Studies on Relationship Quality

	Smith (1998b)	Dorsch, Swanson, and Kelley (1998)
1. Research Objective	To examine the relationship among relationship quality, relational bonds, facets of relationship management, and biological sex.	To examine the extent to which businesses use relationship quality perceptions to differentiate their qualified vendors.
2. Research Design	1st stage: preliminary interviews of purchasing managers and supplier representatives. 2nd stage: mail survey of 220 male and 200 female purchasing managers. 185 usable responses were used (male: 105; female: 80)	Mail survey of 975 purchasing executives. Total sample was divided into 3 groups with different vendor perceptions: (1) best vendors, (2) typical vendors; and (3) worst vendors. 94 usable responses were used in the study.
3. Measurement	Multi-item scales were borrowed from published scales, with the exception of sex and relationship duration.	Multi-item scales were used for the constructs: "trust," "customer satisfaction," "commitment," "customer orientation," "opportunism," "ethics."
4. Validity, Reliability Evidence	Content validity, construct validity, and reliability.	Content validity, convergent validity, predictive validity, and reliability
5. Statistical Analysis	Structural equation modelling.	MANCOVA, ANOVA, and multiple discriminant analysis.
6. Major Strengths	1. Rigorous scale validation process. 2. To account for the sex differences in affecting relationship quality.	1. The first study to use relational quality to segment business customers. 2. Rigorous research design in data collection and instrument development.
7. Major Weaknesses	Self-report about sex-appropriate behaviour is subject to reporting bias.	1. Small sample size. 2. No measure for cross-validation (e.g., for MDA) was taken.
8. Research Findings	Social bonds, as well as the communication/cooperation and relationship investment as facets of relationship management were key predictors of relationship quality. Relationship type (sex role) also had some effect on relationship quality and relational bonds through relationship management.	Overall support was found for the existence of a vendor stratification system consisting of 3 strata. Most of the differences were between the worst group and the other groups. Higher quality relationship perceptions were associated with higher status vendors.

Table 5.2: Summary of Selected Empirical Studies on Relationship Quality

	Page and Sharp (1998)	Naudé and Buttle (2000)
1. Research Objective	To measure the elements of relationship quality.	To explore the dimensions of business-to-business relationship quality.
2. Research Design	Mail survey of customers in 3 business-to-business service industries (i.e., telecommunications, banking, and postal) across 5 studies.	1st stage: group discussion involving 40 executives to indicate important attributes of relationship quality. 2nd stage: questionnaire survey of participants involved in the 1st stage.
3. Measurement	To borrow the items used in Page, Sharp, and Rungie's (1997) study. These items relate to: "effort," "values us," "understanding," "cooperation," "information from," "trust," "liking," "switching costs," "supplier's power," and "conflict."	5 attributes (i.e., trust, needs, integration, power, and profit) uncovered in the group discussion were used for the questionnaire survey. Each attribute was specified at 3 different levels for conjoint analysis.
4. Validity, Reliability Evidence	Convergent validity.	Content validity.
5. Statistical Analysis	Regression analysis.	Conjoint analysis, cluster analysis, and correspondence analysis.
6. Major Strengths	1. The items used in the study were more comprehensive than the other studies (e.g., Crosby, Evans, and Cowles, 1990). 2. Overall R^2 was very high for every study.	To explore other dimensions of relationship quality.
7. Major Weaknesses	1. Possible non-response bias as no follow-up action taken for non-respondents. 2. No evidence of discriminant validity. 3. Factorial structure not known.	1. Small sample size. 2. Independent samples should be used for both stages of the study. 3. The demographic profile of the four clusters was not examined.
8. Research Findings	Four elements (i.e., "values us," effort, cooperation, and understanding) were consistently important in every study.	The dimensions of trust, needs, integration, and profit were important attributes of business-to-business relationship quality.

Table 5.2: Summary of Selected Empirical Studies on Relationship Quality

	Boles, Johnson, and Barksdale (2000)	Hennig-Thurau (2000)
1. Research Objective	To replicate and extend the Crosby, Evans, and Cowles' (1990) relationship quality model.	To examine the relationship between customer skills and relationship quality.
2. Research Design	Mail survey of 3,010 business customers of telecommunication services. 1,009 usable responses were used in the study.	Personal interview of 293 consumers using video recorders or cameras. 187 interviews dealt with video recorders and 106 with cameras.
3. Measurement	The measurement instrument was borrowed from the study of Crosby et al. and then adapted to reflect unique features of telecommunication services. The new added construct, equity, was measured by 3 items adapted from existing studies.	Multi-item scales were used for the constructs of: "skills attribution," "customer skills," "skills specificity," "product-related quality perception," "trust," emotional commitment," and "calculative commitment." Relationship quality is a higher order construct of product quality, trust, and commitment.
4. Validity, Reliability Evidence	Content validity, predictive validity, and reliability.	Content validity
5. Statistical Analysis	Structural equation modelling.	Structural equation modelling
6. Major Strengths	1. Additional construct, equity, was added to the established relationship quality model. 2. The model was tested in a business-to-business setting.	To forge the link between customer skills communication and relationship quality.
7. Major Weaknesses	Evidence of construct validity (i.e., convergent validity and discriminant validity) was not provided.	Assessment of construct validity and reliability was not provided.
8. Research Findings	Six of the eight hypotheses common to the original study and replication study yielded similar findings. The findings indicated that equity was a significant predictor of relationship quality.	Customer skills were positively related to relationship quality. Also, the nature of the increase in relationship quality attributable to skills communication was product specific.

4. Interaction frequency. It is defined as the inverse of the average time between supplier-buyer interactions. More frequent interactions are likely to lead to the processing of greater amounts of information, thereby reducing the uncertainty and ambiguity on the part of both a supplier and a buyer.

5. Interaction richness. It is defined as the proportion of total interactions between a supplier and a buyer that are face-to-face as opposed to written or telephone.

Figure 5.2 illustrates Leuthesser's (1997) relationship quality model. The model was tested using a sample of 454 purchasing executives and analysed using structural equation modelling approach. The results suggest that all antecedents, except interaction richness, are positively related to relationship quality which in turn has a positive effect on the share of business. Apparently, the antecedents used in Leuthesser's (1997) study and those suggested in the existing relationship quality literature (e.g., relational selling behaviour as suggested by Crosby et al., 1990) have certain overlaps. The positive relationship between relationship quality and share of business is also consistent with the findings of similar studies in business markets (e.g., Boles et al., 2000).

Another recent study is by Smith (1998b) who examined the linkages among relationship quality, relational bonds, facets of relationship management, and relationship type (i.e., biological sex) in business markets. The model is shown in Figure 5.3. Smith defines the constructs in the model as follows:

> Bonds are the psychological, emotional, economic, or physical attachments in a relationship that are fostered by association and interaction and serve to bind parties together under relational exchange...Relationship management is the extent to which relators have the orientation or behavioural tendency to actively cultivate and maintain close working relationships (pp. 78-79).

Figure 5.2: Leuthesser's (1997) Relationship Quality Model

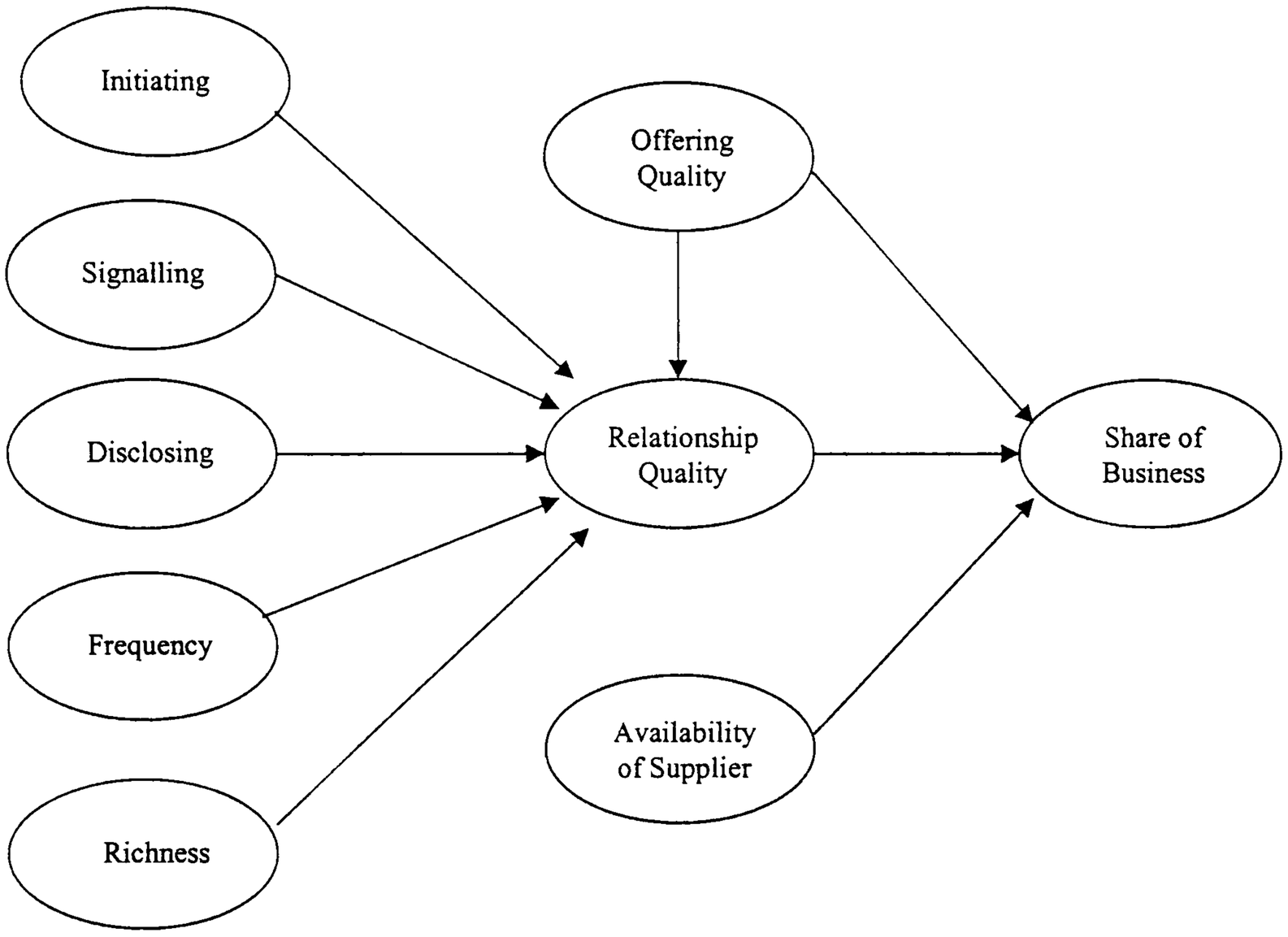
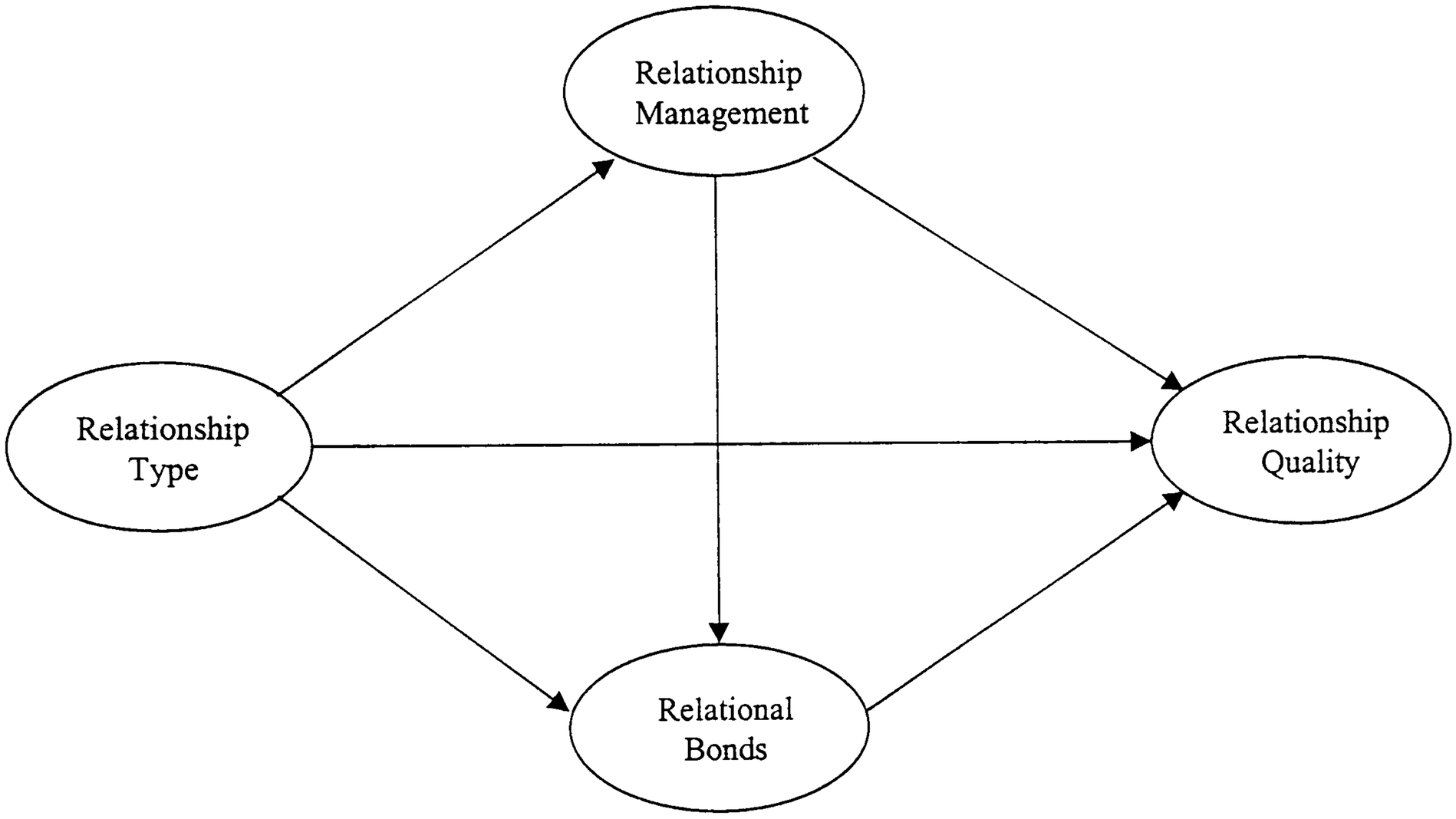


Figure 5.3: Smith's (1998b) Relationship Quality Model



Smith analysed survey data collected from 105 male purchasing executives and 80 female purchasing executives using hierarchical regression analysis, MANOVA, and ANOVA. He found that relational bonds, relationship management, and relationship type have a significant effect on relationship quality. The findings also suggest that male purchasing professionals reported greater relationship quality, relationship investment, and relational bonds with male supplier representatives than with female supplier representatives. On the other hand, female purchasing professionals reported greater relationship quality, relational bonds, and relationship management with female supplier representatives than male purchasing professionals did with female supplier representatives. Although Smith's study provides an indication about the impact of biological sex on relationship quality and serves to encourage further research on this subject, it is not clear whether there may be reporting bias. Smith admits that "self-reports about sex-appropriate behaviour are notoriously subject to reporting bias" (p. 88).

Summing up, most of the studies on relationship quality during the past decade were directed towards examining its antecedents and consequences from different perspectives. As revealed from these studies, there is ample evidence suggesting that relational behaviours (e.g., cooperation, conflict handling, interaction intensity, and open communications) are positively related to relationship quality. Future studies should explore other constructs (e.g., adaptation and atmosphere in the IMP interaction approach mentioned in the previous chapter) that may have a close connection with relationship quality. Apart from taking into consideration of other constructs of interest in modelling relationship quality, the way how the models are tested should be the other avenue for further research. The following section will discuss the approaches adopted in the past decade in investigating relationship quality.

5.6 MEASUREMENT OF RELATIONSHIP QUALITY

Similar to the measurement of service quality mentioned in Chapter Two, researchers have used either qualitative approach or quantitative approach or a combination of the two in studying relationship quality.

5.6.1 Qualitative Approach

In studying service quality, some researchers have used a wide variety of qualitative approaches. They include critical incident technique (Strauss and Hentschel, 1991), focus group interviews and in-depth personal interviews (Parasuraman et al., 1985), and observational methods (Grove and Fisk, 1992). But this is another picture when researchers investigate relationship quality. Only a few qualitative studies were found in the relevant literature. For example, Page et al. (1997) used in-depth interviews and focus group interviews to explore different elements of relationship quality. Naudé and Buttle (2000) conducted group discussion to uncover attributes of relationship quality. Their subsequent conjoint analysis was used to substantiate the relative importance of these relationship quality attributes.

Although there are only a few studies using a qualitative approach in researching relationship quality, the approach is quite useful in the early stage of research work to uncover important attributes of relationship quality and to pave the way for further quantitative study.

5.6.2 Quantitative Approach

A wide variety of quantitative approaches used in studying relationship quality is summarised in Table 5.2. They include structural equation modelling (e.g., Crosby et al., 1990), regression analysis (Lagace et al., 1991), neural network analysis (Wray et al., 1994), MANOVA (Dorsch et al., 1998), and conjoint analysis (Naudé and Buttle, 2000). It is clear that no single analytical approach is perfect. Two points are worth noting. First, the use of structural equation modelling technique in on the rise in model testing. As mentioned in Chapter Two, there are four advantages of using structural equation modelling over regression analysis: violation of normality, use of multiple indicators for latent constructs, test of construct unidimensionality, and competing model evaluation. Second, the use of new technique in marketing also makes a contribution. Wray et al., (1994) comment that much of the weaknesses of previous research can be attributed to

the use of regression techniques which require a prior specification of input and output relationship variables. They suggest the use of neural network analysis which does not require this prior knowledge since the network "learns" hidden relationships in data implicitly. Their study using 1944 customers of financial services confirmed the relative superiority of neural network analysis over regression analysis.

Summing up, each measurement approach has its own particular advantages over the others in different stages of the research work. For example, qualitative works in terms of personal interviews are required to uncover important attributes of the constructs under examination before designing a measurement instrument and collecting data for a quantitative study.

5.7 CHAPTER REVIEW

This chapter examined the concept of relationship quality and related empirical issues. As compared with those studies undertaken in the area of service quality in general, or business-to-business professional service quality in particular, the number of studies on relationship quality is very limited. Based on a paucity of relationship quality studies, there is suggestion showing that relationship quality is an antecedent of service quality when service quality is considered as a global evaluation of a service offering. There should be a positive association between relationship quality and overall service quality. There is also clear indication that relationship quality is a higher-order construct consisting of a number of dimensions, including trust and satisfaction in a customer-company setting. Future studies should be directed towards exploring other dimensions from a business-to-business perspective and confirming the "relationship quality leads to service quality" relationship. As far as this study is concerned, one avenue is to incorporate the relational exchange elements of the IMP interaction model in studying relationship quality and business-to-business professional service quality. The next chapter will review a particular business-to-business professional service industry, that is the consulting engineering industry in Hong Kong, in order to capture the unique features of the industry before formulating a theoretical model to be tested for the study.

CHAPTER SIX:
REVIEW OF HONG KONG CONSULTING ENGINEERING INDUSTRY

6.1 INTRODUCTION

A review of the literature pertaining to service quality in general and professional service quality in particular was presented in Chapters Two and Three respectively. It was envisaged that very few studies had investigated the business-to-business professional service quality from a relational perspective. Chapters Four and Five had provided theoretical input to build up a model to account for both transactional and relational exchanges between clients and professional service providers. In this chapter, a particular business-to-business professional service industry, that is the consulting engineering industry in Hong Kong, will be reviewed. Such a review is essential in order to capture the unique features of that industry before a theoretical model of business-to-business professional service quality can be formulated and tested. The review of the consulting engineering industry in Hong Kong will comprise three main parts. The first part will address the role of consulting engineers in construction projects and their relationships with clients. The second part will focus on the supply side of consulting engineering services with a review on industry structure and development. The last part of this chapter will investigate the demand for consulting engineering services from the perspective of both public and private sector clients.

6.2 WHAT IS A CONSULTING ENGINEER?

The common definition of a consulting engineer is simply a professional engineer who offers consultancy services to his clients. More formal definition is provided by the Association of Consulting Engineers, United Kingdom (ACEUK) which defines a consulting engineer as:

> A person possessing the necessary qualifications to practise in one or more of the various branches of engineering, who devotes himself to advising the public on engineering matters, or to designing and supervising the construction of engineering works (Association of Consulting Engineers (UK), 1992, p.viii).

The above definition suggests that a consulting engineer has to obtain a recognised professional qualification. Among the most common qualifications are membership of the Institution of Civil Engineers and Hong Kong Institute of Engineers. Not only should a consulting engineer possess a professional qualification, he has to be independent. The Hong Kong Association of Consulting Engineers (ACEHK) requires that "the consulting engineer acts solely in the interests of his clients and retains absolute independence from manufacturers, contractors and suppliers. He may not be connected with any business that may influence his professional judgement" (Association of Consulting Engineers of Hong Kong, 1996, p.1). The ACEUK's definition also suggests that a consulting engineer, in general, provides three types of services: advisory services, design, and construction supervision. The ACEHK goes into more details by categorising these services into five aspects:

1. Pre-investment studies. These include establishing investment policies and sector policies; determining the basic features and the feasibility of individual projects; and defining changes in policies, operations, and institutions necessary for successful implementation or functioning of projects.
2. Design and supervision services for construction. These consist of three phases: pre-design engineering; basic design engineering; and special services including resident supervision of construction.
3. Specialised design and development services. Consulting engineers can be engaged to research and develop new designs, concepts, processes, and inventions.
4. Project management. The firm providing project management services prepares and negotiates contracts with all entities involved in the actual construction process and manages the construction effort.
5. Advisory services. Consulting engineers can be engaged to give professional engineering advice, such as to give engineering services to courts, commissions, boards, and other judicial bodies.

Other categorisations of services are illustrated in Table 6.1. These include services relating to pre-project planning, project support, project preparation, construction implementation, post construction, and legal support. It seems that the services offered

Table 6.1: Field of Consulting Engineering Services

Pre-project Planning	Project Support	Project Preparation	Construction Implementation	Post Construction	Legal Support
1. Project identification	1. Cartography	1. Sketches & pre-designs	1. Accounting & auditing	1. Commissioning	1. Arbitration
2. Pre-investment studies	2. Computer services	2. Funding & procurement advice	2. Construction management	2. Enterprise management	2. Damage evaluation
3. Feasibility studies & assessments	3. Contaminated land assessment	3. Technical appraisals & advice	3. Field engineering	3. Operations & maintenance	3. Expert witness
4. Project appraisal	4. Cost planning	4. Detailed designs	4. Inspection	4. Training	
	5. Earth Sciences	5. Tender documents & bid evaluation	5. Material testing		
	6. Environmental impact studies		6. Procurement services		
	7. Exploration & evaluation		7. Product certification		
	8. Financial impact studies		8. Project management		
	9. market surveys		9. Quality assurance		
	10. model testing		10. Site supervision		
	11. Oceanography				
	12. Photogrammetry				
	13. Regional/urban/rural planning				
	14. Remote sensing/GIS				
	15. Resource studies				
	16. Site evaluation				
	17. Technical surveys				
	18. Topography				

Source: International Federation of Consulting Engineers, 1991-92

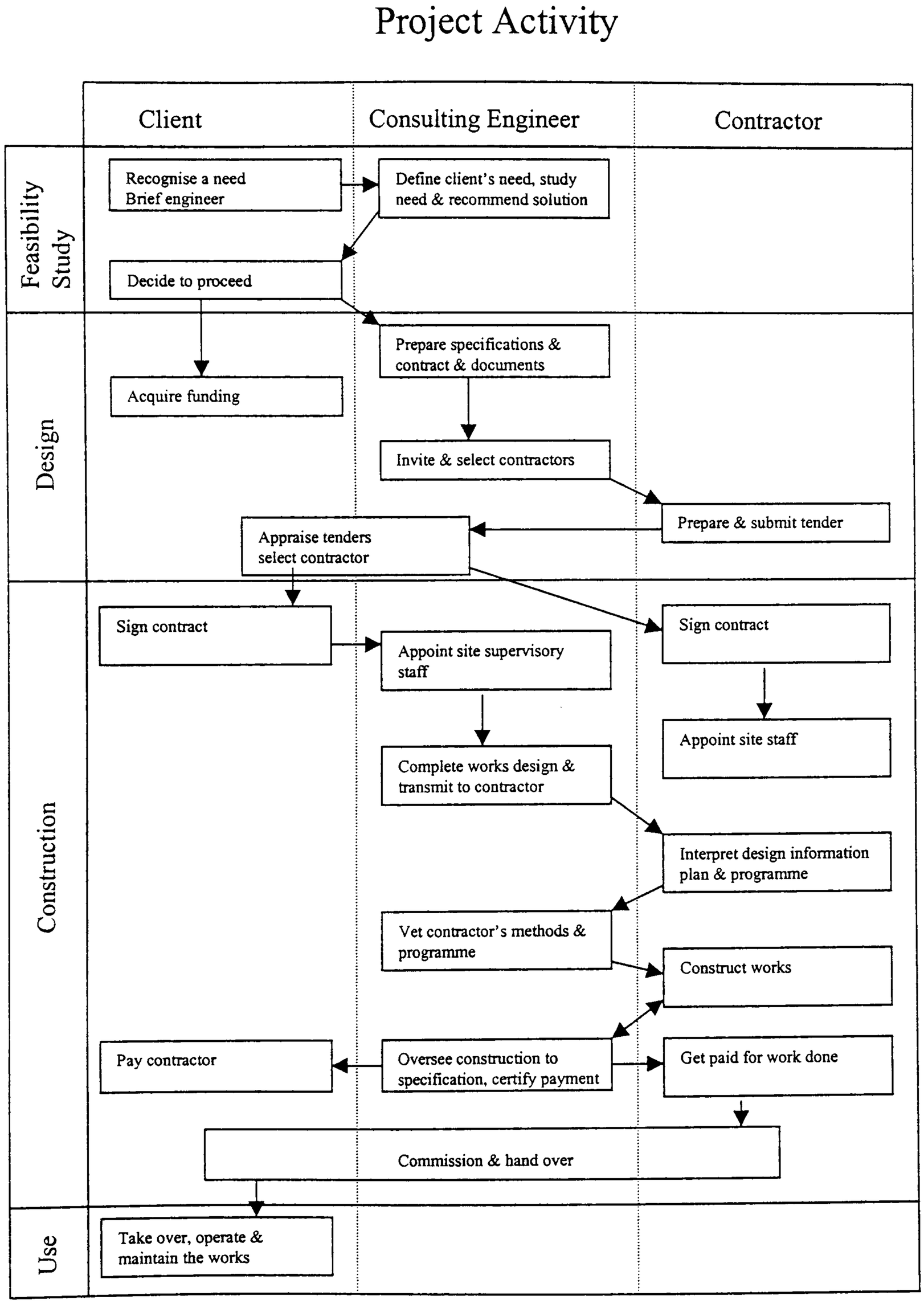
by consulting engineers are diverse, specialised, and spanning across the different stages of construction projects.

A consulting engineer can be appointed for a particular contract in a project or for the whole project depending on clients' requirements. In relation to government works, it is a rather common practice for different consulting engineering firms to be involved in different stages of the project, depending on the bidding outcome. For clients in the private sector (e.g., property developers), the same consulting engineering firm is normally appointed throughout the whole construction project. The flow of work among the parties involved from initiation to completion of a project can be illustrated in Figure 6.1. Three principal parties contractually involved in a project and their roles are as follows:

1. Promoter/Client. The engineer usually refers to the promoter as client. The promoter may have virtually any legal status: he may be a sole trader, a partnership, a limited liability company or part of the government, or any other incorporated or unincorporated body.
2. Engineer. The term "engineer" refers to the person representing the organisation that provides professional advice on the investigation for, and the design and construction of, civil engineering works. Consulting engineers usually practise in the form of partnerships or as individuals. It is important that the person appointed as the engineer should have qualifications and experience appropriate to the project. Corporate membership of the Institution of Civil Engineers is recognised as an appropriate qualification for any position of responsibility in civil engineering.
3. Contractor. The firm which carries out the work of construction is the contractor. There is usually only one contractor in a project, sometimes referred to as the main contractor. On some works, he may sublet or subcontract parts of the works to specialists or other contractors who become known as subcontractors. Contractors and subcontractors are usually limited liability companies.

In a typical project, the design team may include other parties. For example, civil or structural engineers are included when the structural aspects of the project warrant it.

Figure 6.1: Project Activity



Other parties that can be involved in a large scale project include quantity surveyors, landscape architects, electrical and mechanical engineers, and environmental scientists. The involvement of different project participants in various stages of the project is summarised in Table 6.2. For the clients in the private sector, in most cases, the architect appointed often becomes the design team leader responsible not only for the overall design and supervision of the project, but also for the co-ordination of the other designers and contractors. The organisational and contractual relationships among the parties in a project are illustrated in Figure 6.2.

6.3 SUPPLY OF CONSULTING ENGINEERING SERVICES

Hong Kong was ceded to the British Government by the Chinese Government in 1897 and had been a British colony since then. In July 1997, the sovereignty of Hong Kong was handed over back to the Chinese Government under the joint declaration by both state governments in 1984. Under British rule, Hong Kong had been transformed from a fishing village to one of the most important container ports and financial centres after New York and London in less than a century. Even after the handover, British interest in Hong Kong remains intact and can be seen from a wide variety of aspects ranging from property development, telecommunications, and catering to grocery trade. In order to keep pace with rapid economic and population growth since the turn of the century, many infrastructure projects have been in the pipeline. This attracted a lot of international consulting engineering firms coming to Hong Kong to bid for projects. Although the consulting engineering profession is not such a frequent topic for researchers as compared with the other professions, like professional accountants and management consultants, its significance to the Hong Kong economy cannot be overlooked. The following sections will examine the supply of consulting engineering services in Hong Kong in terms of its industry structure and its latest development.

6.3.1 Industry Structure

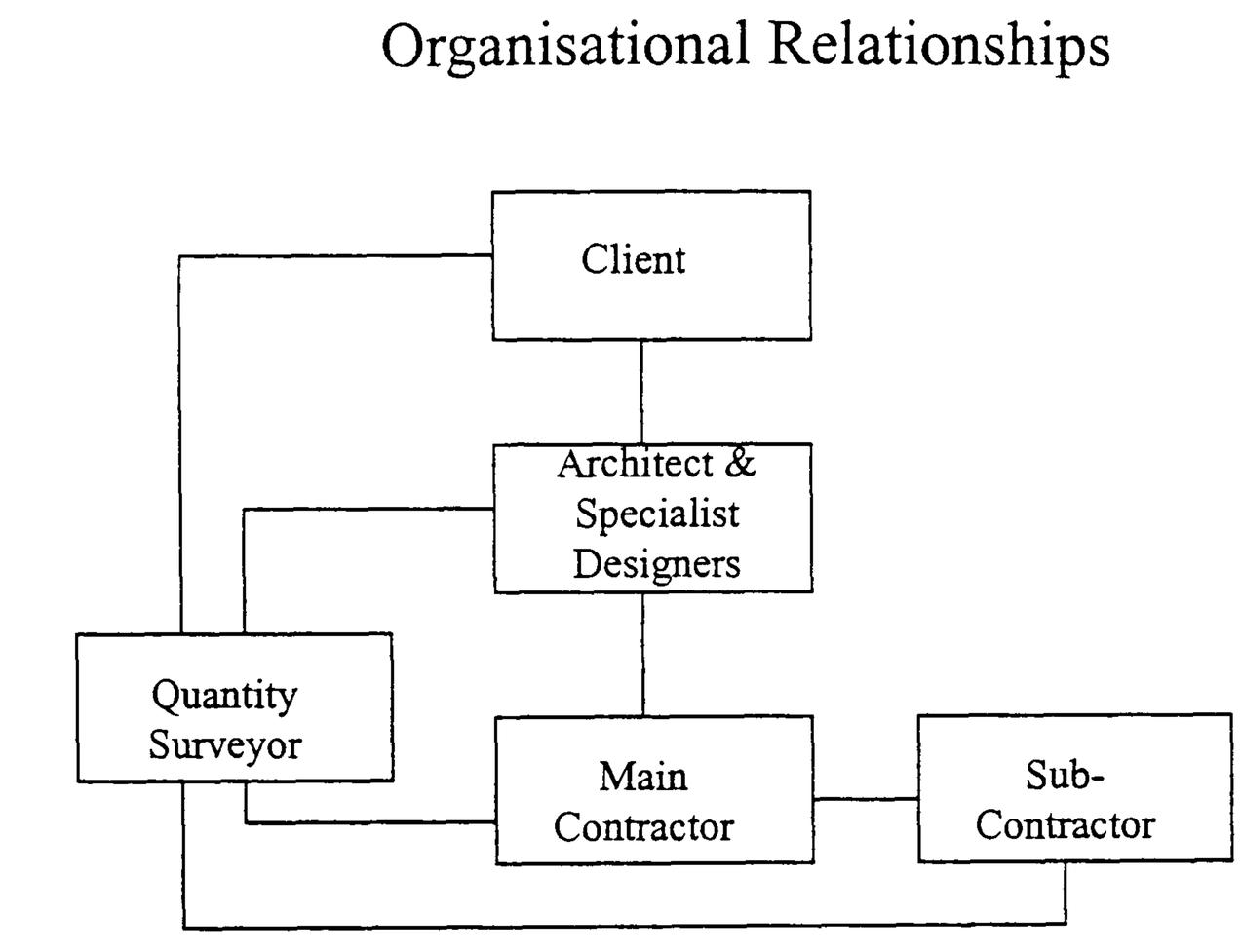
The British interest in Hong Kong's consulting engineering industry can be seen from the membership of the Hong Kong Association of Consulting Engineers. It is mostly dominated by a handful of big British-based firms. Some of them have deep roots in Hong Kong and have been headed by top British consulting engineers since the early 1930s to primarily assist the Hong Kong Government in designing large scale reservoirs and dams, together with roads and highways across the entire territory.

Table 6.2: Involvement of Project Participants

Project Participant	Client's brief Development of detailed requirements	Design Development of alternative schemes	Detailing of specific scheme	Construction Erection of project	Commissioning Handover, final account and defect rectification
Project Management Team (involving architect, quantity surveyor, client)	1. Questions client to establish teams and level of co-ordination required 2. Questions client to establish programme for project 3. Prepares management control and timetable briefs 4. Obtains client's acceptance of project briefs	1. Co-ordinates client design and cost teams to maintain programme 2. Evaluates alternative schemes in light of time requirements 3. Presents alternative schemes to client 4. Obtains client's approval of development of a particular scheme	1. Co-ordinates client, design and cost teams to maintain programme 2. Identifies and resolves potential bottlenecks of resources during construction phase 3. Reports any unavoidable changes in the cost and time programmes 4. Obtains client's approval of detailed scheme	1. Ensures that builder co-ordinates the various trades and sub-contractors to maintain the construction programme 2. Ensures that any outstanding information required by the builders is prepared and costed in time for the client to appraisal the situation and the builder to maintain the flow of work	1. Resolves any differences between client, designers, costers and builders
Designer Team (involving architect and other design consultants, and client)	1. Questions client to establish detailed building requirements 2. Questions client to establish quality and aesthetic requirements 3. Prepares building brief	1. Checks that there are no objections in principle to the proposed project from relevant authorities 2. Explores alternative building solutions to meet the client's requirements 3. Evaluates alternative schemes in light of client's building and quality requirements	1. Prepares detailed production information and specifications 2. Appoints any material suppliers and/or sub-contractors essential for the project 3. Obtains detailed approvals from necessary authorities	1. Hands over production information to the builder 2. Details any additional information for the builder 3. Checks that quality standards are adhered to 4. Prepares client handbook on how to maintain and use the completed building	1. Inspects building to verify that it has been completed to specification 2. Briefs client on how to use the building and hands over maintenance and user handbook
Cost Controlling Team (involving quantity surveyor and client)	1. Questions client to establish budget for the project 2. Prepares budget brief	1. Prepares outline budgets for each of the schemes developed 2. Prepares outline running and maintenance budgets for each of the schemes developed 3. Evaluates alternative schemes in light of cost constraints	1. Monitors cost implications of design as it develops 2. Prepares bills of quantities or equivalent	1. Values work done by the builder for payment 2. Monitors expenditure against budget 3. Costs additional items or variations to work being undertaken by the builder	1. Prepares final account
Building Team (involving main contractor and/or sub-contractors and client)				1. Brings together necessary labour, materials and plant to erect the building 2. Co-ordinates the activities of own employees and sub-contractors to maintain programme 3. Ensures that building is completed to satisfaction of relevant authorities 4. Tests any plant or machinery to ensure that it operates satisfactory	1. Hands over completed building 2. Remedies any faulty workmanship

Source: National Economic Development Office, London, HMSO (1979)

Figure 6.2: Organisational and Contractual Relationships among Project Participants



They outperform local Chinese firms in terms of not only providing multi-disciplinary engineering services, but also by exhibiting high technical standard and appreciation of local government requirements which were largely derived from relevant UK regulatory framework. With a drive to continue improvement in local infrastructure and satellite town development, Hong Kong Government has become a major client for most of the consulting engineering firms, accounting for a significant chunk of total consultancy contracts.

Competition is very keen among consulting engineering firms in Hong Kong. As illustrated in Table 6.3, there are about 40 consulting engineering firms of which most are British-based (Association of Consulting Engineers in Hong Kong, 1996). The top five have staff of about 350 to 800 and each of them has its own expertise and competitive advantage. The number of professional engineers in a firm sometimes offers a competitive edge since the client knows that the firm will have sufficient expertise and manpower to cope with large scale construction projects. Past job references and reputation of the firm are also important factors in the process of selecting consultants by clients.

Some large architectural firms also have their own engineering departments which provide in-house consulting engineering services to architects. But their competitive strength is not strong enough to bid for outside jobs independently when compared with specialised consulting engineering firms. But the cost of their services is low as their fixed overhead can be absorbed by the architectural sections.

Apart from British-based consulting engineering firms, there are some small-to-medium-sized firms owned by local Chinese engineers who usually provide structural engineering services to small local property developers, contractors, and manufacturers relating to building projects or refurbishment works. The number of staff employed by these firms is usually not more than 20 and they compete primarily by charging a low consultancy fee. The other type of market niche is specialist firms with expertise on special areas such as traffic management and environmental protection projects. In response to the growing trend that the scale of government projects in general is getting bigger, consulting firms are forging joint-ventures as an alternative to securing a share in projects and a way to pool resources and expertise,

Table 6.3: Members of the Hong Kong Association of Consulting Engineers (1996)

Name	Staffing	
	Professional & Technical	Administrative
Hyder Consulting	205	75
Associated Consulting Engineers	143	20
Atkins China Ltd.	66	21
Au Posford Consultants Ltd.	31	4
BNNK, Ratcliff, Hoare & Co Ltd.	15	3
Babtie BMT (Hong Kong) Ltd.	71	10
Binnie Consultants Ltd.	319	36
C M Wong & Associates Ltd.	41	9
Camp Dresser & McKee International Inc.	24	4
Capital China Group	8	2
Daniel Chan & Associates Ltd.	Not disclosed	
David Morris Associates Ltd.	Not disclosed	
Dennis Lau & Ng Chun Man Arch.& Eng.	257	57
Far East Consulting Engineers	40	5
Gregory Asia Ltd.	55	7
H K Cheng & Partners	26	8
Halcrow Asia Partnership Ltd.	77	32
Harris & Sutherland (Far East) Ltd.	126	25
Ho Tin & Associates Consulting Engineers	48	7
JMK Consulting Engineers	40	8
MAA Engineering Consultants (HK) Ltd.	Not disclosed	
Maunsell Consultants Asia Ltd.	841	174
Meinhardt (HK) Ltd.	212	36
Mitchell, McFarlane, Brentnall & Partners	126	22
Montgomery Watson	65	26
Mott Connell Ltd.	742	140
Mouchel Asia Ltd.	193	17
Ove Arup & Partners HK Ltd.	474	131
Parsons Brinckerhoff (Asia) Ltd.	375	60
Rankine & Hill (HK) Ltd.	46	6
Richard Chan & Associates Ltd.	13	5
Rust Asia Pacific Ltd.	Not disclosed	
Scott Wilson Kirpatrick (HK) Ltd.	482	158
Thomas Anderson & Partners (HK) Ltd.	24	6
Wilbur Smith Associates Ltd.	22	5
Wong & Ouyang (Civil-Structural Engineering)	43	

instead of competing head-on with consultants. Joint venture is formed on the basis that the participating firms have expertise complimentary to each other.

6.3.2 Industry Development

Based on the above-mentioned industry background, the consulting engineering industry is apparently getting more competitive than before. Apart from existing competitors, new-comers are making inroads into the industry. In order to tap the local lucrative consulting engineering business, a number of non-UK consulting engineering firms, notably from United States, have established a foothold in Hong Kong or formed strategic alliances either through mergers and acquisitions with their UK counterparts. Keen competition within the industry is evident when the price-cutting strategy has significant influence in winning contracts. In addition to the local market, consulting engineering firms are also penetrating into the China market which is being fuelled by a property boom and rapid economic growth after the state austerity programme ended in late 1980s. Most of these consulting engineering firms are engaged in energy projects and city planning for newly developed provinces. For instance, the joint venture of Ove Arup and Richard Rogers Partnership was selected by the mayor of Shanghai to design a multi-billion dollar business and commercial centre in Pudong (South China Morning Post : 3 Jan 1993).

Another development is occurring in the public sector when tendering contracts. In the past, large scale projects were tendered out in the form of a single contract by Hong Kong Government and utility companies. Such a practice had benefited international consulting engineering firms with ample expertise and manpower at the expense of local consultancy firms which were smaller in size and lagging behind in expertise. The practice had put local firms into a disadvantaged position and was under much criticism from the industry. In order to increase industry competition, this practice is being changed, in that large scale projects are divided into a number of small contracts to allow small-to-medium-sized consulting engineering firms to bid for the contracts. For example, Kowloon Canton Railway, one of the two railway companies in Hong Kong, is going to take the lead in adopting this approach. Therefore, in the future, these small-to-medium-sized consulting engineering firms will be able to compete with international consulting firms to get a share of the market.

Recent developments also include direct competition coming from the public sector. In an unprecedented plan by one of the Hong Kong Government bodies, the Housing Authority is about to contract out its consultancy service through its engineering arm in direct competition with other consulting engineering firms (Hong Kong Standard: 31 Jul 1992). Other government departments (e.g., Environment Protection Department, Mechanical and Electrical Department) will be most likely to follow suit in the foreseeable future. A similar movement is taking place in the public utility sector. Hong Kong Mass Transit Railway, being a major client of consulting engineers, is also offering its consultancy services in railway technology to other companies in the Asia Pacific region. This will in some way in direct competition with international consulting firms.

6.4 DEMAND FOR CONSULTING ENGINEERING SERVICES

The supply of consulting engineering services is largely affected by the demand from the construction industry. Construction industry is one of the main industries in Hong Kong sharing about 6 per cent of Gross Domestic Product (see Table 6.4). All the construction activities require consulting engineering services. Therefore, the work of consulting engineers has an important influence on the utilisation of resources of Hong Kong society. In Hong Kong, structural and building engineering services are works related to the construction of buildings of all kinds whereas civil engineering works are those related to the construction of roads, bridges, foul water drainage, and sewage system. Clients of the structural and building engineering services are either from the private sector (e.g., property developers) or from the public sector (e.g., government and utility companies). For most of the large scale civil engineering works, the major client is Hong Kong Government which manages different types of projects through its various departments such as Territory Development Department, Highways Department, Drainage Services Department, and Water Supply Department. The following sections will discuss the demand from both the private and the public sectors.

Table 6.4: Hong Kong Gross Domestic Product (at Factor Cost) by Economic Activity

Economic Activity	1995		1996 [a]	
	HK$ (million)	%	HK$ (million)	%
Agriculture & fishing	1,453	0.1	1,444	0.1
Industry				
Mining & quarrying	317	0.00 [b]	332	0.00 [b]
Manufacturing	84,770	8.3	80,064	7.2
Electricity, gas & water	23,578	2.3	26,992	2.4
Construction	54,761	5.4	64,396	5.8
Services	851,235	83.8	935,355	84.4
Wholesale, retail, I/E trade	270,520	26.6	281,748	25.4
Transport, storage & communications	102,199	10.1	112,636	10.2
Financing, insurance, business services	247,985	24.4	276,573	24.9
Community, social & personal services	175,956	17.3	198,262	17.9
Ownership of premises	134,933	13.3	154,228	13.9
Adjustment for financial intermediation services indirectly measured	-80,358	-7.9	-88,092	-7.9
GDP at factor cost	1,016,115	100.0	1,108,583	100

[a] Preliminary estimates.

[b] Less than 0.05.

Source: Hong Kong Annual Report, 1998

6.4.1 Private Sector

In the 1970s, the Hong Kong economy was mainly controlled by British enterprises, such as Swire, Jardines, and Hutchison. These enterprises dominated the Hong Kong property market at that time and had promoted many important developments in prime commercial and residential areas. Power and wealth of local enterprises, such as Cheung Kong, Sun Hung Kai, New World Development, and Great Eagle, gathered in the late 1970s and became dominant in the 1980s. During that time, Japanese enterprises had also involved in the local property industry. But most of their activities were restricted in trading of completed buildings, rather than in developing properties.

These British-based enterprises and local Chinese property developers have been eager to penetrate further in the property market in response to the increasing growth in population that creates strong demand for mid-sized residential buildings.

Although the demand for residential buildings is very strong, the demand for industrial building is sluggish. Since the early 1990s, the price of industrial land through public auction had skyrocketed. The cost of production inevitably increased to a level that impaired the competitive edge of Hong Kong products as compared to those produced in the other Asian countries. In order to lower cost of production, most of the manufacturers established their production facilities in China. Therefore, demand for industrial buildings dropped significantly. These trends have prompted consulting engineering firms firstly to expand their structural engineering division to cater for the booming residential property market and secondly to establish joint-ventures with consultants in China to offer services to industrialists and Chinese Government.

6.4.2 Public Sector

Apart from clients in the private sector, the major source of business for consulting engineers is from the public sector. It shares almost 70 per cent of total revenue earned by consulting engineering firms in Hong Kong. Utility companies and government departments form the two major types of clients in the public sector. The following sections summarise some of the government objectives in infrastructure planning in the current decade.

1. Housing. In 1996, the public sector produced about 31,200 flats, of which about 12,000 were for sale, and the private sector produced 19,800 flats. The government aims to produce 511,000 new flats over six years from 1995 to 2001, made up of 141,000 public rental flats, 175,000 subsidised flats for sale, and 195,000 private housing flats through new town development and existing town redevelopment.
2. Land, public works, and utilities. In the five years since 1992, the government has spent more than HK$72 billion on public works, other than works in connection with the new Airport Core Programme, to build the infrastructure necessary to cope with Hong Kong's rapid development. This constitutes an increase of 40 per cent in real terms

by comparison with the previous five years. Some of the main infrastructure projects in the coming decade include multi-billion-dollar port development, wastewater disposal, and flood control projects.

3. Transport. Dense urban development and the growth of new towns continue to place heavy demand on Hong Kong's transport system. The government has been pressing ahead with the planning of railway projects under the Railway Development Strategy established in 1994. Commissioning consultants for advice on strategic road network to ease traffic congestion becomes more critical than before to explore feasibility of other alternatives to improve road usage. These alternatives include building more flyovers and tunnels as well as extending the existing railway network A total of HK$26 billion has been earmarked on new roads up to the year of 2001.

It is expected that in the years to come when major infrastructure projects are in full swing, particularly port development projects, strategic sewerage treatment, and extension of existing rail network, the already keen competition within the consulting engineering industry will be even more intensified. Some of the big UK consulting engineering firms, albeit those already at the top of the league table, are thriving even harder to maintain competitive edge.

6.5 CHAPTER REVIEW

This chapter provided a review on the consulting engineering industry in Hong Kong in terms of its supply of and demand for services. Since the turn of the century when Hong Kong was a British colony, the industry has been mainly dominated by a few British-based consulting engineering firms. Vying for the rapid growth in infrastructure development and property market, international consulting engineering firms, notably from the US, are making inroads into Hong Kong. In response to intense competition, greater alliance among firms has become a norm rather than an exception. Also, what matter most to consulting engineering firms in getting business are sound technical proposals, competitive fees, and an intimate working relationship with clients. These unique features will be taken into account when crafting a theoretical model and related

hypotheses in the investigation of business-to-business professional service quality in the next chapter.

CHAPTER SEVEN:
RESEARCH HYPOTHESES, DESIGN, AND METHODOLOGY

7.1 INTRODUCTION

Previous chapters had presented literature on both service quality in general and professional service quality in particular in terms of theoretical foundation and empirical considerations in measurement. The concept of relationship marketing, the IMP interaction model, and the construct of relationship quality were also reviewed. The structure and unique features of Hong Kong consulting engineering industry were also addressed in the last chapter. In this chapter, a theoretical model will be established to conceptualise business-to-business professional service quality in the context of Hong Kong consulting engineering service by synthesising existing service quality models mentioned in Chapter Two, professional service quality models in Chapter Three, the IMP interaction model in Chapter Four, and relationship quality models in Chapter Five. Apart from the review of literature, a series of exploratory interviews with the industry participants will be conducted to capture the unique features of Hong Kong consulting engineering industry. The results of these exploratory interviews not only help the process of theory building, but also provide industry-specific attributes for developing a measurement scale for the main survey.

This chapter is divided into seven parts. The first part discusses the application of the IMP interaction model to the existing service quality models. The second part focuses on the process and decisions involved in the exploratory interviews with the industry participants. The third part outlines a conceptual model for the study after having drawn on the results of exploratory interviews. The fourth part sets out a host of research hypotheses to be tested. It is then followed by a discussion on scale development and item purification. The last two parts detail the data collection procedures for the main survey and approach to data analysis respectively.

7.2 IMP INTERACTION MODEL AND DUAL-QUALITY MODEL

In Chapter Two, different models of service quality were discussed. They included technical-functional quality model (Grönroos, 1984), image-physical-interactive quality model (Lehtinen and Lehtinen 1991), and the gap model (Parasuraman et al., 1985). In

Chapter Three, the hard-soft quality model (Szmigin, 1993) and similar conceptualisation (Venetis, 1997) of professional service quality were explored. Although the existing models are extensive and include most of the important dimensions and attributes of service quality, there is room for further contribution to address the relationship between business clients and professional service providers as a dimension of service quality evaluation.

Halinen (1996) notes that, in the service quality literature, relationship building has been advocated as an effective strategy for securing service quality and for enhancing customers' quality perceptions. Relationship building activities add value to a service and contribute to perceived service quality. Halinen also forwards a number of arguments for using a relationship approach in studying the evaluation of business-to-business professional service performances. Firstly, within established buyer-seller relationships, a considerable proportion of business services are bought and sold. Secondly, building an exchange relationship can be a crucial means of meeting the objectives of the parties involved and satisfying their requirements concerning service performance. Thirdly, the nature of professional services which is intangible and complex makes the relationship approach especially relevant in reducing risk and uncertainty. Lastly, the relationship approach provides a natural framework for dyadic investigations of the interaction and co-operation between buyer and seller.

In previous chapters, the concepts of exchange and relationship marketing had been reviewed. These two concepts have a profound effect on business-to-business professional service quality research in deriving quality dimensions and attributes from a transactional perspective to a relational perspective. In the services marketing and service quality literature, researchers propose to examine both discrete transaction-based exchange and relational exchange in service quality measurement (e.g., Dwyer et al., 1987; Glynn and Lehtinen 1995; Kong and Mayo 1993). Transactional quality, at its broadest level, is derived from discrete exchange in terms of products, services, money, and information whilst relational quality, at another level, is produced by trust, cooperation, and commitment during the service delivery. This business-to-business perspective is wider in scope than the prevailing literature in conceptualising relational quality as a higher-order construct simply consisting of

trust in the salesperson and satisfaction with the salesperson as addressed in Chapter Five. It is expected that different types of services may have different balance between transactional quality and relational quality elements, depending on the perceived risk and time factor. But both can impact service quality evaluations. From a managerial perspective, it is important for managers to understand how the discrete transactional and relational elements influence service quality.

The application of the IMP interaction model is relevant to this study of business-to-business professional service quality in the context of Hong Kong consulting engineering service, judging from the theoretical foundations of the model. Firstly, both the client and the consulting engineer are active participants in the market as far as the highly interactive nature of the service is concerned. Secondly, the relationship between client and consulting engineer is frequently long term, close, and involving a complex pattern of interactions between and within each party in particular when the transaction cost and perceived risk are high. In addition, the continuous stream of payment paid and received by respective parties throughout the project also contributes to the bonding of the parties. Thirdly, the link between client and consulting engineer gradually becomes institutionalised into a set of roles that each party expects the other to perform in order to foster a more concerted effort. This may be in the form of investment in latest technology and adaptation of operational procedures throughout the project period. The relational elements in the IMP model are particularly important when uncertainty in the market is higher as in the case of construction projects. In the service quality literature, Crosby et al. (1990) also suggest that the concept of service quality has relevance to service marketing of both a transactional nature (impersonal, discrete, episodic exchange) and relational nature (close, enduring, interdependent associations). Relational quality reduces perceived uncertainty which arises from long and indefinite time horizon of service delivery.

Möller and Wilson (1988) also notice that business marketing has shifted from single-transaction oriented and market mechanism-based buying/selling to a buyer-seller relationship-based perspective of business exchange. They reason that this change in focus has its root in the perception that business marketing is increasingly becoming characterised by long term contractual relationships as evidenced by increasing use of,

for example, just-in-time purchasing contracts, international joint venture, and R&D co-operation.

Combining the IMP interaction model and the transactional-relational service quality model, the proposed hybrid model takes into account both the routine exchange episodes and relationship building elements. In the IMP literature, Möller and Wilson (1988) make the point that at the most elementary level of a buyer-seller interaction, three basic processes are involved: exchange, adaptation, and co-ordination. Exchange process can be divided into the exchange of resources (e.g., products, service, technology, financial resources, and information), and social exchange (e.g., beliefs, attitudes, values, norms, and goals). Based on this framework, the transactional quality dimension comprises all the short term exchange episodes including resource exchange and social exchange episodes whereas relational quality is built up through co-operation and adaptation in the long term. Therefore, transactional quality not only affects short term service quality perceptions, but also acts as an antecedent to relational quality which ultimately leads to professional service quality perception in the long term. In addition, the impact of transactional quality and relational quality on the overall service quality evaluation is mediated by the overall atmosphere surrounding the business client and professional service provider.

7.3 EXPLORATORY QUALITATIVE STUDY

7.3.1 Study Objectives

As compared with the other business-to-business professional service industries (e.g., public accounting, legal, architectural design, and medical), the consulting engineering profession possesses three unique characteristics. Firstly, the perceived risk and the amount involved in a construction project are high. Secondly, the service delivery can span across a long period of time, say, five to ten years for a tunnel project. Frequent resources exchange and relational exchange are expected among the parties involved during the construction period. Lastly, evaluation of service quality of a consulting engineer is made periodically, and in most cases, formally by the client to make sure the service delivered by the consulting engineer is up to the standard stipulated in the contract.

In order to examine the viability of applying the proposed hybrid model to the chosen industry (i.e., consulting engineering industry in Hong Kong), a series of in-depth interviews were undertaken with the industry participants. These were designed to explore how service quality is viewed by the industry participants and to identify the extent to which prevailing perspectives are needed to be augmented. The results of these interviews not only helped the process of theory building (e.g., Eisenhardt, 1989; Miles and Huberman, 1994), but also provided a foundation for developing a measurement scale (e.g., Deshpande, Farley, and Webster, 1993).

Seven interviews, including five client interviews and two consultant interviews, were conducted. The duration of each interview was for 30 to 60 minutes. A brief summary of these interviews is set out in Appendix A. The following sections will detail the decisions involved in selecting interviewees and in planning the interviewing process.

7.3.2 Selection of Interviewees

The first issue to be dealt with in selecting interviewees is to decide the number of participants. Seidman (1991) recommends two criteria. The first is sufficiency. There should be sufficient numbers to reflect the range of participants and sites that make up the population. The other criterion is saturation of information. This can be referred to Glaser and Strauss' (1967) strategy of theoretical sampling which is used for selecting industry participants to interview. In theoretical sampling, the actual number of cases studied is relatively unimportant. What is important is the potential of each case to aid the researcher in developing theoretical insights into the area that is being studied. In other words, when the researcher is not learning anything decidedly new and the process of interview itself is becoming labourious rather than pleasurable, that is the time to say "enough." (Seidman, 1991). Otherwise, more participants are added when newly emerging research interests or needs dictate (Holstein and Gubrium, 1995). In many qualitative studies, this information saturation criterion is well-taken. For example, in their study of strategic market planning in small and midsized industrial firms, Sashittal and Tankersley (1997) terminated the data collection process after 40 completed interviews because they found that new data was only reinforcing the identified themes, without adding substantively to the breadth of findings.

Based on the above two criteria, five client interviews and two consultant interviews were undertaken. These five clients were regarded as representative as far as their size of organisation (e.g., some with in-house consulting engineering department or subsidiary) and nature of business (i.e., private and public sectors) were concerned. No new information was obtained after the fifth interview. Among the five client interviews, two of them were conducted in United Kingdom. As Hong Kong had been a British colony until July 1997, most of the prevailing practice of the consulting engineering industry in Hong Kong was "inherited" from the UK. Although the study did not involve a comparison of service quality perceptions between clients in Hong Kong and those in United Kingdom, the findings of these client interviews facilitated a greater understanding of the unique features of the consulting engineering industry and the possibility of applying the hybrid model to the chosen context. The names of interviewees are as follows:

Name	Position	Company
Mr. Richard Ely	Principal Engineer	Severn Trent Engineering
Mr. Norman Pope	Director	Clough Smith
Mr. Geoff Willcocks	Chief Engineer	Hong Kong Government
Mr. Eric Chiu	Senior Project Manager	Sun Foo Kong (Civil) Ltd.
Mr. Conder Yan	Deputy General Manager	China State Construction
Mr. John Gaskell	Managing Director	Rust Kennedy & Donkin
Mr. David Kell	Partner	Binnie & Partners

7.3.3 The Interviewing Process

Following McCracken's (1988) guidelines, a list of questions and prompts for the interview was created. This guide indicates the topics and their sequence in the interview. Taylor and Bogdan (1998) consider that the discussion guide is not a structured schedule or protocol, but to serve to remind the interviewer to ask about certain things. A copy of the discussion guide is included in Appendix A.

Apart from the discussion guide, Kvale (1996) suggests that an interviewer should provide interviewees a context for the interview by a briefing before the interview. In

this study, the context was introduced with a briefing, for example, about the purpose of the interview. This briefing helped answer any question the interviewees might have before starting the interview.

Throughout the interviewing process, notes were taken in stages based on the suggestion of Babbie (1998). In the first stage, sketchy notes (words and phrases) were taken in order to keep abreast of what was happening during the interview. These notes consisted of key phrases and lists of major points made by clients and consultants. The notes were rewritten in more detail immediately after the interview. In the existing literature, it is not unanimous that in-depth interviews have to be tape-recorded (Patton, 1990). Both approaches (i.e., note-taking and tape-recording) have their own strengths and weaknesses. Although tape-recorded interview has the advantages of retaining the exact words that were used and assisting the interviewer in analysing the length of pauses and the order of wording (Rubin and Rubin, 1995), a number of researchers criticise the use of tape-recorder, in particular for short interview (i.e., within one hour). For example, Taylor and Bogdan (1998) criticises that the use of tape-recorder will let the mind of the interviewer drift during the interviewing process. Jorgensen (1989) comments that tape-recorder itself is obtrusive. Patton (1990) considers that the notes can help interviewer formulate new questions as the interview moves along. In a number of research studies involving in-depth interviews, instead of using tape-recording, notes were taken. For example, Kitchell (1995) followed Lincoln and Guba's (1985) suggestion to use field notes when interviewing CEOs and top mangers about corporate culture. Maignan and Lukas (1997) also used notes to capture internet user perceptions through interviews which lasted between 20 and 60 minutes.

At the end of each interview, some of the main points learned from the interview were mentioned. This allowed individual clients and engineering consultants as interviewees to comment on this feedback. All interviews were then analysed to identify themes and patterns. These were integrated with existing frameworks to develop the model which is outlined in the next section.

7.4 OVERVIEW OF CONCEPTUAL MODEL

Having synthesised the materials from both the existing literature and industry interviews, it is posited that overall business-to-business professional service quality, which is defined as a global evaluation of service performance, is influenced by both transactional quality and relational quality as illustrated in Figure 7.1. Transactional quality is produced by various resource exchanges and social exchange whereas relational quality is produced by cooperation and adaptation. The atmosphere in the working relationship acts as a mediator between exchange variables and service quality perceptions. The conceptual model represents an attempt to identify the structural characteristics in terms of antecedents and consequences of business-to-business professional service quality in the context of Hong Kong consulting engineering service. The model is consistent with the previous conceptualisations of service quality, professional service, and the IMP interaction model.

The exogenous variables in the model are resource exchange (e.g., product/service exchange, financial exchange and information exchange) and social exchange (e.g., beliefs, attitudes, values, norms, and goals). All these exchanges are considered as the core elements for an interaction to take place. The endogenous variables are cooperation, adaptation, atmosphere, overall service quality, client satisfaction, and client behavioural intention (i.e., reappointment and recommendation). Consistent with the existing service quality literature, favourable service quality perception leads to client satisfaction and client behavioural intention. In the customer satisfaction literature, client satisfaction is considered to have a direct and positive influence on client behavioural intention. Based on this conceptual model, detailed hypotheses are established and further explained in the next section.

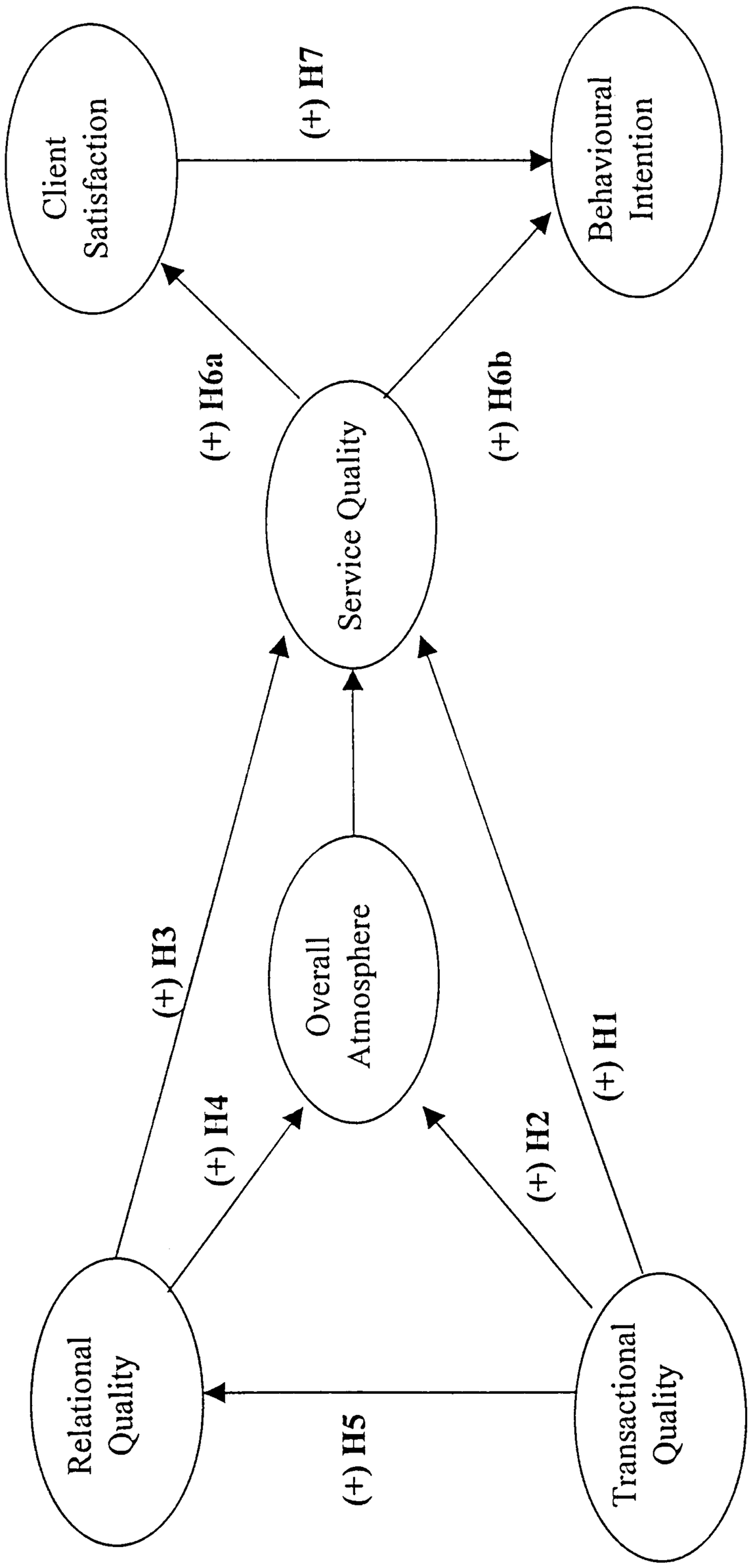
7.5 RESEARCH HYPOTHESES

7.5.1 Transactional Quality and Service Quality

7.5.1.1 Product/Service Exchange

Transactional quality impacts on service quality and the formation of transaction quality mainly comes from discrete exchanges (Dwyer et al., 1987; Glynn and Lehtinen, 1995). Dwyer et al. (1987) characterise discrete exchange as being manifested by money on one side and an easily measured commodity on the other. Easton and Araujo (1992) describe

Figure 7.1: Conceptual Model of Business-to-Business Professional Service Quality



this kind of exchange as economic exchange in that it requires visible transactions among and between participants. In terms of the IMP interaction model, these discrete exchanges embrace product/service exchange, financial exchange, information exchange, and social exchange (Håkansson, 1982; Möller and Wilson, 1988). The exchange of product and/or service represents the core of the interaction process. According to the IMP literature, the characteristics of the product or service involved are likely to have a significant effect on the relationship as a whole (Håkansson, 1982). Subsequent findings by Grönroos (1984) also suggest that an acceptable technical quality of what is being delivered by service providers is a prerequisite for favourable service quality evaluation.

The above-mentioned relationship between product/services exchange and overall service quality was demonstrated in the in-depth client and consultant interviews. In the evaluation of service quality of consulting engineers, the importance of transactional quality is greatly stressed by both public sector clients and private sector clients as well as by consulting engineers. For example, public sector clients usually lay down detailed evaluation criteria in each stage of construction for assessing service performance of consulting engineers. In the feasibility stage, quality of final recommendation and adequacy of cost estimates represent core service quality attributes whereas in the construction stage, administration of staff and contract, and handling of financial matters and cost control are important attributes. These can be illustrated in the following two typical quotes:

> We do have a system in evaluating the service quality of the consulting engineer as required by our department. We care very much about the project itself whether the services provided by the consulting engineer meet our specification in terms of technical standard, information requirement, and meeting the stated budget. (Mr. Geoff Willcocks)

> It is quite true that for any project, the consultancy services have to be clearly defined and spelt out about what is to be done, how it is to be done, when it is to be done, and how much it costs. These are the basic requirements. That is the bottom-line. (Mr. Eric Chiu)

Some clients have a more comprehensive quality plan built in the evaluation system to assess the performance of consulting engineers as described by a private sector client:

> As part of our BS5750 setup, we have a quality division to oversee quality assurance procedures and to work with other certified people who automatically give us, at the outset of the project, the overall quality plan detailing the services provided, materials, time scale, and the key dates for information. These details will be used to build up 10 to 20 different quality plans for the whole project...Throughout the project, there is monitoring going on. At the end of the project, on the last page of the quality plan, there is quality assessment and review section about the performance of each individual section. (Mr. Norman Pope)

It is very common that every client is concerned about the final product as one client suggests:

> When you build a power station, you are not building a showhouse, but a facility. If they [consultants] go wrong, they got problems. It does not matter whether the windows fall out or the brickworks are not perfect as these do not stop the generator working. (Mr. Norman Pope)

For private sector clients, the monitoring system on the service quality of consulting engineers is, however, less formal for two reasons. First, the contract sum involved is less significant as compared with government contract. Second, the evaluation of service quality of consulting engineers is usually and solely done by the project manager. But the same evaluation criteria adopted by the public clients are also emphasised by the private sector clients.

7.5.1.2 Financial Exchange

Although in the IMP literature and other studies using the IMP interaction model, financial exchange episodes are less stressed (Metcalf et al., 1992; Rice 1992), their impact on business-to-business professional services should not be overlooked when the complexity of the service is concerned. In the context of consulting engineering service,

payment has to be made to the consultant from time to time and the amount involved depends on the project stage. One client briefly explains the payment method as follows:

> The payment system is pretty standard and only varies just a little bit. In the design stage one, what normally happens here is to pay on the expenses basis according to the number of man-hours that go into the job. In the design stage two and the construction stage, the consultant will be paid on a percentage basis or a lump sum basis. (Mr. Richard Ely)

It is clear that financial exchange is also part of the transaction and spans throughout the entire project. The involvement of both parties in terms of the amount of money to be paid/received and the frequency of exchange is positively related to the scale and duration of the project.

7.5.1.3 Information Exchange

Metcalf et al. (1992) illustrate that the exchange of technical specifications for a standard product, for example, would not necessarily induce intensive contact between the parties and hence information exchange. But the purchase of a complex product may require close collaboration and extensive information exchange over a long period of time. Information exchange is also addressed in the service quality literature. For example, Parasuraman et al. (1985) include communication as one of the generic dimensions in assessing service quality. But its meaning is rather restrictive only to mean keeping customers informed in a language that they can understand. In the IMP approach, information exchange is much broader and encompasses different ways of communication. In the client interview, it seems that the content is relatively more important than the means of how the message is conveyed:

> I am quite happy to receive [from consultants] a piece of paper with hand-written calculation, hand sketches, and justifications of what they are suggesting…That is important that we have got it right. It does not really matter to me whether it comes in by fax or on a cigarette packet providing that my designer and I can read it. (Mr. Norman Pope)

In terms of contact frequency, it varies a lot depending on the scale of the project as one client illustrates:

> We would normally set up a series of regular progress meetings, roughly monthly. The frequency would depend on the job. There are jobs which are so simple and do not need a lot of contacts. Other jobs are more complicated. We might need to talk and to discuss progress and the problems envisaged. (Mr. Conder Yan)

Based on the above comments, the content itself is more important than the means of communication. It is not surprising that in today's business environment, information exchange can be done in a number of ways instantly, either by phone, fax, and email. Therefore, the accuracy of information can be a significant factor in affecting clients' service quality evaluation.

7.5.1.4 Social Exchange

Social exchange, being an important element in the IMP framework, is particularly significant in services marketing because service is interactive in nature involving simultaneous production and consumption of service. It serves as an important function in reducing uncertainties between the two parties and is particularly significant when the experience of the two parties is limited. Turnbull (1979) also acknowledges the importance of personal contact in industrial marketing when there is a need for a greater volume and quality information. Such a need is usually best met through personal interaction in order to lower buyer perceived risk, improve supplier credibility, and provide a valuable source of market information. Personal contacts help facilitate the social exchange process. Service quality perception derived from the social exchange process between buyer and seller is addressed by Lehtinen and Lehtinen's interactive quality (1991) and Grönroos' (1984) functional quality. Social exchange process has also been included in various service quality dimensions as originally identified by Parasuraman et al. (1985), in terms of access (ease of contact), courtesy (politeness, respect, consideration, and friendliness of contact personnel), communication (keeping customers informed in language they can understand and listening to them), credibility (trustworthiness, confidence, honesty of contact personnel), and understanding/knowing the customer (providing individualised attention).

In the context of consulting engineering service, social exchange is regarded as an element embedded into the routine task as illustrated in the following two quotes:

> Whether it is social relationship or business relationship between a client and a consulting engineer, it is arguable, isn't it? For example, both go out to the construction site for the day, spending lunch time in a pub…There is no reason why the staff of client organisation and staff of consulting organisation can't be friends. (Mr. Richard Ely)

> It is difficult to get to know the professional capability of a person over a period of time without becoming a social thing…Generally speaking, development of professional relationship is bound to spread into the social side. (Mr. Norman Pope)

But the relationship derived from the social exchange is not a substitute of business relationship. One client explicitly makes it clear:

> The social side of relationship can make life easier in that we are able to discuss and to get the message two ways. But that wouldn't be the foremost decision for awarding contracts. (Mr. Eric Chiu)

The other client also makes similar comment in that:

> Relationship tends to be built up by satisfaction with the service we get…There are firms that I worked with twenty years ago and no longer our consultants. They were good at that time. Our friendship is yesterday's news. What we want now is quality. (Mr. Richard Ely)

As uncovered in the interviews, there is one thing in common about the working atmosphere. Both the public sector clients and private sector clients agree that favourable technical quality does not necessarily translate into good service quality unless there is a good working relationship in terms of mutual understanding, trust, and cooperation. Favourable working relationship is particularly important for private sector clients as the reappointment of consulting engineers for subsequent construction projects is less formal and, most likely, based on the past working relationship. The typical quote is that "having a good relationship and working

atmosphere is good for both sides to work together." This ties in with the IMP literature that as mentioned in Section 4.3.6 of Chapter Four, atmosphere represents the state of a relationship (Ford et al. 1996) and mediate the influence of various transactional and relational exchange variables (Håkansson, 1982).

To sum up, at one level, product/service exchange, financial exchange, information exchange, and social exchange represent the core of a service offering that facilitates the interaction of clients and professional service providers (Grönroos, 1984; Möller and Wilson, 1988). These components of transactional quality directly influence overall service quality (Dwyer et al., 1987; Glynn and Lehtinen, 1995). At another level, these components also influence overall service quality through the mediating effect of the overall atmosphere surrounding the parties (Håkansson, 1982).

Therefore, two hypotheses about transactional quality and service quality were made:

Hypothesis 1: In the context of Hong Kong consulting engineering service, transactional quality (including product/service exchange, financial exchange, information exchange, and social exchange) is positively related to the overall service quality evaluation.

Hypothesis 2: In the context of Hong Kong consulting engineering service, the influence of transactional quality on the overall service quality evaluation is mediated by the overall atmosphere.

7.5.2 Relational Quality and Service Quality

7.5.2.1 Cooperation

It is commonly addressed in the service quality literature that a customer wants more from the service exchange than mere technical service quality (e.g., Glynn and Lehtinen, 1995). The interactive quality between customers and service providers is vital to the retention of customers. Apart from transactional quality, relational quality is also vital to service quality evaluation. Dwyer et al. (1987) suggest that "relational exchange transpires over time. Each transaction must be viewed in terms of its history and its anticipated future. Future collaborations are supported by implicit and explicit

assumptions, trust, and planning. It is more apparent when dependence is prolonged and the performance is less obvious" (p.12). Rokkan and Haugland (1998) make the point that the core of relational exchange is informal coordination based on norms of behaviour. In the IMP literature, relational exchange is characterised by mutual co-operation and commitment to adaptation.

The IMP findings suggest that one of the outcomes of successful exchange episodes is co-operation. Holm, Eriksson, and Johanson (1996) propose that the concept of co-operation can refer to mutual understanding in co-ordinating exchange activities in the relationship. These co-operative arrangements may be formal or informal. Formal co-operative arrangements are referred to as explicit sharing of resources supported by a contract (Bidault, Laurent, and Segla, 1992). Sanvido, Grobler, Parfitt, Guvenis, and Coyle (1992) cite one of the success factors for construction projects is to have a series of contracts allowing and encouraging the various specialists to behave as a team without conflicts of interest and differing goals. These contracts must allocate risk and reward in the correct proportion. Bidault et al. (1992) suggest that a higher level of uncertainty will lead to a higher level of co-operative behaviour.

In the client in-depth interviews, it is indicated that co-operation is particularly important for large scale projects. One public sector client illustrates the importance of cooperation:

> Many of our projects span across different government departments and require different types of engineering consultants, for example, structural engineers for structural design, mechanical and electrical engineers for M&E works…it is always a headache to coordinate different parties to work for a big project. (Mr. Geoff Willcocks)

Clients in the private sector comment that the circumstances which give rise to conflict are quite minimal and the resolving mode tends to be friendly and open.

> In our experience, our working relationship with the consultants is very good even when there is a conflict, for example, about a sudden burst of pipeline or late submission of technical documents. We have

> confidence in resolving conflicts with the consultants...It is highly unlikely that we go to the arbitration stage. (Mr. Eric Chiu)

7.5.2.2 Adaptation

Another outcome of the intimate relationship between the parties is adaptation. Adaptation can be made by either or both parties in an unconscious manner as a relationship develops (Håkansson, 1982). Metcalf et al. (1992) refer to adaptation as "the extent to which the buyer and seller make substantial investments in the relationship" (p.29). Adaptation is similar to idiosyncratic investment suggested by Williamson (1979) mentioned in Section 4.2.4.2.

In the IMP literature, adaptations can be made in product modification, production, administration procedures, marketing, information dissemination, delivery lead time and scheduling, and financial arrangement. Other studies using the IMP model also emphasise adaptation in particular on joint product development, technical solutions, and production co-ordination (Metcalf et al., 1992); or in technical features, production capacity, distribution channels, and techniques (Leung et al., 1995). Commitment to mutual adaptation or adaptation made solely by the seller is dependent on the organisational culture. Some organisations tend to take on a long-term view on adaptation whereas others take on a short-term view. Therefore, quality perception can be influenced by the commitment to adaptation.

About adaptation in the consulting engineering business, it is largely related to technical adaptation. A typical comment is that "we have our standards. We want our standards to be incorporated into the project that the consultants are doing for us." Another quote by one private sector client highlights the reality of adaptation:

> Technical adaptation by the consultant is required when there is system incompatibility (e.g., computer aided design) with our ultimate client. But the chance is very remote as the system used is rather comparable, except for smaller consultants. When there is system incompatibility between our systems and those used by the consultants, we would require the consultant to adapt to ours unless we found that those used by the consultants are better. (Mr. Eric Chiu)

Based on the above, the demand for adaptation by clients is not very strong unless there is a definite need. It is also envisaged that co-operation and commitment to adaptation are largely hinged on the outcome of transactional quality. For example, frequent social exchanges through more personal contacts, either formal or informal, will increase the intention to co-operate and to adapt. It is a common practice that, from time to time, consultants would invite clients to tour around the office for new equipment acquisitions in order to build up more social contacts and to strengthen technical capability as well as working atmosphere. All these will improve service quality perceptions.

The findings from the literature review and comments from the industry participants provide a strong case that relational quality in the form of co-operation and adaptation impacts on service quality. Similar to Hypothesis 2, service quality is affected by the relational quality through the mediating effect of overall atmosphere. In addition, relational quality is affected by transactional quality. Therefore, the following hypotheses were established:

Hypothesis 3: In the context of Hong Kong consulting engineering service, relational quality (including co-operation and adaptation) is positively related to the overall service quality evaluation.

Hypothesis 4: In the context of Hong Kong consulting engineering service, the influence of relational quality on the overall service quality evaluation is mediated by the overall atmosphere.

Hypothesis 5: In the context of Hong Kong consulting engineering service, transactional quality is positively related to relational quality.

7.5.3 Service Quality, Client Satisfaction, and Client Behavioural Intention

In Chapter Two, both the constructs of service quality and satisfaction and their relationship were explored and discussed. There is wider agreement in the existing literature that the two constructs are not synonymous, but interrelated (Oliver, 1993). In terms of their causal relationship, although Bolton and Drew (1991a) argue that service quality is a consequence of satisfaction, more researchers (e.g., Iacobucci et al., 1994;

Oliver, 1993; Parasuraman et al., 1994; Rust and Oliver, 1994) tend to adopt the causal link that service quality leads to satisfaction.

Based on their research experience on service quality and customer profitability, Storbacka et al. (1994) propose a relationship profitability model that connects the concept of service quality with satisfaction and relationship profitability. The assumption is based on the idea that by improving the quality of the provider's service, customers' satisfaction is improved. A customer creates a strong relationship with the provider and this leads to relationship longevity (or customer retention/loyalty). This is consistent with the findings of a pilot study by Rust and Zahorik (1993) that customer retention is driven by satisfaction. The framework as proposed by Storbacka et al. (1994) matches with the current literature that service quality leads to satisfaction mentioned earlier. The direct effect of service quality on customer retention has also been proposed and empirically tested in the existing service quality literature (e.g., Boulding et al., 1993).

The proposed positive relationships between service quality and client behavioural intention, and between client satisfaction and client behavioural intention are also observed in the client in-depth interviews. One client illustrates:

> To me, client satisfaction has a lot more to do than service quality. For each project, we have quality criteria which have clearly spelt out about the services required and the standard to be met. However, there are peripherals which may affect the end product whether it is satisfactory or not. For example, the effect of minority or pressure group cannot be overlooked. There is no quality documentation for that…Client satisfaction is not just a perception of service quality. It may be coloured by the reaction of third party who has no direct involvement with the project. (Mr. Norman Pope)

From the above quote, clients are able to draw a distinction between service quality and client satisfaction. Client satisfaction is viewed as wider in scope than service quality. Client satisfaction as applied in the context of consulting engineering industry may be affected by factors (e.g., weather and government policy) which are outside the control

of the consulting engineers. Both service quality and client satisfaction impact on client behavioural intention. Therefore, the following hypotheses were proposed:

Hypothesis 6: In the context of Hong Kong consulting engineering service, overall service quality evaluation is positively related to both (a) client satisfaction and (b) client behavioural intention.

Hypothesis 7: In the context of Hong Kong consulting engineering service, client satisfaction is positively related to client behavioural intention.

7.6 SCALE DEVELOPMENT

Before developing a measurement instrument to assess business-to-business professional service quality, the construct of service quality should be operationalised before it can be measured. The following sections will outline the operationalisation of service quality, generation of measures, and purification procedures before finalising the measures for the main survey.

7.6.1 Operationalisation of Service Quality Construct

Operationalisation of the service quality construct in the context of general service and professional service have already been discussed in Chapters Two and Three respectively. They are summarised as follows:

1. attribute expectations;
2. attribute expectations and attribute importance;
3. attribute performance and attribute importance;
4. attribute performance and attribute expectations;
5. attribute performance, expectations, and importance; and
6. attribute performance and expectations (desired and minimum tolerable levels).

The two most dominant operationalisations are based on the perception-minus-expectation (P-E) framework and the P-only framework. As mentioned in Chapter Two, a growing amount of literature seems to discredit the P-E measurement framework because researchers do not agree in general on the usefulness of capturing expectations (e.g., Carman, 1990; Clow and Vorhies, 1993; Cronin and Taylor, 1992; Teas, 1993b).

Study results also show that respondents do not make clear distinction between attribute expectation and attribute importance (Lambert and Lewis, 1990). Although there is evidence suggesting that a measurement instrument using performance-based operationalisation outperforms the one using the P-E framework in terms of scale reliability and questionnaire length as mentioned in Chapter Two, recent studies tend to collect both sets of data (e.g., Bienstock et al., 1997; Dabholkar, Thorpe, and Rentz, 1996). It is one of the objectives of this study to compare the two measurement frameworks. Therefore, both P-E and P-only measurement frameworks were used in this study. Apart from construct operationalisation, the other issue that should be addressed is reference anchor for service quality measurement. In the past service quality studies, different researchers had used different reference anchors when measuring expectation and performance perception as shown in Table 7.1. For example, some service quality researchers have used the wording "excellent service providers" for anchoring expectation (e.g., Parasuraman et al., 1988) and "primary service provider" for anchoring performance perception (e.g., Bienstock et al., 1997). To account for the existing literature and the potential confusion to respondents, "reasonable service provider" was used to anchor expectation and "one which is dealt with frequently" was used to anchor performance perception.

7.6.2 Item Generation

Regarding measures of business-to-business professional service quality as applied in the Hong Kong consulting engineering industry, there is no existing source of measures which incorporate the IMP Interaction variables. Therefore, measures have to be developed and/or borrowed from past research and then purified using a small sample. This is the common methodological approach adopted by researchers in developing measures (e.g., Moorman, Deshpandé, and Zaltman, 1993; Parasuraman et al., 1998). A single-item scale, while capable of offering clues about respondents' overall attitude towards the service quality performance of a professional service provider, is a rather crude measure. It only categorises respondents into a relatively small number of groups and does not help management concerned in charting marketing strategy. Past studies on service quality, professional service quality, and business-to-business professional service quality tend to use multi-item measures to capture the essence of service quality evaluation and related constructs. One of the advantages of using multi-item

Table 7.1: Reference Anchor for Measuring Service Quality Expectations and Perceptions

Researcher/(s) and Industry	For Expectations	For Perceptions
Parasuraman, Berry, and Zeithaml (1991a): Telephone repair service, insurance, and banking service.	• "Based on your experiences as a customer of telephone repair services, please think about the kind of telephone company that would deliver excellent quality of repair service. Think about the kind of telephone company with which you would be please to do business…" • Use of "Excellent telephone companies will…"	• "…Please show the extent to which you believe XYZ has the feature described by the statement…"
Bienstock, Mentzer and Bird (1997): Industrial physical distribution service	• "Circle a number to the right of each feature of physical distribution service, indicating whether you think suppliers in general should offer the feature; that is, whether you feel it is reasonable to expect a supplier to offer the feature." • Use of should-expectation comparison standard.	• "This question concerns the physical distribution service performance of a specific supplier. For this section, please think about your primary, secondary, and third most often used supplier for the product you most often purchase and indicate the extent to which you agree or disagree that the performance you receive from this supplier possesses each feature below."
McDougall and Levesque (1994): Financial service	• Follow the SERVQUAL	• Follow the SERVQUAL • Respondents were asked to identify their "main financial institution," then complete the perceptions questions based on and evaluation of their main financial institution.
Samson and Parker (1994): Consulting engineering service	• Expectation measures were incorporated in the questionnaire. But no mention was made about the particular comparison standard.	• Respondents were asked to indicate how they perceived the engineering firm dealt with most frequently.

Table 7.1 (cont'd): Reference Anchor for Measuring Service Quality Expectations and Perceptions

Dabholkar, Thorpe, and Rentz (1996): Retailing	• Use of "Excellent retail stores" and the will-expectation comparison standard.	• "Excellent retail stores" used in the expectation battery was substituted by "This store." The use of this wording is because the questionnaire was self-administered at the store location.
Mittal, and Lassar (1996): Health service and car repair service.	• Expectation was not measured	• Respondents of the car repair survey were asked to select a car repair service facility utilised within the past year • Respondents of the health clinic survey were asked to select "a hospital or a health clinic or a doctor's office" they visited within the last year. • The researchers admit a limiting assumption of this method that differences among providers within a service industry are randomly distributed.

measurement instrument is that individual items in a measurement instrument usually have considerable uniqueness or specificity that needs to be exploited. Statistically, each item will have only a low correlation with the attributes being measured and tends to relate to other attributes as well (Churchill, 1979).

In addition, individual items typically have considerable measurement error. The reliability as measured by Cronbach Alpha tends to increase and measurement error decreases as the number of items in a combination increases, providing that the addition of more items to a scale does not result in a reduction in the average inter-item correlation. Nevertheless, Churchill and Peter (1984) found that a positive relationship exists between the number of items used in the scale and the reliability of the measure. One possible explanation is that summing the ratings across a number of items has the effect of neutralising random fluctuations. Positive errors in a respondent's ratings on certain items may be offset by negative errors in his or her ratings on other items.

Items included in the measurement instrument were generated from the review of service quality literature in Chapter Two, professional service quality literature in Chapter Three, IMP studies in Chapter Four, relationship quality models in Chapter Five, and consulting engineering industry in Hong Kong in Chapter six as well as through five in-depth client interviews and two consultant interviews mentioned earlier in this chapter. The following sections detail the process of item generation for respective IMP dimensions/attributes.

7.6.2.1 Resource Exchange

Resource exchange includes product/service exchange, information exchange, financial exchange, and social exchange. In Frear and Metcalf's (1988) study, a six-item subscale was used to measure product/service exchange. Metcalf et al. (1992) also used a six-item subscale for measuring product exchange. They purified it in a series of maximum likelihood confirmatory analyses. Five items for product/service exchange were found to correlate with each other. The measure of product exchange contains items related to product quality, product reliability, product service, technical assistance, and product essentiality. In the consulting engineering literature, clients are also concerned with conformance to requirements, availability and completeness of information, concerns of

cost and time overrun as determinants affecting project consultants' performance (e.g., Kometa, Olomolaiye, and Harris, 1994; Sanvido et al., 1992; Tan and Lu, 1995). Samson and Parker (1994) also consider client focus (e.g., post-job reviews, creativity, initiative, customisation). These attributes were also emphasised in the consultant and client in-depth interviews. Public sector clients are more explicit in stressing these attributes (see interview summary with Mr Geoff Willcocks in Appendix A). Based on a synthesis of the relevant literature and comments from the in-depth interviews, seven items were used to measure product/service exchange. They are as follows:

Service/product exchange:

1. Provide customised services
2. Provide sound technical services
3. Achieve project cost-effectiveness
4. Provide reliable services
5. Meet clients' project requirements
6. Meet the time schedule
7. Meet the agreed budget

For information exchange, Metcalf et al. (1992) only focus on technical documentation and technical information. These two items are however considered insufficient to capture the characteristics of information exchange in the context of consulting engineering service. It is from a client's perspective that information should not only be adequate, but also meet specific needs of client. This is reflected in an client interview that "it does not matter whether the information comes in by fax or on a cigarette packet as long as it meets the need" (see interview with Mr Noman Pope). Parasuraman et al. (1988) also address the importance of responsiveness in exchanging information between customers and service providers (e.g., calling the customer back quickly). In the study, four items were used to measure information exchange.

Information exchange

1. Submit technical documentation which is easily understood by clients
2. Submit technical documentation which meets clients' needs
3. Submit adequate technical information
4. Respond promptly to clients' requests for information

Regarding financial exchange, the need to exchange money, the value, volume, and exchange rate are descriptors in the IMP literature (Håkansson, 1982). Rice (1992) considered negotiation of contract and signing of contracts as financial exchange in the study of international trade shows. In terms of financial exchange, it is evidenced that clients emphasised contract administration and payment claims as part of the financial exchange in the client in-depth interviews. Therefore, four items were used to measure financial exchange. They are as follows:

Financial exchange

1. Keep proper records for contract administration
2. Make timely payment claims
3. Make accurate payment claims
4. Make legitimate payment claims

7.6.2.2 Social Exchange

In the consulting engineering literature, aspects of social exchange as a "soft" side of service quality is less stressed (e.g., Kometa et al., 1994; Sanvido et al., 1992; Tan and Lu, 1995). However, Morgan and Morgan (1991) call for greater social contacts and personal contacts of staff as part of the marketing strategy of consulting engineering firms. The IMP Group characterises social exchange as building mutual trusts, social contacts, and personal relationship. In their empirical study, Frear and Metcalf (1988) used 11 items to operationalise social exchange. These items were purified and reduced to five items in the study by Metcalf et al. (1992). These five items are “like dealing with them,” “understanding problems,” “confidence in information,” “poor understanding,” and “difficult to make friends.” It is also evidenced in the client in-depth interviews that frequency of social contacts also influence service quality evaluation (see interview with Mr Richard Ely and Mr Norman Pope).

The above-mentioned characteristics of social exchange were embedded in a five-item scale. The items are as follows:

1. Establish trust in the working relationships with clients
2. Have a good understanding of how clients operate
3. Show enthusiasm in dealing with clients
4. Easy to make friends

5. Maintain frequent contacts with clients

7.6.2.3 Co-operation

The dimension of co-operation is important in engineering projects (Bidault et al., 1992). Attributes of co-operation in the consulting engineering industry include allocation of project responsibility, organisation of project team, and co-ordination of project interphase (Kometa et al., 1994). In Frear and Metcalf' s (1988) study, 13 items were used to operationalise the construct of co-operation, including items about conflict handling. But Metcalf et al. (1992) used four items after item purification. These four items are related to marketing co-operation, call frequency, request salesperson, and product use. Based on the unique features of the industry and comments from the client in-depth interviews, the nature of these four items are not entirely relevant in the consulting engineering industry. Rather, in this study, some of the conflict handling items (e.g., complaints) in Frear and Metcalf's (1988) study and attributes of co-operation in construction engineering (Kometa et al., 1994) were used to capture a wider perspective of co-operative arrangement in the consulting engineering industry. The three items used in this study are as follows:

1. Co-operate closely with clients in project management
2. Able to handle clients complaints
3. Collaborative in resolving clients' conflicts

7.6.2.4 Adaptation

Similar to co-operation, adaptation is also a major factor affecting the performance of consulting engineers in respective client interviews in terms of operational and technical adaptation. Issues of adaptation, in particular technical adaptation, are more commonly addressed by clients in the public sector than those in the private sector as far as the duration and the value of the project are concerned (see interviews with Mr Geoff Willcocks and Mr Conder Yan). In other words, the need for technical adaptation and finding more cost-effective technical solution is stronger when the project spans across a long period of time and the amount involved is greater. Samson and Parker (1994) consider that consulting engineers should constantly improve their products, services, and technical capabilities. Leung et al. (1995) used four items to operationalise adaptation in the areas of technical features, production capacity, distribution channels,

and techniques in a business environment. Nine items were used in Frear and Metcalf's (1988) study. They include items related to product adaptation, delivery plan, local stock, joint product development, quality control changes, quality control procedures, production co-ordination, demand delivery, and procedural changes. However, three items were found to be highly correlated in the study by Metcalf et al. (1992). They include joint product development, technical solutions, and production co-ordination. To synthesise the results of client interviews with the literature on marketing and consulting engineering, the following four items were used to measure adaptation in this study:

1. Improve technical capability constantly
2. Proactively offer clients new technical solutions
3. Make operational adjustment when required by clients
4. Co-ordinate multi-engineering disciplines when required by clients

All the items measuring different resources exchange attributes (i.e., attributes of product/service exchange, financial exchange, information exchange, and social exchange) and relational exchange attributes (i.e., attributes of co-operation and adaptation) were rated on a seven-point Likert scale (1 = strongly disagree, and 7 = strongly agree). In the extant literature, there are a number of criticisms against the use of Likert scale. For example, Andersson (1991) considers that the use of an ordinal scale can seriously limit the choice of statistical methods to be used. Oppenheim (1992) and Zikmund (1988) also argue that Likert scale suffers lack of reproductability in the sense that the same total score may be obtained in many different ways. However, Hensel and Bruner (1992) reviewed articles in six top-level marketing journals for a ten-year period from 1980 to 1989 and found 750 uses of scales in which almost 78% were of the Likert scale. They also pointed out that Likert scale is easy to construct and enables respondents to understand quickly how to respond. Another reason of using a seven-point Likert scale with extreme labelling is to keep align with the other service quality studies (e.g., Bienstock et al., 1997; Parasuraman et al., 1988, 1991a) and to facilitate comparison about model robustness.

7.6.2.5 Overall Atmosphere

In the existing service quality studies and IMP studies, the operationalisation of the construct of atmosphere is rarely addressed. Therefore, the atmosphere scale had to be

developed for the study on the basis of the IMP literature and in-depth client and consultant interviews. The elements characterising the atmosphere between buying and selling organisations are related to power-dependence, state of conflict or co-operation, overall closeness or distance of the relationship, and companies' mutual expectations (Håkansson, 1982). However, these variables were not measured in a direct way in the IMP study. In the client in-depth interviews, mutual expectations are established formally in the form of contract (e.g., meeting required budget and time schedule) before the start of the project and shaped in the light of interactions among the project participants from the feasibility study stage through the post-commissioning stage (see interview with Mr Geoff Willcocks). In the context of consulting engineering service, the perceived power of the consultant seems to be stronger as the service itself possesses a high degree of credence property. This is particularly true when clients do not have in-house consulting engineering department or subsidiary. A client relies on the consultant's new technical solution very much as a result of technological advancement or a change of government regulations. The attribute of conflict handling has already been addressed in the co-operation dimension. Therefore, four items were used to measure overall atmosphere. They are:

1. I consider the general atmosphere surrounding the working relationship with the consulting engineer as... (1 = very adverse, and 7 = very harmonious).
2. I regard the overall relationship with the consulting engineer as... (1 = very distant, and 7 = very close).
3. I believe mutual expectations for the project have been established with the consulting engineer...(1 = to a lesser extent, and 7 = to a greater extent).
4. I believe my organisation is dependent on the consulting engineer's services for the project...(1 = to a lesser extent, and 7 = to a greater extent).

7.6.2.6 Overall Service Quality

The overall service quality scale is adapted from the existing service quality studies. However, in measuring the summary judgement of service quality, existing research findings are divided whether to use a single item (e.g. Cronin and Taylor 1992;

Parasuraman et al., 1988) or multiple items (e.g., Taylor and Baker 1994). Oliver (1997) suggests using at least two items to measure summary judgement because of higher reliability. Items for measuring business-to-business professional service quality were adapted from Fornell, Johnson, Anderson, Cha, and Bryant (1996) who studied service quality and customer satisfaction across over 40 industries. These three items are as follows:

1. Overall, the service quality of the consulting engineering is...(1 = very poor, and 7 = excellent).
2. The service performance of the consulting engineering fits our project requirements...(1 = to a lesser extent, and 7 = to a greater extent).
3. In terms of service reliability, things have gone wrong...(1 = very often, and 7 = very seldom).

7.6.2.7 Client Satisfaction

Similar debates about whether to use single item or multi-items to measure summary satisfaction judgement also unfold in the customer satisfaction literature. In their longitudinal study, LaBarbera and Mazursky (1983) noted that the use of multi-items for measuring summary evaluation does not increase reliability over time, but leads to poor response rate and artificial answers by respondents. Other researchers, however, argue that satisfaction should be measured by a combination of attributes (e.g., Crosby and Stephens, 1987; Oliver, 1980; Taylor and Baker, 1994). Oliver (1997) suggests to use multi-item scale because of higher reliability. Therefore, a three-item scale was adapted from Fornell et al. (1996). The wordings of the adapted items are as follows:

1. Overall, our experience in dealing with the consulting engineer is...(1 = very dissatisfying, and 7 = very satisfying).
2. The consulting engineer's service performance...(1 = falls short of our expectations, and 7 = exceeds our expectations).
3. My feelings towards the consulting engineer's services can be characterised as...(1 = very displeased, and 7 = very pleased).

7.6.2.8 Behavioural Intention

The behavioural intention scale was also adapted from the existing service quality studies. In measuring behavioural intention, researchers tend to use a multi-item scale.

For example, Boulding et al. (1993) used items to measure behavioural intention to stay in a hotel using questions being anchored between "very unlikely" and "very likely" in their first study. Their second study also contained six behavioural variables about educational services. These items are related to saying positive things about the school, planning to donate, and recommendation to others. Taylor and Baker (1994) used three items to measure purchase intentions in a retail environment. In a study of customer behavioural intentions, Zeithaml, Berry, and Parasuraman (1996) used a 13-item battery to gauge a wide range of behavioural intentions including five items for loyalty, two items for switching behaviour, two items for willing to pay, three items for measuring external response, and one item for internal response. In this study, their five-item loyalty scale was adapted because of higher reliability (0.93 to 0.94 across four samples). These items include:

1. I would say positive things about the consulting engineer to others.
2. I would recommend the consulting engineer to other people who seek my advice.
3. I would encourage other companies to do business with the consulting engineer.
4. I would consider the consulting engineer as my first choice when engineering consultancy services are needed.
5. I wish my organisation would do more business with the consulting engineer in the next few years.

Each of these items was accompanied by a 7-point likelihood scale (1 = very unlikely, and 7 = very likely).

7.6.3 Item Purification

The item purification process involved two stages. A preliminary survey instrument was first sent to four clients, being two in the public sector (i.e., government departments) and two in the private sector (i.e., architectural firms), who were asked to provide comments on the wording and face validity of the items in the instrument. The format of the instruction preceding the measurement of clients' expectation and perception items was adapted from the SERVQUAL instrument (Parasuraman et al., 1988). After modification to the wording and the structure of the questionnaire, copies of the pre-test instrument were then sent to 50 clients, being 28 in the government

sector and 22 in the architectural industry. Samson and Parker (1994) also focused on these two client sectors in their service quality study of consulting engineers in Australia. These two client sectors as revealed in the in-depth consultant interviews contributed over half of the total consultant fees turnover. Pre-test client samples were selected from the Staff List of Hong Kong Government 1996 and Member List of Architects 1996. The survey questionnaires were addressed to senior engineering staff (i.e., the rank of Chief Engineer or above for government clients) and partners/directors of architectural firms with a personalised covering letter. Addressees were also given an option to receive a copy of research result when they returned the completed questionnaires.

At the end of a two-wave mail-out in one month, a total of 21 questionnaires were received including 12 replies from government officials and nine replies from architects. One was discarded from the data analysis for incompleteness. The 20 usable replies used in the scale purification compared favourably with other studies using organisations as samples. For example, Simonin (1997) only used 12 executives to pre-test a questionnaire about strategic alliance. In their service quality study, Bienstock et al. (1997) received 33 usable responses out of a sample 50 purchasing managers in a pre-test survey about physical distribution service quality. In this study, the 20 usable replies were regarded as adequate for item purification purpose.

The questionnaires from the two sectors were combined for the data analysis. Initial analysis of the 20 usable responses consisted of an evaluation of coefficient alpha and item-to-total correlation. This is in accordance with Churchill's (1979) suggestion that "coefficient alpha absolutely should be the first measure one calculates to assess the quality of the instrument" (p.68). Use of item-to-total correlations is also recommended for item purification (Nunnally and Bernstein, 1994) although Gerbing and Anderson (1988) argue that the use of item-to-total correlation method fails to discriminate between set of indicators that represent different, though correlated, factors. Nevertheless, the use of coefficient alpha and item-to-total correlation in purifying scale items at the early stage of scale development have become an established practice by researchers (e.g., Bienstock et al., 1997; Parasuraman et al., 1988). Low values of coefficient alpha suggest that deleting certain items will

improve the alpha values. The criterion used in deciding the item to be deleted is the item's corrected item-to-total correlation (i.e., correlation between the score on the item and the sum of score on all other items making up the dimensions to which the item is assigned). In this study, to prevent the inadvisable deletion of items based solely on the results of the small pre-test sample, the assessment of the quantitative item-to-total correlations was combined with a qualitative assessment of each of the items. This qualitative assessment was based on firstly, the face and content validity of each item and secondly, how frequently the item was mentioned in the in-depth consultant and client interviews.

Based on the pre-test results set out in Tables 7.2A, 7.2B, and 7.2C, the reliability coefficients of 27 items across six dimensions are fairly high: 0.46 to 0.89 for the expectation battery (see Table 7.2A); 0.73 to 0.94 for the perception battery (see Table 7.2B), 0.69 to 0.91 for the difference scores (see Table 7.2C). Although the reliability coefficient for the adaptation dimension is rather low at 0.46 in the expectation battery, it is quite high in the perception battery. Therefore, no item was deleted. Scale reliabilities for different overall evaluation measures are also high, except overall atmosphere (see Table 7.2D). Therefore, one item in the overall atmosphere was deleted based on its small and negative item-total correlation. After item deletion, the final result on overall atmosphere is shown in Table 7.2E. The final version of the questionnaire is in Appendix B.

7.7 MAIN SURVEY

The refined questionnaire was sent to a sample of 640 clients in two main client sectors, professional architects and local government engineers. These client samples were selected from the Staff List of Hong Kong Government 1996 and Member List of Architects 1996 after discarding those which were selected for the pre-test survey. The survey questionnaires were addressed to senior government officials (i.e., the rank of Chief Engineer or above) and partners or directors of architectural firms. The questionnaire packet consisted of a personalised covering letter, a stamped return envelope, and the questionnaire itself. To motivate selected samples to respond, they were offered an incentive in the form of a report that summarised the results of the study. Two weeks after the initial mailing, reminders were sent to all non-respondents.

Table 7.2A: Pre-test Results: Expectations (n = 20)

Dimension	Mean	Standard Deviation	Corrected Item-Total Correlation	Reliability Alpha
Product/Service Ex.				0.72
PE1	6.19	1.07	0.46	
PE2	6.90	0.43	0.52	
PE3	6.47	0.87	0.78	
PE4	6.28	1.45	0.57	
PE5	6.80	0.40	0.42	
PE6	6.76	0.43	0.20	
PE7	6.38	0.86	0.36	
Financial Ex.				0.72
FE8	6.80	0.40	0.27	
FE9	6.30	0.92	0.51	
FE10	6.70	0.57	0.65	
FE11	6.70	0.65	0.71	
Information Ex.				0.79
IE12	6.00	0.94	0.49	
IE13	6.66	0.73	0.68	
IE14	6.57	0.59	0.66	
IE15	6.66	0.65	0.69	
Social Ex.				0.76
SE16	6.66	0.65	0.46	
SE17	5.90	1.04	0.53	
SE18	6.00	1.22	0.77	
SE19	4.80	1.40	0.49	
SE20	5.42	1.50	0.53	
Co-operation				0.89
CO21	6.19	1.03	0.67	
CO22	6.23	0.94	0.86	
CO23	6.23	0.99	0.83	
Adaptation				0.46
AD24	6.76	0.43	0.21	
AD25	6.42	0.74	0.25	
AD26	5.76	0.88	0.40	
AD27	6.14	1.23	0.28	

Table 7.2B: Pre-test Results: Perceptions (n = 20)

Dimension	Mean	Standard Deviation	Corrected Item-Total Correlation	Reliability Alpha
Product/Service Ex.				0.92
PE1	4.75	1.44	0.71	
PE2	5.40	1.14	0.61	
PE3	4.55	1.39	0.90	
PE4	4.70	1.45	0.82	
PE5	5.20	1.28	0.84	
PE6	4.45	1.43	0.64	
PE7	4.85	1.42	0.84	
Financial Ex.				0.73
FE8	5.05	1.39	0.32	
FE9	5.30	1.34	0.38	
FE10	5.15	1.22	0.70	
FE11	5.55	1.05	0.76	
Information Ex.				0.90
IE12	5.25	0.91	0.56	
IE13	4.85	1.09	0.86	
IE14	4.60	1.35	0.90	
IE15	4.10	1.55	0.89	
Social Ex.				0.87
SE16	5.10	0.99	0.65	
SE17	4.47	1.35	0.72	
SE18	4.89	0.99	0.83	
SE19	4.89	0.94	0.59	
SE20	4.84	1.12	0.72	
Co-operation				
CO21	4.75	1.02	0.68	0.88
CO22	4.55	1.10	0.90	
CO23	4.55	1.23	0.77	
Adaptation				
AD24	4.50	1.50	0.87	0.94
AD25	4.20	1.51	0.87	
AD26	4.05	1.32	0.78	
AD27	4.80	1.36	0.88	

Table 7.2C: Pre-test Results: P-E Gap (n = 20)

Dimension	Mean	Standard Deviation	Corrected Item-Total Correlation	Difference Score Reliability[a]
Product/Service Ex.				0.88
PE1	-1.40	1.67	0.71	
PE2	-1.50	1.36	0.66	
PE3	-1.90	1.59	0.87	
PE4	-1.55	1.54	0.75	
PE5	-1.60	1.31	0.77	
PE6	-2.30	1.49	0.65	
PE7	-1.60	1.54	0.65	
Financial Ex.				0.69
FE8	-1.84	1.42	0.54	
FE9	-0.84	1.61	0.55	
FE10	-1.63	1.07	0.53	
FE11	-1.21	1.13	0.70	
Information Ex.				0.86
IE12	-0.80	1.20	0.43	
IE13	-1.80	1.32	0.77	
IE14	-1.95	1.36	0.83	
IE15	-2.55	1.70	0.83	
Social Ex.				0.80
SE16	-1.58	1.22	0.62	
SE17	-1.42	1.95	0.66	
SE18	-1.05	1.51	0.72	
SE19	0.00	1.60	0.56	
SE20	-0.53	1.54	0.64	
Co-operation				0.91
CO21	-1.40	1.47	0.79	
CO22	-1.65	1.63	0.94	
CO23	-1.70	1.87	0.88	
Adaptation				0.86
AD24	-2.30	1.49	0.82	
AD25	-2.25	1.65	0.74	
AD26	-1.65	1.66	0.80	
AD27	-1.30	1.66	0.64	

[a] Reliability of a difference score (Brown, Churchill, and Peter, 1993; Prakash, 1984)

Table 7.2D: Pre-test Results: Overall Evaluation Before Item Deletion (n = 20)

Dimension	Mean	Standard Deviation	Corrected Item-Total Correlation	Reliability Alpha
Overall Atmosphere				0.55
ATM1	5.00	0.92	0.66	
ATM2	4.90	0.85	0.38	
ATM3	4.70	1.08	0.58	
ATM4	4.25	1.25	-0.05	
Service Quality				0.85
SQ1	4.45	1.19	0.86	
SQ2	4.50	1.15	0.79	
SQ3	4.40	0.94	0.56	
Client Satisfaction				0.95
SAT1	4.45	1.23	0.89	
SAT2	4.35	1.09	0.91	
SAT3	4.40	1.19	0.92	
Behavioural Intentions				0.91
BI1	4.58	1.07	0.80	
BI2	4.47	1.17	0.86	
BI3	4.00	1.49	0.68	
BI4	3.89	1.52	0.83	
BI5	3.79	1.40	0.80	

Table 7.2E: Pre-test Results: Overall Evaluation After Item Deletion (n = 20)

Dimension	Mean	Standard Deviation	Corrected Item-Total Correlation	Reliability Alpha
Overall Atmosphere				0.83
ATM1	5.00	0.92	0.71	
ATM2	4.90	0.85	0.68	
ATM3	4.70	1.08	0.71	

There is evidence suggesting that mail survey in Hong Kong tends to result in lower response rate. For example, in a study of business connections in Hong Kong, Leung et al. (1995) achieved only a 19.9% response rate based on 1,000 samples. They reasoned that "Hong Kong executives are working long hours and under considerable pressure, the response rate to mail surveys tends to be low" (p.12). Leung, Wong, and Wong (1996) in a similar study, also achieved a response rate of only 15%. Assessment of non-response bias thus became a major issue in this study. A low response rate reflects the concern that the respondents to the survey will differ in some way from the non-respondents and the whole sample will not be regarded as a representative sample. Kanuk and Berenson (1975) suggest a number of ways to reduce and correct non-response bias, including studying differences between early and late respondents, and estimating non-response bias from speed of response. Similar time-trend extrapolation test as recommended by Armstrong and Overton (1977) was undertaken. The assumption of such a test is that respondents who respond less readily are considered to be more like non-respondents. This would necessitate dividing respondents into "early" and "late" respondents and comparing response differences with t-tests. Babakus and Boller (1992) classified responses received within the first 10 days as "early" and the rest as "late" whilst Dahlstrom, McNeilly, and Speh (1996) classified responses received within 3 weeks as "early" and the rest as "late." In this study, a two-week period was adopted to separate the two "waves" of respondents. During the four-week collection period, 187 questionnaires were received, with 98 questionnaires from government engineers and 89 questionnaires from professional architects. Table 7.3 provides a summary of response rate analysis. Prior to carrying out the data analysis, all completed questionnaires were inspected to check for missing data. Of the 187 questionnaires, two of them were discarded because they contained excessive missing data. Therefore, the data analysis would be based on 185 usable responses.

T-tests were conducted to examine the mean differences between early and late respondents across the gap and the perceptions items, as well as the overall evaluation items including atmosphere, service quality, satisfaction, and behavioural intention. The results are illustrated in Tables 7.4A, 7.4B, and 7.4C. On the basis of these results, the null hypothesis of no mean differences across the early (n=120) and late

(n=65) responding groups was not rejected. Babakus and Boller (1992) also use service quality difference scores and overall quality rating to regress on the "date of return" to estimate non-response bias. Regression analysis results shown in Tables 7.5A, 7.5B, and 7.5C also suggest that non-response bias is not a serious concern as most of the regression coefficients are not statistically significant ($p < .05$).

Table 7.3: Main Survey Response Rate

	Government Engineers	Professional Architects	Total	%
Total Sample Size	273	367	640	100.0
1st Wave				
Total Replied *(a+b)*	85	58	143	22.3
– Completed (a)	64	55	119	18.6
– Non-Completed# (b)	21	3	24	3.7
Non-Delivery	4	28	32	5.0
2nd Wave				
Total Replied *(a+b)*	44	34	78	12.2
– Completed (a)	34	34	68	10.6
– Non-Completed# (b)	10	--	10	1.6
Non-Delivery	--	2	2	0.3
Total Non-Replied	140	245	385	60.2

They represent those respondents who replied but stated no involvement with consulting engineers. Therefore, they did not complete the questionnaire.

7.8 APPROACH TO DATA ANALYSIS

To assess the direct and indirect relationships among the constructs (i.e., transactional quality, relational quality, overall atmosphere, service quality, client satisfaction, and behavioural intention) posited in the theoretical model illustrated in Figure 7.1, data analysis was performed on both P-E and P-only scores so as to compare the relative model fit. LISREL version 8.14, a structural equation modelling programme was used. The use of structural equation modelling (SEM), as compared with other multivariate techniques, like multiple regression, allows simultaneous test of hypotheses among

Table 7.4A: Comparison of Means (Perception Items)

	Early Respondents (n=120)		Late Respondents (n=65)			
Items	Means	SD	Means	SD	*t*-value	*p*
PER1	4.666	1.071	4.446	1.381	1.118	0.266
PER2	4.958	1.020	5.107	1.119	-0.919	0.359
PER3	4.479	1.015	4.723	1.068	-1.530	0.128
PER4	4.516	1.037	4.723	1.218	-1.214	0.226
PER5	5.033	0.969	5.061	1.223	-0.161	0.873
PER6	4.416	1.220	4.359	1.418	0.286	0.775
PER7	4.630	1.213	4.553	1.447	0.381	0.704
PER8	4.658	1.286	4.876	1.152	-1.143	0.254
PER9	5.000	1.372	5.093	1.204	-0.460	0.646
PER10	4.783	1.403	5.062	1.096	-1.488	0.139
PER11	4.966	1.229	5.203	1.143	-1.273	0.205
PER12	4.848	1.154	4.815	1.171	0.186	0.852
PER13	4.810	1.127	4.923	1.253	-0.457	0.648
PER14	4.708	1.239	4.815	1.309	-0.550	0.583
PER15	4.400	1.305	4.600	1.234	-1.014	0.312
PER16	4.733	1.113	5.030	1.131	-1.725	0.086
PER17	4.575	1.254	4.984	1.256	-2.119	0.035
PER18	4.680	1.227	4.830	1.244	-0.789	0.431
PER19	4.605	1.026	4.800	1.227	-1.148	0.253
PER20	4.558	1.165	4.692	1.059	-0.770	0.442
PER21	4.691	1.158	4.938	1.088	-1.413	0.159
PER22	4.450	1.308	4.707	1.366	-1.259	0.210
PER23	4.683	1.152	4.861	1.273	-0.968	0.335
PER24	4.411	1.398	4.484	1.333	-0.340	0.734
PER25	4.226	1.304	4.107	1.542	0.555	0.580
PER26	4.294	1.310	4.384	1.271	-0.452	0.651
PER27	4.516	1.231	4.538	1.426	-0.107	0.915

Table 7.4B: Comparison of Means (Gap Scores)

	Early Respondents (n=120)		Late Respondents (n=65)			
Items	Means	SD	Means	SD	*t*-value	*p*
GAP1	-1.327	1.372	-1.369	1.596	0.185	0.854
GAP2	-1.873	1.021	-1.723	1.166	-0.910	0.364
GAP3	-1.882	1.215	-1.707	1.307	-0.907	0.366
GAP4	-1.783	1.168	-1.656	1.416	-0.615	0.540
GAP5	-1.583	1.081	-1.446	1.275	-0.773	0.441
GAP6	-2.041	1.311	-1.968	1.447	-0.346	0.729
GAP7	-1.638	1.418	-1.492	1.276	-0.692	0.490
GAP8	-1.783	1.264	-1.569	1.322	-1.082	0.281
GAP9	-0.966	1.460	-0.875	1.339	-0.417	0.677
GAP10	-1.575	1.345	-1.312	1.139	-1.327	0.186
GAP11	-1.466	1.269	-1.281	1.119	-0.982	0.327
GAP12	-1.176	1.608	-0.707	1.627	-1.882	0.061
GAP13	-1.495	1.413	-1.292	1.607	-0.856	0.394
GAP14	-1.725	1.321	-1.646	1.440	-0.375	0.708
GAP15	-1.808	1.392	-1.553	1.436	-1.174	0.242
GAP16	-1.566	1.326	-1.338	1.349	-1.110	0.268
GAP17	-1.300	1.344	-1.046	1.429	-1.199	0.232
GAP18	-1.152	1.381	-1.323	1.480	0.779	0.437
GAP19	-0.142	1.329	-0.046	1.624	-0.851	0.396
GAP20	-0.933	1.228	-0.707	1.366	-1.111	0.269
GAP21	-1.358	1.214	-1.107	1.160	-1.361	0.175
GAP22	-1.625	1.414	-1.446	1.323	-0.839	0.402
GAP23	-1.450	1.321	-1.230	1.568	-1.008	0.315
GAP24	-2.016	1.437	-2.062	1.489	0.202	0.840
GAP25	-1.966	1.437	-2.046	1.604	0.345	0.730
GAP26	-1.554	1.406	-1.292	1.422	-1.205	0.230
GAP27	-1.677	1.338	-1.507	1.601	-0.728	0.468

Table 7.4C: Comparison of Means (Overall Evaluation Items)

	Early Respondents (n=120)		Late Respondents (n=65)			
Items	Means	SD	Means	SD	*t*-value	*p*
ATM1	4.933	0.914	4.861	0.949	0.503	0.616
ATM2	4.875	0.845	4.815	0.899	0.448	0.655
ATM3	4.808	1.176	4.707	1.400	0.493	0.623
SQ1	4.450	1.011	4.584	1.184	-0.813	0.417
SQ2	4.625	1.085	4.723	1.205	-0.564	0.573
SQ3	4.383	1.210	4.292	1.307	0.475	0.636
SAT1	4.408	1.080	4.476	1.213	-0.395	0.694
SAT2	4.275	1.012	4.184	1.248	0.533	0.595
SAT3	4.416	1.041	4.415	1.157	0.008	0.994
BI1	4.525	1.215	4.661	1.189	-0.735	0.463
BI2	4.567	1.165	4.615	1.331	-0.251	0.802
BI3	4.355	1.180	4.400	1.389	-0.216	0.829
BI4	4.290	1.137	4.238	1.411	0.254	0.800
BI5	4.271	1.203	4.338	1.366	-0.341	0.733

Table 7.5A: Relationship between Return Dates and Perception Scores (n=185)

Independent Variable: Return Dates			
Dependent Variable	Standardised Coefficient	t-value	*p*
PER1	0.015	0.203	0.840
PER2	0.165	2.258	0.025
PER3	0.151	2.058	0.041
PER4	0.127	1.738	0.084
PER5	0.135	1.848	0.066
PER6	0.053	0.722	0.471
PER7	0.071	0.955	0.341
PER8	0.199	2.741	0.007
PER9	0.095	1.291	0.199
PER10	0.162	2.217	0.028
PER11	0.150	2.049	0.042
PER12	0.096	1.308	0.193
PER13	0.111	1.513	0.132
PER14	0.147	2.015	0.045
PER15	0.178	2.453	0.015
PER16	0.169	2.317	0.022
PER17	0.216	2.986	0.003
PER18	0.134	1.830	0.069
PER19	0.153	2.093	0.038
PER20	0.131	1.791	0.075
PER21	0.183	2.522	0.013
PER22	0.167	2.289	0.023
PER23	0.119	1.628	0.105
PER24	0.097	1.309	0.192
PER25	0.057	0.764	0.446
PER26	0.127	1.727	0.086
PER27	0.088	1.184	0.238

Table 7.5B: Relationship between Return Dates and Gap Scores (n=185)

Independent Variable: Return Dates			
Dependent Variable	Standardised Coefficient	t-value	*p*
GAP1	0.081	1.090	0.277
GAP2	0.165	2.255	0.025
GAP3	0.057	0.771	0.442
GAP4	0.061	0.820	0.413
GAP5	0.113	1.541	0.125
GAP6	0.044	0.600	0.549
GAP7	0.064	0.867	0.387
GAP8	0.146	1.995	0.048
GAP9	0.043	0.585	0.560
GAP10	0.168	2.297	0.023
GAP11	0.122	1.659	0.099
GAP12	0.144	1.969	0.050
GAP13	0.081	1.096	0.275
GAP14	0.113	1.537	0.126
GAP15	0.139	1.894	0.060
GAP16	0.112	1.522	0.130
GAP17	0.101	1.378	0.170
GAP18	-0.049	-0.663	0.508
GAP19	0.066	0.889	0.375
GAP20	0.019	0.253	0.801
GAP21	0.113	1.533	0.127
GAP22	0.110	1.494	0.137
GAP23	0.111	1.517	0.131
GAP24	0.028	0.378	0.706
GAP25	0.029	0.386	0.700
GAP26	0.150	2.049	0.042
GAP27	0.072	0.971	0.333

Table 7.5C: Relationship between Return Dates and Overall Evaluation scores (n=185)

Independent Variable: Return Dates			
Dependent Variable	Standardised Coefficient	t-value	*p*
ATM1	0.089	1.213	0.227
ATM2	0.081	1.104	0.271
ATM3	0.100	1.359	0.176
SQ1	0.184	2.527	0.012
SQ2	0.155	2.121	0.035
SQ3	0.063	0.849	0.397
SAT1	0.167	2.297	0.023
SAT2	0.105	1.431	0.154
SAT3	0.114	1.556	0.121
BI1	0.120	1.640	0.103
BI2	0.110	1.488	0.139
BI3	0.071	0.953	0.342
BI4	0.039	0.521	0.603
BI5	0.092	1.227	0.221

multiple variables in a complex model. The main advantages of using SEM have already been discussed in Section 2.4.2 of Chapter Two. SEM is commonly used by customer satisfaction researchers for testing model robustness. Although SEM is attractive in testing model robustness, there is a requirement about sample size. Both the estimation methods (e.g., maximum likelihood) and tests of model fit (e.g., the χ^2 test) are based on the assumption of large samples. However, there is no absolute definition of "large sample." In the examination of SEM literature, Schumacker and Lomax (1996) found that many researchers used from 250 to 500 subjects. However, Ding, Velicer, and Harlow (1995) suggest that a total of 100 to 150 subjects is the minimum satisfactory sample size whereas Bentler and Chou (1987) indicate that the ratio of sample size to estimated parameters be between 5:1 and 10:1. In this study, as far as the complexity of the model in terms of number of latent constructs and indicators is concerned, a sample size of 185 subjects was considered to be sufficient for SEM. Detailed procedures and results on data analysis will be set out in the following chapter.

7.9 CHAPTER REVIEW

This chapter set out a conceptual model and a host of hypotheses for investigating the consulting engineering service in Hong Kong. Research design and methodology in terms of exploratory interviews, scale development, purification through a pre-test survey, main survey procedures, and data analysis using structural equation modelling were outlined and discussed. In the main survey, a total of 185 usable replies were collected. Results from the assessment of non-response bias showed that it is not a concern that hampers the quality of the data. Although the sample size is relatively small as compared with other studies using structural equation modelling, it is regarded as sufficient as far as the complexity of the model and the number of measurement items are concerned. Detailed data analysis decisions, procedures, and results are to be set out in the next chapter.

CHAPTER EIGHT:
DATA ANALYSIS AND RESULTS

8.1 INTRODUCTION

In the preceding chapter, a conceptual model of business-to-business professional service quality and a host of research hypotheses underlying the model were proposed. They are to be tested in the context of Hong Kong consulting engineering services by using structural equation modelling. In this chapter, detailed data analysis decisions and procedures are explained. Based on established practice of structural equation modelling, the data analysis is performed in two stages involving confirmatory factor analyses of the exogenous and endogenous variables for both perception-only and gap measurement frameworks, and path analyses of the structural relationships, both direct and indirect interactions, among the latent constructs.

This chapter is organised into four main parts: (1) data screening and validation, (2) the process and decisions involved in structural equation modelling, (3) measurement model estimation in terms of confirmatory factor analyses, and (4) structural model estimation on testing the proposed hypotheses.

8.2 DATA SCREENING AND VALIDATION

8.2.1 Treatment of Missing Values

The data set obtained through the questionnaire survey was scrutinised and validated for errors and omissions. At the preliminary stage, two responses were found with excessive missing values (i.e., the whole questionnaire was not completed) and were discarded. The remaining 185 responses were checked for randomness of missing data. Hair, Anderson, Tatham, and Black (1995) suggest a method to assess the randomness of missing data by dividing the whole sample into two groups according to whether the responses contained missing data. T-tests were then performed to determine whether significant differences between the two groups (i.e., those responses with missing values and those without) on all items. Results show no significant differences in all service quality items across two measurement approaches (i.e., P-only and P-E approaches). Therefore, missing values were replaced with mean values.

8.2.2 Sample Profile and Homogeneity

Table 8.1 contains details about the respondents' organisations and their engineering projects. On average, the size of responding organisations is 121 employees (s.d.=159). The duration of project spans across 36 months (s.d.= 23). In terms of the value of the project, it amounts to HK$490 million (s.d.=943), or about £40 million. The fee paid to the consulting engineering firm is 4.5% of the total value of the project (s.d.=4.7). The average number of employees involved in a project is 49 (s.d.=97). Among them, seven staff members (s.d.=6) are responsible for evaluating the performance of the consulting engineering firm and the performance assessment is made for every 8 months.

Apart from respondents' characteristics, their responses on service quality items were also analysed. A summary of descriptive statistics of client expectations, perceptions, P-E gap, and overall evaluation is set out in Tables 8.2A, 8.2B, 8.2C, and 8.2D respectively. Clients' expectations are generally high as illustrated in Table 8.2A. Most of the expectation scores are about six in a seven-point Likert scale. This is consistent with other service quality studies which found that respondents generally possess high expectations. For example, in their service quality study, Lam and Woo (1997) found that all of the expectation scores are over six in a seven-point Likert scale across one-week, two-month, and one-year test-retest intervals. Two items (i.e., PE2 and PE5) in the product/service exchange dimension have the highest ratings as compared with items in the other exchange dimensions. These two items are "The CE's services are technically sound" and "The CE's design scheme meets our specific project requirement." It is not surprising as these two attributes represent the core service offering. As far as the other exchange dimensions are concerned, clients generally do not have high expectations in social exchange. Four out of five items (i.e., SE2, SE3, SE4, and SE5) in the social exchange dimension fall below six in a seven-point scale. The mean expectation rating of SE4 is 4.75 (s.d.=1.27) and is related to "The CE's consultants are easy to make friends."

In comparison with expectation scores, the perception scores are consistently lower. As indicated in Tables 8.2B and 8.2C, the mean perception ratings range from 4.18 (s.d.=1.39) to 5.04 (s.d.=1.06) across various exchange items, creating mean gap scores ranging from -2.03 (s.d.=1.45) to -0.07 (s.d.=1.43). As mentioned earlier that

Table 8.1: Profile of Responding Organisations and Their Projects

	Total (n = 185)		Professional Architect (n = 89)		Govt. Engineer (n = 96)		
	Mean	SD	Mean	SD	Mean	SD	*t*-value [(a)]
No. of employees	121	159	102	107	141	199	1.56^{ns}
Duration of project (months)	36	23	31	10	41	30	3.01^{**}
Project value (HK$ in million) [b]	493	943	396	747	580	1087	1.31^{ns}
Consultancy Fee to Project value (%)	4.5	4.7	2.6	3.1	6.3	5.3	5.29^{**}
No. of staff involved in a project	49	97	34	59	63	121	2.02^{**}
No. of staff to evaluate consultant's performance	7	6	6	6	7	6	1.02^{ns}
Frequency of evaluation (months)	8	6	10	6	6	4	4.77^{**}

[a] ns = non-significant; ** $p < 0.05$.

[b] HK$1 : £0.08

Table 8.2A: Summary Statistics for Construct Items (Expectation Scores) (n=185)

Variable/ Item	Range	Mean	SD	Item-to-Total Correlation	Coefficient Alpha Reliability
Product/Service Exchange					0.77
PE1	2 - 7	5.92	1.11	0.34	
PE2	4 - 7	6.83	0.44	0.48	
PE3	4 - 7	6.38	0.82	0.56	
PE4	2 - 7	6.32	0.98	0.44	
PE5	4 - 7	6.57	0.65	0.50	
PE6	1 - 7	6.41	0.88	0.65	
PE7	1 - 7	6.18	1.04	0.66	
Financial Exchange					0.86
FE1	4 - 7	6.44	0.76	0.68	
FE2	3 - 7	5.97	1.03	0.68	
FE3	4 - 7	6.36	0.86	0.77	
FE4	4 - 7	6.45	0.82	0.72	
Information Exchange					0.80
IE1	1 - 7	5.84	1.37	0.64	
IE2	1 - 7	6.29	1.02	0.69	
IE3	3 - 7	6.44	0.77	0.52	
IE4	3 - 7	6.18	0.96	0.70	
Social Exchange					0.84
SE1	4 - 7	6.32	0.83	0.64	
SE2	1 - 7	5.92	1.04	0.67	
SE3	1 - 7	5.93	1.10	0.75	
SE4	1 - 7	4.75	1.27	0.56	
SE5	2 - 7	5.45	1.18	0.68	
Cooperation					0.82
CO1	3 - 7	6.04	0.97	0.66	
CO2	3 - 7	6.10	0.90	0.72	
CO3	4 - 7	6.11	0.83	0.65	
Adaptation					0.82
AD1	4 - 7	6.46	0.75	0.60	
AD2	3 - 7	6.17	0.89	0.70	
AD3	1 - 7	5.79	1.14	0.67	
AD4	4 - 7	6.14	0.91	0.65	

Table 8.2B: Summary Statistics for Construct Items (Perception Scores) (n=185)

Variable/ Item	Range	Mean	SD	Item-to-Total Correlation	Coefficient Alpha Reliability
Product/Service Exchange					0.91
PE1	1 - 7	4.58	1.19	0.55	
PE2	2 - 7	5.01	1.05	0.77	
PE3	2 - 7	4.56	1.03	0.78	
PE4	2 - 7	4.58	1.10	0.79	
PE5	3 - 7	5.04	1.06	0.76	
PE6	1 - 7	4.39	1.28	0.73	
PE7	1 - 7	4.60	1.29	0.73	
Financial Exchange					0.89
FE1	1 - 7	4.73	1.24	0.60	
FE2	1 - 7	5.03	1.31	0.76	
FE3	1 - 7	4.88	1.30	0.85	
FE4	2 - 7	5.04	1.20	0.80	
Information Exchange					0.90
IE1	1 - 7	4.83	1.15	0.75	
IE2	1 - 7	4.86	1.17	0.79	
IE3	1 - 7	4.74	1.26	0.84	
IE4	1 - 7	4.47	1.28	0.72	
Social Exchange					0.90
SE1	2 - 7	4.83	1.12	0.73	
SE2	1 - 7	4.71	1.26	0.75	
SE3	1 - 7	4.73	1.23	0.83	
SE4	2 - 7	4.67	1.10	0.71	
SE5	1 - 7	4.60	1.12	0.75	
Cooperation					0.91
CO1	2 - 7	4.77	1.13	0.78	
CO2	1 - 7	4.54	1.33	0.82	
CO3	1 - 7	4.74	1.19	0.84	
Adaptation					0.94
AD1	1 - 7	4.43	1.37	0.87	
AD2	1 - 7	4.18	1.39	0.88	
AD3	1 - 7	4.32	1.29	0.83	
AD4	1 - 7	4.52	1.30	0.82	

Table 8.2C: Summary Statistics for Construct Items (Gap Scores) (n=185)

Variable/ Item	Range	Mean	SD	Item-to-Total Correlation	Difference Score Reliability
Product/Service Exchange					0.85
PE1	-5 - 3	-1.34	1.45	0.45	
PE2	-4 - 1	-1.82	1.07	0.68	
PE3	-5 - 2	-1.82	1.24	0.68	
PE4	-4 - 1	-1.73	1.25	0.61	
PE5	-4 - 2	-1.53	1.15	0.62	
PE6	-6 - 1	-2.01	1.35	0.61	
PE7	-6 - 1	-1.58	1.36	0.63	
Financial Exchange					0.83
FE1	-6 - 2	-1.70	1.28	0.55	
FE2	-5 - 3	-0.93	1.41	0.64	
FE3	-6 - 1	-1.48	1.28	0.79	
FE4	-5 - 1	-1.40	1.21	0.66	
Information Exchange					0.81
IE1	-6 - 4	-1.01	1.62	0.61	
IE2	-6 - 5	-1.42	1.48	0.69	
IE3	-6 - 1	-1.69	1.36	0.67	
IE4	-6 - 3	-1.71	1.40	0.57	
Social Exchange					0.85
SE1	-5 - 3	-1.48	1.33	0.68	
SE2	-5 - 2	-1.21	1.37	0.64	
SE3	-5 - 4	-1.21	1.41	0.77	
SE4	-3 - 6	-0.07	1.43	0.56	
SE5	-5 - 3	-0.85	1.27	0.63	
Cooperation					0.85
CO1	-5 - 2	-1.27	1.19	0.65	
CO2	-6 - 1	-1.56	1.38	0.78	
CO3	-6 - 3	-1.37	1.41	0.75	
Adaptation					0.88
AD1	-6 - 1	-2.03	1.45	0.77	
AD2	-6 - 2	-1.99	1.49	0.81	
AD3	-6 - 3	-1.46	1.41	0.67	
AD4	-6 - 2	-1.61	1.43	0.72	

Table 8.2D: Summary Statistics for Construct Items (Overall Evaluation) (n=185)

Variable/ Item	Range	Mean	SD	Item-to-Total Correlation	Coefficient Alpha Reliability
Atmosphere					0.87
ATM1	2 - 7	4.90	0.92	0.79	
ATM2	3 - 7	4.85	0.86	0.78	
ATM3	1 - 7	4.77	1.25	0.76	
Service Quality					0.89
SQ1	1 - 6	4.49	1.07	0.83	
SQ2	2 - 7	4.65	1.12	0.85	
SQ3	1 - 7	4.35	1.24	0.71	
Satisfaction					0.94
SAT1	1 - 7	4.43	1.12	0.90	
SAT2	1 - 6	4.24	1.09	0.90	
SAT3	1 - 6	4.41	1.08	0.91	
Behavioural Intention					0.95
BI1	1 - 7	4.57	1.20	0.84	
BI2	1 - 7	4.58	1.22	0.92	
BI3	1 - 7	4.37	1.25	0.87	
BI4	1 - 7	4.27	1.23	0.84	
BI5	1 - 7	4.29	1.25	0.86	

the expectation ratings of PE2 and PE5 are relatively higher, the same pattern is observed in the perception ratings of these two items. Respondents generally rated consulting engineers higher in terms of providing sound technical services (mean=5.01; s.d.=1.05) and meeting specific requirements of the project (mean=5.04; s.d.=1.06). However, the mean rating of PE6 ("The CE is able to meet the time schedule for the project") is low at 4.39; thereby, creating a large gap (mean=2.01; s.d.=1.35). This large gap is not surprising when there are other factors (e.g., weather and government policy change) which are beyond the control of consulting engineers in meeting the time schedule for the project as illustrated in the client's in-depth interviews.

Three out of four items in the adaptation dimension fall below 4.50. The item, AD2, has the lowest perception rating (i.e., mean=4.18; s.d.=1.39) and is related to "The CE proactively offers us new technical solutions when conditions change." In other words, consulting engineers are generally perceived by clients as not able to keep abreast with the current situation. As revealed from Table 8.2C, most of the largest gaps are observed in product/service exchange dimension and adaptation dimension.

Regarding overall evaluation items, the mean ratings illustrated in Table 8.2D range from 4.77 to 4.90 for atmosphere, 4.35 to 4.65 for service quality, 4.24 to 4.41 for satisfaction, and 4.27 to 4.58 for behavioural intention. The patterns of these mean ratings seem to suggest that respondents generally have a more favourable perception on overall working relationship than service quality, client satisfaction, and reappointment intention.

As the sample consists of two categories of respondents (i.e., government engineers and professional architects), separate analysis of sub-sample characteristics is considered necessary for examining possible bias. Also indicated in Table 8.1, across different characteristics of responding organisations, it is not surprising that in the government sector, the project duration is longer ($\bar{X}_{Govt}$ = 41 months, $\bar{X}_{Arch}$ = 31 months), more staff are involved in engineering projects ($\bar{X}_{Govt}$ = 63, $\bar{X}_{Arch}$ = 34), and performance of consulting engineers is evaluated more frequently ($\bar{X}_{Govt}$ = 6 months, $\bar{X}_{Arch}$ = 10 months) than architectural firms. It is because government works are more related to infrastructure developments which are larger in scale. In the consultants' in-depth interviews during the hypotheses development stage, the interviewees cited that

the public sector shares a high proportion of the consultants' total revenue. In evaluating the performance of consulting engineers, the concept of "buying centre" applies in that there is a group of people, rather than a single person, involved in the evaluation process ($\bar{X}_{Total}$ = 7, s.d. = 6). Overall, the duration of engineering projects, on average, spans across three years and the performance of consulting engineers is evaluated about twice a year. About 60% of respondents agree that there are factors which are beyond the control of project teams. The two major factors are related to changes in statutory requirements (32%) and unforeseen budget changes (29%).

In addition to sample profile characteristics, the two samples were also analysed by means of *t*-tests on mean differences across various service quality items and overall evaluation items to ascertain sub-sample homogeneity. Results indicate that 13 of the 27 perception-only measures (see Table 8.3A), three of the 27 gap measures (Table 8.3B), and eight of the 14 overall evaluation items (see Table 8.3C) are statistically significant ($p < 0.05$). In relation to the perception scores revealed in Table 8.3A, there is no systematic difference in the product/service exchange dimension, financial exchange dimension, and information exchange dimension between the professional architect sub-sample and the government engineer sub-sample. One of the possible explanations is that these exchange dimensions represent the core service elements. The process and outcome of delivery of these core service elements can be very homogeneous, but the perceptions of other non-core service elements, like social exchange, cooperation, and adaptation, can be very different between private and public sector clients. In general, government engineers have a more favourable perception than professional architects in the areas of social exchange, cooperation, and adaptation. Given the fact that project duration in the public sector is longer and the public sector clients contribute a high proportion of the consultants' total revenue (see Table 8.1 and interview with Mr David Kell, Partner of Binnie & Partners), it is expected that consulting engineers will devote more resources in public sector projects. Therefore, involvement of staff and partners is greater for public sector projects than private sector projects. Intention for cooperation and adaptation is also stronger. The combined effect of favourable perceptions of social exchange, cooperation, and adaptation also creates a favourable evaluation of overall atmosphere, service quality, and satisfaction. This is illustrated in Table 8.3C that the

Table 8.3A: Comparison of Means (Perception Scores)

Variable/ Item	Professional Architect (n=89)		Government Engineer (n=96)		*t*-value	*p*
	Mean	SD	Mean	SD		
Product/Service Exchange						
PE1	4.47	1.28	4.69	1.08	-1.28	0.201
PE2	4.95	1.13	5.06	0.94	-0.69	0.489
PE3	4.56	1.11	4.56	0.96	-0.04	0.966
PE4	4.52	1.10	4.64	1.10	-0.72	0.471
PE5	5.00	1.13	5.08	0.99	-0.53	0.595
PE6	4.19	1.25	4.58	1.29	-2.06	0.040
PE7	4.44	1.28	4.74	1.29	-1.56	0.120
Financial Exchange						
FE1	4.49	1.35	4.95	1.08	-2.55	0.012
FE2	5.04	1.32	5.02	1.30	0.12	0.899
FE3	4.86	1.36	4.89	1.26	-0.16	0.868
FE4	5.00	1.25	5.09	1.16	-0.52	0.599
Information Exchange						
IE1	4.70	1.28	4.95	1.02	-1.45	0.147
IE2	4.88	1.26	4.85	1.08	0.20	0.841
IE3	4.66	1.42	4.82	1.09	-0.85	0.395
IE4	4.14	1.44	4.77	1.03	-3.36	0.001
Social Exchange						
SE1	4.69	1.25	4.96	0.97	-1.63	0.104
SE2	4.44	1.36	4.96	1.11	-2.81	0.005
SE3	4.41	1.26	5.03	1.12	-3.47	0.001
SE4	4.38	1.12	4.94	1.01	-3.57	0.000
SE5	4.25	1.15	4.92	1.00	-4.20	0.000
Cooperation						
CO1	4.41	1.14	5.11	1.02	-4.37	0.000
CO2	4.23	1.45	4.82	1.14	-3.03	0.003
CO3	4.57	1.33	4.90	1.03	-1.89	0.061
Adaptation						
AD1	4.12	1.55	4.73	1.10	-3.04	0.003
AD2	3.92	1.58	4.43	1.12	-2.49	0.014
AD3	4.10	1.40	4.53	1.14	-2.29	0.023
AD4	4.28	1.41	4.75	1.14	-2.48	0.014

Table 8.3B: Comparison of Means (Gap Scores)

Variable/ Item	Professional Architect (n=89)		Government Engineer (n=96)		*t*-value	*p*
	Mean	SD	Mean	SD		
Product/Service Exchange						
PE1	-1.40	1.63	-1.28	1.26	-0.55	0.579
PE2	-1.84	1.18	-1.80	0.96	-0.26	0.790
PE3	-1.69	1.32	-1.93	1.16	1.30	0.195
PE4	-1.78	1.27	-1.69	1.24	-0.46	0.644
PE5	-1.43	1.29	-1.62	0.99	1.09	0.276
PE6	-2.02	1.38	-2.01	1.33	-0.06	0.951
PE7	-1.53	1.41	-1.63	1.32	0.45	0.649
Financial Exchange						
FE1	-1.83	1.42	-1.59	1.13	-1.25	0.210
FE2	-0.67	1.38	-1.17	1.40	2.45	0.015
FE3	-1.35	1.39	-1.60	1.15	1.33	0.183
FE4	-1.31	1.23	-1.47	1.20	0.89	0.373
Information Exchange						
IE1	-0.77	1.82	-1.23	-1.38	1.89	0.059
IE2	-1.16	1.68	-1.66	1.23	2.28	0.023
IE3	-1.76	1.49	-1.63	1.23	-0.63	0.525
IE4	-1.87	1.57	-1.57	1.22	-1.45	0.148
Social Exchange						
SE1	-1.49	1.52	-1.47	1.14	-0.07	0.939
SE2	-1.23	1.40	-1.18	1.35	-0.23	0.812
SE3	-1.34	1.52	-1.08	1.30	-1.25	0.210
SE4	-0.12	1.39	-0.03	1.48	-0.43	0.666
SE5	-0.71	1.38	-0.97	1.16	1.37	0.170
Cooperation						
CO1	-1.26	1.25	-1.27	1.156	0.01	0.995
CO2	-1.69	1.58	-1.43	1.159	-1.26	0.209
CO3	-1.47	1.53	-1.28	1.295	-0.91	0.360
Adaptation						
AD1	-2.31	1.62	-1.76	1.213	-2.57	0.011
AD2	-2.06	1.73	-1.92	1.239	-0.63	0.528
AD3	-1.39	1.53	-1.52	1.295	0.63	0.525
AD4	-1.68	1.64	-1.55	1.214	-0.61	0.538

Table 8.3C: Comparison of Means (Overall Evaluation)

Variable/ Item	Professional Architect (n=89)		Government Engineer (n=96)		*t*-value	*p*
	Mean	SD	Mean	SD		
Atmosphere						
ATM1	4.65	0.95	5.14	0.83	-3.75	0.000
ATM2	4.65	0.91	5.04	0.76	-3.12	0.002
ATM3	4.46	1.33	5.06	1.11	-3.32	0.001
Service Quality						
SQ1	4.28	1.15	4.69	0.95	-2.66	0.008
SQ2	4.43	1.19	4.86	1.02	-2.59	0.010
SQ3	4.07	1.21	4.60	1.21	-2.93	0.004
Satisfaction						
SAT1	4.19	1.11	4.65	1.09	-2.86	0.005
SAT2	3.95	1.07	4.51	1.05	-3.54	0.001
SAT3	4.15	1.05	4.65	1.05	-3.21	0.002
Behavioural Intention						
BI1	4.40	1.21	4.72	1.18	-1.84	0.067
BI2	4.50	1.27	4.65	1.17	-0.85	0.396
BI3	4.34	1.27	4.39	1.24	-0.24	0.808
BI4	4.30	1.22	4.24	1.25	0.33	0.739
BI5	4.34	1.27	4.25	1.24	0.48	0.629

ratings of overall atmosphere, service quality, and satisfaction are relatively higher in the government sub-sample than in the architect sub-sample. But as far as the behavioural intention is concerned, there is no systematic difference. The major reason is that the reappointment of consulting engineers for most of the projects in the public sector are subject to competitive bidding, rather than relationship and satisfaction.

Summing up the above differences between the sub-samples in terms of profile characteristics and service quality ratings, the two sub-samples are regarded as containing unique features. In response to a sample consisting of sub-samples, Hair et al. (1995) strongly recommend that the researcher must ensure the homogeneity of the sample with respect to the underlying factor structure. They suggest that "whenever differing groups are expected in the sample, separate factor analysis should be performed, and the results should be compared to identify differences not reflected in the results of the combined sample" (p.375). This perspective was taken in this study. Therefore, in addition to combining the two sample for an overall analysis, separate data analysis for each sub-sample was performed.

8.2.3 Multivariate Normality

Apart from the condition of sample homogeneity, the other condition to be fulfilled for structural equation modelling is multivariate normality of the variables. The PRELIS 2 programme accompanying the LISREL version 8.14 software package was used to produce a summary of the mean, standard deviation, skewness, and kurtosis coefficients of the variables under study. Results of normality tests are shown in Table 8.4. Considering that a normal distribution of scores is characterised by skewness and kurtosis values approximating zero, from a practical perspective, normality must be defined within a range that spans either side of zero (Byrne, 1998). However, no definite cutpoints have been firmly established as to when scores may not be regarded as normally distributed (Curran, West, and Finch, 1996). Curran et al. (1996), following the pattern used in other Monte Carlo studies, consider scores to be moderately non-normal if they demonstrate skewness values ranging from 2.00 to 3.00 and kurtosis values from 7.00 to 21.00. Extreme non-normality is defined by skewness values and kurtosis values greater than 3.00 and 21.00 respectively. Using

Table 8.4: Summary Results of Normality Test

	Skewness	Kurtosis	Detailed Table Ref.
Perception-Based Measurement (Transactional & Relational Items)			
Total Sample			
Mean	-0.32	-0.07	Appendix
Range	-0.64 to -0.03	-0.73 to 0.49	C1
Govt. Sample			
Mean	-0.45	0.15	Appendix
Range	-0.78 to –0.11	-1.33 to –0.64	C2
Arch. Sample			
Mean	-0.12	-0.23	Appendix
Range	-0.53 to 0.31	-0.84 to 0.29	C3
Gap-Based Measurement (Transactional and Relational Items)			
Total Sample			
Mean	-0.18	0.38	Appendix
Range	-0.85 to 0.46	-0.57 to 2.14	C4
Govt. Sample			
Mean	-0.19	0.17	Appendix
Range	-0.84 to 0.82	-0.76 to 2.32	C5
Arch. Sample			
Mean	-0.17	0.21	Appendix
Range	-0.10 to 0.37	-0.63 to 2.06	C6
Overall Evaluation Items			
Total Sample			
Mean	-0.49	-0.04	Appendix
Range	-0.66 to –0.22	-0.59 to 0.17	C7
Govt. Sample			
Mean	-0.71	0.63	Appendix
Range	-1.15 to –0.39	-0.39 to 1.78	C8
Arch. Sample			
Mean	-0.27	-0.50	Appendix
Range	-0.54 to 0.15	-0.10 to 0.13	C9

these thresholds as a guideline, the data approximated a normal distribution with skewness and kurtosis values falling within the acceptable range.

8.3 STRUCTURAL EQUATION MODELLING: PROCESS AND DECISIONS

After data had been validated and checked for normality, a two-stage procedure was adopted in analysing survey data (Anderson and Gerbing, 1988). The two-stage approach emphasises the analysis of two conceptually distinct latent variable models: measurement model and structural model. The measurement model which provides an assessment of convergent and discriminant validity should be estimated before the structural model which provides an assessment of predictive validity. Jöreskog and Sörbom (1993) also state:

> 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 model 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. It may be useful to do this for each construct separately, then for the constructs taken two at a time, and then for all constructs simultaneously. In doing so, one should let the constructs themselves be freely correlated, i.e., the covariance matrix of the constructs should be unconstrained (p.113).

Such a practice has become the norm in the application of structural equation modelling in marketing (e.g., Bello and Gilliland, 1997; Lusch and Brown, 1996; Osterhus, 1997). In the first stage, the measurement model was estimated using confirmatory factor analyses for both perception-only and gap versions. Because of the ordinal nature of rating scales (i.e., Likert scale), Jöreskog and Sörbom (1996a, 1996b) argue for the use of polychoric correlation matrix and the corresponding asymptotic covariance matrix for estimating parameters, rather than Pearson product-moment correlations which assume all variables to have a continuous scale. The use of polychoric correlations was not possible in this study because the asymptotic covariance matrix requires a very large sample-to-variable ratio (Jöreskog and Sörbom, 1996b). The minimum sample size for estimating asymptotic covariance matrices is $k(k\text{-}1)/2$ where k is the number of

variables. As there are 27 exchange variables, it means that the required sample size for this study should be over 350. Although the use of polychoric correlations with the weighted least square (WLS) estimation is not possible for small sample size, other input matrices and estimation approaches are also available to researchers in structural equation modelling. Jöreskog and Sörbom (1996a) make the point that:

> This [WLS] requires a large sample so that the asymptotic covariance matrix of the sample variances and covariances can be estimated accurately. A poorly estimated asymptotic covariance matrix, such as estimated from a small sample, can do more harm than good, when used with WLS. If the sample size is not sufficiently large to produce an accurate estimate of the asymptotic covariance matrix, it is probably better to use ML [maximum likelihood] or GLS [generalised least square] (p. 239).

But one condition has to be met about the nature of measurement scale when using product-moment correlations and ML estimation. Bentler and Chou (1987) have argued that, given normally distributed categorical variables, "continuous methods can be used with little worry when a variable has four or more categories" (p.88). Apart from estimation method, the choice between covariance and correlation matrices is also critical to the test of theory. Hair et al. (1995) recommend that the covariance matrix should be used for a true "test of theory." This is also reiterated by Kelloway (1998) that the use of a covariance matrix is strongly recommended in virtually all instances because the hypotheses available in structural equation modelling are based on the assumption that one is analysing a covariance matrix. In this study, the ordinal variables were treated as if they were continuous variables. The covariance matrix was used as input matrix with ML as the estimation method.

The whole process of data analysis and decision strategy is illustrated in Figure 8.1. Two confirmatory factor analyses were performed. This is similar to the study of export channel performance by Bello and Gilliland (1997) who took into account the multi-dimensional nature of constructs. Given the fact that transactional quality and relational quality represent constructs of higher order, the first confirmatory factor analysis was run on 27 exchange indicators to substantiate the six factor structure (i.e., service exchange, financial exchange, information exchange, social exchange, cooperation, and

Figure 8.1: Overview of Data Analysis Decisions

1. Evaluate the first measurement model (see section 8.4.1).

2. Evaluate the second measurement model (see Section 8.4.2).

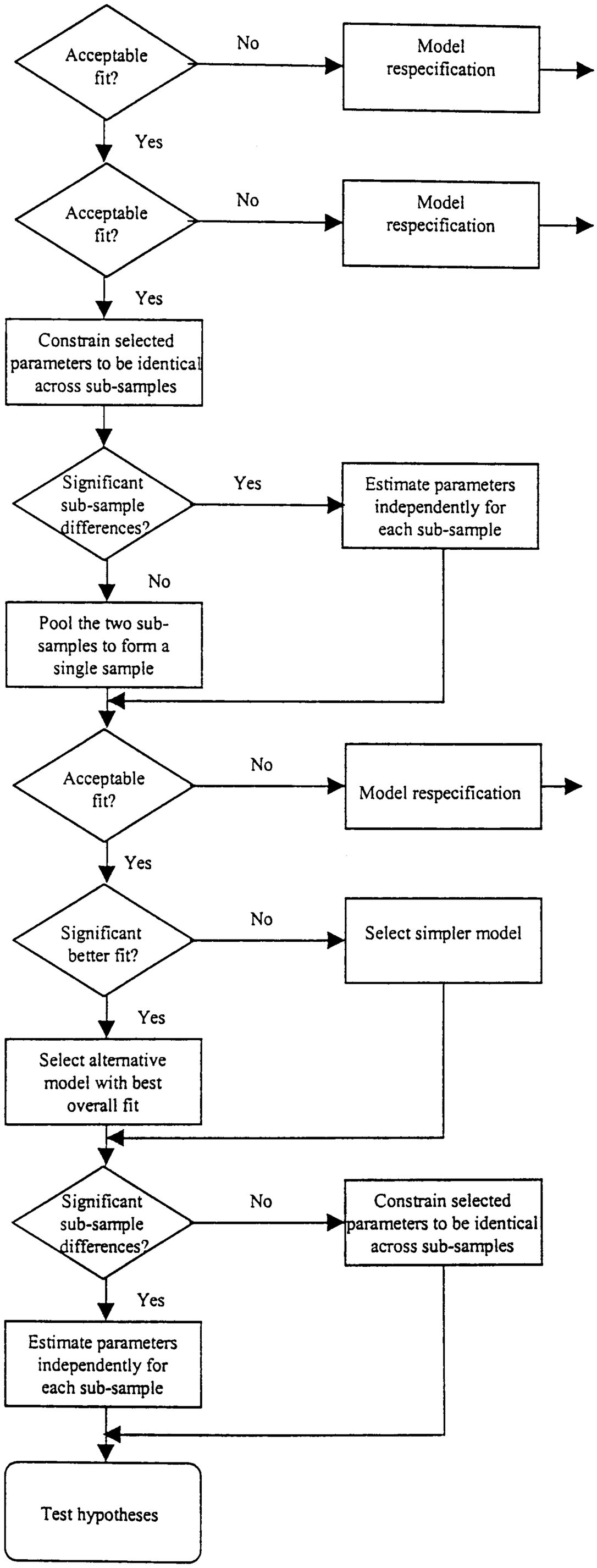
3. Test sub-sample differences in the first and second measurement models (see Sections 8.4.1 and 8.4.2).

4. Evaluate overall latent variable path model (see Section 8.5.2).

5. Compare competing models (see Section 8.5.2).

6. Test sub-sample differences in path model (see Section 8.5.3).

7. Test hypotheses respectively for the combined sample and the two sub-samples (see Section 8.5.3).



adaptation) as depicted in Figure 8.2. The indicators for respective exchange dimensions were summed and then averaged. The second run was then performed on transactional quality (i.e., formed by service exchange, financial exchange, information exchange, and social exchange), relational quality (i.e., formed by cooperation and adaptation), atmosphere, service quality, satisfaction, and behavioural intention. After two confirmatory factor analyses, a path analysis was performed based on the full LISREL model shown in Figure 8.3.

8.4 MEASUREMENT MODELS

For each confirmatory factor analysis, measurement reliability, scale validity in terms of convergent and discriminant validity, and factor characteristics across samples were examined.

8.4.1 First Confirmatory Factor Analysis

According to the results of the first confirmatory factor analysis on the six exchange constructs shown in Table 8.5, the initial measurement model fits the data poorly (for the perception version: $\chi^2_{(309)} = 795.27$, $p<0.001$; goodness-of-fit index [GFI] = 0.76; comparative fit index [CFI] = 0.89; root mean square error of approximation [RMSEA] = 0.092; for the gap version: $\chi^2_{(309)} = 820.22$, $p<0.001$; GFI = 0.76; CFI = 0.84; RMSEA = 0.095). This poor fit is not surprising since measurement models typically require respecification (Anderson and Gerbing, 1988). Respecification decisions should follow both content and statistical considerations. Deleting problem indicators is the preferred solution for poor fit (Anderson and Gerbing, 1988). On the basis of item content evaluation and inspection of modification indexes, three items with the largest values, being one item for financial exchange, one item for information exchange, and one item for cooperation, were dropped from the model. Improvement of fit was achieved after item deletion (for the perception version: $\chi^2_{(237)} = 489.12$, $p<0.001$; GFI = 0.82; CFI = 0.94; RMSEA = 0.076; for the gap version: $\chi^2_{(237)} = 541.49$, $p<0.001$; GFI = 0.80; CFI = 0.88; RMSEA = 0.084). As compared with pre-modification model, the post-modification model is statistically significant (for the perception version: $\chi^2_{difference} = 306.15$, $df_{difference} = 72$, $p < 0.05$; for the gap version: $\chi^2_{difference} = 278.73$, $df_{difference} = 72$, $p < 0.05$). Chi-square differences under the measurement models respectively for both the government sub-sample and the

Figure 8.2: Factorial Structure of Exchange Variables

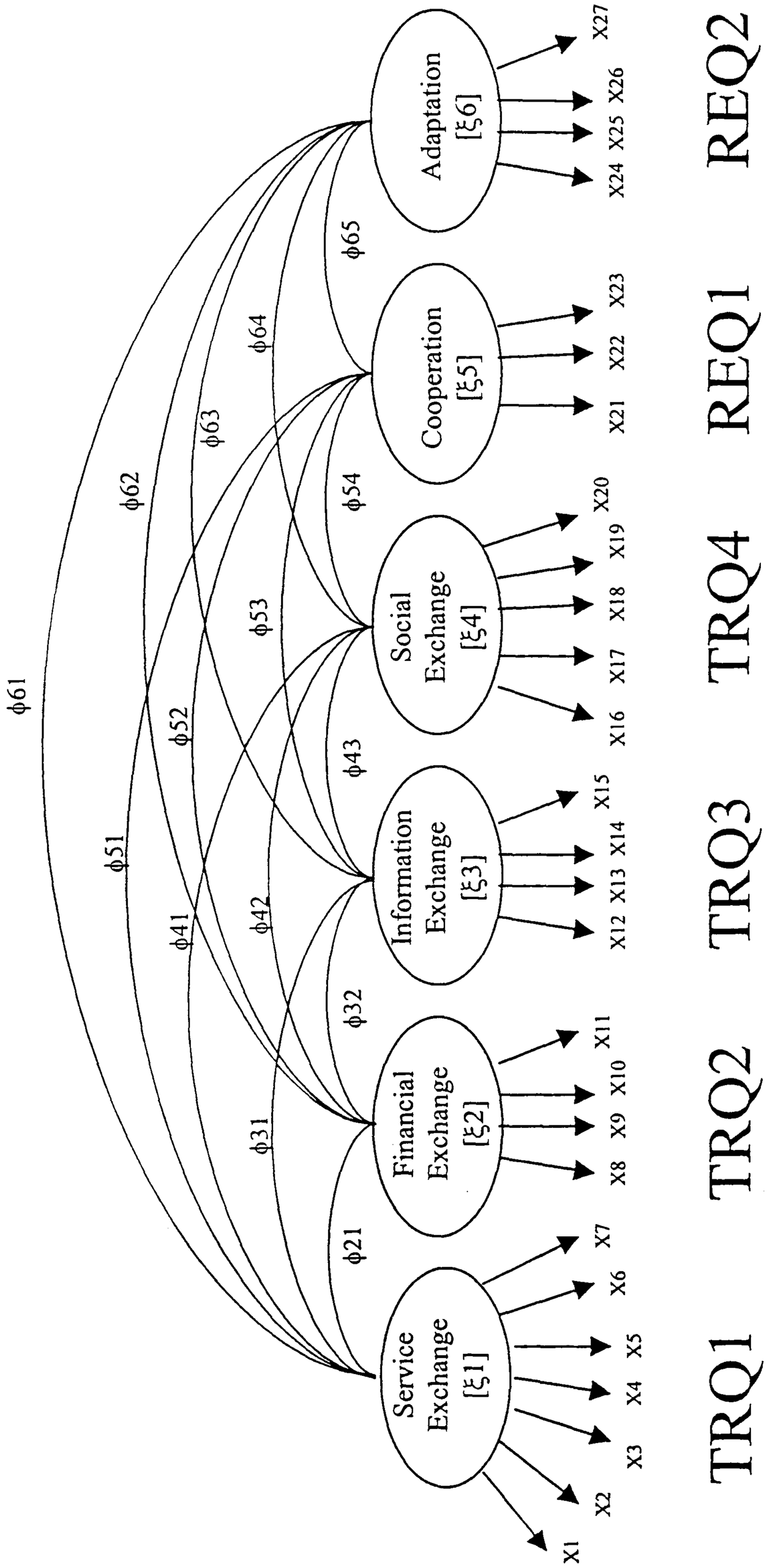


Figure 8.3: Theoretical Model in LISREL Notation

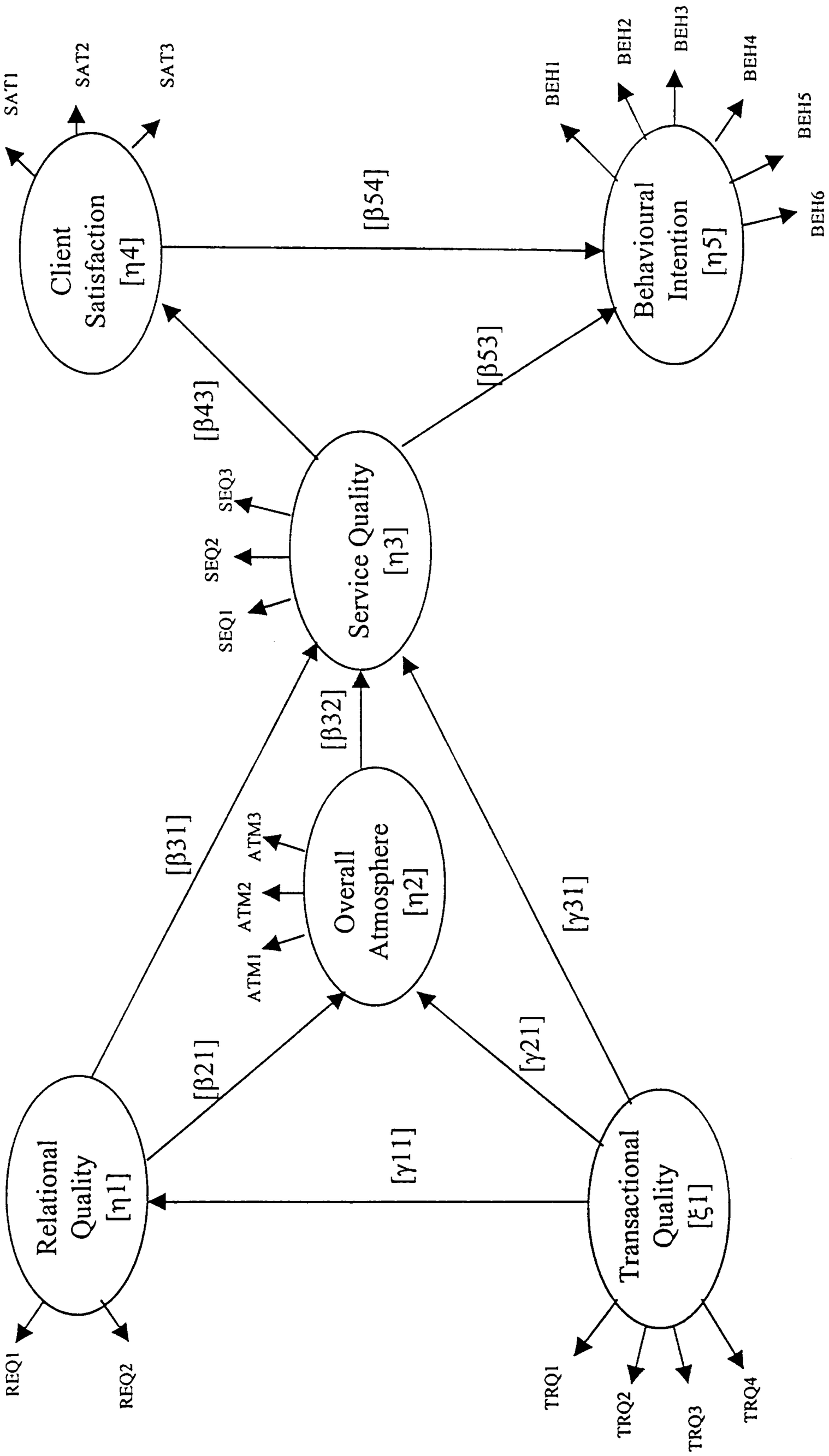


Table 8.5: Summary Results of CFA on Transactional and Relational Variables

	χ^2	df	RMSEA	GFI	CFI	NNFI	Detailed Table Ref.
Pre-Modification							
Total Sample							
Perception-based	795.27	309	0.09	0.76	0.89	0.88	Table
Gap-based	820.22	309	0.10	0.76	0.84	0.82	8.5A
Govt. Sample							
Perception-based	585.89	309	0.10	0.71	0.87	0.86	Table
Gap-based	578.46	309	0.10	0.70	0.83	0.81	8.5B
Arch. Sample							
Perception-based	694.01	309	0.12	0.64	0.85	0.83	Table
Gap-based	688.06	309	0.12	0.66	0.78	0.75	8.5C
Post-Modification							
Total Sample							
Perception-based	489.12	237	0.08	0.82	0.94	0.92	Table
Gap-based	541.49	237	0.08	0.80	0.88	0.87	8.5D
Govt. Sample							
Perception-based	422.06	237	0.09	0.76	0.90	0.89	Table
Gap-based	390.13	237	0.08	0.74	0.89	0.87	8.5E
Arch. Sample							
Perception-based	486.27	237	0.11	0.69	0.88	0.86	Table
Gap-based	511.39	237	0.11	0.68	0.81	0.78	8.5F

Table 8.5A: Pre-Modification Measurement Results: Transactional Quality and Relational Quality (Combined Sample n=185)

Dimensions & Scale Items	Pre-Modification [(a)] Perception Scores [(a1)] λ (*t*-value)	AVE	CR	α	Gap Scores [(a2)] λ (*t*-value)	AVE	CR	DSR
Product/Service Exchange (PE)		0.60	0.66	0.91		0.46	0.56	0.85
PE1	0.58 (8.42)				0.49 (6.73)			
PE2	0.82 (13.46)				0.76 (11.82)			
PE3	0.83 (13.54)				0.76 (11.65)			
PE4	0.83 (13.67)				0.69 (10.21)			
PE5	0.82 (13.30)				0.71 (10.65)			
PE6	0.75 (11.77)				0.66 (9.65)			
PE7	0.76 (12.03)				0.66 (9.75)			
Financial Exchange (FE)		0.68	0.72	0.89		0.57	0.64	0.83
FE1	0.67 (10.11)				0.67 (9.75)			
FE2	0.80 (12.80)				0.70 (10.31)			
FE3	0.93 (16.21)				0.85 (13.75)			
FE4	0.88 (14.95)				0.78 (12.04)			
Information Exchange (IE)		0.70	0.73	0.90		0.52	0.60	0.81
IE1	0.79 (12.73)				0.64 (9.28)			
IE2	0.86 (14.28)				0.73 (10.98)			
IE3	0.87 (14.69)				0.76 (11.60)			
IE4	0.82 (13.30)				0.76 (11.64)			
Social Exchange (SE)		0.65	0.69	0.90		0.53	0.61	0.85
SE1	0.81 (13.05)				0.79 (12.42)			
SE2	0.78 (12.43)				0.72 (10.78)			
SE3	0.89 (15.16)				0.81 (12.72)			
SE4	0.72 (11.12)				0.60 (8.49)			
SE5	0.81 (13.11)				0.71 (10.70)			
Cooperation (CO)		0.76	0.79	0.91		0.66	0.71	0.85
CO1	0.88 (15.06)				0.72 (10.95)			
CO2	0.86 (14.43)				0.86 (14.01)			
CO3	0.88 (14.94)				0.86 (14.16)			
Adaptation (AD)		0.79	0.81	0.94		0.65	0.70	0.88
AD1	0.91 (15.78)				0.83 (13.42)			
AD2	0.91 (15.86)				0.85 (13.97)			
AD3	0.87 (14.77)				0.75 (11.50)			
AD4	0.86 (14.36)				0.80 (12.70)			

ϕ Matrix [(b)]

	PE	FE	IE	SE	CO	AD
PE		0.79	0.84	0.72	0.73	0.74
FE	0.73		0.78	0.67	0.62	0.64
IE	0.85	0.77		0.85	0.84	0.72
SE	0.77	0.68	0.86		0.76	0.65
CO	0.75	0.68	0.83	0.95		0.81
AD	0.72	0.67	0.78	0.75	0.84	

Note:

λ = completely standardised loading; AVE = average variance extracted computed as $\Sigma\lambda^2/(\Sigma\lambda^2 + \Sigma\epsilon_j)$;
CR = composite reliability computed as $(\Sigma\lambda)^2/[(\Sigma\lambda)^2 + \Sigma\epsilon_j)]$; α = Cronbach's alpha; DSR = difference score reliability

[(a)] Fit statistics for confirmatory factor analysis:

1. Perception Scores: $\chi^2_{(309)} = 795.27$, $p<0.001$; $\chi^2/df = 2.65$; GFI = 0.76; AGFI = 0.71; RMR = 0.12; CFI = 0.89; PNFI = 0.74; NNFI = 0.88; RMSEA = 0.092.
2. Gap Scores: $\chi^2_{(309)} = 820.22$, $p<0.001$; $\chi^2/df = 2.57$; GFI = 0.76; AGFI = 0.71; RMR = 0.12; CFI = 0.84; PNFI = 0.68; NNFI = 0.82; RMSEA = 0.095.

[(b)] The lower triangle shows correlations for perception scores, and the upper triangle shows correlations for gap scores. All correlations are significant at $p \leq 0.05$.

Table 8.5B: Pre-Modification Measurement Results: Transactional Quality and Relational Quality (Government sub-sample n=96)

	Pre-Modification							
	Perception Scores [a1]				Gap Scores [a2]			
Dimensions & Scale Items	λ (*t*-value)	AVE	CR	α	λ (*t*-value)	AVE	CR	DSR
Product/Service Exchange (PE)		0.59	0.65	0.90		0.46	0.56	0.85
PE1	0.67 (7.16)				0.57 (5.81)			
PE2	0.83 (9.77)				0.76 (8.55)			
PE3	0.77 (8.75)				0.76 (8.49)			
PE4	0.83 (9.81)				0.69 (7.45)			
PE5	0.81 (9.45)				0.66 (7.02)			
PE6	0.70 (7.64)				0.60 (6.21)			
PE7	0.75 (8.49)				0.68 (7.37)			
Financial Exchange (FE)		0.67	0.71	0.88		0.56	0.63	0.82
FE1	0.66 (7.09)				0.70 (7.49)			
FE2	0.80 (9.30)				0.73 (7.88)			
FE3	0.94 (11.84)				0.85 (9.81)			
FE4	0.84 (9.93)				0.70 (7.54)			
Information Exchange (IE)		0.65	0.70	0.88		0.55	0.62	0.81
IE1	0.76 (8.62)				0.78 (8.64)			
IE2	0.83 (9.72)				0.77 (8.58)			
IE3	0.86 (10.25)				0.82 (9.37)			
IE4	0.77 (8.77)				0.56 (5.61)			
Social Exchange (SE)		0.60	0.66	0.88		0.52	0.60	0.84
SE1	0.79 (9.04)				0.79 (8.90)			
SE2	0.73 (8.10)				0.71 (7.65)			
SE3	0.85 (10.13)				0.75 (8.24)			
SE4	0.69 (7.53)				0.60 (6.19)			
SE5	0.80 (9.24)				0.74 (8.08)			
Cooperation (CO)		0.72	0.75	0.88		0.64	0.69	0.83
CO1	0.86 (10.31)				0.78 (8.70)			
CO2	0.83 (9.71)				0.87 (10.35)			
CO3	0.85 (10.09)				0.73 (8.02)			
Adaptation (AD)		0.74	0.77	0.92		0.64	0.69	0.87
AD1	0.83 (9.87)				0.79 (8.96)			
AD2	0.84 (9.93)				0.86 (10.09)			
AD3	0.89 (10.91)				0.77 (8.63)			
AD4	0.88 (10.67)				0.78 (8.71)			

ϕ Matrix [b]

	PE	FE	IE	SE	CO	AD
PE		0.88	0.75	0.75	0.82	0.81
FE	0.77		0.74	0.60	0.64	0.72
IE	0.86	0.81		0.79	0.70	0.74
SE	0.74	0.66	0.85		0.85	0.75
CO	0.81	0.67	0.83	0.93		0.79
AD	0.83	0.74	0.89	0.76	0.82	

Note:

λ = completely standardised loading; AVE = average variance extracted computed as $\Sigma\lambda^2/(\Sigma\lambda^2 + \Sigma\epsilon_j)$;
CR = composite reliability computed as $(\Sigma\lambda)^2/[(\Sigma\lambda)^2 + \Sigma\epsilon_j)]$; α = Cronbach's alpha; DSR = difference score reliability

[a] Fit statistics for confirmatory factor analysis:

1. Perception Scores: $\chi^2_{(309)} = 585.89$, $p<0.001$; $\chi^2/df = 1.90$; GFI = 0.71; AGFI = 0.65; RMR = 0.082; CFI = 0.87; PNFI = 0.68; NNFI = 0.86; RMSEA = 0.097.
2. Gap Scores: $\chi^2_{(309)} = 578.46$, $p<0.001$; $\chi^2/df = 1.87$; GFI = 0.70; AGFI = 0.63; RMR = 0.13; CFI = 0.83; PNFI = 0.62; NNFI = 0.81; RMSEA = 0.096.

[b] The lower triangle shows correlations for perception scores, and the upper triangle shows correlations for gap scores. All correlations are significant at $p \leq 0.05$.

Table 8.5C: Pre-Modification Measurement Results: Transactional Quality and Relational Quality (Architect sub-sample n=89)

Dimensions & Scale Items	Pre-Modification							
	Perception Scores [(a1)]				Gap Scores [(a2)]			
	λ (*t*-value)	AVE	CR	α	λ (*t*-value)	AVE	CR	DSR
Product/Service Exchange (PE)		0.62	0.67	0.91		0.47	0.56	0.85
PE1	0.50 (4.86)				0.43 (4.07)			
PE2	0.80 (8.91)				0.75 (7.92)			
PE3	0.89 (10.57)				0.76 (8.19)			
PE4	0.83 (9.38)				0.68 (6.96)			
PE5	0.82 (9.23)				0.74 (7.80)			
PE6	0.82 (9.29)				0.71 (7.36)			
PE7	0.79 (8.76)				0.68 (7.02)			
Financial Exchange (FE)		0.71	0.74	0.89		0.59	0.65	0.84
FE1	0.69 (7.26)				0.68 (6.98)			
FE2	0.81 (9.04)				0.67 (6.85)			
FE3	0.91 (10.99)				0.87 (9.85)			
FE4	0.93 (11.29)				0.83 (9.14)			
Information Exchange (IE)		0.74	0.77	0.92		0.55	0.62	0.82
IE1	0.81 (9.12)				0.57 (5.61)			
IE2	0.90 (10.67)				0.73 (7.73)			
IE3	0.88 (10.39)				0.79 (8.75)			
IE4	0.85 (9.86)				0.84 (9.56)			
Social Exchange (SE)		0.64	0.69	0.90		0.55	0.62	0.86
SE1	0.83 (9.43)				0.79 (8.50)			
SE2	0.79 (8.81)				0.71 (7.42)			
SE3	0.90 (10.83)				0.85 (9.59)			
SE4	0.71 (7.54)				0.60 (5.91)			
SE5	0.78 (8.69)				0.74 (7.79)			
Cooperation (CO)		0.79	0.81	0.91		0.70	0.74	0.86
CO1	0.90 (10.73)				0.69 (7.19)			
CO2	0.86 (10.01)				0.86 (10.00)			
CO3	0.91 (10.98)				0.94 (11.52)			
Adaptation (AD)		0.81	0.82	0.94		0.68	0.72	0.89
AD1	0.93 (11.46)				0.88 (10.16)			
AD2	0.94 (11.63)				0.86 (9.85)			
AD3	0.86 (10.00)				0.74 (7.84)			
AD4	0.85 (9.89)				0.81 (8.90)			

ϕ Matrix [(b)]

	PE	FE	IE	SE	CO	AD
PE		0.74	0.86	0.70	0.70	0.69
FE	0.71		0.77	0.73	0.64	0.60
IE	0.84	0.74		0.80	0.87	0.70
SE	0.82	0.71	0.88		0.70	0.58
CO	0.72	0.71	0.84	0.96		0.80
AD	0.63	0.63	0.73	0.71	0.83	

Note:

λ = completely standardised loading; AVE = average variance extracted computed as $\Sigma\lambda^2/(\Sigma\lambda^2 + \Sigma\epsilon_j)$;
CR = composite reliability computed as $(\Sigma\lambda)^2/[(\Sigma\lambda)^2 + \Sigma\epsilon_j)]$; α = Cronbach's alpha; DSR = difference score reliability

[(a)] Fit statistics for confirmatory factor analysis:

1. Perception Scores: $\chi^2_{(309)} = 694.01$, $p<0.001$; $\chi^2/df = 2.25$; GFI = 0.64; AGFI = 0.56; RMR = 0.14; CFI = 0.85; PNFI = 0.67; NNFI = 0.83; RMSEA = 0.12.
2. Gap Scores: $\chi^2_{(309)} = 688.06$, $p<0.001$; $\chi^2/df = 2.23$; GFI = 0.66; AGFI = 0.58; RMR = 0.18; CFI = 0.78; PNFI = 0.59; NNFI = 0.75; RMSEA = 0.12.

[(b)] The lower triangle shows correlations for perception scores, and the upper triangle shows correlations for gap scores. All correlations are significant at $p \leq 0.05$.

Table 8.5D: Post-Modification Measurement Results: Transactional Quality and Relational Quality (Combined Sample n=185)

Dimensions & Scale Items	Post-Modification							
	Perception Scores [a1]				Gap Scores [a2]			
	λ (*t*-value)	AVE	CR	α	λ (*t*-value)	AVE	CR	DSR
Product/Service Exchange (PE)		0.60	0.66	0.91		0.46	0.56	0.85
PE1	0.58 (8.40)				0.49 (6.76)			
PE2	0.82 (13.45)				0.76 (11.83)			
PE3	083 (13.51)				0.75 (11.57)			
PE4	0.83 (13.67				0.69 (10.22)			
PE5	0.82 (13.39)				0.72 (10.79)			
PE6	0.75 (11.73)				0.65 (9.52)			
PE7	0.76 (12.01)				0.66 (9.67)			
Financial Exchange (FE)		0.77	0.79	0.91		0.63	0.68	0.83
FE1					Item deleted			
FE2	0.80 (12.83)				0.70 (10.38)			
FE3	0.93 (16.39)				0.88 (14.10)			
FE4	0.89 (15.10)				0.80 (12.41)			
Information Exchange (IE)		0.73	0.76	0.86		0.58	0.64	0.79
IE1	0.79 (12.66)				0.67 (9.65)			
IE2	0.89 (15.26)				0.82 (12.73)			
IE3	0.87 (14.71)				0.78 (11.92)			
IE4					Item deleted			
Social Exchange (SE)		0.64	0.69	0.90		0.53	0.61	0.85
SE1	0.80 (12.97)				0.79 (12.24)			
SE2	0.78 (12.41)				0.72 (10.69)			
SE3	0.89 (15.24)				0.81 (12.76)			
SE4	0.72 (11.14)				0.60 (8.49)			
SE5	0.80 (12.83)				0.72 (10.80)			
Cooperation (CO)		0.81	0.82	0.89		0.75	0.78	0.86
CO1					Item deleted			
CO2	0.89 (15.07)				0.85 (13.68)			
CO3	0.91 (15.54)				0.88 (14.42)			
Adaptation (AD)		0.79	0.81	0.94		0.65	0.70	0.88
AD1	0.91 (15.80)				0.83 (13.45)			
AD2	0.91 (15.90)				0.85 (14.00)			
AD3	0.87 (14.71)				0.74 (11.43)			
AD4	0.86 (14.36)				0.80 (12.73)			

ϕ Matrix [b]

	PE	FE	IE	SE	CO	AD
PE		0.74	0.79	0.71	0.71	0.74
FE	0.70		0.71	0.64	0.51	0.60
IE	0.84	0.74		0.74	0.70	0.66
SE	0.76	0.65	0.80		0.72	0.65
CO	0.72	0.61	0.76	0.89		0.80
AD	0.72	0.65	0.75	0.75	0.84	

Note:

λ = completely standardised loading; AVE = average variance extracted computed as $\Sigma\lambda^2/(\Sigma\lambda^2 + \Sigma\epsilon_j)$;
CR = composite reliability computed as $(\Sigma\lambda)^2/[(\Sigma\lambda)^2 + \Sigma\epsilon_j)]$; α = Cronbach's alpha; DSR = difference score reliability

[a] Fit statistics for confirmatory factor analysis:

1. Perception Scores: $\chi^2_{(237)} = 489.12$, $p<0.001$; $\chi^2/df = 2.06$; GFI = 0.82; AGFI = 0.77; RMR = 0.066; CFI = 0.94; PNFI = 0.76; NNFI = 0.92; RMSEA = 0.076.
2. Gap Scores: $\chi^2_{(237)} = 541.49$, $p<0.001$; $\chi^2/df = 2.28$; GFI = 0.80; AGFI = 0.75; RMR = 0.11; CFI = 0.88; PNFI = 0.70; NNFI = 0.87; RMSEA = 0.084.

[b] The lower triangle shows correlations for perception scores, and the upper triangle shows correlations for gap scores. All correlations are significant at $p \leq 0.05$.

Table 8.5E: Post-Modification Measurement Results: Transactional Quality and Relational Quality (Government sub-sample n=96)

Dimensions & Scale Items	Post-Modification							
	Perception Scores [(a1)]				Gap Scores [(a2)]			
	λ (*t*-value)	AVE	CR	α	λ (*t*-value)	AVE	CR	DSR
Product/Service Exchange (PE)		0.59	0.65	0.90		0.46	0.56	0.85
PE1	0.66 (7.13)				0.56 (5.71)			
PE2	0.83 (9.76)				0.76 (8.46)			
PE3	0.77 (8.72)				0.76 (8.43)			
PE4	0.83 (9.82)				0.70 (7.64)			
PE5	0.82 (9.51)				0.66 (7.06)			
PE6	0.70 (7.63)				0.60 (6.20)			
PE7	0.75 (8.47)				0.68 (7.29)			
Financial Exchange (FE)		0.75	0.79	0.89		0.61	0.67	0.81
FE1					Item deleted			
FE2	0.80 (9.14)				0.71 (7.61)			
FE3	0.95 (12.14)				0.88 (10.24)			
FE4	0.85 (10.03)				0.75 (8.13)			
Information Exchange (IE)		0.71	0.74	0.88		0.66	0.70	0.85
IE1	0.78 (8.77)				0.76 (8.33)			
IE2	0.85 (10.13)				0.81 (9.04)			
IE3	0.89 (10.83)				0.86 (9.92)			
IE4					Item deleted			
Social Exchange (SE)		0.60	0.66	0.88		0.52	0.60	0.84
SE1	0.80 (9.11)				0.79 (8.85)			
SE2	0.74 (8.18)				0.72 (7.71)			
SE3	0.85 (10.12)				0.76 (8.36)			
SE4	0.70 (7.62)				0.60 (6.13)			
SE5	0.78 (8.87)				0.73 (7.91)			
Cooperation (CO)		0.77	0.79	0.87		0.66	0.70	0.78
CO1					Item deleted			
CO2	0.86 (10.15)				0.87 (9.81)			
CO3	0.89 (10.70)				0.75 (8.10)			
Adaptation (AD)		0.74	0.77	0.92		0.64	0.69	0.87
AD1	0.83 (9.84)				0.79 (8.98)			
AD2	0.84 (9.94)				0.86 (10.14)			
AD3	0.89 (10.89)				0.77 (8.55)			
AD4	0.88 (10.70)				0.78 (8.71)			

ϕ Matrix [(b)]

	PE	FE	IE	SE	CO	AD
PE		0.83	0.73	0.75	0.82	0.81
FE	0.74		0.69	0.55	0.55	0.69
IE	0.84	0.76		0.72	0.66	0.71
SE	0.74	0.64	0.77		0.84	0.75
CO	0.76	0.58	0.70	0.86		0.79
AD	0.83	0.72	0.85	0.76	0.79	

Note:

λ = completely standardised loading; AVE = average variance extracted computed as $\Sigma\lambda^2/(\Sigma\lambda^2 + \Sigma\epsilon_j)$;
CR = composite reliability computed as $(\Sigma\lambda)^2/[(\Sigma\lambda)^2 + \Sigma\epsilon_j)]$; α = Cronbach's alpha; DSR = difference score reliability

[(a)] Fit statistics for confirmatory factor analysis:

1. Perception Scores: $\chi^2_{(237)} = 422.06$, $p<0.001$; $\chi^2/df = 1.78$; GFI = 0.76; AGFI = 0.69; RMR = 0.067; CFI = 0.90; PNFI = 0.69; NNFI = 0.89; RMSEA = 0.091.
2. Gap Scores: $\chi^2_{(237)} = 390.13$, $p<0.001$; $\chi^2/df = 1.65$; GFI = 0.74; AGFI = 0.67; RMR = 0.12; CFI = 0.89; PNFI = 0.65; NNFI = 0.87; RMSEA = 0.082.

[(b)] The lower triangle shows correlations for perception scores, and the upper triangle shows correlations for gap scores. All correlations are significant at $p \leq 0.05$.

Table 8.5F: Post-Modification Measurement Results: Transactional Quality and Relational Quality (Architect sub-sample n=89)

Dimensions & Scale Items	Post-Modification							
	Perception Scores [a1]				Gap Scores [a2]			
	λ (*t*-value)	AVE	CR	α	λ (*t*-value)	AVE	CR	DSR
Product/Service Exchange (PE)		0.62	0.67	0.91		0.47	0.56	0.85
PE1	0.50 (4.84)				0.43 (4.08)			
PE2	0.80 (8.90)				0.75 (7.94)			
PE3	0.89 (10.52)				0.75 (8.02)			
PE4	0.82 (9.35)				0.68 (6.93)			
PE5	0.82 (9.31)				0.75 (8.01)			
PE6	0.82 (9.26)				0.70 (7.19)			
PE7	0.79 (8.82)				0.69 (7.07)			
Financial Exchange (FE)		0.79	0.81	0.92		0.65	0.70	0.84
FE1					Item deleted			
FE2	0.82 (9.21)				0.69 (7.03)			
FE3	0.91 (10.84)				0.89 (10.13)			
FE4	0.94 (11.54)				0.83 (9.11			
Information Exchange (IE)		0.76	0.79	0.90		0.54	0.61	0.76
IE1	0.81 (9.12)				0.58 (5.70)			
IE2	0.94 (11.48)				0.81 (8.72)			
IE3	0.86 (10.02)				0.79 (8.43)			
IE4					Item deleted			
Social Exchange (SE)		0.65	0.70	0.90		0.55	0.62	0.86
SE1	0.82 (9.27)				0.78 (8.41)			
SE2	0.79 (8.76)				0.71 (7.39)			
SE3	0.91 (10.95)				0.85 (9.61)			
SE4	0.71 (7.48)				0.61 (6.03)			
SE5	0.78 (8.59)				0.74 (7.80)			
Cooperation (CO)		0.82	0.84	0.90		0.83	0.84	0.90
CO1					Item deleted			
CO2	0.88 (10.41)				0.84 (9.49)			
CO3	0.93 (11.38)				0.98 (12.16)			
Adaptation (AD)		0.80	0.82	0.94		0.68	0.72	0.89
AD1	0.93 (11.48)				0.88 (10.20)			
AD2	0.94 (11.62)				0.86 (9.89)			
AD3	0.86 (9.98)				0.73 (7.76)			
AD4	0.85 (9.90)				0.81 (8.90)			

ϕ Matrix [b]

.	PE	FE	IE	SE	CO	AD
PE		0.69	0.83	0.69	0.67	0.69
FE	0.68		0.70	0.71	0.55	0.56
IE	0.83	0.71		0.76	0.79	0.64
SE	0.82	0.68	0.84		0.66	0.58
CO	0.69	0.66	0.79	0.90		0.77
AD	0.63	0.60	0.70	0.71	0.85	

Note:

λ = completely standardised loading; AVE = average variance extracted computed as $\Sigma\lambda^2/(\Sigma\lambda^2 + \Sigma\epsilon_j)$;
CR = composite reliability computed as $(\Sigma\lambda)^2/[(\Sigma\lambda)^2 + \Sigma\epsilon_j)]$; α = Cronbach's alpha; DSR = difference score reliability

[a] Fit statistics for confirmatory factor analysis:

1. Perception Scores: $\chi^2_{(237)} = 486.27$, $p<0.001$; $\chi^2/df = 2.05$; GFI = 0.69; AGFI = 0.61; RMR = 0.10; CFI = 0.88; PNFI = 0.68; NNFI = 0.86; RMSEA = 0.11.
2. Gap Scores: $\chi^2_{(237)} = 511.39$, $p<0.001$; $\chi^2/df = 2.16$; GFI = 0.68; AGFI = 0.59; RMR = 0.17; CFI = 0.81; PNFI = 0.60; NNFI = 0.78; RMSEA = 0.11.

[b] The lower triangle shows correlations for perception scores, and the upper triangle shows correlations for gap scores. All correlations are significant at $p \leq 0.05$.

architect sub-sample are also significant. These indicated that post-modification achieved a better model fit to the data. Comparing the model fit between the perception and gap versions, the former achieved a better fit than the latter in both the total sample and the architect sub-sample (for the total sample: $\chi^2_{difference} = 52.37$, $p < 0.01$; for the architect sub-sample: $\chi^2_{difference} = 22.13$, $p < 0.01$). But for the government sub-sample, the gap version achieved a better fit ($\chi^2_{difference} = 31.93$, $p < 0.01$).

Although the sample size upon which the measurement model was estimated for both government sector and architect sector was smaller than the usual minimum of 100, this concern can be mitigated by the Tucker-Lewis Index (TLI) of value around 0.80 for both samples across the two measurement frameworks (i.e. perception scores and gap scores). The TLI which is also known as Nonnormed Fit Index (NNFI) is recommended for judging the overall fit of small sample-sized models and values above 0.90 are deemed acceptable (March, Balla, and McDonald, 1988). This suggests that the measurement model is also robust across the two sub-samples.

8.4.1.1 Measurement Reliability

In terms of Cronbach's alpha, all construct reliabilities are over 0.80 recommended level as indicated in Tables 8.5D, 8.5E, and 8.5F. This suggests that the measurement scale is reliable. In assessing measurement reliability, Fornell and Larcker (1981) also stress the importance of examining composite reliability (CR) and average variance extracted (AVE). Bagozzi and Yi (1988) suggest two criteria: composite reliability should be equal to or greater than 0.60 and variance extracted should be equal to or greater than 0.50. Except for the product/service exchange (CR = 0.56; AVE = 0.46) in the gap version, requirements on measurement reliability were met in this study. Item reliabilities in terms of R^2 for 26 of 27 factor loadings for the perception measurement framework and 20 of 27 loadings for the gap measurement framework exceed the arbitrary 0.50 standard (Bagozzi and Yi, 1991). Overall, the scale is considered to be reliable.

8.4.1.2 Measurement Validity

The construct validity can be assessed in terms of convergent validity and discriminant validity (Churchill, 1979). Convergent validity involves the extent to which a measure correlates highly with other measures designed to measure the same construct whereas discriminant validity involves the extent to which a measure of a construct does not correlate highly with measures of other constructs. Anderson and Gerbing (1988) consider the need for unidimensional measurement as a crucial undertaking in theory testing and development. The first step to achieving unidimensionality is to examine convergent validity. Anderson and Gerbing suggest that "convergent validity can be assessed from the measurement model by determining whether each indicator's estimated pattern coefficient on its posited underlying construct factor is significant (greater than twice of its standard error)" (p. 416). As indicated in Tables 8.5D, 8.5E, and 8.5F, all factor loadings were statistically significant ($p \leq 0.01$). They range from 0.49 to 0.93 for the combined sample, 0.56 to 0.95 for the government sub-sample, and 0.43 to 0.98 for the architect sub-sample across the perception-only and gap measurement frameworks. Therefore, the measures display adequate convergent validity.

Apart from an assessment of convergent validity, three tests of discriminant validity among the six exchange constructs were performed. In the first test, the assessment follows Fornell and Larcker's (1981) suggestion that if the square of the parameter estimate between two constructs (ϕ^2) is less than the average variance extracted estimates of the two constructs, then discriminant validity is supported. As shown in Table 8.5D, for the combined sample, 13 out of 15 inter-correlations in the perception measurement framework and 14 out of 15 inter-correlations in the gap measurement framework met this criterion. Similar patterns (over 10 of total 15 inter-correlations) were found in both the government sub-sample (see Table 8.5E) and the architect sub-sample (see Table 8.5F), suggesting discriminant validity of the scale across samples.

In the second test, discriminant validity was assessed for all the correlated constructs. The procedure underlying this test of discriminant validity is to fix the correlation parameter between the two factors at 1.0 (as perfectly correlated) and then employ a chi-square difference test on the values obtained for the constrained and unconstrained

models (Bagozzi and Phillips, 1982). Bagozzi and Phillips (1982) state that "a significant lower χ^2 value for the model in which the trait correlations are not constrained to unity would indicate that the traits are not perfectly correlated and that discriminant validity is achieved" (p. 476). As indicated in Table 8.6, all changes in χ^2 are significant at a 0.01 level which indicates that improved fits are obtained by separating the constructs.

In the third test of discriminant validity, the correlation between two latent constructs plus or minus two standard errors should not include one (Anderson, 1987). All six latent constructs in two measurement frameworks across three sample sizes (i.e., combined sample, government sub-sample, and architect sub-sample) met this criterion.

8.4.1.3 Tests of Factor Structure Invariances across Sub-Samples

As mentioned earlier in this chapter, the assumption of sample homogeneity was violated. In performing confirmatory factor analysis, Byrne (1998) also suggests examining equivalence of groups before pooling data for a single-group analysis. In testing the invariance of the factor structure across the two sub-samples (i.e., government engineers and professional engineers) before combining them to form a single sample for further analysis, five hypotheses are to be tested (Jöreskog and Sörbom, 1996a):

1. test of the hypothesis of invariant covariance matrix H_Σ: $\Sigma^{(1)} = \Sigma^{(2)}$;
2. assuming that the measurement model of the form $X = \Lambda_X\xi + \delta$ holds in both groups, test of the hypothesis that there are six correlated common factors in both groups with an identical factor pattern;
3. assuming (2), test of the hypothesis of invariant factor loadings H_Λ: $\Lambda_X^{(1)} = \Lambda_X^{(2)}$;
4. assuming (3), test of the hypothesis of invariant factor variances/covariances $H_\Lambda\Theta : \Theta_\delta^{(1)} = \delta_\Theta^{(2)}$; and
5. assuming (4), test of the hypothesis of error variances/covariances $H_{\Lambda\Phi\Theta}$: $\Phi^{(1)} = \Phi^{(2)}$.

However, Byrne (1998) contends that tests for the invariance of error variances/covariances is the least important except in particular instances when, for

Table 8.6: Summary Results of Tests of Discriminant Validity (Bagozzi and Phillips, 1982)

	χ^2	df	$\Delta\chi^2$ (Note)	Detailed Table Ref.
Total Sample				
Perception-based				
Unconstrained Model	489.12	237	----	
Constrained Models	523.75 to 752.69	238	34.63 to 263.57	Appendix
Gap-based				D1
Unconstrained Model	541.49	237	----	
Constrained Models	582.92 to 694.56	238	41.43 to 153.07	
Govt. Sample				
Perception-based				
Unconstrained Model	422.06	237	----	
Constrained Models	439.91 to 598.50	238	17.85 to 176.44	Appendix
Gap-based				D2
Unconstrained Model	390.13	237	----	
Constrained Models	399.35 to 451.32	238	9.22 to 61.19	
Arch. Sample				
Perception-based				
Unconstrained Model	486.27	237	----	
Constrained Models	502.65 to 673.11	238	16.38 to 186.84	Appendix
Gap-based				D3
Unconstrained Model	511.39	237	----	
Constrained Models	523.99 to 613.00	238	37.72 to 126.73	

Note: χ^2 values of 3.84 or greater are significant at the 0.05 level, and χ^2 values of 6.63 or greater at the 0.01 level.

example, it might be of interest to test for the invariant reliability of a measurement across groups. The first test, however, is not possible in this study given the small sample size for each sample. Even if this test is tenable, it does not necessarily mean that the hypotheses of invariant factor structure, factor loadings, and factor variances/covariances are also confirmed. Therefore, three hypotheses were relevant in this study: (1) testing for the validity of a six-factor structure; (2) testing for an invariant pattern of factor loadings; and (3) testing for invariant factor variances/covariances. The procedures for testing the invariance hypotheses were identical to those used in model fitting. That is, a model in which certain parameters were constrained to be equal across the two sub-samples was compared with a less restrictive model in which these parameters were free to take on any value. For example, the hypothesis of an invariant pattern of factor loadings was tested by constraining all lambda parameters to be equal, and then compared this model (model 2) with model 1 in which only the number of factors was held invariant across the two samples. As illustrated in Table 8.7, all χ^2 values are statistically significant. However, problems associated with the χ^2 statistic as a criterion of fit have been noted (e.g., Bentler and Bonett, 1980). Other alternative indices of fit have been used: χ^2/df ratio and nonnormed fit index (NNFI). Because the differences in the ratio of χ^2/df were not significant, the three hypotheses of invariant number of factors, patterns of loadings, and factor variances/covariances, were considered tenable.

8.4.2 Second Confirmatory Factor Analysis

Based on the results of the first confirmatory factor analysis, the items for each exchange construct were summed and then averaged to form six composite exchange scores. These six exchange scores, in turn, served as indicators for transactional quality and relational quality as illustrated in Figure 8.3. The second confirmatory factor analysis was run on both exogenous indicators (i.e., four items for transactional quality) and endogenous indicators (i.e., two items for relational quality, three items for atmosphere, three items for service quality, three items for client satisfaction, and six items for behavioural intention) underlying the model in Figure 8.3. The measurement models across different sample sizes shown in Table 8.8 provide a reasonable fit (for the perception version: $\chi^2_{(155)} = 372.20$, $p<0.001$; GFI = 0.83; CFI = 0.95; RMSEA = 0.087; for the gap version: $\chi^2_{(155)} = 354.22$, $p<0.001$; GFI = 0.84; CFI = 0.95; RMSEA

Table 8.7: Tests of Invariances of Transactional Quality and Relational Quality Across Sub-Samples

Competing Models	χ^2 (Note 1)	df	$\Delta\chi^2/\Delta df$ (Note 2)	RMSEA	GFI	CFI	NNFI
Perception-Based							
1. Number of Factors Invariant	908.33	474	----	0.100	0.69	0.89	0.87
2. Model 1 with Pattern of Factor Loadings Held Invariant	938.80	498	1.27ns	0.098	0.69	0.89	0.88
3. Model 2 with All Factor Variances and Covariances Held Invariant	970.51	513	1.59ns	0.099	0.69	0.89	0.88
Gap-Based							
1. Number of Factors Invariant	901.52	474	----	0.099	0.68	0.85	0.82
2. Model 1 with Pattern of Factor Loadings Held Invariant	927.65	498	1.09ns	0.097	0.68	0.85	0.83
3. Model 2 with All Factor Variances and Covariances Held Invariant	966.48	513	1.67ns	0.098	0.67	0.84	0.83

Note 1: All χ^2 values are significant at $p<0.01$

Note 2: Except where noted by "ns" (non-significant), χ^2 values of 3.84 or greater are significant at the 0.05 level, and χ^2 values of 6.63 or greater at the 0.01 level.

= 0.084). However, one item with large value was found in the lambda modification matrix. Therefore, having accounted for substantive and statistical reasons, this item was dropped from the behavioural intention construct. The post-modification model is statistically significant (for the perception version: $\chi^2_{difference} = 62.80$, $df_{difference} = 18$, $p < 0.10$; for the gap version: $\chi^2_{difference} = 62.17$, $df_{difference} = 18$, $p < 0.10$). Comparing the model fit between the perception and gap versions, the latter achieved a better fit than the former in both the total sample and the architect sub-sample (for the total sample: $\chi^2_{difference} = 17.35$, $p < 0.01$; for the architect sub-sample: $\chi^2_{difference} = 16.83$, $p < 0.01$). But for the government sub-sample, the perception version achieved a better, but moderate model fit ($\chi^2_{difference} = 2.74$, $p < 0.1$). The results are summarised in Table 8.8.

After collapsing 24 exchange variables to form six composite variables to operationalise the constructs of transactional quality and relational quality, most of the factor loadings of transactional quality are comparable, except TQ2. As compared with other factor loadings which are about 0.80, the loading of TQ2 (about financial exchange) is consistently lower at 0.71 for the combined sample, 0.74 for the government sub-sample, and 0.70 for the architect sub-sample. Similar patterns are also observed in the gap-based measurement model. TQ3 (about information exchange) and TQ4 (about social exchange) are also consistently lower in the gap-based measurement model across samples. On the other hand, the factor loading of TQ1 (about product/service exchange) are relatively higher (i.e., over 0.80) in both perception-based and gap-based measurement frameworks across samples, suggesting an important factor of transactional quality. This is consistent with the service quality literature that product/service exchange represents the core service offerings.

8.4.2.1 Measurement Reliability

After modification, all construct reliabilities in terms of Cronbach's alpha are over 0.80 for different samples as indicated in Tables 8.8D, 8.8E, and 8.8F. This suggests that the scale composing these constructs is also reliable after collapsing 24 exchange indicators into six exchange composite variables. Both composite reliability (CR) and average variance extracted (AVE) also exceed the 0.6 level except the AVE for the construct of transactional quality in the government sub-sample (AVE = 0.59).

Table 8.8: Summary Results of CFA on Exogenous and Endogenous Variables

	χ^2	df	RMSEA	GFI	CFI	NNFI	Detailed Table Ref.
Pre-Modification							
Total Sample							
Perception-based	372.20	155	0.09	0.83	0.95	0.93	Table
Gap-based	354.22	155	0.08	0.84	0.95	0.94	8.8A
Govt. Sample							
Perception-based	241.20	155	0.08	0.79	0.96	0.95	Table
Gap-based	245.70	155	0.08	0.80	0.95	0.94	8.8B
Arch. Sample							
Perception-based	302.77	155	0.10	0.75	0.93	0.91	Table
Gap-based	280.35	155	0.10	0.76	0.93	0.92	8.8C
Post-Modification							
Total Sample							
Perception-based	309.40	137	0.08	0.85	0.95	0.94	Table
Gap-based	292.05	137	0.08	0.86	0.96	0.94	8.8D
Govt. Sample							
Perception-based	219.82	137	0.08	0.80	0.96	0.94	Table
Gap-based	222.56	137	0.08	0.80	0.95	0.94	8.8E
Arch. Sample							
Perception-based	252.95	137	0.10	0.78	0.94	0.92	Table
Gap-based	236.12	137	0.09	0.79	0.94	0.93	8.8F

Table 8.8A: Pre-Modification Measurement Results: Exogenous and Endogenous Constructs (Combined Sample n=185)

Dimensions & Scale Items	Pre-Modification							
	Perception Scores [a1]				Gap Scores [a2]			
	λ (*t*-value)	AVE	CR	α	λ (*t*-value)	AVE	CR	α
Atmosphere (ATM)		0.72	0.75	0.87		0.72	0.75	0.87
ATM1	0.88 (14.87)				0.88 (14.78)			
ATM2	0.83 (13.58)				0.83 (13.61)			
ATM3	0.84 (13.77)				0.84 (13.75)			
Service Quality (SQ)		0.76	0.79	0.89		0.77	0.79	0.89
SQ1	0.92 (16.40)				0.93 (16.43)			
SQ2	0.92 (16.24)				0.92 (16.24)			
SQ3	0.78 (12.45)				0.77 (12.38)			
Satisfaction (SAT)		0.87	0.88	0.95		0.87	0.88	0.95
SAT1	0.94 (16.90)				0.94 (16.89)			
SAT2	0.92 (16.32)				0.92 (16.32)			
SAT3	0.94 (17.01)				0.94 (17.02)			
Behavioural Intention (BI)		0.79	0.87	0.95		0.79	0.87	0.95
BI1	0.91 (15.91)				0.91 (15.89)			
BI2	0.96 (17.46)				0.96 (17.45)			
BI3	0.90 (15.64)				0.90 (15.66)			
BI4	0.83 (13.79)				0.83 (13.82)			
BI5	0.85 (14.16)				0.85 (14.17)			
Transactional Quality (TQ)		0.67	0.72	0.89		0.60	0.66	0.85[b]
TQ1 (PE)	0.85 (14.02)				0.84 (13.57)			
TQ2 (FE)	0.71 (10.83)				0.72 (10.74)			
TQ3 (IE)	0.87 (14.51)				0.79 (12.38)			
TQ4 (SE)	0.85 (14.07)				0.75 (11.55)			
Relational Quality		0.77	0.80	0.87		0.71	0.75	0.83[b]
RQ1 (CO)	0.88 (14.81)				0.82 (12.87)			
RQ2 (AD)	0.87 (14.59)				0.87 (13.96)			

ϕ Matrix [c]

	ATM	SQ	SAT	BI	TQ	RQ
ATM		0.91	0.85	0.79	0.55	0.63
SQ	0.91		0.94	0.87	0.60	0.66
SAT	0.85	0.94		0.86	0.54	0.59
BI	0.79	0.87	0.86		0.55	0.63
TQ	0.79	0.81	0.70	0.70		0.87
RQ	0.79	0.78	0.69	0.71	0.92	

Note:

λ = completely standardised loading; AVE = average variance extracted computed as $\Sigma\lambda^2/(\Sigma\lambda^2 + \Sigma\epsilon_j)$;
CR = composite reliability computed as $(\Sigma\lambda)^2/[(\Sigma\lambda)^2 + \Sigma\epsilon_j)]$; α = Cronbach's alpha

[a] Fit statistics for confirmatory factor analysis:

1. Perception Scores: $\chi^2_{(155)} = 372.20$, $p<0.001$; $\chi^2/df = 2.40$; GFI = 0.83; AGFI = 0.77; RMR = 0.048; CFI = 0.95; PNFI = 0.74; NNFI = 0.93; RMSEA = 0.087.
2. Gap Scores: $\chi^2_{(155)} = 354.22$, $p<0.001$; $\chi^2/df = 2.29$; GFI = 0.84; AGFI = 0.78; RMR = 0.057; CFI = 0.95; PNFI = 0.74; NNFI = 0.94; RMSEA = 0.084.

[b] Difference score reliability.

[c] The lower triangle shows correlations for perception scores, and the upper triangle shows correlations for gap scores. All correlations are significant at $p \leq 0.05$.

Table 8.8B: Pre-Modification Measurement Results: Exogenous and Endogenous Constructs (Government sub-sample n=96)

Dimensions & Scale Items	Pre-Modification: Perception Scores [a1] λ (*t*-value)	AVE	CR	α	Pre-Modification: Gap Scores [a2] λ (*t*-value)	AVE	CR	α
Atmosphere (ATM)		0.71	0.74	0.86		0.71	0.74	0.86
ATM1	0.89 (10.76)				0.88 (10.61)			
ATM2	0.80 (9.18)				0.81 (9.26)			
ATM3	0.83 (9.65)				0.83 (9.67)			
Service Quality (SQ)		0.75	0.78	0.88		0.75	0.78	0.88
SQ1	0.93 (11.85)				0.93 (11.85)			
SQ2	0.91 (11.55)				0.92 (11.59)			
SQ3	0.75 (8.43)				0.74 (8.34)			
Satisfaction (SAT)		0.87	0.88	0.95		0.87	0.88	0.95
SAT1	0.93 (11.99)				0.93 (12.03)			
SAT2	0.93 (12.07)				0.93 (12.07)			
SAT3	0.94 (12.17)				0.94 (12.13)			
Behavioural Intention (BI)		0.77	0.88	0.94		0.77	0.88	0.94
BI1	0.95 (12.48)				0.95 (12.47)			
BI2	0.94 (12.21)				0.94 (12.21)			
BI3	0.84 (10.09)				0.84 (10.11)			
BI4	0.81 (9.52)				0.81 (9.51)			
BI5	0.84 (10.05)				0.84 (10.08)			
Transactional Quality (TQ)		0.66	0.71	0.88		0.58	0.65	0.85[b]
TQ1 (PE)	0.88 (10.75)				0.84 (10.49)			
TQ2 (FE)	0.74 (8.25)				0.72 (7.90)			
TQ3 (IE)	0.84 (9.94)				0.74 (8.13)			
TQ4 (SE)	0.79 (9.10)				0.73 (7.96)			
Relational Quality		0.71	0.74	0.83		0.66	0.70	0.79[b]
RQ1 (CO)	0.81 (9.41)				0.79 (8.93)			
RQ2 (AD)	0.87 (10.44)				0.83 (9.51)			

ϕ Matrix [c]

	ATM	SQ	SAT	BI	TQ	RQ
ATM		0.88	0.81	0.80	0.50	0.59
SQ	0.88		0.93	0.89	0.58	0.59
SAT	0.82	0.93		0.95	0.52	0.58
BI	0.80	0.89	0.95		0.51	0.56
TQ	0.73	0.78	0.64	0.68		0.97
RQ	0.80	0.78	0.67	0.68	0.99	

Note:

λ = completely standardised loading; AVE = average variance extracted computed as $\Sigma\lambda^2/(\Sigma\lambda^2 + \Sigma\epsilon_j)$;
CR = composite reliability computed as $(\Sigma\lambda)^2/[(\Sigma\lambda)^2 + \Sigma\epsilon_j)]$; α = Cronbach's alpha

[a] Fit statistics for confirmatory factor analysis:

1. Perception Scores: $\chi^2_{(155)} = 241.2$, $p<0.001$; $\chi^2/df = 1.56$; GFI = 0.79; AGFI = 0.72; RMR = 0.053; CFI = 0.96; PNFI = 0.73; NNFI = 0.95; RMSEA = 0.077.
2. Gap Scores: $\chi^2_{(155)} = 245.70$, $p<0.001$; $\chi^2/df = 1.59$; GFI = 0.80; AGFI = 0.73; RMR = 0.062; CFI = 0.95; PNFI = 0.72; NNFI = 0.94; RMSEA = 0.078.

(a) Difference score reliability.

(b) The lower triangle shows correlations for perception scores, and the upper triangle shows correlations for gap scores. All correlations are significant at $p \leq 0.05$.

Table 8.8C: Pre-Modification Measurement Results: Exogenous and Endogenous Constructs (Architect sub-sample n=89)

Dimensions & Scale Items	Pre-Modification							
	Perception Scores [a1]				Gap Scores [a2]			
	λ (*t*-value)	AVE	CR	α	λ (*t*-value)	AVE	CR	α
Atmosphere (ATM)		0.71	0.74	0.86		0.71	0.74	0.86
ATM1	0.87 (10.05)				0.87 (10.09)			
ATM2	0.84 (9.47)				0.83 (9.42)			
ATM3	0.82 (9.20)				0.82 (9.16)			
Service Quality (SQ)		0.77	0.79	0.90		0.77	0.79	0.90
SQ1	0.92 (11.22)				0.92 (11.22)			
SQ2	0.92 (11.18)				0.92 (11.15)			
SQ3	0.79 (8.78)				0.79 (8.81)			
Satisfaction (SAT)		0.85	0.86	0.95		0.85	0.86	0.95
SAT1	0.94 (11.74)				0.94 (11.76)			
SAT2	0.90 (10.78)				0.90 (10.77)			
SAT3	0.93 (11.58)				0.93 (11.57)			
Behavioural Intention (BI)		0.82	0.89	0.96		0.82	0.89	0.96
BI1	0.87 (10.20)				0.86 (10.18)			
BI2	0.97 (12.48)				0.97 (12.51)			
BI3	0.95 (11.91)				0.95 (11.90)			
BI4	0.86 (10.18)				0.86 (10.18)			
BI5	0.87 (10.32)				0.87 (10.30)			
Transactional Quality (TQ)		0.69	0.73	0.89		0.62	0.67	0.89[b]
TQ1 (PE)	0.84 (9.55)				0.82 (9.04)			
TQ2 (FE)	0.70 (7.44)				0.71 (7.32)			
TQ3 (IE)	0.89 (10.56)				0.83 (9.23)			
TQ4 (SE)	0.89 (10.45)				0.79 (8.50)			
Relational Quality		0.80	0.82	0.89		0.74	0.76	0.89[b]
RQ1 (CO)	0.92 (11.04)				0.84 (9.23)			
RQ2 (AD)	0.86 (9.87)				0.88 (9.87)			

ϕ Matrix [c]

	ATM	SQ	SAT	BI	TQ	RQ
ATM		0.93	0.87	0.82	0.69	0.67
SQ	0.93		0.94	0.86	0.70	0.71
SAT	0.87	0.94		0.80	0.65	0.60
BI	0.82	0.86	0.80		0.59	0.67
TQ	0.82	0.82	0.76	0.70		0.83
RQ	0.76	0.76	0.67	0.74	0.89	

Note:

λ = completely standardised loading; AVE = average variance extracted computed as $\Sigma\lambda^2/(\Sigma\lambda^2 + \Sigma\epsilon_j)$;
CR = composite reliability computed as $(\Sigma\lambda)^2/[(\Sigma\lambda)^2 + \Sigma\epsilon_j)]$; α = Cronbach's alpha

[a] Fit statistics for confirmatory factor analysis:

1. Perception Scores: $\chi^2_{(155)} = 302.77$, $p<0.001$; $\chi^2/df = 1.95$; GFI = 0.75; AGFI = 0.66; RMR = 0.071; CFI = 0.93; PNFI = 0.70; NNFI = 0.91; RMSEA = 0.10.
2. Gap Scores: $\chi^2_{(155)} = 280.35$, $p<0.001$; $\chi^2/df = 1.81$; GFI = 0.76; AGFI = 0.67; RMR = 0.073; CFI = 0.93; PNFI = 0.70; NNFI = 0.92; RMSEA = 0.096.

[b] Difference score reliability.

[c] The lower triangle shows correlations for perception scores, and the upper triangle shows correlations for gap scores. All correlations are significant at $p \leq 0.05$.

Table 8.8D: Post-Modification Measurement Results: Exogenous and Endogenous Constructs (Combined Sample n=185)

Dimensions & Scale Items	Post-Modification: Perception Scores [a1] λ (*t*-value)	AVE	CR	α	Post-Modification: Gap Scores [a2] λ (*t*-value)	AVE	CR	α
Atmosphere (ATM)		0.72	0.75	0.87		0.72	0.75	0.87
ATM1	0.88 (14.86)				0.88 (14.76)			
ATM2	0.83 (13.58)				0.83 (13.62)			
ATM3	0.84 (13.77)				0.84 (13.76)			
Service Quality (SQ)		0.76	0.79	0.89		0.77	0.79	0.89
SQ1	0.92 (16.40)				0.93 (16.43)			
SQ2	0.92 (16.25)				0.92 (16.25)			
SQ3	0.78 (12.45)				0.77 (12.38)			
Satisfaction (SAT)		0.87	0.88	0.95		0.87	0.88	0.95
SAT1	0.94 (16.92)				0.94 (16.91)			
SAT2	0.92 (16.31)				0.92 (16.31)			
SAT3	0.94 (16.99)				0.94 (17.00)			
Behavioural Intention (BI)		0.79	0.89	0.94		0.80	0.89	0.94
BI1					Item deleted			
BI2	0.95 (17.21)				0.95 (17.16)			
BI3	0.90 (15.73)				0.90 (15.75)			
BI4	0.85 (14.29)				0.85 (14.33)			
BI5	0.86 (14.57)				0.86 (14.58)			
Transactional Quality (TQ)		0.67	0.71	0.89		0.60	0.66	[b]
TQ1 (PE)	0.85 (14.01)				0.84 (13.54)			
TQ2 (FE)	0.71 (10.83)				0.72 (10.75)			
TQ3 (IE)	0.87 (14.51)				0.79 (12.40)			
TQ4 (SE)	0.85 (14.07)				0.75 (11.56)			
Relational Quality		0.77	0.79	0.87		0.71	0.74	[b]
RQ1 (CO)	0.88 (14.82)				0.82 (12.89)			
RQ2 (AD)	0.87 (14.57)				0.87 (13.93)			

ϕ Matrix [c]

	ATM	SQ	SAT	BI	TQ	RQ
ATM		0.91	0.85	0.77	0.55	0.63
SQ	0.91		0.94	0.85	0.60	0.66
SAT	0.85	0.94		0.83	0.54	0.59
BI	0.77	0.85	0.83		0.54	0.61
TQ	0.79	0.81	0.70	0.68		0.87
RQ	0.79	0.78	0.69	0.69	0.92	

Note:

λ = completely standardised loading; AVE = average variance extracted computed as $\Sigma\lambda^2/(\Sigma\lambda^2 + \Sigma\epsilon_j)$;
CR = composite reliability computed as $(\Sigma\lambda)^2/[(\Sigma\lambda)^2 + \Sigma\epsilon_j)]$; α = Cronbach's alpha

[a] Fit statistics for confirmatory factor analysis:

1. Perception: $\chi^2_{(137)} = 309.40$, $p<0.001$; $\chi^2/df = 2.26$; GFI = 0.85; AGFI = 0.79; RMR = 0.041; CFI = 0.95; PNFI = 0.74; NNFI = 0.94; RMSEA = 0.083.
2. Gap: $\chi^2_{(137)} = 292.05$, $p<0.001$; $\chi^2/df = 2.13$; GFI = 0.86; AGFI = 0.81; RMR = 0.053; CFI = 0.96; PNFI = 0.74; NNFI = 0.94; RMSEA = 0.078.

[b] Difference score reliability.

[c] The lower triangle shows correlations for perception scores, and the upper triangle shows correlations for gap scores. All correlations are significant at $p \leq 0.05$.

Table 8.8E: Post-Modification Measurement Results: Exogenous and Endogenous Constructs (Government sub-sample n=96)

Dimensions & Scale Items	Post-Modification							
	Perception Scores [a1]				Gap Scores [a2]			
	λ (*t*-value)	AVE	CR	α	λ (*t*-value)	AVE	CR	α
Atmosphere (ATM)		0.70	0.74	0.86		0.70	0.74	0.86
ATM1	0.89 (10.73)				0.88 (10.57)			
ATM2	0.80 (9.21)				0.81 (9.30)			
ATM3	0.83 (9.64)				0.83 (9.66)			
Service Quality (SQ)		0.75	0.78	0.88		0.75	0.78	0.88
SQ1	0.93 (11.84)				0.93 (11.84)			
SQ2	0.91 (11.56)				0.92 (11.61)			
SQ3	0.75 (8.43)				0.94 (8.34)			
Satisfaction (SAT)		0.87	0.88	0.95		0.87	0.88	0.95
SAT1	0.93 (12.05)				0.94 (12.08)			
SAT2	0.93 (12.04)				0.93 (12.04)			
SAT3	0.94 (12.13)				0.94 (12.09)			
Behavioural Intention (BI)		0.75	0.88	0.94		0.75	0.88	0.93
BI1				Item deleted				
BI2	0.93 (11.84)				0.93 (11.79)			
BI3	0.85 (10.27)				0.85 (10.29)			
BI4	0.83 (9.90)				0.83 (9.91)			
BI5	0.85 (10.30)				0.86 (10.34)			
Transactional Quality (TQ)		0.66	0.70	0.88		0.59	0.65	[b]
TQ1 (PE)	0.88 (10.77)				0.88 (10.50)			
TQ2 (FE)	0.74 (8.23)				0.72 (7.90)			
TQ3 (IE)	0.84 (9.94)				0.74 (8.13)			
TQ4 (SE)	0.79 (9.08)				0.73 (7.95)			
Relational Quality		0.71	0.74	0.83		0.66	0.70	[b]
RQ1 (CO)	0.81 (9.42)				0.79 (8.93)			
RQ2 (AD)	0.87 (10.43)				0.83 (9.51)			

ϕ Matrix [c]

	ATM	SQ	SAT	BI	TQ	RQ
ATM		0.88	0.81	0.78	0.50	0.59
SQ	0.88		0.93	0.89	0.58	0.59
SAT	0.81	0.93		0.93	0.52	0.58
BI	0.78	0.89	0.93		0.53	0.57
TQ	0.73	0.78	0.64	0.67		0.97
RQ	0.80	0.78	0.67	0.68	0.99	

Note:

λ = completely standardised loading; AVE = average variance extracted computed as $\Sigma\lambda^2/(\Sigma\lambda^2 + \Sigma\epsilon_j)$;
CR = composite reliability computed as $(\Sigma\lambda)^2/[(\Sigma\lambda)^2 + \Sigma\epsilon_j)]$; α = Cronbach's alpha

[a] Fit statistics for confirmatory factor analysis:

1. Perception Scores: $\chi^2_{(137)} = 219.82$, $p<0.001$; $\chi^2/df = 1.60$; GFI = 0.80; AGFI = 0.72; RMR = 0.054; CFI = 0.96; PNFI = 0.71; NNFI = 0.94; RMSEA = 0.080.
2. Gap Scores: $\chi^2_{(137)} = 222.56$, $p<0.001$; $\chi^2/df = 1.62$; GFI = 0.80; AGFI = 0.73; RMR = 0.062; CFI = 0.95; PNFI = 0.71; NNFI = 0.94; RMSEA = 0.081.

[b] Difference score reliability.

[c] The lower triangle shows correlations for perception scores, and the upper triangle shows correlations for gap scores. All correlations are significant at $p \leq 0.05$.

Table 8.8F: Post-Modification Measurement Results: Exogenous and Endogenous Constructs (Architect sub-sample n=96)

Dimensions & Scale Items	Post-Modification							
	Perception Scores [a1]				Gap Scores [a2]			
	λ (*t*-value)	AVE	CR	α	λ (*t*-value)	AVE	CR	α
Atmosphere (ATM)		0.71	0.74	0.86		0.71	0.74	0.86
ATM1	0.87 (10.05)				0.87 (10.09)			
ATM2	0.84 (9.47)				0.83 (9.42)			
ATM3	0.82 (9.20)				0.82 (9.16)			
Service Quality (SQ)		0.77	0.79	0.90		0.77	0.79	0.90
SQ1	0.92 (11.21)				0.92 (11.21)			
SQ2	0.92 (11.18)				0.92 (11.150			
SQ3	0.79 (8.78)				0.79 (8.81)			
Satisfaction (SAT)		0.85	0.86	0.95		0.85	0.86	0.95
SAT1	0.94 (11.75)				0.94 (11.77)			
SAT2	0.90 (10.78)				0.90 (10.76)			
SAT3	0.93 (11.57)				0.93 (11.56)			
Behavioural Intention (BI)		0.84	0.90	0.96		0.84	0.90	0.96
BI1					Item deleted			
BI2	0.97 (12.48)				0.97 (12.51)			
BI3	0.94 (11.82)				0.94 (11.81)			
BI4	0.87 (10.37)				0.87 (10.35)			
BI5	0.88 (10.50)				0.88 (10.47)			
Transactional Quality (TQ)		0.69	0.73	0.86		0.62	0.67	[b]
TQ1 (PE)	0.84 (9.55)				0.82 (9.03)			
TQ2 (FE)	0.70 (7.44)				0.71 (7.33)			
TQ3 (IE)	0.89 (10.55)				0.83 (9.23)			
TQ4 (SE)	0.89 (10.45)				0.79 (8.50)			
Relational Quality		0.80	0.82	0.85		0.74	0.77	[b]
RQ1 (CO)	0.93 (11.07)				0.84 (9.25)			
RQ2 (AD)	0.86 (9.83)				0.88 (9.83)			

ϕ Matrix [b]

	ATM	SQ	SAT	BI	TQ	RQ
ATM		0.93	0.87	0.81	0.69	0.67
SQ	0.93		0.94	0.84	0.70	0.70
SAT	0.87	0.94		0.78	0.65	0.60
BI	0.81	0.84	0.78		0.58	0.65
TQ	0.82	0.82	0.76	0.69		0.83
RQ	0.76	0.76	0.67	0.72	0.88	

Note:

λ = completely standardised loading; AVE = average variance extracted computed as $\Sigma\lambda^2/(\Sigma\lambda^2 + \Sigma\epsilon_j)$;
CR = composite reliability computed as $(\Sigma\lambda)^2/[(\Sigma\lambda)^2 + \Sigma\epsilon_j)]$; α = Cronbach's alpha

[a] Fit statistics for confirmatory factor analysis:

1. Perception Scores: $\chi^2_{(137)} = 252.95$, $p<0.001$; $\chi^2/df = 1.85$; GFI = 0.78; AGFI = 0.70; RMR = 0.057; CFI = 0.94; PNFI = 0.70; NNFI = 0.92; RMSEA = 0.098.
2. Gap Scores: $\chi^2_{(137)} = 236.12$, $p<0.001$; $\chi^2/df = 1.72$; GFI = 0.79; AGFI = 0.71; RMR = 0.064; CFI = 0.94; PNFI = 0.70; NNFI = 0.93; RMSEA = 0.091.

[b] Difference score reliability.

[c] The lower triangle shows correlations for perception scores, and the upper triangle shows correlations for gap scores. All correlations are significant at $p \leq 0.05$.

8.4.2.2 Measurement Validity

The convergent validity of all exogenous and endogenous constructs was substantiated by the significant factor loadings ($p \leq 0.01$) set out in Tables 8.8D, 8.8E, and 8.8F. Factor loadings range from 0.71 to 0.95 for the combined sample, 0.72 to 0.94 for the government sub-sample, and 0.70 to 0.97 for the architect sub-sample across the perception-only and gap measurement frameworks. As with the first measurement model assessment, three tests of discriminant validity were performed. In the first test, the square of the parameter estimate between two constructs was examined whether it is less than the average variance extracted estimates of the two constructs. As shown in Table 8.8D, 12 out of 15 inter-construct correlations in both the perception and gap measurement frameworks met this criterion. 10 of total 15 inter-construct correlations in the government sub-sample (see Table 8.8E) and over 12 of 15 inter-construct correlations in the architect sub-sample (see Table 8.8F) also met this criterion, suggesting discriminant validity of the scale across samples.

In the second test, the correlation parameter between the two factors was fixed at 1.0 and the chi-square difference on the values obtained for the constrained and unconstrained models was examined. As indicated in Table 8.9, all changes in χ^2 between unconstrained and constrained models except two in the government sub-sample are significant at a 0.01 level.

In the third test of discriminant validity, the confidence interval (± two standard errors) around the correlation between two latent constructs should not include one (Anderson and Gerbing, 1988). All six latent constructs in two measurement frameworks across three sample sizes met this criterion. The results of these tests suggest that the discriminant validity was substantiated.

8.4.2.3 Tests of Factor Structure Invariances Across Sub-Samples

As with the first measurement model assessment, three hypotheses were tested: (a) testing for the validity of a six-factor structure (b) testing for an invariant pattern of factor loadings, and (c) testing for invariant factor variances/covariances. As illustrated in Table 8.10, the differences in the ratio of χ^2/df between the models were not significant. The three hypotheses of invariant number of factors, patterns of

Table 8.9: Summary Results of Tests of Discriminant Validity (Bagozzi and Phillips, 1982)

	χ^2	df	$\Delta\chi^2$ (note)	Detailed Table Ref.
Total Sample				
Perception-based				
Unconstrained Model	309.40	137	----	
Constrained Models	323.52 to 538.08	138	14.12 to 228.68	Appendix
Gap-based				E1
Unconstrained Model	292.05	137	----	
Constrained Models	311.72 to 518.30	138	19.67 to 226.25	
Govt. Sample				
Perception-based				
Unconstrained Model	219.82	137	----	
Constrained Models	219.85 to 344.81	138	0.03 to 124.99	Appendix
Gap-based				E2
Unconstrained Model	222.56	137	----	
Constrained Models	223.10 to 340.82	138	0.54 to 118.26	
Arch. Sample				
Perception-based				
Unconstrained Model	252.95	137	----	
Constrained Models	261.34 to 380.70	138	8.39 to 127.75	Appendix
Gap-based				E3
Unconstrained Model	236.12	137	----	
Constrained Models	244.42 to 364.09	138	8.30 to 127.97	

Note: χ^2 values of 3.84 or greater are significant at the 0.05 level, and χ^2 values of 6.63 or greater at the 0.01 level.

Table 8.10: Tests of Invariances of Exogenous and Endogenous Constructs Across Sub-Samples

Competing Models	χ^2	df	$\Delta\chi^2/\Delta$df (note)	RMSEA	GFI	CFI	NNFI
Perception-Based							
1. Number of Factors Invariant	472.77	274	----	0.089	0.78	0.95	0.93
2. Model 1 with Pattern of Factor Loadings Held Invariant	493.22	293	1.08ns	0.086	0.78	0.95	0.94
3. Model 2 with All Factor Variances and Covariances Held Invariant	530.69	308	1.70ns	0.089	0.77	0.94	0.93
Gap-Based							
1. Number of Factors Invariant	458.68	274	----	0.086	0.79	0.95	0.93
2. Model 1 with Pattern of Factor Loadings Held Invariant	475.2	293	0.87ns	0.082	0.79	0.95	0.94
3. Model 2 with All Factor Variances and Covariances Held Invariant	510.6	308	1.53ns	0.085	0.77	0.94	0.93

Note: Except where noted by "ns" (non-significant), χ^2 value of 3.84 or greater are significant at the 0.05 level, and χ^2 value of 6.63 or greater at the 0.01 level.

loadings, and factor variances/covariances, were considered tenable. Although the results indicate a different picture from Table 8.3 which shows there are significant mean differences in some items, they are not surprising because the use of multi-sample structural equation modelling is to understand patterns of relationship between constructs (or specifically, model differences) across samples, rather than mean difference between individual variables across samples. Based on the invariant factor characteristics between the two samples (i.e., government sub-sample and architect sub-sample), they were combined to form a single group for testing the structural model.

8.5 STRUCTURAL MODEL

After achieving a satisfactory fit in the measurement models, the structural model was then estimated. Prior to estimating the structural model, two relevant issues were addressed: item aggregation and competing models.

8.5.1 Item Aggregation versus Item Disaggregation

Dabholkar et al. (1996) address issues on partial disaggregation, total disaggregation, and total aggregation in their service quality study on retail stores. Total disaggregation uses each item as a separate indicator of the relevant construct whereas total aggregation combines items and uses a composite score (e.g., mean rating) for a construct. Dabholka et al. (1996) point out that total disaggregation suffers from the disadvantages of higher level of random errors of items and estimation of many parameters whereas total aggregation does not offer much advantage over traditional multivariate analysis, except providing fit indexes. Partial disaggregation is a compromise between the two. The three approaches have been used in research (e.g., Aquino, Griffeth, Allen, and Hom (1997), and Lusch and Brown (1996) for using total aggregation; Osterhus (1997) for partial aggregation; Simonin (1997) and Powpaka (1998) for total disaggregation). Given the small number of indicators and the fact that exchange variables had already been collapsed to form six composite scores as in Figure 8.3, further aggregation of scales might obscure the true pattern of score distribution. Anderson and Gerbing (1988) also found that a sample size of 150 is usually sufficient to obtain a converged and proper solutions for models with three or more indicators per factor. This criterion was met in this study with a total sample size of 185. Therefore, the total disaggregation approach was used in testing the structural model.

8.5.2 Competing Models

To provide greater confidence of the hypothesised model in Figure 8.3, the hypothesised model (M_T) was gauged against two other competing models. The hypothesised model was compared to (1) a less constrained model (M_U) in which an extra pathway (i.e., relational quality → satisfaction) was added to the hypothesised model (see Figure 8.4), and then (2) a more constrained model (M_C) in which two paths (i.e., transactional quality → service quality; and relational quality → service quality) were removed from the hypothesised model (see Figure 8.5). The rationale underlying the less constrained model is that relational quality can have a direct and positive effect on client satisfaction. In the customer satisfaction literature, Oliver (1997) mentions that there are satisfaction drivers which lead to customer satisfaction. And these satisfaction drivers (e.g., relationship with service providers) are not related to core services. Core services in terms of resources exchanges are regarded as choice drivers rather than satisfaction drivers. The two-factor theory of customer satisfaction (Maddox, 1981; Swan and Combs, 1976;) suggests that favourable perception on the core service elements (i.e., transactional exchange) will not lead to customer satisfaction, but "no customer dissatisfaction." Only the expressive performance (e.g., quality of relational exchange) will lead to customer satisfaction. The rationale for the more constrained model is that overall atmosphere mediates between all the exchange variables and performance perceptions and long-term relationships (Håkansson, 1982).

The change in Chi-square between the hypothesised model and the constrained model reflects the effect of removing those paths and thus is a test of their significance to the model. If the change in Chi-square is significant, it suggests that the removed paths are important and thus provides support for the hypothesised model. In contrast, a less constrained model is one in which one or more of the parameters constrained (i.e., set to zero) in the hypothesised model are relaxed (i.e., to be estimated). If the difference in the Chi-square of the less constrained and the hypothesised model is not significant, the hypothesised model is a better fit because it is more parsimonious. Anderson and Gerbing (1988) recommend this procedure of nested model comparisons. Comparing the hypothesised model with alternative competing models is widely used by researchers in using structural equation modelling for model testing. (e.g., Bienstock et al., 1997; Wayne, Shore, and Liden, 1997).

Figure 8.4: Less Constrained Model of Business-to-Business Professional Service Quality

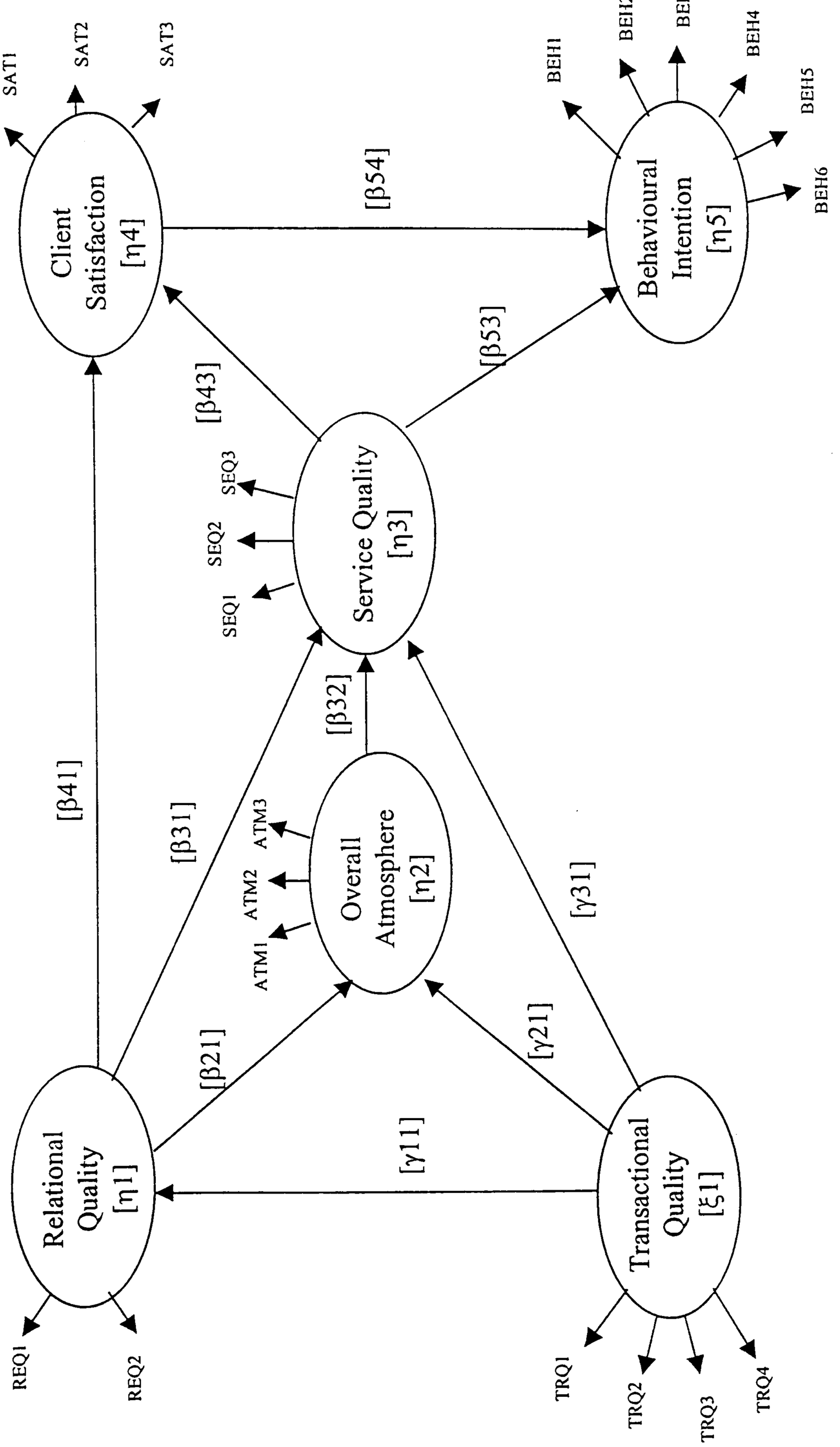
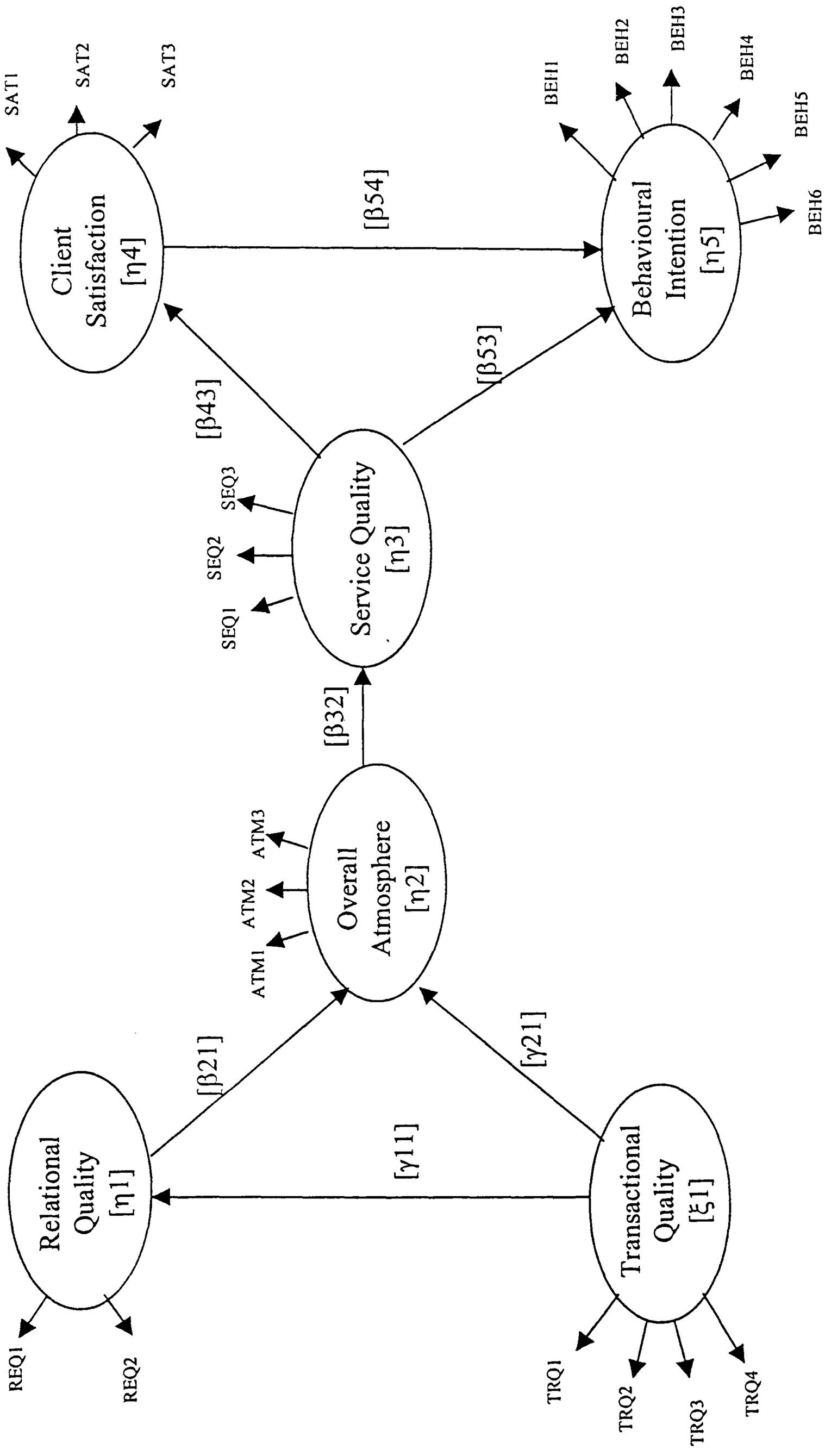


Figure 8.5: More Constrained Model of Business-to-Business Professional Service Quality



The results of nested model comparisons are shown in Table 8.11. Comparing the two measurement versions (i.e., perception-only version and gap version), the gap-based hypothesised model provides a better fit of the data (perception-only version: χ^2 = 316.20, df = 144, $p < 0.001$; gap version: $\chi^2 = 296.44$, df = 144, $p < 0.001$; $\chi^2_{difference} = 19.76$, $p < 0.01$). The results provide support for the gap-based model. This is consistent with certain organisation-based SERVQUAL studies (e.g., Bienstock, Mentzer, and Bird, 1997) and non-consistent with other consumer-based SERVQUAL studies (e.g., Cronin and Taylor, 1992). Therefore, the applicability of the gap-based measurement of service quality is highly context specific whether it is consumer-based service or organisation-based service. In the gap-based measurement version, the hypothesised model outperforms the constrained model as indicated by the Chi-square difference (hypothesised model: $\chi^2 = 296.44$, df = 144, $p < 0.001$; more constrained model: $\chi^2 = 303.48$, df = 146, $p < 0.001$; $\chi^2_{difference} = 3.52$, $p < 0.10$), thus providing moderate support for the hypothesised model (critical value for $\chi^2_{1df} = 3.84$ at $p<0.05$). The non-significant Chi-square difference (hypothesised model: χ^2 = 296.44, df = 144, $p < 0.001$; less constrained model: $\chi^2 = 295.51$, df = 143, $p < 0.001$; $\chi^2_{difference} = 0.93$, $p > 0.10$) when comparing the hypothesised model and the less constrained model also suggests that parsimony is achieved for the hypothesised model. Although the Goodness-of-Fit Index (GFI), Comparative Fit Index (NFI), and Non-Normed Fit Index (NNFI) are comparable across the three models (i.e., hypothesised, constrained, and unconstrained models) in both the perception-based and gap-based measurement frameworks, the Root Mean Square Error of Approximation (RMSEA) of the gap-based hypothesised model falls into a more acceptable value of under 0.08. Overall, the results of the model comparisons provide support for the gap-based hypothesised model.

The gap-based hypothesised model was also applied to the two sub-samples. As indicated in Table 8.12, the perception-based hypothesised model for the government sub-sample did not converge and this further substantiates the relative superiority of the gap-based hypothesised model. Based on the superiority of the gap-based hypothesised model over the perception-based hypothesised model, separate structural models were run for both sub-samples. The results are shown in Table 8.13. The model for the architect sub-sample yielded a good fit to the data. However, the results

Table 8.11: Summary of Specification and Fit Statistics for Nested Models (Combined Sample n=185)

Competing Models	χ^2	Df	$\Delta\chi^2/\Delta df$	RMSEA	GFI	CFI	NNFI
Perception-Based							
Hypothesised Model	316.20	144	----	0.081	0.85	0.95	0.95
Less Constrained Model [(a)]	312.34	143	3.86*	0.080	0.85	0.95	0.95
More Constrained Model [(b)]	321.63	146	2.71**	0.081	0.84	0.95	0.95
Gap-Based							
Hypothesised Model	296.44	144	----	0.076	0.86	0.96	0.95
Less Constrained Model	295.51	143	0.93	0.076	0.86	0.96	0.95
More Constrained Model	303.48	146	3.52**	0.077	0.85	0.95	0.95

[(a)] In comparison to the hypothesised model, less constrained model adds the paths from relational quality to satisfaction.

[(b)] More constrained model constrains the paths from relational quality to service quality, and transactional quality to service quality.

* $p < 0.05$

** $p < 0.10$

Table 8.12: Summary of Fit Statistics for Hypothesised Models across Sub-Samples

	χ^2	Df	$\Delta\chi^2/\Delta df$	RMSEA	GFI	CFI	NNFI
Government Sub-sample							
Perception-based	The data did not converge.						
Gap-based	226.81	144	----	0.078	0.80	0.95	0.94
Architect Sub-sample							
Perception-based	260.31	144	----	0.096	0.78	0.94	0.93
Gap-based	242.50	144	17.81***	0.088	0.79	0.94	0.93

*** $p < 0.01$

Table 8.13: Tests of Gap-based Hypothesised Structural Model across Sub-Samples

Linkages in the Model		Professional Architect (n = 89)		Government Engineer (n = 96)	
		Estimate	t-value [(b)]	Estimate	t-value [(b)]
Exo. → Endo. Constructs					
TQ → SQ	(γ_{31})	0.84	8.08	1.28	0.59ns
TQ → ATM	(γ_{21})	0.43	2.03	-1.44	-0.57ns
TQ → RQ	(γ_{11})	0.02	0.17ns	0.97	10.26
Between Endo. Constructs					
ATM → SQ	(β_{32})	0.83	7.53	0.96	2.69
RQ → SQ	(β_{31})	0.12	0.89ns	-1.21	-0.51ns
RQ → ATM	(β_{21})	0.33	1.53ns	2.01	0.78ns
SQ → SAT	(β_{43})	0.94	13.64	0.93	13.77
SQ → BI	(β_{53})	0.96	3.60	0.16	0.87ns
SAT → BI	(β_{54})	-0.11	-0.42ns	0.79	4.36

Endo. Constructs:	R^2	R^2
RQ	0.70	0.95
ATM	0.53	0.48
SQ	0.88	0.86
SAT	0.88	0.86
BI	0.73	0.88

(c) Fit statistics for path analysis:

Professional Architect: $\chi^2_{(144)} = 242.50$, $p<0.001$; $\chi^2/df = 1.68$; GFI = 0.79; AGFI = 0.72; RMR = 0.11; CFI = 0.94; PNFI = 0.74; NNFI = 0.93; RMSEA = 0.088.

Government Engineer: $\chi^2_{(144)} = 226.81$, $p<0.001$; $\chi^2/df = 1.58$; GFI = 0.80; AGFI = 0.73; RMR = 0.079; CFI = 0.95; PNFI = 0.74; NNFI = 0.94; RMSEA = 0.078.

(b) Except where noted by "ns" (non-significant), t-values of 1.65 or greater are significant at the 0.05 level, and t-values of 1.96 or greater at the 0.01 level.

have to be interpreted with caution given the small sample size. These estimates may not be reliable. The model also fitted the data well in the government sub-sample, though there were certain offending estimates in the structural model. Four out of nine standardised estimates exceeded 1.0. The standard errors associated with these estimated coefficients were excessively large ranging from 1.88 to 2.27 comparing with the estimated coefficients. In structural equation modelling, the standard errors should be small indicating that the values of the free parameters have been estimated accurately (Jöreskog and Sörbom, 1996a). Two contributing factors are in play. The first factor is that as indicated in Appendix E2, the non-significant chi-square difference between unconstrained model and constrained model when TQ and RQ constructs are fixed at 1.0 suggests that the discriminant validity between these two constructs is questionable. The other contributing factor is the small sample size relative to the number of free parameters to be estimated. Given the small sample size and the instability of structural estimates, multi-sample analysis between the government structural model and the architect structural models were not performed. Instead, the gap-based data of two sub-samples were then pooled to perform a path analysis of the hypothesised model and to test the hypotheses set out in Chapter Seven.

8.5.3. Results of Hypotheses Testing

Determination of acceptance or rejection of hypotheses is based on path coefficients and supporting statistics. The standardised estimates for the gap-based hypothesised model paths and the associated t-values are provided in Table 8.14 and also illustrated in Figure 8.6. Direct and indirect effects among the constructs are shown in Table 8.15. The following sections summarise the results of hypotheses testing.

8.5.3.1 Transactional Quality and Service Quality (H1)

H1 predicts that transactional quality derived from product/service exchange, financial exchange, information exchange, and social exchange would be positively related to the overall service quality evaluation in the context of Hong Kong consulting engineering services. Results indicated in Table 8.14 show that the path coefficient is insignificant ($\gamma_{31} = 0.13$, $t = 1.07$), signifying that there is no direct relationship between transactional quality and overall service quality. The rejection of H1 is rather surprising given the fact

Table 8.14: Structural Hypothesised Model (Combined Sample n=185)

Linkages in the Model			Hypothesis		Gap-Based [(a)] Estimate	Gap-Based [(a)] t-value [(b)]
Exo. → Endo. Constructs						
TQ → SQ	(γ_{31})	+	H1	Not Supported	0.13	1.07ns
TQ → ATM	(γ_{21})	+	H2	Not Supported	-0.01	-0.05ns
TQ → RQ	(γ_{11})	+	H5	Supported	0.88	11.93
Between Endo. Constructs						
ATM → SQ	(β_{32})	+			0.82	11.53
RQ → SQ	(β_{31})	+	H3	Not Supported	0.02	0.16ns
RQ → ATM	(β_{21})	+	H4	Supported	0.65	2.93
SQ → SAT	(β_{43})	+	H6a	Supported	0.93	19.42
SQ → BI	(β_{53})	+	H6b	Supported	0.55	3.32
SAT → BI	(β_{54})	+	H7	Supported	0.32	1.98

Endo. Constructs:	R^2
RQ	0.77
ATM	0.41
SQ	0.85
SAT	0.87
BI	0.74

(a) Fit statistics for path analysis: $\chi^2_{(144)} = 296.44$, $p<0.001$; $\chi^2/df = 2.06$; GFI = 0.86; AGFI = 0.81; RMR = 0.061; CFI = 0.96; PNFI = 0.77; NNFI = 0.95; RMSEA = 0.076.

(b) Except where noted by "ns" (non-significant), t-values of 1.65 or greater are significant at the 0.05 level, and t-values of 1.96 or greater at the 0.01 level.

Figure 8.6: Theoretical Model with Completely Standardised Parameters

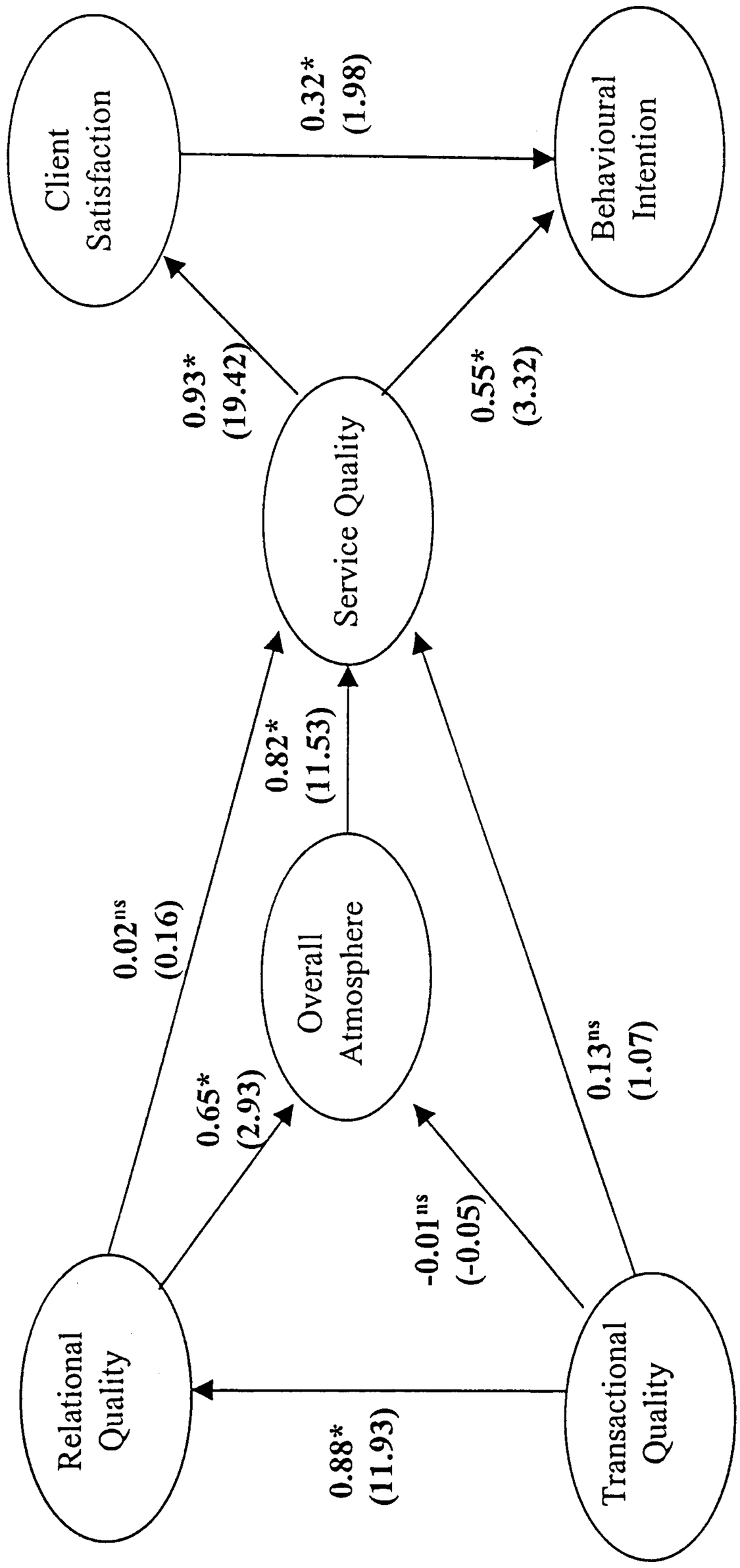


Table 8.15: Standardised Direct, Indirect, and Total Effects [a]

Constructs	Direct Effects (1)	Indirect Effects (2)	Total Effects (1) + (3)
Effects on Atmosphere			
Transactional Quality	-0.01 (-0.05)	0.57 (2.86)	0.56 (7.26)
Relational Quality	0.65 (2.93)	----	0.65 (2.93)
Effects on Service Quality			
Transactional Quality	0.13 (1.07)	0.48 (3.75)	0.61 (8.60)
Relational Quality	0.02 (0.16)	0.53 (2.82)	0.55 (2.78)
Atmosphere	0.82 (11.53)	----	0.82 (11.53)
Effects on Behavioural Intention			
Service Quality	0.55 (3.32)	0.30 (1.98)	0.85 (15.89)
Satisfaction	0.32 (1.98)	----	0.32 (1.98)

[a] t-values are in parentheses. t-values of 1.65 or greater are significant at the 0.05 level, and t-values of 1.96 or greater at the 0.01 level.

that, in the existing literature, there is wide support that core resources exchange (e.g., reliable service) is one of the critical elements in the overall service quality (e.g., Grönroos, 1984; Parasuraman, Zeithaml, and Berry, 1988). It can be explained that, in the context of Hong Kong consulting engineering services, clients do not evaluate service quality simply based on transactional exchange. To a certain extent, professional service in general and business-to-business professional service in particular contains a high degree of credence properties and clients may not be able to assess core service elements.

Although there is no direct relationship between transactional quality and overall service quality, the total indirect effect is significant (0.48, t = 3.75). The main indirect effect can be analysed through relational quality and then overall atmosphere (γ_{11} x β_{21} x β_{32} = 0.88 x 0.65 x 0.82 = 0.47). Therefore, transactional quality can be perceived as a catalyst for relational exchange.

8.5.3.2 Relational Quality and Service Quality (H3)

H3 predicts that relational quality, embracing cooperation and adaptation, is positively related to the overall service quality evaluation in the context of Hong Kong consulting engineering services. The direct path coefficient shown in Table 8.14 is insignificant (γ_{31} = 0.02, t = 0.16). Similar to the rejection of H1, the lack of direct relationship between relational quality and overall service quality is also surprising in the sense that the rejection of both H1 and H3 is inconsistent with what has been proposed in the service quality literature. In the existing service quality literature, many studies have been done on consumer services and the results of these studies suggest that both technical quality (what is delivered) and functional quality (how the service is delivered) impact on service quality evaluation. However, for business-to-business professional service, the nature, frequency, and duration of interactions between client and professional service providers are entirely different, suggesting that other variables are mediating the influence of resource/relational exchanges and service quality perceptions. The basis for such a proposition is similar to the model proposed by Grönroos (1984) in which the image quality mediates the influence of technical quality/functional quality on the ultimate perceived service quality (see Figure 2.1). The

main mediating effect in the study can be also analysed through the atmosphere variable which will be further discussed in the following section.

8.5.3.3 Mediating Effect of Atmosphere (H2 and H4)

H2 predicts that, in the context of Hong Kong consulting engineering services, the influence of transactional quality on the overall service quality evaluation is mediated by the overall atmosphere whereas H4 predicts that the influence of relational quality on the overall service quality evaluation is also mediated by the overall atmosphere. The role of atmosphere has become important after the rejection of H1 and H3 when transactional quality and relational quality were found to have no direct relationship with overall service quality. As shown in Table 8.14, the path linking transactional quality and atmosphere (γ_{21} = -0.01, t = -0.05) is insignificant although the path linking atmosphere and overall service quality is significant (β_{32} = 0.82, t = 11.53). The total effect (γ_{21} x β_{32}) is non-significant, suggesting that H2 is not supported.

Also indicated in Table 8.14, the path linking relational quality and overall atmosphere (β_{21} = 0.65, t = 2.93) and the path linking atmosphere and service quality (β_{32} = 0.82, t = 11.53) are both significant, providing strong support for H4. In addition, both transactional quality and relational quality explain 41 per cent of the variance in atmosphere. The acceptance of H4 and the rejection of H2 signify the fact that transactional quality is derived from routine exchange episodes and these exchange episodes help build up relational exchange and favourable working atmosphere.

8.5.3.4 Transactional Quality and Relational Quality (H5)

H5 predicts that transactional quality is positively related to relational quality in the context of Hong Kong consulting engineering services. This hypothesis is strongly supported by the significant path coefficient (γ_{11} = 0.88, t = 11.93), with transactional quality explaining 77 per cent of the variance in relational quality. It suggests that management of transactional quality is important to the formation of relational quality perception. This is consistent with the IMP literature that resource exchange through routine service/product exchange, information exchange, financial exchange, and social exchange creates a platform for mutual cooperation and commitment to adaptation.

Transactional quality acts as a hygiene factor. Without it, relational quality alone will not translate into overall service quality.

8.5.3.5 Service Quality, Satisfaction, and Behavioural Intention (H6a and 6b)

H6 predicts that in the context of Hong Kong consulting engineering services, overall service quality evaluation is positively related to both (a) client satisfaction and (b) client behavioural intention. These two hypotheses were strongly supported (for satisfaction: $\beta_{43} = 0.93$, $t = 19.42$; for behavioural intention: $\beta_{53} = 0.55$, $t = 3.32$). In terms of R^2 shown in Table 8.14, service quality explains 87 per cent of the variance in satisfaction whereas both service quality and satisfaction explain 74 per cent of the variance in behavioural intention. Although the path coefficient between service quality and satisfaction is very high, these two constructs are not synonymous judging from the discriminant validity evidence. These results complement past research and are consistent with the service quality→satisfaction and service quality→behavioural intention propositions.

8.5.3.6 Satisfaction and Behavioural Intention (H7)

H7 predicts that client satisfaction is positively related to client behavioural intention in the context of Hong Kong consulting engineering services. This hypothesis is supported by the significant path between satisfaction and behavioural intention ($\beta_{54} = 0.32$, $t = 1.98$). Comparing the direct effect of satisfaction on behavioural intention, service quality ($\beta_{53} = 0.55$, $t = 3.32$) has a stronger influence on behavioural intention than satisfaction. Actually, this findings is not too surprising. This can be revealed from the clients' responses to the questionnaire that there are other factors (e.g., weather and government policy change) which may affect the performance of consulting engineers and these factors are however beyond their control. Even though clients are dissatisfied to some extent, they perceive consulting engineers to have high service quality. Therefore, service quality may have a greater influence on reappointment intention than client satisfaction.

In summary, the hypotheses testing provided support for H4 (relational quality→atmosphere→service quality), H5 (transactional quality→relational quality), H6a (service quality→satisfaction), H6b (service quality→behavioural intention), and

H7 (satisfaction→behavioural intention). But H1 (transactional quality→service quality), H2 (relational quality→atmosphere→service quality), and H3 (relational quality→service quality) were not supported.

8.6 CHAPTER REVIEW

This chapter detailed the approach of data analysis from the inception of data screening through the process of estimating two measurement models and a structural model. Although two categories of sample were involved, they were considered to be homogenous in terms of factor structure, loadings, and factor variances/covariances and were then pooled to form a single sample for estimating the structural model. The results of structural equating modelling suggest that in the context of Hong Kong consulting engineering services, the gap-based hypothesised model outperforms the perception-based hypothesised model on the basis of relative model fit. In terms of hypotheses testing, four hypotheses were supported and three hypotheses were rejected. In the next chapter, the theoretical and managerial implications of the results will be addressed, followed by a discussion of study limitations and suggestions for further research.

CHAPTER NINE:
DISCUSSION, IMPLICATIONS, AND CONCLUSIONS

9.1 INTRODUCTION

The previous chapter detailed the data analysis procedures and results. This chapter will conclude this research study with further thoughts and reflections on the findings and is organised into five main parts. The first part reiterates the research objectives and summarises the empirical findings in the light of these research objectives. The second and third parts present possible model extension and managerial implications respectively. The fourth part highlights limitations of the study. The last part sets out the directions for future research before drawing conclusions from this study.

9.2. SUMMARY OF EMPIRICAL FINDINGS

This study attempts to explore service quality measurement in a business-to-business professional service setting (i.e., consulting engineering services). This extends the domain of service quality research beyond consumer services and consumer professional services and represents an important step in the progression of service quality theory development. In recent decade, there has been a proliferation of service quality studies. But most of them are related to consumer services and consumer professional services. Relevant studies on business-to-business professional service quality are however limited. Bienstock et al. (1997) also suggest that conducting service quality research in the context of another industry (i.e., business-to-business professional service in this study) will help facilitate the discovery of limitations and foster legitimate extensions of the theoretical development of service quality. Therefore, this study's primary concern is with the conceptualisation and measurement of business-to-business professional service quality.

Building on the growing debate about the conceptualisation and measurement of service quality, inter-linking concepts between service quality and customer satisfaction, and possible incorporation of relational elements in understanding business-to-business professional service quality, three core research questions were specified: (1) to compare

the robustness of the current two measurement approaches of service quality in a business-to-business professional service setting; (2) to investigate the relationship between service quality and service satisfaction; (3) to assess the feasibility of incorporating relational elements underlying the IMP interaction model in conceptualising and measuring business-to-business professional service quality.

An integration of service quality models with the IMP interaction model to conceptualise business-to-business professional service quality is consistent with the IMP literature that the interaction model is relevant in particular to the marketing of business-to-business professional services (Yorke, 1990) and is in tune with the service quality literature for applying exchange theory to the management and measurement of service quality (e.g., Glynn and Lehtinen, 1995; Patterson, 1995). Of the two measurement approaches, the gap-based approach achieved better model fit than the perception-only approach across both the measurement model and the structural model. Using the gap-based measurement approach, the theoretical model outperformed both the constrained and unconstrained models. The fit indexes of the theoretical model were within acceptable ranges. Of the seven hypotheses put forward in Chapter Seven, three of them were not supported. The results highlight the point that traditional service quality models (e.g., process/outcome model and functional/technical model) may not be able to explain business-to-business professional service quality as evidenced by the lack of direct influence of exchange variables on the overall service quality evaluation. This suggests that using the IMP interaction model to conceptualise business-to-business professional service quality can enrich the understanding of the long-term relationship between organisational clients and professional service providers, and the impact of atmosphere on service quality evaluation. The following sections will summarise the research findings and outline some of the possible reasons for the rejection of these hypotheses.

9.2.1 Gap-based versus Perception-only Measurement Approaches

Responding to the growing debate about measurement of service quality, the first research question that is to be answered is about the relative superiority between gap-based measurement approach and perception-only measurement approach. In

conceptualising service quality in general and business-to-business professional service quality in particular, there is wider support to define service quality as a comparison between customers' expectations and their perceptions of actual performance (Grönroos, 1984; Parasuraman et al., 1985; Reeves and Bednar, 1994). However, the SERVQUAL instrument based on this conceptualisation in measuring service quality is under severe criticism as already indicated in Chapter Two when, for example, questionnaire length (e.g., Carman, 1990) and scale reliability (e.g., Brown et al., 1993) are taken into consideration.

Although some researchers question the usefulness of expectation and pinpoint the ambiguity of the term "customer expectation" (e.g., Cronin and Taylor, 1992, 1994; Teas, 1993a, 1993b), the empirical results confirming the function of expectations in forming service quality judgment are contradictory. For example, Parasuraman et al. (1988, 1991a) support the gap-based (P-E) measurement framework in their SERVQUAL studies. On the contrary, Cronin and Taylor (1992) support the perception-only measurement framework after having empirically tested the two measurement approaches. They conclude that:

> The performance-based scale developed (SERVPERF) is efficient in comparison with the SERVQUAL scale; it reduces by 50% the number of items that must be measured (44 items to 22 items). The analysis of the structural models also supports the theoretical superiority of the SERVPERF scale; only the model that uses the SERVPERF scale consistently confirmed. (p.64)

However, the above studies do not examine business-to-business professional service quality. As indicated in Chapter Two (see Table 2.5), the results of some studies suggest that the gap approach outperforms the P-only approach in high involvement services, in particular business-to-business services (e.g., Bienstock et al., 1997; Durvasula et al., 1999). The P-only approach works better in the context of low involvement or consumer services (e.g., Brown et al., 1993; Cronin and Taylor, 1992). This study bridged the gap in the existing literature by comparing both measurement approaches in terms of examining

relative model fits in both measurement model and structural model using structural equation modeling in a business-to-business professional service setting. In the context of Hong Kong consulting engineering services, the results of the study support the gap-based measurement framework in terms of relative model fit. The results are consistent with another business-to-business study on physical distribution service quality by Bienstock et al. (1997) who found that the gap-based approach has better model fits than the perception-only approach. In another study by Lee and Kettinger (1996) (requoted in Kettinger and Lee (1997)), they however found that there is only minor improvement in model fit in the SERVPERF instrument over the SERVQUAL instrument when applied in an information system environment.

Parasuraman et al. (1994) reiterate the benefits of gap-based measurement approach in that it provides managers with richer information and diagnostic power than the perception-only measurement approach. They admit the superiority of the perception-only scale over the gap-based scale and yet point out that:

> An important question to ask in assessing the practical value of SERVQUAL vis-à-vis SERVPERF is, Are managers who use SQ measurements more interested in accurately identifying service shortfalls or explaining variance in an overall measure of perceived service? (Explained variance is the only criterion on which SERVPERF performs better than SERVQUAL, and, as discussed previously, this could be due to shared method variance.) We believe that managers would be more interested in an accurate diagnosis of SQ problem. From a practical standpoint, SERVQUAL is preferable to SERVPERF in our judgment. The superior diagnostic value of SERVQUAL more than offsets the loss in predictive power. (p.116)

Based on the arguments put forward in the existing literature and the findings of this study, a gap-based measurement approach seems to be more consistent with the theoretical conceptualisation of service quality and more superior than the perception-based measurement approach when empirically tested in the context of consulting

engineering services in Hong Kong. Most important of all, it provides more diagnostic information to managers of business-to-business professional service firms.

9.2.2 Transactional Quality, Relational Quality, and Service Quality

Traditional service quality models (e.g., process/outcome model and functional/technical model) suggest that what is delivered and how the service is delivered directly impact on the overall service quality evaluation. However, the findings of the study do not support a direct relationship between transactional quality and service quality, nor the direct relationship between relational quality and service quality in the context of Hong Kong consulting engineering services. The rejection of these two hypotheses is rather surprising. In the existing service quality literature, transactional quality in terms of discrete exchanges (e.g., service and product exchange) has direct impact on service quality (e.g., Dwyer et al., 1987; Glynn and Lehtinen, 1995). The findings by Grönroos (1984) also suggest that technical quality of what is being delivered by service providers is a prerequisite for favourable service quality evaluation. Although the direct effects between transactional quality and service quality, and between relational quality and service quality, were not observed in the current study of consulting engineering services, one interesting point can be noted about the mediating effect of relational quality and overall atmosphere on the overall service quality evaluation. One possible explanation about the lack of direct linkages between transactional quality and service quality lies in the nature of service setting. Services, in general, can be categorised into three types: consumer services (e.g., retail banking services), consumer professional services (e.g., dental services), and business-to-business professional services (e.g., management consulting services). For the consumer services, it has been widely studied and found that outcome/technical quality in terms of service reliability is more important than process/interactive quality (e.g., Parasuraman et al., 1988) in particular for continuously provided services (e.g., utility services) unless there is service breakdown. For the consumer professional services, interaction and relationship with professional service providers play a more important part in the overall service quality evaluation than consumer services because of a higher degree of credence elements in the services. Consumers may not be able to assess the outcome of service delivery for these kinds of

services. Therefore, process/interactive quality forms an important constituent to consumer professional service quality.

But for the business-to-business professional services, the service delivery is rather formal and the involvement from both parties is high relative to consumer services and consumer professional services because of the technical complexity of the subject matter and the risk involved. The duration of service delivery can span across a long period of time, providing ample opportunity for both parties to interact and thus to build up a long term relationship. The interactive elements of business-to-business professional services become more critical than those in consumer professional services. Favourable transactional quality will become a pre-requisite to relational quality which in turn helps build up an atmosphere between the parties with close relationship and mutual expectations. This may be a possible explanation that either transactional quality alone or relational quality alone does not have any direct influence on service quality but is a catalyst for the overall relationship building exercise. This point will be further discussed in terms of managerial implications set out in Section 9.4 of this chapter

As mentioned earlier, there is intrinsic difficulty for clients to evaluate complex business-to-business professional services that are very high in credence properties. Therefore, the other possible explanation emerges. Clients may judge the service quality of professionals based on the distance of relationship and overall working atmosphere. A failure in delivering transactional quality may be forgiven up to a certain extent if the intimate relationship is strongly held. In particular, the failure in delivering transactional quality may be due to factors which are outside the control of the professionals. This is especially true for a client-professional relationship which has been built up and maintained for a long period of time. Their mutual expectations have already been agreed upon about nature of the task and responsibilities between the parties. In that sense, providing that the overall atmosphere surrounding the working relationship is favourable, the direct linkages between transactional quality and overall service quality may not necessarily be observed.

9.2.3 Service Quality, Satisfaction, and Behavioural Intention

In the existing services marketing literature, a great deal of discussion has occurred regarding the conceptual similarities and differences between service quality and service satisfaction, and the appropriate causal relationships between them with regard to their individual effects on behavioural intentions. Conceptually, the two constructs have been discussed in terms of the form of judgment, use of comparison standards, and direction of relationship in Chapter Two. But most of the discussions have been centred on consumer services and consumer professional services. Few empirical studies have been undertaken to confirm the relationships among service quality, satisfaction, and behavioural intention in a business-to-business professional service setting. One contribution that this study makes is to confirm empirically the direction of relationship between service quality and service satisfaction in the context of consulting engineering services. Based on the evidence of discriminant validity, the findings tie in the current conceptualisation that service quality and satisfaction are not synonymous (Bitner, 1991; Crompton and Mackay, 1989; Oliver, 1993: Parasuraman et al., 1988) when examined in the context of Hong Kong consulting engineering services.

A further contribution of this study is to examine the causal relationship between service quality and service satisfaction. Unlike Cronin and Talyor's (1992) study which modelled a non-recursive ("two-way") relationship between service quality and service satisfaction, a recursive relationship was proposed because this "one-way" linkage has been advocated or substantiated in many consumer service industries (e.g., Bolton and Drew, 1991a; Oliver, 1993; Parasuraman et al., 1994). The findings of this study support the hypotheses that in the context of Hong Kong consulting engineering service, service quality is positively related to both satisfaction and behavioural intention. The hypothesis that satisfaction is positively related to behavioural intention is also supported. The relationships among these constructs are consistent with the existing literature in that service satisfaction is superordinate to service quality. However, it is important to note that a higher level of service quality may not necessarily be associated with a higher level of service satisfaction. This issue will be further examined later in terms of managerial implications in Section 9.4. Comparing the direct effect on behavioural intention, the

direct effect of service quality towards behavioural intention is stronger than the direct effect between satisfaction and behavioural intention.

9.3 MODEL EXTENSION

Based on the results of confirmatory factors analyses and a path analysis, the study supports the usefulness of the IMP interaction model in conceptualising and measuring business-to-business professional service. However, the application of that framework is incomplete. The results of the study indicate that positive transactional quality leads to positive relational quality, and the positive atmosphere mediates the relationship between relational quality and overall service quality. A high degree of unexplained variance in the construct of atmosphere suggests that additional factors which may influence overall atmosphere have not been accounted for in the study. It would be worth investigating other determinants of atmosphere and extending the existing theoretical model. In the IMP interaction model, the interaction between buyer and seller cannot be analysed in isolation, but must be considered in a wider context. There are macro-environmental factors that could influence or moderate the overall working atmosphere. These factors include forms of market structure, degree of dynamism, state of internationalisation, position in the manufacturing channel, and the social system. Forms of market structure and degree of dynamism are particularly important to the procuring and marketing of business-to-business professional services in a national context. For example, for a professional service firm surviving in a highly competitive market structure, it requires a great deal of effort to cement client relationships. In addition, in a rather dynamic industry characterised by rapid technology advancement, commitment to technical adaptation is stronger and provides more opportunities for information exchange and social exchange. Extent of internationalisation and the social system may be relevant for delivering business-to-business professional service in an international context when the language and international business practices are divergent.

9.4 MANAGERIAL IMPLICATIONS

The findings underlying the theoretical model appear to have practical implications to business-to-business professional service providers. Firstly, managers of consulting

engineering service providers need to be aware of clients' expectations in forming service quality evaluation as indicated by the relative superiority of the gap-based measurement approach. From a managerial perspective, this entirely tunes in to the advocacy by Parasuraman et al. (1994) that the gap-based measurement approach provides richer information and diagnostic power than the perception-only measurement approach to identify service shortfalls. Therefore, clients' expectations become one of the critical components in the overall service quality management. This is especially important for consulting engineering services which are mostly contracted on a project-to-project basis, and the client's power is evident in the expendability of the service provider. To better manage clients' expectations, managers also need to structure their communication strategies by not under-promising and/or over-delivering the services. Pitt and Jeantrout (1994) point out that clients' expectations are learned, partly, from experience, and the act of over-delivering will increase expectations for the next service encounter. It is probably easier, and better practice in the long run, for service providers to deliver exactly what they promise every time. Balancing under-promising and over-delivering the services requires an understanding of mutual expectations at the outset of service delivery and an constant stream of information flow.

Secondly, this is one of the few studies to incorporate the IMP interaction model to service quality models and to demonstrate empirically the interplay of transactional quality and relational quality in forming overall service quality evaluation through the mediating effect of atmosphere. Managers of consulting engineering service providers need to be aware that transactional quality alone will not lead to service quality evaluation. This is analogous to the well-known Herzberg's two-factor theory (Herzberg, Mausner, and Snyderman, 1959). Transactional quality through exchange of services, information, financial resources, and social aspects represents the core offering which can be homogenous in a competitive consulting engineering service industry. A favourable transactional quality does not necessarily lead to favourable service quality, but "no unfavourable" service quality. Therefore, transactional quality can be regarded as a hygiene factor. What makes a particular consulting engineering firm stand out is relational quality and positive overall atmosphere through mutual cooperation, long-term

commitment to adaptation, and intimate working relationship. In this regard, relational quality is the motivator. The direction and magnitude of relational quality hinge entirely on the devotion to the maintenance of client relationship. Therefore, practices to build up relational quality can be highly heterogeneous among professional service firms.

The final implication relates to the strong links among service quality, satisfaction, and behavioural intention (explaining more than 70% of the variance). This is consistent with Patterson, Johnson, and Spreng's (1997) study of customer satisfaction in a business-to-business professional service setting in that a strong link between satisfaction and repurchase intentions was found. Cronin and Taylor (1992) make a remark to the importance of distinguishing the relationship between service quality and satisfaction. They consider that:

> This distinction is important to managers and researchers alike because service providers need to know whether their objective should be to have customers who are "satisfied" with their performance or to deliver the maximum level of "perceived service quality." (p. 56)

In other words, having favourable service quality evaluation does not necessarily produce satisfied customers. The same analogy applies in this study of consulting engineering services. What concerns managers most is whether clients will bring repeated business to their firms in the long term. In this study of consulting engineering services, service quality has a stronger influence on behavioural intention than satisfaction. Therefore, managers of professional firms are required to deliver the maximum level of perceived service quality, rather than maximum level of satisfaction. If Grönroos' (1993) conceptualisation of the difference between service quality and satisfaction is upheld, it can be relatively easier to deliver higher level of perceived service quality than satisfaction level because satisfaction judgment include evaluation of non-quality related dimensions which can be beyond the control of consulting engineering service providers (e.g., weather, abrupt change in government control and market conditions). Therefore, the implication to consulting engineering service providers is to maximise service quality, rather than satisfaction, in order to gain repeated business.

9.5 LIMITATIONS OF THE STUDY

Although the study results have theoretical and substantive explanations, some caution should be taken because of the limitations of the study. Although these limitations are consistent with the previous service quality studies and do not compromise the integrity of the research, they do put some bounds on the generalisability of the results.

Firstly, because the study involved only one business-to-business professional service (i.e., Hong Kong consulting engineering service), the results of the study may not be able to be generalised to the other business-to-business industries (e.g., legal services and management consultancy). As mentioned in Chapter Two, Gummesson (1991) considers that the relationship factor is of particular significance in certain people-oriented industries. Therefore, clients of different types of business-to-business professional services may have different perceptions about the relative importance between transactional quality and relationship quality. In Chapter Five, it is clearly stated that relationship quality matters most when: (1) the service is complex and delivered over a continuous stream of transactions; (2) many buyers are relatively unsophisticated about the service; and (3) the environment is dynamic and uncertain in terms of demand and supply (Crosby et al., 1990). Therefore, the formation of expectations and perceptions of actual performance on the various IMP dimensions may also be different. The directions and magnitudes of relationships among transactional quality, relationship quality, working atmosphere, and overall service quality should be different dependent on the nature of business-to-business professional service. Therefore, there is a need to replicate the model in different service contexts.

Secondly, though the empirical evidence is consistent with some of the hypothesised relationships among variables, the cross-sectional nature of the data cannot be used to establish such relationships over time, in particular, when the relationships of these variables allow simultaneous causality. This is particularly true for consulting engineering service when the service involves an extended period of consumption. For example, relational quality over time may impact transactional quality during the service exchange process. As mentioned in Chapter Four, although the IMP researchers explicitly

incorporated the "time" dimension in the interaction approach, establishing the relationships among the variables in this study over time must be interpreted with some caution.

The third limitation is about the operationalisation of the relationship quality construct. The operationalisation of the relationship quality construct in this study was in line with the IMP literature. Relationship quality is regarded as a higher-order construct of cooperation and adaptation. From a substantive perspective, such an operationalisation is considered more appropriate as far as the nature of consulting engineering service is concerned. The use of cooperation and adaptation as a proxy of relationship quality is also consistent with the existing relationship quality literature in that the concepts of trust, conflict, and commitment as suggested by Kumar et al. (1995) and Dorsch et al. (1998) were synthesised. However, other dimensions of relationship quality mentioned in Chapter Five were excluded from this study as they were not rigorously examined in other relationship quality studies. These dimensions include opportunism and ethical profile (Dorsch et al., 1998), power and profit (Naudé and Buttle, 2000), and switching costs (Page et al., 1997) Therefore, the results of this study regarding the reliability and validity of the relationship quality construct may not be comparable with the other relationship quality studies.

Another limitation of this study is about the selection of interviewees for qualitative study before the main survey. In the client and consultant interviews, all interviewees were involved in the technical aspects of the projects. In the main survey, it was found that, on average, there are seven people involved in evaluating the performance of consulting engineers. There may be a possibility that, other than engineers, staff with non-technical background (e.g., financial controller and cost analyst) are involved in evaluating the performance of consulting engineers although they may not have a complete picture about how consulting engineers perform. This point was not observed when planning the qualitative study because the purpose of conducting interviews is not to generalise findings across samples but to develop hypotheses for future testing (Sashittal and Tankersley, 1997).

A final limitation is the small sample size. Although there is suggestion in the structural equation modelling literature that the minimum sample size should be over 100, or at least a ratio of sample size to estimated parameters be between 5:1 and 10:1, some researchers comment that structural equation modelling is very much a large sample technique (e.g., Kelloway, 1998). In that sense, both the estimation methods (e.g., maximum likelihood) and tests of model fit (e.g., the χ^2 test) are based on the assumption of large samples (e.g., at least 200 observations). Schumacker and Lomax (1996), after examining published research, found that many articles used from 250 to 500 subjects. Comparing the sample size (i.e., 187 subjects in total) used in this study with the average, it is considered to be relatively small. However, as far as the business-to-business nature of the study is concerned, a sample size of less than 200 is commonplace (e.g., Bello and Gilliland, 1997; Patterson et al., 1997). The greater the sample size (i.e., from 200 to 400), the better would be the result. As far as the current study is concerned, the results are fairly robust judging from the model fit indices and evidence of measurement reliability and validity.

Data limitation also raises another issue in the use of matrix input for structural equating modelling. As pointed out in Chapter Seven, Jöreskog and Sörbom (1996a, 1996b) argue to use matrix of polychoric correlations and the corresponding asymptotic covariance matrix for estimating parameters when ordinal rating scales are used. Having considered the relatively small sample size, Pearson product-moment correlations matrices were used instead. It would be better if both types of matrices could be obtained and the relative model fit indexes could be compared.

9.6 DIRECTIONS FOR FUTURE RESEARCH

Like many exploratory studies, the research results of this study clarify some relationships. But they also raise new questions and suggest several opportunities for further research. Suggestions for further research are set out in the following directions: (a) model generalisation across industries, (b) influence of time on the model, (c) other gap-based measurement approaches, and (d) concept of "buying centre" in business-to-business professional services.

9.6.1 Model Generalisability

The derived model seems able to be generalised in a range of business-to-business professional services characterised by a higher degree of technical complexity (e.g., architectural consultancy and information technology consultancy). These types of professional services require frequent and substantive exchange of services, financial resources, information, and social interaction, thus creating more opportunities for cooperation and adaptation. But applying the model to other business-to-business professional service contexts with lower degree of technical complexity (e.g., management consultancy and legal services) would test its generalisability.

9.6.2 Longitudinal Study

Because the goal of this study was to develop a hybrid model based on the existing gap model and the IMP interaction model and to test its robustness in the context of Hong Kong consulting engineering service, a cross-sectional sample was used. The results supported four of the seven hypotheses underlying the hybrid model. Bolton and Drew (1991b) confirm the importance of longitudinal analyses in examining the impact of service changes on customer attitudes in continuously provided services (e.g., telephone services). Longitudinal studies on business-to-business professional service quality can also yield fruitful results in the sense that most business-to-business professional services are essentially processes with an extended "consumption" period. Time is an important variable. Future work is needed to make use of longitudinal rather than cross-sectional studies to examine the effects of shifts in transactional quality, relational quality, and overall atmosphere over time and their combined effects on service quality, client satisfaction, and behavioural intention.

9.6.3 Comparison of Other Disconfirmation-Based Measurement Approaches

Unlike continuously provided consumer services (e.g., retail banking and telephone services), most of the business-to-business professional services are complex and divergent. Clients rely heavily on prior expectations in the form that are set out in the agreed contract or project brief and they base their service quality evaluation on a comparison of expectations and their perceptions of actual performance. Given the results

of the study that support a gap-based measurement approach, further research is needed to compare different gap-based measurement approaches, in particular the inferred disconfirmation-based (P-E gap used in the study) and direct disconfirmation-based (e.g., "better-than-expected" or "exceed my expectation") measurement approaches. It is not an issue to use better/worse-than-expected type of scale to measure global quality because overall satisfaction and global quality take on similar properties. However, caution has to be taken because this practice to use better/worse-than-expected scales as proxies for quality measures for individual dimensions can be confounded with satisfaction measures. Other possibilities have to be explored to incorporate the normative expectation standard into direct measurement practice.

Apart from inferred and direct measurement approaches, the other research opportunity is to apply the zone of tolerance concept mentioned in Chapter Two to measure business-to-business professional service quality. The measurement of dual-levelled expectations (i.e., desired level and minimum tolerable level), as Parasuraman (1995) suggests, is not only empirically feasible, but also provides more valuable diagnostic information to professional service providers to understand how well they are meeting clients' minimum requirements, and how much improvement is needed before they can achieve service superiority. Although researching the zone of tolerance concept in business-to-business professional service quality is a promising area, the selection of industry is critical, given the relatively low response rate of mail surveys in organisational studies.

9.6.4 Concept of "Buying Centre" in Business-to-Business Professional Service

In the markets of consumer services, professional consumer services, and business-to-business professional services, the buying behavioural patterns among the three service categories can be very different in terms of the number of people involved in making buying decision. The concept of buying centre proposed by Webster and Wind (1972) may be more important in a business-to-business professional service setting, than in a consumer service or professional consumer service setting. This can be illustrated in Table 8.1 of Chapter Eight that on average, there are seven persons involved in evaluating the performance of consulting engineering firms. In the study, only respondents from the

technical disciplines (e.g., technical directors and chief engineers) were surveyed. Other members in the buying centre (e.g., financial controllers) can have different perspectives on the quality perceptions of consulting engineers. In addition, the variables in the theoretical model may behave differently in different buying situations (i.e., new task, modified rebuy, and straight rebuy situations proposed by Robinson et al. (1967)). For example, in a new task buying situation, transactional quality may be more important than relational quality because clients do not have any previous experience in service exchange. Future research is required to examine the theoretical model from the perspective of different buying roles and in different buying situations.

9.7 CONCLUSIONS

In this study, it is considered that a significant gap has been bridged in the understanding of business-to-business professional service quality in the context of Hong Kong consulting engineering service. The results have demonstrated that overall atmosphere acts as a mediator between various exchange episodes underlying the IMP interaction model and service quality. The results of the study have also highlighted the importance of transactional quality to the establishment of relational quality and the stronger linkage between service quality and behavioural intention than between satisfaction and behavioural intention. The study also supports a gap-based measurement approach, rather than a perception-based approach for relative model fit. The gap-based approach provides more diagnostic information to practitioners in business-to-business professional service firms. However, further research is needed to extend the model by incorporating environmental factors which may impact overall working atmosphere between clients and professional service providers. Examining the different buying roles and buying situations is also an additional avenue for researching business-to-business professional service quality. To align with the current conceptualisation of service quality as a comparison of expectation and perception of actual performance and the results of the study, different gap-based measurement approaches (e.g., direct measurement approach mentioned in Chapter Two) should also be explored.

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APPENDIX A

Summary of Client/Consultant In-depth Interviews

APPENDIX A: CLIENT INTERVIEW

Discussion Guide

Period: January and February, 1995.

Venue: Client's/consultant's Office

Duration: about 30 to 60 minutes

Questions to be discussed:

Client Interview	Consultant Interview
Client Name: 1. Mr Richard Ely, Principal Engineer, Severn Trent Engineering 2. Mr Norman Pope, Director (UK Transmission), Clough Smith 3. Mr Geoff Willcocks, Chief Engineer of Territory Development Department, Hong Kong Government 4. Mr Eric Chiu, Senior Project Manager Sun Foo Kong (Civil) Limited 5. Mr Conder Yan, Deputy General Manager China State Construction Engineering Corporation	**Consultant Name:** 1. Mr John Gaskell, Managing Director of Rust Kennedy & Donkin Limted 2. Mr David Kell, Partner of Binnie & Partners
Discussion Questions 1. Can you give me some background information about your company/department? 2. How is the selection process when consulting engineers are employed? 3. What are the selection criteria in choosing consulting engineers? 4. What are the criteria when evaluating the performance of consulting engineers and the criteria for reappointment?	**Discussion Questions** 1. Can you give me some background information about your company? 2. How is the selection process by client when consulting engineers are employed? 3. What are the selection criteria by client in choosing consulting engineers? 4. From your perspective, what are the criteria that your clients normally use when evaluating the performance of consulting engineers and the criteria for reappointment?

5. How relevant are the following dimensions when evaluating the performance of consulting engineers: service exchange, information exchange, financial exchange, social exchange, co-operation, and adaptation? What are the characteristics of these dimensions? 6. Think of the best consulting engineer, how are you going to describe the atmosphere (as a state of relationship) between your organisation and this consulting engineer?	4. From your perspective, how relevant are the following dimensions when your clients evaluate the performance of consulting engineers: service exchange, information exchange, financial exchange, social exchange, co-operation, and adaptation? What are the characteristics of these dimensions? 6. Think of the best client organisation, how are you going to describe the atmosphere (as a state of relationship) between your organisation and this client organisation?

Mr Richard Ely, Principal Engineer

Severn Trent Engineering

Company Background

Severn Trent Engineering (STE) is an in-house consultancy arm of Severn Trent Water (STW) which has eight million customers and the serving area spans across 8,000 square miles between Humber and Severn estuaries. Keeping aligned with European standards on drinking water quality, its capital programme has increased significantly to maintain the quality of effluents from sewage works within the required level and to improve operational efficiency of STW.

STE provides an engineering design resource for STW in terms of design scheme, preparation of tendering document, and construction supervision. With a workforce of about 300, largely in civil engineering and with one quarter in the mechanical and electrical discipline, STE is based in two design centres, respectively in Warwick and in East Midlands and in close co-operation with 15 other Severn Trent operational districts. Unlike other water companies, it doesn't contract out its consultancy services to other companies. Every year, it manages capital investment of about £200 million for STW. The principal activities of STE range from the design and construction of pumping stations, mains and tunnels, service reservoirs and water treatment works, through to sewers, sewage treatment works and supervisory control systems. It also involves the refurbishment and extension of existing works, as well as providing new works on green field sites.

Selection of Consulting Engineers

It is the STE's policy to place a significant percentage of work with private sector consulting engineers. These consulting engineering firms are appointed and managed by STE with the objective of giving staff experience in overseeing the work of professionals from outside the company and the opportunity to maintain a comparison with in-house technical and commercial standards. In addition, the need to employ consulting engineers becomes critical when the workload is beyond the capacity of existing manpower and certain projects require special technical skills. For instance, in building a reservoir, it requires a multi-disciplinary engineering services from

consultants to design preliminary infrastructure, roads and highways for access to the site.

There are two types of consultants to be employed by STE :

1. Charles Haswell (CH). CH is a consulting engineering firm wholly-owned by STW. In the past several years, it handled most of the contracts. Because of recent slow-down in capital investment activity, no major engineering work has been contracted to CH. In most cases, negotiation on scope of work and fee between STE and CH is less formal and largely based on mutual understanding and precedents. Standard arrangement procedures are normally applied so as to shorten period of negotiation on fee and service scope.
2. Independent consultants. If CH is not appointed, STE will shortlist three firms with known expertise, track records and previous experience with them. When there is a need to reach a final decision to select independent consultants, both the functional principal engineer and the engineer involved in the proposed project will jointly evaluate all the proposals. They will judge the merits based on a combination of criteria of reference, fee competitiveness, methodology to cost-effectiveness and current problem-solving, and technical presentation. A need to strike a balance between fee competitiveness and quality is envisaged for certain projects which require superior technical skills and relevant past experience even though there is a tendency to select the firm with the lowest bid. A formal report on the bid and technical presentation in relation to the proposed project will be submitted to the headquarters for final recommendation.

Evaluation of Service Quality of Consulting Engineers

Within STE, there is no formal system in evaluating the performance of consulting engineers. It is not a standard procedure to report to headquarters about the performance of consulting engineers under normal circumstances. It is the perception of the principal engineer and liaison engineer who have frequent interactions with consulting engineers that matters most. Although many consultants are quality

accredited (e.g., BS 5750), it is not a pre-condition of good service quality perception. STE comments that some good consultants do not have quality accreditation whereas some bad ones have. Therefore, it is not a requirement under the contract that consultants bidding for jobs should be quality accredited.

At the commencement of any project, STE expects consultants to understand thoroughly the design brief which defines the nature of the job and the consultants' responsibilities. Consultants are expected to understand fully the design document, form of contract, detail of technical specification, financial estimates, and frequency of reporting. In addition, they have to comply with the STE's requirements and to keep STE informed periodically throughout the project.

In relation to contact pattern, depending on the size and complexity of the project, regular progress meetings, mostly monthly, are held to deal with problems envisaged, changing cost estimates and progress. When problem arises, both STE and consultants will solve problems in a mutual way except on repeated serious errors under which sanctions will be imposed. In most cases, STE and the consultant will jointly deal with the issue. Business relationship is nurtured in an open and friendly way between STE and consulting engineers. However, personal relationship is conditioned by overall service quality perception and the formation of corporate relationship.

In evaluating the service quality of consulting engineers, the principal engineer of STE will expect certain service quality attributes to be present throughout the project. For example, consulting engineers are expected to have comprehensive knowledge with the design brief at the start of the project and finish the project on time and with no significant cost overrun. A lack of these service quality attributes will lead to unfavourable judgement about the performance and will have an impact on subsequent appointment for similar projects. For other service quality attributes, they are not as critical as expected service quality. They may be in terms of the use of technology and adaptation to the STE's systems. For example, some consultants will adopt latest computer-aided-design software for design. It will impress STE to the extent that the format and precision are up to the STE's specification. Another type of exciting quality is to invite client for a tour around the consultant's premise for latest

acquisition on equipment. It is only an exhibition of the consultant's capability but with no major impact on forming favourable perception of service quality for the project concerned. In whole, exciting service quality is not a close substitute for expected quality.

Distinction between Expected Quality and Exciting Quality

	Outcome quality	Process quality
Expected quality (must be present during service delivery. Lack of it will create unfavourable service quality judgement)	for example : - finish the project on time - meet the budget (i.e., no cost overrun)	for example : - understand thoroughly the design brief - competent technical presentation - correct calculation
Exciting quality (may not be present during service delivery. Lack of it will not create unfavourable service quality judgement)	for example : - finish the project earlier - cost less than the budget	for example : - use of latest technology in computer-aided design - pro-active approach to problem-solving, adaptation to client system

Mr Norman Pope, Director (UK Transmission)
Clough Smith

Company Background

Clough Smith (CS) was established in 1910 and pioneered in the electrification of tramway systems. Since early twentieth century, it has been engaged in electrical and civil engineering contracting. With an annual turnover of £20 million, it is now one of the member companies of the Tilbury Douglas group, a £500 million turnover plc. CS focuses projects in the region of £5m to £10m and generates business through four main divisions. In brief, they are :

1. UK power transmission & distribution system division engages in the design, supply, and erection of steel towers for transmission projects.
2. Railway industries division manages signalling projects and passenger information systems.
3. Power engineering division specialises in underground cabling and in the installation of telecommunication cables and equipment.
4. Overseas division mainly looks after Far East and East African markets. The contracts undertaken range from the installation and commissioning of substations and associated overhead line transmission and distribution systems, to microwave transmitting towers.

Clough Smith has an in-house engineering team to manage project from conceptual design, construction, to post-commissioning maintenance.

Selection of Consulting Engineers

The need for employing consulting engineers arises when special technical assistance is sought or the in-house engineering team cannot cope with the existing workload in project management. In some cases, the employment of consulting engineering firms is under the direction of the ultimate client for conceptual design and construction supervision. During the last couple of years, the employment of consulting engineering firms was based on their respective expertise and technical superiority. For example, some firms were strong in civil engineering while others specialised in

electrical engineering. But in recent years, the whole consulting engineering industry has been changed as a result of takeovers and mergers. The result of which enables consultants to offer multi-disciplinary services even though some of the service domains were not in their stronghold prior to takeovers and mergers.

The selection process of consulting engineers is, to a greater extent, formalised by corporate procedures from receiving technical proposals, negotiation of fee to awarding of contract. In most cases, CS has a comprehensive knowledge about the people and leaders in the consulting engineering industry. On average project, three consultants are invited to submit tender for the contract. With the popularity of ISO9000 or BS5750 quality standard, CS expects consultants to pursue certification. Although quality accreditation is not conclusive evidence of excellent service quality, it is an added advantage and an indication of acceptable quality assurance. Price plays an important part but not a single factor to be considered in reaching final decision. At the start of the selection process, consultant with the lowest bid will have priority over others to present in response to the client brief and proposed methodology for the project. The weighting of price competitiveness to technical expertise depends on the nature of project particulars. For example, if innovative design or new concept is involved, high percentage on technical expertise is expected. On the whole, the main selection criteria are based on capability, national and international expertise, track record in similar project and price competitiveness.

Evaluation of Service Quality of Consulting Engineers

It is part of the requirement of BS5750 to establish a quality division to oversee the individual quality plan of a project in respect of the services rendered by different supplier, time scale, and key dates to be met. Different quality plans will be integrated to form an overall quality plan. Consultancy services are under the same scrutiny. CS evaluates service quality of consulting engineers based on certain project-related criteria. They are adherence to construction schedule, accurate budget, risk balancing, and co-ordinations within the project team. Any deviation will be reported to the director for corrective action. Apart from formal evaluation based on quality control techniques and procedures, it is the perception of project director that service quality of consulting engineers can be evaluated by what is delivered and how

it is delivered. What is delivered is assessed by the final output from a technical point of view and evaluation is made in the light of what has been proposed before the commencement of the project. As far as how is delivered is concerned, the content is more important than the means of delivery. It can be described as: "Whether it [the drawings] comes in by fax or hand-written in a cigarette packet to me, it really does not matter, provided that I can read it and my designer can read it".

Apart from "what" and "how" service delivery, CS also makes a distinction between core quality and non-core quality. Normally, core quality is clearly spelt out in a contract. It is related to basic and unambiguous requirements that the other parties to the contract are expected to fulfil. Core quality attaches importance to the critical part of a project, for example, conceptual design, feasibility of constructability, and adaptation by consultant to ensure compatibility in technical information exchange. Some core quality expectations are implicit. For instance, in structural modelling, CS expects the consultants to know the basis or methods used in the design of certain steel tower, not just the figures or graphic drawings generated by the computer. Otherwise, this is, in fact, equivalent to "garbage in, garbage out" consultancy service. Non-core quality comes from additional services offered by consultants and beyond the contractual obligations. They are mostly related to the establishment of working relationships. CS views that consultancy service is not a commodity. It is largely human-oriented. Socialisation is part of the process of service delivery. Through building up personal relationship, it provides an avenue to explore further informally about mutual expectation and co-operation over time. The endeavour of both parties in maintaining friendship and mutual trust is paramount in any project management activity. From the CS perspective, it is expected that professional consultants are aware of how and when personal relationship is manipulated unprofessionally. Both CS and the consultants realise that business relationship precedes personal relationship.

Service Quality and Client Satisfaction

From the CS' perspective, service quality and client satisfaction are inter-related. But the latter has a lot more to do than the former. Client satisfaction tends to be wider in scope than service quality. Quality criteria in some way can be spelt out and to be

judged in accordance with some yardsticks. However, client satisfaction is affected by variables outside the control of consultants and cannot be overcome by quality control procedures alone. For example, such factors can be related to sudden change in environment and opposition from pressure groups. It can also be judged by third party. For example, National River Authorities have certain requirements for discharge into river. They have quality standard for engineering consultants and all of the requirements have to be met. But people living nearby may still complain about rubbish built up at certain points of the river because of alluvium resulting from heavy rain. In this case, CS is less satisfied by the complaints which are outside the quality control of consultants.

On the whole, service quality and client satisfaction have strong impact on re-employment of consultants and business referrals. Providing that all project particulars and requirements are the same, service quality is a more dominant factor than client satisfaction because CS realise that complete satisfaction cannot be easily achieved and is sometimes not readily assessed by any standard. Nevertheless, CS views that satisfaction should be the objective for all consultants.

Mr Geoff Willcocks, Chief Engineer
Territory Development Department, Hong Kong Government

General Background about Territory Development Department

Territory Development Department (TDD) is responsible for urban redevelopment, reclamation and new town development. In the past several decades, major infrastructure works were carried out in rural areas (e.g. Shatin, Yuen Long and Tuen Mun) to accommodate greater demand for housing estates in response to growing population. Its interaction with other government departments, for example, Highways Department, Water Supplies Department and Environmental Protection Department, is critical to the implementation of any large-scale infrastructure project.

Selection Process of Consulting Engineers

Hong Kong Government, being a major client of most of the international consulting engineering firms in Hong Kong, adopts a centralised basis in the selection of engineering consultants. Engineering Associated Consultants Selection Board (EACSB) was set up and has been serving as the main organ for evaluating both technical and fee proposals by dedicated assessment panels with the assistance of the departments concerned when the need for engineering consultants is envisaged. The marking of technical proposal is based on the certain criteria shown in Table 1.

Because of the voluminous amount of assessment work involved, the selection process tends to be lengthy. For large scale projects, a six-month period is commonplace. In other instances, the project may be delayed or even aborted during the detailed proposal stage because of insufficient funds allocated after feasibility study. Together with technical aspects, the assessment panels will also take into account of fee competitiveness. In a vast majority of cases, a technical to fee ratio of 70:30 would be used for large scale infrastructure projects. Such rational approach to the selection of consulting engineers intends to strike a balance between different aspects of technical evaluation but with less emphasis on fee competitiveness. Although it is not a recommended practice for EACSB to welcome a very low bid from consultants, apparently it is widely used by consultants to win contracts.

Table 1: Selection Criteria

Main Evaluation Criteria	Sub-criteria	Allocated Marks
Consultant's Experience	• Relevant experience & knowledge	5% - 10%
Response to the Brief	• Understanding of objectives • Identification of key issues • Appreciation of project constraints & special requirements • Presentation of innovative ideas	15% - 25%
Approach to Cost-effectiveness	• Ability to produce cost-effective solutions from past projects • Approach to achieve cost-effectiveness on this project	15% - 20%
Methodology & Work Programme	• Technical approach • Work programme • Arrangements for contract management & site supervision	15% - 25%
Staffing	• Staff organisation • Relevant experience & qualifications of key staff • Responsibilities & degree of involvement of key staff	30% - 40%

Evaluation of Service Quality

Within the TDD, semi-annual assessment of consultants' performance for various projects is carried out by the respective chief engineers and then endorsed by the project manager concerned. The assessment of quality at different stages is based on the criteria listed in the table shown in Table 2. Good client relationship does not guarantee business as most of the projects are contracted out on a competitive bidding

basis and the assessment is done by an independent party (i.e. EACSB which does not have any involvement in different stages). Relationship is seen only to be a gateway to having a chance to bid. At different construction phases, it is not uncommon to have cost overruns for government contracts particularly when some projects are spanning across five to ten years. Such cost overruns are inevitable from a client perspective. It is therefore within client expectation that consultants should build in a monitoring system for controlling construction cost and as far as possible to come up with corrective action to minimise cost overruns.

As revealed from Table 2, various exchange dimensions and relational elements (i.e., service exchange, information exchange, financial exchange, social exchange, co-operation, and adaptation) are embedded in the evaluation criteria. Co-operation and adaptation are particularly important for large scale projects. For example, engineering consultants are expected to make substantial investment in upgrading existing equipment or to hire experts for special assignments. For example, client would demand a different computer-aided design system (CAD) or geographical information system (GIS) to make information exchange compatible. Although these initial adaptations by consultants are clearly stated in contracts at the commencement of the project, gradual adaptation through successive stages is a positive indicator of service quality when needs arise to keep in line with advanced technology. From time to time, consultants would invite the client to tour around office for new acquisitions. This is for the sake of strengthening technical capability and serves as a sign of on-going commitment for quality quest.

Table 2: Evaluation Criteria

Stage Assessment	Assessment Criteria
Feasibility or Report stage	• Collection & appreciation of background information • Comprehensiveness & imagination in alternatives considered • Quality of final recommendation • Adequacy of cost estimates • Presentation of report
Design & Contract stage	• Collection & interpretation of information • Design solutions • Presentation of drawings • Cost estimates • Quality of contract documents
Construction stage	• Tender assessment • Recruitment, supervision & administration of site staff • Administration of contract • Supervision of contractor & quality of end product • Financial control of contract including expenditure forecasting • Handling of claims
General	• Appreciation of Government requirements and procedures • Progress reports and financial forecasts • Relationship with client office • Competence and conduct of consultants staff • Partners involvement • Effectiveness in surmounting problems • Programming and target achievement

Mr Eric Chiu, Senior Project Manager
Sun Foo Kong (Civil) Limited

Company Background

Sun Foo Kong is a listed company with a market capitalisation of about HKD60 million. Its principal activities are property development, construction, and building maintenance as well as with growing emphasis in energy projects in China. It is a listed government contractor for public projects.

Selection Process for Consulting Engineers

The selection process for consulting engineers tends to be very short (e.g., normally in a few weeks) and is determined by the responsible project manager. The criteria used in selection are based on technical background, reputation, and expertise of the consulting firms in the relevant discipline. Ultimate client background is also a major determinant in reaching the final decision. For example, it is perceived to be preferable to employ British-based consulting firms over local firms for the ultimate British clients. Such practice helps bridge the language and cultural barriers among the parties, thus creating an atmosphere of unity during the preliminary relationship building period.

Evaluation of Service Quality

Interactions with consulting engineers take place when :

1. the ultimate client employs consulting engineers to oversee the project and contractor's performance to make sure that client's requirements and specifications have been met; or
2. contractor employs consulting engineers to assist in feasibility study, design, and construction supervision.

In relation to contractor as a client, up to the present moment, there is no formal system of evaluating the service quality of consulting engineers. Firstly, the contract sum is not significant as compared with government contracts. It is not worth installing a monitoring system. Secondly, as the selection decision is solely made by the responsible project manager who makes service quality judgements through

routine and exceptional interactions. Routine interactions may be in the form of presentation and exchange of technical information. There may be cases for exceptional interactions when conflict arises. From past experience, circumstances which give rise to conflict are quite minimal and the resolving mode tends to be friendly and open. Arbitration as a final resort is not generally adopted unless in the worst scenario. Once bonding is built up, any breakdown in interactions, for example, failing to meet deadlines in submitting drawings and reports, would not jeopardise the relationship provided the final output of design reaches the expectation of the project manager as such breakdowns occur from time to time. In most cases, consulting engineers are not required to adapt to client administrative system and technical system unless such needs are envisaged. For example, the ultimate client demands a different operating system.

The perception of service quality of consulting engineers, apart from the technical aspects, cultural aspects also play an important role. Sometimes, language barrier and cultural difference are an added advantage. For example, in certain circumstances, it is preferable to have British consulting engineers to conduct independent investigation. British engineers are perceived to be technically superior to local Hong Kong Chinese engineers even though most of these Hong Kong Chinese engineers were educated and trained overseas, mostly in the UK. The treatment of particular issues by British consulting engineers and their resultant endorsements to certain methodology and technology in solving technical problems are considered more convincing. Although it is not generally the trend as some of the technical problems are related to local issues and by-law whereby Hong Kong Chinese engineers are more experienced, it is a common practice for most of these issues to be dealt with by the British consulting engineers.

Mr Conder Yan, Deputy General Manager
China State Construction Engineering Corporation

Company Background

China State Construction Engineering Corporation (CSCEC) is a holding company of China Overseas Land and Investment Ltd., a listed company with a market captialisation of over HKD300 million and with significant stake in the PRC property market. The principal activities of CSCEC are construction and building maintenance. It is a listed government contractor for public projects.

Selection Process of Consulting Engineers

The selection of consulting engineers is based on technical expertise and experience. There is no preference of British consulting firms over Hong Kong Chinese engineers. Good client relationship is one of the contributing factors to be considered for repeated contracts. Like any other construction contractors, the decision to employ consulting engineers has to be made within a limited time frame to meet tight schedules. Time concern becomes critical when prompt action is required after natural disasters. It is, therefore, generally the practice to maintain a list of several consultants with specialisation and expertise for different projects. British-based consulting firms are normally at the top of the list for their perceived technical expertise and superiority.

The selection process is simple. There is no formal system in selecting consulting engineers and in most cases, it is done purely by the project manager or person in charge of the project in order to facilitate a quick decision. The decision is based according to their past experience and interactions with consultants. However, in the near future, the system will be formalised in pursuit of ISO 9000 certification which becomes mandatory for government contracts. It is expected when the certification is in full swing in the coming few months, proper documentation for selection and periodic evaluation for all service providers and sub-contractors has to be set up.

Evaluation of Service Quality

Consulting engineers are employed to carry out independent feasibility study, design and construction supervision. As far as the evaluation of performance is concerned, main emphasis is placed on tangible cues, like final design and technical reports. Service quality judgement, from a contractor perspective, is based on the criteria of constructability, cost-effectiveness, practical application of the methodology and meeting required timetable. Successful client relationship is therefore a composite of tangible evaluation. However, relationship is not a perfect substitute of technical experience and expertise. A relationship would break down in case of technical incompetence from time to time.

Pro-active behaviour and attention to details are also positive indicators of good service quality in particular when the project is carried on to successive stages whereby consulting engineers come up with idea on how to shorten construction time or reduce cost. As far as routine exchange of information is concerned, the language of communication is mainly in English, even in a Chinese-based organisation. Firstly, English is the official language which is widely used across the entire business community since Hong Kong became a British colony. Secondly, it is almost an international language. Hong Kong is susceptible to external influence and reliant on foreign trade. Many Hong Kong-based contractors are flexing their muscles to other Asia-Pacific countries in their quest for construction projects. Although British consulting engineers are undoubtedly fluent in the use of the their own language, this does not necessarily mean that they are superior from a technical point of view. Many local Hong Kong Chinese engineers can speak dual languages (i.e., Cantonese and English). Therefore, language superiority is not a contributing factor to the evaluation of service quality of consulting engineers.

Adaptation issues is less considered important because it is based on contractual obligation and operational feasibility. In a vast majority of cases, projects span across a three to four years period. It is not a general requirement for contractor to specify a particular system to be used throughout the project unless it is clearly stated by the ultimate client. Consulting engineers will consider feasibility of particular investment of their own.

Mr John Gaskell, Managing Director

Rust Kennedy & Donkin Limited

Company Background

Rust Kennedy & Donkin Limited was established in early 1995 as a result of take-over of Kennedy & Donkin Ltd. in 1994 by the Rust Ltd., a subsidiary of American conglomerate giant WMX Technologies. Kennedy & Donkin was formed in 1889, offering a multi-disciplinary engineering services to clients. The takeover of Kennedy & Donkin signifies a major addition to WMX Technologies, not only exploring greater business opportunities in rebuilding infrastructure and environmental work, but also rationalising the entire group in providing a wide range of engineering consultancy services, particularly in the heavier end of civil engineering together with waste management expertise where WMX Technologies lies.

The principal activities of Rust Kennedy & Donkin are moving from traditional domain of engineering consultancy in transport, building services, energy projects and water and wastewater engineering to quality engineering and system control in an attempt to meet client's need to plan, implement and control manufacturing process. Scope of services offered range from economic and feasibility assessment through design and project management to supervision of construction and final commissioning.

Service Quality from a Consultant's Perspective

In the corporate brochure of Rust Kennedy & Donkin, there is a saying which goes: "Quality is never an accident. It is always the result of intelligent effort." The top management visions that providing quality services to client is the only route to increased market share. Quality services broadly speaking can be inferred from cost of construction, construction time, balance of risk exposure and uncertainty. The determination to achieve such objective transforms the corporate philosophy and operational practice across the entire group. Quality services can be seen from a wide variety of attributes from the beginning of the project to its completion. These attributes in a typical transportation project are summarised in Table 1.

Table 1: Service Attributes

Project Stage	Service Attributes
Project Management	• Comprehensive planning & control • Cohesive management • Co-ordinated approach to achieving stated objectives • Proven techniques to maximise cost benefit
Project Inception	• Complete understanding of client's needs • Acceptance by the community • Informed decision making on the basis of knowledge
Project Preparation	• Integrated planning & design • Identification and allocation of resources to maximise cost-effectiveness • Provision of specialist services • In-house capability to provide speed & quality
Project Implementation	• Integrated construction • Clear responsibilities • Efficient operations
Post-Commissioning	• Continued commitment • Adaptation to changing conditions • Quality monitoring

However, the system of evaluating client perceptions of service quality is not formally set up. In most cases, it is from the consultant's perception that outcome quality in terms of tangible elements is more important than the process quality as it is more evident to client and easier to appreciate and evaluate. For example, in meeting growing demand for environmental concern and stringent regulatory requirements, much attention is given to the final product to maximise energy efficiency and utilisation of natural energy and at the same time reduce emission of pollutants. Therefore, the design scheme at the start of the project and the final structure embracing these kinds of issues form the main criteria for the ultimate service quality

evaluation. For process quality, consultants are expected to keep track of costing throughout the course of the project. Any cost overrun should be reported to client when it arises so that corrective action can be taken. Emphasis on pro-active solutions to clients should also be placed particularly for certain projects which are susceptible to rapidly changing environment.

Mr David Kell, Partner

Binnie & Partners

Company Background

Binnie & Partners was founded in 1890 specialising in water supply and wastewater treatment. In order to provide clients with a multi-disciplinary engineering services, it has shifted to other engineering disciplines, like rural development, leisure engineering and energy. Business from water supply and sewerage treatment work, on average, shares about 50% of total fee generated. Binnie & Partners has experienced a shrinking of business from both the public and private sectors because of keen competition. Manufacturing companies have been curtailing or shifting their manufacturing process to other countries to tap lower cost of production. Its stronghold is on water supply-related consultancy. Recently, it has moved towards consultancy on structural engineering.

Service Quality from a Consultant's Perspective

Binnie & Partners has installed a quality system to monitor and assess project performance. The management concerned realises the majority of project work is of a non-repetitive nature so that conventional statistical feedback techniques are not applicable to professional service in which a high degree of content is human and expertise oriented. At the conclusion of consultancy work, there will be an internal completion review meeting to identify whether clients' requirements have been met. It is the responsibility of project manager to make an estimate of the client's apparent satisfaction with the work undertaken. The assessment of performance is made in the following areas :

1. Clear definition of client's requirement at the start of job
2. Changes to the job, if any, are for the good of client
3. Deployment of staff resources
4. Stick to programme
5. Adoption of appropriate technology
6. Adequate checkings throughout the project
7. Monitor of progress against the programme
8. Prompt remedial actions taken if necessary

9. Maintenance of professional standing
10. Strategy to deal with adverse social and environmental effects
11. Overall satisfaction

It is perceived that clients tend to appreciate more the technical aspects of a project, especially for some sophisticated clients who are in a position to evaluate technical performance. For example, in building a reservoir, the use of state-of-the-art technology in communication system and data transmission will impress client more than the concrete structure itself.

In most cases, client and consultant are in a state of open and friendly atmosphere to resolve conflict. Arbitration is the last resort to deal with conflict under very exceptional circumstances. Mutual trust is established as evidenced from the fact that, for example, progress payment is simply based on a single cost worksheet. Supporting documents are not necessary to be present. Although technical expertise and adoption of sophisticated technology contribute greatly to service quality perception, routine interaction also plays a part. Throughout the project, junior staff will have wider exposure of interactions with client, partner involvement at a higher level will ultimately exhibit commitment to the project. Information exchange has to be timely, especially when the regulatory requirement changes.

APPENDIX B

Covering Letter and Questionnaire

香港公開大學
THE OPEN UNIVERSITY
OF HONG KONG
商業管理學院 *School of Business & Administration*

14 August, 1998

Mr Kwan, P.L.
Deputy Director of Architectural Services
Headquarters
Architectural Services Department
The HKSAR Govt.

437

Dear Mr Kwan

Academic Research on the Service Quality of Consulting Engineers

I am a Lecturer in Marketing in the School of Business and Administration at the Open University of Hong Kong. In addition to teaching duties, I am also studying for a Doctor of Philosophy degree at the University of Nottingham, United Kingdom on a part-time basis. Currently, I am undertaking a research project on the service quality of consulting engineers. This project not only forms a critical part of the doctoral degree curriculum, but also helps me get an in-depth understanding about the service quality of consulting engineers from the clients' perspective. I obtained your name from the *1997 Telephone Directory of the HKSAR Government* published by the Hong Kong SAR Government and would like to seek your general opinion on the service performance of consulting engineers that your Department appoints. Therefore, your reply to the enclosed questionnaire is very important to this academic research and it will only take a few minutes of your time.

All you need to do is to read through the statements and questions and circle the numbers that correspond with your view unless stated otherwise. Please remember that there are no "correct" answers; it is your opinions that I am interested in. When you have finished, please return the questionnaire in the enclosed self-addressed envelope. It would be very helpful if you could do this by 28 August. Your reply will be strictly confidential and it will be analysed along with other responses from government engineers.

My success in completing my doctoral degree is totally dependent on your assistance. Should you have any queries, please feel free to contact me by phone at 2768 6930 (fax: 2391 9095; email: kswoo@ouhk.edu.hk)

Thank you for your kind assistance.

Yours sincerely,

30 Good Shepherd Street, Homantin, Kowloon, Hong Kong
Tel : (852) 2768 6930 Fax : (852) 2391 9095 email : kswoo@ouhk.edu.hk

香港公開大學
THE OPEN UNIVERSITY
OF HONG KONG
商業管理學院 *School of Business & Administration*

14 August, 1998

Mr Kwan, P.L.
Deputy Director of Architectural Services

Dear Mr Kwan

Academic Research on the Service Quality of Consulting Engineers :
Summary of Research Results

If you are interested in the results of the captioned study, please return this letter together with the completed questionnaire. A summary of the research results will be sent to you in due course.

Thank you for your interest in the study.

Yours sincerely,

Woo, Ka-shing (Mr)

:TION

following statements deal with your opinions of consulting engineering services. For each of the following statements, ıse circle any of the numbers that show the extent to which you think <u>consulting engineering firms in general</u> should r the feature as described by the statement; that is, whether you feel it is reasonable to expect consulting engineering ıs to offer the feature. Values range from 1, *strongly disagree*, to 7, *strongly agree*.

		Strongly Disagree						Strongly Agree
	They should provide customised, rather than standardised, professional services to meet the needs of individual clients.	1	2	3	4	5	6	7
!	Their services should be technically sound.	1	2	3	4	5	6	7
3	They should achieve cost-effectiveness for the project.	1	2	3	4	5	6	7
4	Through their established quality control procedures, they should provide reliable services.	1	2	3	4	5	6	7
.5	Their design schemes should meet client's specific project requirement.	1	2	3	4	5	6	7
A6	They should meet the time schedule for the project.	1	2	3	4	5	6	7
A7	They should meet the agreed budget for the project.	1	2	3	4	5	6	7
A8	They should keep proper records for contract administration.	1	2	3	4	5	6	7
A9	Their payment claims should be made timely.	1	2	3	4	5	6	7
A10	Their payment claims should be accurate.	1	2	3	4	5	6	7
A11	Their payment claims should be legitimate.	1	2	3	4	5	6	7
A12	They should submit technical documentation which is easily understood by clients.	1	2	3	4	5	6	7
A13	They should submit technical documentation which meets clients' needs.	1	2	3	4	5	6	7
A14	The technical information supplied by them should be adequate.	1	2	3	4	5	6	7
A15	They should respond promptly to clients' request for information.	1	2	3	4	5	6	7
A16	They should build up trust in the working relationship with clients.	1	2	3	4	5	6	7
A17	They should have a good understanding of how clients operate.	1	2	3	4	5	6	7
A18	Their consultants should be enthusiastic in dealing with clients.	1	2	3	4	5	6	7
A19	Their consultants should be easy to make friends.	1	2	3	4	5	6	7
A20	They should maintain frequent contacts with clients.	1	2	3	4	5	6	7
A21	They should co-operate closely with clients in project management.	1	2	3	4	5	6	7
A22	They should be able to handle clients' complaints.	1	2	3	4	5	6	7
A23	They should be collaborative in resolving conflicts with clients.	1	2	3	4	5	6	7
A24	They should constantly improve technical capabilities to keep abreast with new developments in the engineering profession.	1	2	3	4	5	6	7
A25	They should proactively offer clients new technical solutions when conditions change.	1	2	3	4	5	6	7
A26	They should make operational changes to project management when required by clients.	1	2	3	4	5	6	7
A27	They should be able to co-ordinate the various engineering disciplines when required by clients.	1	2	3	4	5	6	7

SECT PERFORMANCE

The following statements deal with your opinions of the service performance of a specific consulting engineering firm. For each of the following statements, please circle any of the numbers that show the extent to which you think the consulting engineering firm (as "the CE" hereafter) that you deal with most frequently has the feature as described by the statement. Values range from 1, *strongly disagree*, to 7, *strongly agree*.

		Strongly Disagree						Strongly Agree
B1	The CE provides customised, rather than standardised, professional services to meet our needs.	1	2	3	4	5	6	7
B2	The CE's services are technically sound.	1	2	3	4	5	6	7
B3	The CE is able to achieve cost-effectiveness for the project.	1	2	3	4	5	6	7
B4	Through its established quality control procedures, the CE provides reliable services.	1	2	3	4	5	6	7
B5	The CE's design scheme meets our specific project requirement.	1	2	3	4	5	6	7
B6	The CE is able to meet the time schedule for the project.	1	2	3	4	5	6	7
B7	The CE is able to meet the agreed budget for the project.	1	2	3	4	5	6	7
B8	The CE keeps proper records for contract administration.	1	2	3	4	5	6	7
B9	The CE's payment claims are made timely.	1	2	3	4	5	6	7
B10	The CE's payment claims are accurate.	1	2	3	4	5	6	7
B11	The CE's payment claims are legitimate.	1	2	3	4	5	6	7
B12	The CE submits technical documentation which is easily understood by our project team.	1	2	3	4	5	6	7
B13	The CE submits technical documentation which meets our needs.	1	2	3	4	5	6	7
B14	The technical information supplied by the CE is adequate.	1	2	3	4	5	6	7
B15	The CE responds promptly to our request for information.	1	2	3	4	5	6	7
B16	The CE builds up trust in the working relationship with us.	1	2	3	4	5	6	7
B17	The CE has a good understanding of how our section operates.	1	2	3	4	5	6	7
B18	The CE's consultants are enthusiastic in dealing with us.	1	2	3	4	5	6	7
B19	The CE's consultants are easy to make friends.	1	2	3	4	5	6	7
B20	The CE maintains frequent contacts with us.	1	2	3	4	5	6	7
B21	The CE co-operates closely with us in project management.	1	2	3	4	5	6	7
B22	The CE is able to handle our complaints.	1	2	3	4	5	6	7
B23	The CE is collaborative in resolving conflicts with us.	1	2	3	4	5	6	7
B24	The CE constantly improves technical capabilities to keep abreast with new developments in the engineering profession.	1	2	3	4	5	6	7
B25	The CE proactively offers us new technical solutions when conditions change.	1	2	3	4	5	6	7
B26	The CE makes operational changes to project management when required by our project team.	1	2	3	4	5	6	7
B27	The CE is able to co-ordinate the various engineering disciplines when required by our project team.	1	2	3	4	5	6	7

ECTIOI

ıe following statements deal with your opinions about the overall service performance of a specific consulting engineering m. For each of the following statements, please circle any of the numbers that show the extent of your overall perceptions bout the service performance of consulting engineering firm (as "the CE" hereafter) that you deal with most frequently.

)verall Atmosphere

		Very Adverse						Very Harmonious
C1	I consider the general atmosphere surrounding the working relationship with the CE as...	1	2	3	4	5	6	7
		Very Distant						Very Close
C2	I regard the overall relationship with the CE as...	1	2	3	4	5	6	7
		To a Lesser Extent						To a Greater Extent
C3	I believe mutual expectations for the project have been established with the CE...	1	2	3	4	5	6	7

Service Quality

		Very Poor						Excellent
C4	Overall, the service quality of the CE is...	1	2	3	4	5	6	7
		To a Lesser Extent						To a Greater Extent
C5	The service performance of the CE fits our project requirements...	1	2	3	4	5	6	7
		Very Often						Very Seldom
C6	In terms of service reliability, things have gone wrong...	1	2	3	4	5	6	7

Client Satisfaction

		Very Dissatisfying						Very Satisfying
C7	Overall, our experience in dealing with the CE is...	1	2	3	4	5	6	7
		Fall Short of Our Expectations						Exceeds Our Expectations
C8	The CE's service performance...	1	2	3	4	5	6	7
		Very Displeased						Very Pleased
C9	My feelings toward the CE's services can be characterised as...	1	2	3	4	5	6	7

Recommendation and Re-appointment Intentions

		Very Unlikely						Very Likely
C10	I would say positive things about the CE to others.	1	2	3	4	5	6	7
C11	I would recommend the CE to other people who seek my advice.	1	2	3	4	5	6	7
C12	I would encourage other companies to do business with the CE.	1	2	3	4	5	6	7
C13	I would consider the CE as my first choice when engineering consultancy services are needed.	1	2	3	4	5	6	7
C14	I wish our section would do more business with the CE in the next few years.	1	2	3	4	5	6	7

ECTION D: PROFILE OF YOUR SECTION AND PROJECTS

his part of the questionnaire asks you some questions about your section and projects. Please write your answer to the pace provided unless stated otherwise.

D1. How many employees in your section?

_____(no. of employees)

D2. On average, what is the duration of an engineering project?

_____(no. of months)

D3. On average, what is the value of an engineering project?

_____(HK$ in million)

D4. In your experience, what is the average % of engineering consultancy fee to the total project value?

_____(%)

D5. On average, how many people in your section are involved in an engineering project?

_____(no. of staff)

D6. On average, how many people in your section are involved in evaluating the performance of consulting engineers in an engineering project?

_____(no. of staff)

D7. On average, how often is the performance of consulting engineers being evaluated in an engineering project?

_____(no. of months)

D8. In your experience, has the project/part of a project been delayed by consulting engineers due to factors outside their control or your section? (Please circle)

1. No.
2. Yes, please state three most important factors:

2.1_____

2.2_____

2.3_____

+++++ END OF THIS QUESTIONNAIRE +++++
THANK YOU FOR YOUR COOPERATION

香港公開大學
THE OPEN UNIVERSITY
OF HONG KONG
商業管理學院 *School of Business & Administration*

14 August, 1998

Mr Cook, M V
Director
Campbell Shillinglaw Cook & Associates Ltd

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Dear Mr Cook

Academic Research on the Service Quality of Consulting Engineers

I am a Lecturer in Marketing in the School of Business and Administration at the Open University of Hong Kong. In addition to teaching duties, I am also studying for a Doctor of Philosophy degree at the University of Nottingham, United Kingdom on a part-time basis. Currently, I am undertaking a research project on the service quality of consulting engineers. This project not only forms a critical part of the doctoral degree curriculum, but also helps me get an in-depth understanding about the service quality of consulting engineers from the clients' perspective. I obtained your name from the *Architect's Practice 1996* published by the *Hong Kong Institute of Architects* and would like to seek your opinion on the service performance of consulting engineers. Therefore, your reply to the enclosed questionnaire is very important to this academic research and it will only take a few minutes of your time.

All you need to do is to read through the statements and questions and circle the numbers that correspond with your view unless stated otherwise. Please remember that there are no "correct" answers; it is your opinions that I am interested in. When you have finished, please return the questionnaire in the enclosed self-addressed envelope. It would be very helpful if you could do this by 28 August. Your reply will be strictly confidential and it will be analysed along with other responses from professional architects.

My success in completing the doctoral degree is totally dependent on your assistance. Should you have any queries, please feel free to contact me by phone at 2768 6930 (fax: 2391 9095; email: kswoo@ouhk.edu.hk)

Thank you for your kind assistance.

Yours sincerely,

Woo Ka-shing (Mr)

30 Good Shepherd Street, Homantin, Kowloon, Hong Kong
Tel : (852) 2768 6930 Fax : (852) 2391 9095 email : kswoo@ouhk.edu.hk

香港公開大學
THE OPEN UNIVERSITY
OF HONG KONG
商業管理學院 *School of Business & Administration*

14 August, 1998

Mr Cook, M V
Director
Campbell Shillinglaw Cook & Associates Ltd

Dear Mr Cook

Academic Research on the Service Quality of Consulting Engineers :
Summary of Research Results

If you are interested in the results of the captioned study, please return this letter together with the completed questionnaire. A summary of the research results will be sent to you in due course.

Thank you for your interest in the study.

Yours sincerely,

Woo, Ka-shing (Mr)

SECTIC

The foll[illegible] statements deal with your opinions of consulting engineering services. For each of the following statements, please circle any of the numbers that show the extent to which you think consulting engineering firms in general should offer the feature as described by the statement; that is, whether you feel it is reasonable to expect consulting engineering firms to offer the feature. Values range from 1, *strongly disagree*, to 7, *strongly agree*.

		Strongly Disagree						Strongly Agree
A1	They should provide customised, rather than standardised, professional services to meet the needs of individual clients.	1	2	3	4	5	6	7
A2	Their services should be technically sound.	1	2	3	4	5	6	7
A3	They should achieve cost-effectiveness for the project.	1	2	3	4	5	6	7
A4	Through their established quality control procedures, they should provide reliable services.	1	2	3	4	5	6	7
A5	Their design schemes should meet client's specific project requirement.	1	2	3	4	5	6	7
A6	They should meet the time schedule for the project.	1	2	3	4	5	6	7
A7	They should meet the agreed budget for the project.	1	2	3	4	5	6	7
A8	They should keep proper records for contract administration.	1	2	3	4	5	6	7
A9	Their payment claims should be made timely.	1	2	3	4	5	6	7
A10	Their payment claims should be accurate.	1	2	3	4	5	6	7
A11	Their payment claims should be legitimate.	1	2	3	4	5	6	7
A12	They should submit technical documentation which is easily understood by clients.	1	2	3	4	5	6	7
A13	They should submit technical documentation which meets clients' needs.	1	2	3	4	5	6	7
A14	The technical information supplied by them should be adequate.	1	2	3	4	5	6	7
A15	They should respond promptly to clients' request for information.	1	2	3	4	5	6	7
A16	They should build up trust in the working relationship with clients.	1	2	3	4	5	6	7
A17	They should have a good understanding of how clients operate.	1	2	3	4	5	6	7
A18	Their consultants should be enthusiastic in dealing with clients.	1	2	3	4	5	6	7
A19	Their consultants should be easy to make friends.	1	2	3	4	5	6	7
A20	They should maintain frequent contacts with clients.	1	2	3	4	5	6	7
A21	They should co-operate closely with clients in project management.	1	2	3	4	5	6	7
A22	They should be able to handle clients' complaints.	1	2	3	4	5	6	7
A23	They should be collaborative in resolving conflicts with clients.	1	2	3	4	5	6	7
A24	They should constantly improve technical capabilities to keep abreast with new developments in the engineering profession.	1	2	3	4	5	6	7
A25	They should proactively offer clients new technical solutions when conditions change.	1	2	3	4	5	6	7
A26	They should make operational changes to project management when required by clients.	1	2	3	4	5	6	7
A27	They should be able to co-ordinate the various engineering disciplines when required by clients.	1	2	3	4	5	6	7

SECTION B: PERCEPTIONS OF ACTUAL SERVICE PERFORMANCE

The following statements deal with your opinions of the service performance of a specific consulting engineering firm. For each of the following statements, please circle any of the numbers that show the extent to which you think the consulting engineering firm (as "the CE" hereafter) that you deal with most frequently has the feature as described by the statement. Values range from 1, *strongly disagree*, to 7, *strongly agree*.

		Strongly Disagree						Strongly Agree
B1	The CE provides customised, rather than standardised, professional services to meet our needs.	1	2	3	4	5	6	7
B2	The CE's services are technically sound.	1	2	3	4	5	6	7
B3	The CE is able to achieve cost-effectiveness for the project.	1	2	3	4	5	6	7
B4	Through its established quality control procedures, the CE provides reliable services.	1	2	3	4	5	6	7
B5	The CE's design scheme meets our specific project requirement.	1	2	3	4	5	6	7
B6	The CE is able to meet the time schedule for the project.	1	2	3	4	5	6	7
B7	The CE is able to meet the agreed budget for the project.	1	2	3	4	5	6	7
B8	The CE keeps proper records for contract administration.	1	2	3	4	5	6	7
B9	The CE's payment claims are made timely.	1	2	3	4	5	6	7
B10	The CE's payment claims are accurate.	1	2	3	4	5	6	7
B11	The CE's payment claims are legitimate.	1	2	3	4	5	6	7
B12	The CE submits technical documentation which is easily understood by our project team.	1	2	3	4	5	6	7
B13	The CE submits technical documentation which meets our needs.	1	2	3	4	5	6	7
B14	The technical information supplied by the CE is adequate.	1	2	3	4	5	6	7
B15	The CE responds promptly to our request for information.	1	2	3	4	5	6	7
B16	The CE builds up trust in the working relationship with us.	1	2	3	4	5	6	7
B17	The CE has a good understanding of how our department operates.	1	2	3	4	5	6	7
B18	The CE's consultants are enthusiastic in dealing with us.	1	2	3	4	5	6	7
B19	The CE's consultants are easy to make friends.	1	2	3	4	5	6	7
B20	The CE maintains frequent contacts with us.	1	2	3	4	5	6	7
B21	The CE co-operates closely with us in project management.	1	2	3	4	5	6	7
B22	The CE is able to handle our complaints.	1	2	3	4	5	6	7
B23	The CE is collaborative in resolving conflicts with us.	1	2	3	4	5	6	7
B24	The CE constantly improves technical capabilities to keep abreast with new developments in the engineering profession.	1	2	3	4	5	6	7
B25	The CE proactively offers us new technical solutions when conditions change.	1	2	3	4	5	6	7
B26	The CE makes operational changes to project management when required by our project team.	1	2	3	4	5	6	7
B27	The CE is able to co-ordinate the various engineering disciplines when required by our project team.	1	2	3	4	5	6	7

SECTIO

The following statements deal with your opinions about the overall service performance of a specific consulting engineering firm. For each of the following statements, please circle any of the numbers that show the extent of your overall perceptions about the service performance of consulting engineering firm (as "the CE" hereafter) that you deal with most frequently.

Overall Atmosphere

		Very Adverse						Very Harmonious
C1	I consider the general atmosphere surrounding the working relationship with the CE as...	1	2	3	4	5	6	7
		Very Distant						Very Close
C2	I regard the overall relationship with the CE as...	1	2	3	4	5	6	7
		To a Lesser Extent						To a Greater Extent
C3	I believe mutual expectations for the project have been established with the CE...	1	2	3	4	5	6	7

Service Quality

		Very Poor						Excellent
C4	Overall, the service quality of the CE is...	1	2	3	4	5	6	7
		To a Lesser Extent						To a Greater Extent
C5	The service performance of the CE fits our project requirements...	1	2	3	4	5	6	7
		Very Often						Very Seldom
C6	In terms of service reliability, things have gone wrong...	1	2	3	4	5	6	7

Client Satisfaction

		Very Dissatisfying						Very Satisfying
C7	Overall, our experience in dealing with the CE is...	1	2	3	4	5	6	7
		Fall Short of Our Expectations						Exceeds Our Expectations
C8	The CE's service performance...	1	2	3	4	5	6	7
		Very Displeased						Very Pleased
C9	My feelings toward the CE's services can be characterised as...	1	2	3	4	5	6	7

Recommendation and Re-appointment Intentions

		Very Unlikely						Very Likely
C10	I would say positive things about the CE to others.	1	2	3	4	5	6	7
C11	I would recommend the CE to other people who seek my advice.	1	2	3	4	5	6	7
C12	I would encourage other companies to do business with the CE.	1	2	3	4	5	6	7
C13	I would consider the CE as my first choice when engineering consultancy services are needed.	1	2	3	4	5	6	7
C14	I wish my organisation would do more business with the CE in the next few years.	1	2	3	4	5	6	7

SECTION D: PROFILE OF YOUR ORGANISATION AND PROJECTS

This part of the questionnaire asks you some questions about your organisation and projects. Please write your answer to the space provided unless stated otherwise.

D1. How many employees in your organisation?

_____(no. of employees)

D2. On average, what is the duration of a construction project?

_____(no. of months)

D3. On average, what is the value of a construction project?

_____(HK$ in million)

D4. In your experience, what is the average % of engineering consultancy fee to the total project value?

_____(%)

D5. On average, how many people in your organisation are involved in a construction project?

_____(no. of staff)

D6. On average, how many people in your organisation are involved in evaluating the performance of consulting engineers in a construction project?

_____(no. of staff)

D7. On average, how often is the performance of consulting engineers being evaluated in a construction project?

_____(no. of months)

D8. In your experience; has the project/part of a project been delayed by consulting engineers due to factors outside their control or your organisation? (Please circle)

1. No.
2. Yes, please state three most important factors:

2.1_____

2.2_____

2.3_____

+++++ END OF THIS QUESTIONNAIRE +++++
THANK YOU FOR YOUR COOPERATION

APPENDIX C

Test of Normality

Appendix C1: Test of Normality of Exchange Variables based on Perception Scores (Combined Sample n=185)

UNIVARIATE SUMMARY STATISTICS FOR CONTINUOUS VARIABLES

VARIABLE	MEAN	ST. DEV.	SKEWNESS	KURTOSIS	MINIMUM	FREQ.	MAXIMUM	FREQ.
PE1	4.589	1.190	-0.175	0.021	1.000	1	7.000	10
PE2	5.011	1.053	-0.191	-0.382	2.000	1	7.000	12
PE3	4.565	1.035	-0.087	0.117	2.000	5	7.000	6
PE4	4.589	1.105	-0.033	-0.376	2.000	4	7.000	7
PE5	5.043	1.062	-0.059	-0.726	3.000	13	7.000	14
PE6	4.397	1.285	-0.063	-0.297	1.000	2	7.000	9
PE7	4.603	1.294	-0.170	-0.180	1.000	2	7.000	14
FE1	4.735	1.242	-0.275	-0.021	1.000	2	7.000	13
FE2	5.033	1.310	-0.442	-0.104	1.000	2	7.000	24
FE3	4.880	1.305	-0.488	0.035	1.000	2	7.000	17
FE4	5.049	1.199	-0.363	-0.159	2.000	6	7.000	20
IE1	4.837	1.154	-0.491	-0.040	1.000	1	7.000	8
IE2	4.870	1.168	-0.426	0.201	1.000	1	7.000	12
IE3	4.746	1.262	-0.526	0.302	1.000	3	7.000	11
IE4	4.470	1.281	-0.309	-0.057	1.000	3	7.000	9
SE1	4.838	1.126	-0.184	-0.135	2.000	5	7.000	12
SE2	4.719	1.267	-0.542	0.009	1.000	2	7.000	8
SE3	4.734	1.229	-0.383	0.216	1.000	2	7.000	12
SE4	4.674	1.099	-0.289	0.304	2.000	9	7.000	8
SE5	4.605	1.128	-0.254	-0.267	1.000	1	7.000	4
CO1	4.778	1.137	-0.317	-0.160	2.000	7	7.000	8
CO2	4.541	1.331	-0.507	-0.033	1.000	5	7.000	7
CO3	4.746	1.196	-0.635	0.491	1.000	3	7.000	7
AD1	4.437	1.365	-0.404	-0.239	1.000	5	7.000	8
AD2	4.185	1.386	-0.312	-0.319	1.000	7	7.000	6
AD3	4.326	1.291	-0.246	-0.161	1.000	4	7.000	6
AD4	4.525	1.293	-0.367	0.018	1.000	4	7.000	9

TEST OF UNIVARIATE NORMALITY FOR CONTINUOUS VARIABLES

	SKEWNESS		KURTOSIS		SKEWNESS AND KURTOSIS	
	Z-SCORE	P-VALUE	Z-SCORE	P-VALUE	CHI-SQUARE	P-VALUE
PE1	-1.309	0.095	0.307	0.379	1.809	0.405
PE2	-1.388	0.083	-1.084	0.139	3.102	0.212
PE3	-0.771	0.220	0.569	0.285	0.918	0.632
PE4	-0.316	0.376	-1.057	0.145	1.218	0.544
PE5	-0.549	0.292	-2.930	0.002	8.888	0.012
PE6	-0.579	0.281	-0.741	0.229	0.884	0.643
PE7	-1.281	0.100	-0.315	0.376	1.741	0.419
FE1	-1.723	0.042	0.187	0.426	3.005	0.223
FE2	-2.188	0.014	-0.067	0.473	4.794	0.091
FE3	-2.287	0.011	0.347	0.364	5.349	0.069
FE4	-1.993	0.023	-0.244	0.403	4.032	0.133
IE1	-2.293	0.011	0.130	0.448	5.273	0.072
IE2	-2.152	0.016	0.779	0.218	5.236	0.073
IE3	-2.363	0.009	1.016	0.155	6.616	0.037
IE4	-1.837	0.033	0.079	0.468	3.383	0.184
SE1	-1.353	0.088	-0.166	0.434	1.859	0.395
SE2	-2.393	0.008	0.274	0.392	5.802	0.055
SE3	-2.047	0.020	0.816	0.207	4.855	0.088
SE4	-1.773	0.038	1.021	0.154	4.188	0.123
SE5	-1.649	0.050	-0.628	0.265	3.113	0.211
CO1	-1.861	0.031	-0.250	0.401	3.526	0.172
CO2	-2.326	0.010	0.150	0.440	5.435	0.066
CO3	-2.551	0.005	1.416	0.078	8.515	0.014
AD1	-2.099	0.018	-0.525	0.300	4.682	0.096
AD2	-1.845	0.033	-0.827	0.204	4.088	0.129
AD3	-1.618	0.053	-0.251	0.401	2.681	0.262
AD4	-2.006	0.022	0.298	0.383	4.111	0.128

Appendix C2: Test of Normality of Exchange Variables based on Perception Scores (Government Sub-sample n=96)

UNIVARIATE SUMMARY STATISTICS FOR CONTINUOUS VARIABLES

VARIABLE	MEAN	ST. DEV.	SKEWNESS	KURTOSIS	MINIMUM	FREQ.	MAXIMUM	FREQ.
PE1	4.698	1.087	-0.474	0.785	1.000	1	7.000	3
PE2	5.063	0.971	-0.550	0.204	2.000	1	7.000	3
PE3	4.568	0.959	-0.419	1.014	2.000	4	7.000	2
PE4	4.646	1.105	-0.355	0.001	2.000	4	7.000	3
PE5	5.083	0.991	-0.170	-0.640	3.000	5	7.000	5
PE6	4.583	1.295	-0.366	-0.359	1.000	1	7.000	4
PE7	4.746	1.289	-0.111	-0.579	2.000	4	7.000	9
FE1	4.958	1.085	-0.168	-0.433	2.000	1	7.000	6
FE2	5.021	1.306	-0.503	-0.094	1.000	1	7.000	11
FE3	4.896	1.261	-0.476	-0.287	2.000	5	7.000	7
FE4	5.094	1.161	-0.351	-0.213	2.000	2	7.000	10
IE1	4.957	1.015	-0.404	-0.420	3.000	11	7.000	3
IE2	4.853	1.076	-0.476	0.289	2.000	3	7.000	4
IE3	4.823	1.095	-0.425	0.278	2.000	4	7.000	4
IE4	4.771	1.031	-0.407	0.169	2.000	2	7.000	3
SE1	4.969	0.978	-0.281	0.110	2.000	1	7.000	4
SE2	4.969	1.119	-0.767	0.667	2.000	5	7.000	4
SE3	5.028	1.119	-0.285	0.030	2.000	2	7.000	9
SE4	4.945	1.009	-0.448	0.973	2.000	3	7.000	5
SE5	4.927	1.008	-0.419	-0.553	2.000	1	7.000	1
CO1	5.115	1.025	-0.594	0.489	2.000	2	7.000	5
CO2	4.823	1.142	-0.509	-0.272	2.000	3	7.000	3
CO3	4.906	1.037	-0.561	0.017	2.000	2	7.000	2
AD1	4.728	1.098	-0.600	0.446	1.000	1	7.000	2
AD2	4.429	1.121	-0.551	0.281	1.000	1	7.000	1
AD3	4.535	1.141	-0.695	0.812	1.000	2	7.000	1
AD4	4.751	1.131	-0.779	1.328	1.000	2	7.000	3

TEST OF UNIVARIATE NORMALITY FOR CONTINUOUS VARIABLES

	SKEWNESS		KURTOSIS		SKEWNESS AND KURTOSIS	
	Z-SCORE	P-VALUE	Z-SCORE	P-VALUE	CHI-SQUARE	P-VALUE
PE1	-1.916	0.028	1.605	0.054	6.245	0.044
PE2	-2.222	0.013	0.725	0.234	5.461	0.065
PE3	-1.692	0.045	1.878	0.030	6.390	0.041
PE4	-1.434	0.076	0.326	0.372	2.164	0.339
PE5	-0.687	0.246	-1.542	0.062	2.849	0.241
PE6	-1.478	0.070	-0.572	0.284	2.512	0.285
PE7	-0.447	0.327	-1.303	0.096	1.899	0.387
FE1	-0.681	0.248	-0.796	0.213	1.098	0.578
FE2	-2.032	0.021	0.117	0.454	4.143	0.126
FE3	-1.924	0.027	-0.367	0.357	3.836	0.147
FE4	-1.417	0.078	-0.171	0.432	2.038	0.361
IE1	-1.632	0.051	-0.756	0.225	3.234	0.198
IE2	-1.925	0.027	0.876	0.191	4.470	0.107
IE3	-1.716	0.043	0.856	0.196	3.676	0.159
IE4	-1.643	0.050	0.660	0.255	3.135	0.209
SE1	-1.136	0.128	0.548	0.292	1.590	0.452
SE2	-3.098	0.001	1.450	0.073	11.699	0.003
SE3	-1.152	0.125	0.387	0.349	1.478	0.478
SE4	-1.812	0.035	1.831	0.034	6.636	0.036
SE5	-1.691	0.045	-1.207	0.114	4.318	0.115
CO1	-2.400	0.008	1.197	0.116	7.191	0.027
CO2	-2.057	0.020	-0.327	0.372	4.337	0.114
CO3	-2.267	0.012	0.359	0.360	5.268	0.072
AD1	-2.426	0.008	1.130	0.129	7.164	0.028
AD2	-2.227	0.013	0.860	0.195	5.700	0.058
AD3	-2.808	0.002	1.639	0.051	10.570	0.005
AD4	-3.149	0.001	2.206	0.014	14.782	0.001

Appendix C3: Test of Normality of Exchange Variables based on Perception Scores (Architect Sub-sample n=89)

UNIVARIATE SUMMARY STATISTICS FOR CONTINUOUS VARIABLES

VARIABLE	MEAN	ST. DEV.	SKEWNESS	KURTOSIS	MINIMUM	FREQ.	MAXIMUM	FREQ.
PE1	4.472	1.289	0.096	-0.388	2.000	6	7.000	7
PE2	4.955	1.137	0.090	-0.744	3.000	9	7.000	9
PE3	4.562	1.118	0.141	-0.514	2.000	1	7.000	4
PE4	4.528	1.109	0.311	-0.641	3.000	18	7.000	4
PE5	5.000	1.138	0.047	-0.840	3.000	8	7.000	9
PE6	4.195	1.251	0.259	0.172	1.000	1	7.000	5
PE7	4.449	1.288	-0.245	0.179	1.000	2	7.000	5
FE1	4.494	1.358	-0.155	-0.097	1.000	2	7.000	7
FE2	5.045	1.322	-0.387	-0.120	1.000	1	7.000	13
FE3	4.864	1.358	-0.498	0.260	1.000	2	7.000	10
FE4	5.001	1.243	-0.364	-0.153	2.000	4	7.000	10
IE1	4.708	1.281	-0.427	-0.189	1.000	1	7.000	5
IE2	4.888	1.265	-0.404	0.032	1.000	1	7.000	8
IE3	4.663	1.422	-0.496	-0.040	1.000	3	7.000	7
IE4	4.146	1.442	0.041	-0.332	1.000	3	7.000	6
SE1	4.697	1.256	-0.001	-0.415	2.000	4	7.000	8
SE2	4.449	1.365	-0.261	-0.352	1.000	2	7.000	4
SE3	4.416	1.269	-0.353	0.159	1.000	2	7.000	3
SE4	4.382	1.123	-0.067	0.135	2.000	6	7.000	3
SE5	4.258	1.153	0.021	0.128	1.000	1	7.000	3
CO1	4.416	1.146	0.003	-0.154	2.000	5	7.000	3
CO2	4.236	1.454	-0.310	-0.222	1.000	5	7.000	4
CO3	4.573	1.330	-0.531	0.291	1.000	3	7.000	5
AD1	4.124	1.551	-0.043	-0.685	1.000	4	7.000	6
AD2	3.921	1.590	0.028	-0.724	1.000	6	7.000	5
AD3	4.101	1.407	0.168	-0.460	1.000	2	7.000	5
AD4	4.281	1.414	0.028	-0.470	1.000	2	7.000	6

TEST OF UNIVARIATE NORMALITY FOR CONTINUOUS VARIABLES

	SKEWNESS		KURTOSIS		SKEWNESS AND KURTOSIS	
	Z-SCORE	P-VALUE	Z-SCORE	P-VALUE	CHI-SQUARE	P-VALUE
PE1	0.374	0.354	-0.613	0.270	0.516	0.773
PE2	0.349	0.363	-1.891	0.029	3.697	0.157
PE3	0.551	0.291	-1.004	0.158	1.312	0.519
PE4	1.212	0.113	-1.461	0.072	3.606	0.165
PE5	0.184	0.427	-2.352	0.009	5.565	0.062
PE6	1.008	0.157	0.664	0.253	1.458	0.483
PE7	-0.952	0.170	0.676	0.249	1.364	0.506
FE1	-0.604	0.273	0.126	0.450	0.380	0.827
FE2	-1.507	0.066	0.076	0.470	2.276	0.321
FE3	-1.941	0.026	0.818	0.207	4.435	0.109
FE4	-1.419	0.078	-0.001	0.500	2.013	0.365
IE1	-1.663	0.048	-0.087	0.465	2.773	0.250
IE2	-1.573	0.058	0.399	0.345	2.634	0.268
IE3	-1.933	0.027	0.249	0.401	3.797	0.150
IE4	0.158	0.437	-0.453	0.325	0.231	0.891
SE1	-0.004	0.498	-0.692	0.244	0.479	0.787
SE2	-1.018	0.154	-0.509	0.305	1.296	0.523
SE3	-1.375	0.085	0.640	0.261	2.301	0.317
SE4	-0.262	0.397	0.596	0.276	0.424	0.809
SE5	0.080	0.468	0.584	0.280	0.347	0.841
CO1	0.012	0.495	-0.003	0.499	0.000	1.000
CO2	-1.205	0.114	-0.166	0.434	1.481	0.477
CO3	-2.067	0.019	0.869	0.192	5.028	0.081
AD1	-0.166	0.434	-1.637	0.051	2.708	0.258
AD2	0.107	0.457	-1.804	0.036	3.265	0.195
AD3	0.652	0.257	-0.829	0.203	1.113	0.573
AD4	0.108	0.457	-0.862	0.194	0.754	0.686

Appendix C4: Test of Normality of Exchange Variables based on Gap Scores (Combined Sample n=185)

NIVARIATE SUMMARY STATISTICS FOR CONTINUOUS VARIABLES

VARIABLE	MEAN	ST. DEV.	SKEWNESS	KURTOSIS	MINIMUM	FREQ.	MAXIMUM	FREQ.
PE1	-1.342	1.447	0.356	0.042	-5.000	1	3.000	2
PE2	-1.821	1.071	-0.070	-0.383	-4.000	12	1.000	1
PE3	-1.821	1.245	-0.004	0.219	-5.000	4	2.000	1
PE4	-1.739	1.254	0.078	-0.574	-4.000	16	1.000	6
PE5	-1.535	1.152	0.141	-0.148	-4.000	6	2.000	1
PE6	-2.016	1.353	-0.156	-0.311	-6.000	1	1.000	3
PE7	-1.587	1.365	-0.354	-0.031	-6.000	1	1.000	8
FE1	-1.708	1.286	-0.390	0.393	-6.000	2	2.000	1
FE2	-0.935	1.413	-0.175	0.443	-5.000	2	3.000	1
FE3	-1.484	1.277	-0.710	0.243	-6.000	1	1.000	1
FE4	-1.402	1.216	-0.579	0.218	-5.000	3	1.000	4
IE1	-1.011	1.622	0.149	0.357	-6.000	1	4.000	1
IE2	-1.424	1.480	0.282	2.140	-6.000	1	5.000	1
IE3	-1.697	1.361	-0.694	0.754	-6.000	3	1.000	4
IE4	-1.719	1.409	-0.051	0.474	-6.000	2	3.000	1
SE1	-1.486	1.336	0.185	0.620	-5.000	3	3.000	2
SE2	-1.211	1.377	-0.498	0.645	-5.000	7	2.000	2
SE3	-1.213	1.408	-0.063	0.790	-5.000	4	4.000	1
SE4	-0.076	1.435	0.458	1.185	-3.000	7	6.000	1
SE5	-0.854	1.279	-0.088	0.281	-5.000	1	3.000	1
CO1	-1.270	1.199	-0.287	0.571	-5.000	3	2.000	1
CO2	-1.562	1.382	-0.849	0.919	-6.000	4	1.000	3
CO3	-1.373	1.413	-0.391	0.994	-6.000	3	3.000	1
AD1	-2.033	1.444	-0.336	-0.050	-6.000	3	1.000	4
AD2	-1.995	1.491	-0.318	-0.169	-6.000	3	2.000	1
AD3	-1.462	1.410	-0.173	0.633	-6.000	1	3.000	2
AD4	-1.617	1.428	-0.326	0.040	-6.000	2	2.000	2

TEST OF UNIVARIATE NORMALITY FOR CONTINUOUS VARIABLES

	SKEWNESS		KURTOSIS		SKEWNESS AND KURTOSIS	
	Z-SCORE	P-VALUE	Z-SCORE	P-VALUE	CHI-SQUARE	P-VALUE
PE1	1.974	0.024	0.367	0.357	4.030	0.133
PE2	-0.636	0.262	-1.086	0.139	1.584	0.453
PE3	-0.040	0.484	0.823	0.205	0.679	0.712
PE4	0.704	0.241	-2.005	0.022	4.516	0.105
PE5	1.123	0.131	-0.210	0.417	1.306	0.520
PE6	-1.211	0.113	-0.796	0.213	2.102	0.350
PE7	-1.968	0.025	0.158	0.437	3.897	0.142
FE1	-2.065	0.019	1.216	0.112	5.743	0.057
FE2	-1.310	0.095	1.320	0.093	3.458	0.177
FE3	-2.664	0.004	0.880	0.189	7.873	0.020
FE4	-2.458	0.007	0.820	0.206	6.716	0.035
IE1	1.172	0.121	1.138	0.128	2.668	0.263
IE2	1.749	0.040	3.575	0.000	15.837	0.000
IE3	-2.642	0.004	1.896	0.029	10.574	0.005
IE4	-0.481	0.315	1.383	0.083	2.143	0.343
SE1	1.359	0.087	1.661	0.048	4.606	0.100
SE2	-2.308	0.010	1.707	0.044	8.240	0.016
SE3	-0.580	0.281	1.955	0.025	4.157	0.125
SE4	2.225	0.013	2.539	0.006	11.396	0.003
SE5	-0.774	0.220	0.970	0.166	1.539	0.463
CO1	-1.764	0.039	1.571	0.058	5.580	0.061
CO2	-2.846	0.002	2.160	0.015	12.767	0.002
CO3	-2.066	0.019	2.272	0.012	9.430	0.009
AD1	-1.918	0.028	0.101	0.460	3.689	0.158
AD2	-1.864	0.031	-0.279	0.390	3.551	0.169
AD3	-1.296	0.097	1.685	0.046	4.520	0.104
AD4	-1.889	0.029	0.361	0.359	3.698	0.157

Appendix C5: Test of Normality of Exchange Variables based on Gap Scores (Government Sub-sample n=96)

UNIVARIATE SUMMARY STATISTICS FOR CONTINUOUS VARIABLES

VARIABLE	MEAN	ST. DEV.	SKEWNESS	KURTOSIS	MINIMUM	FREQ.	MAXIMUM	FREQ.
PE1	-1.285	1.254	0.593	0.541	-4.000	1	3.000	1
PE2	-1.800	0.958	-0.343	-0.170	-4.000	5	0.000	6
PE3	-1.936	1.159	-0.336	0.148	-5.000	3	0.000	11
PE4	-1.698	1.249	-0.099	-0.757	-4.000	9	1.000	1
PE5	-1.625	0.997	-0.102	-0.379	-4.000	2	1.000	1
PE6	-2.010	1.334	-0.225	-0.471	-5.000	4	1.000	1
PE7	-1.631	1.322	-0.156	-0.607	-5.000	1	1.000	3
FE1	-1.594	1.139	-0.157	-0.727	-4.000	4	1.000	1
FE2	-1.177	1.407	-0.327	-0.001	-5.000	1	2.000	3
FE3	-1.604	1.156	-0.409	-0.330	-5.000	1	0.000	18
FE4	-1.479	1.205	-0.584	0.454	-5.000	2	1.000	2
IE1	-1.229	1.380	0.056	-0.017	-4.000	6	2.000	4
IE2	-1.661	1.228	-0.403	0.052	-5.000	2	1.000	2
IE3	-1.635	1.232	-0.318	0.449	-5.000	3	1.000	3
IE4	-1.573	1.229	0.763	1.414	-4.000	3	3.000	1
SE1	-1.479	1.142	-0.225	-0.190	-5.000	1	1.000	2
SE2	-1.188	1.356	-0.842	1.320	-5.000	5	1.000	9
SE3	-1.088	1.287	-0.346	0.623	-5.000	2	2.000	1
SE4	-0.032	1.476	0.819	2.319	-3.000	3	6.000	1
SE5	-0.979	1.170	-0.485	0.582	-5.000	1	1.000	9
CO1	-1.271	1.156	-0.327	0.531	-5.000	1	1.000	6
CO2	-1.438	1.159	-0.445	-0.660	-4.000	5	0.000	24
CO3	-1.281	1.295	0.275	0.446	-4.000	4	3.000	1
AD1	-1.772	1.201	-0.193	-0.329	-5.000	1	1.000	1
AD2	-1.927	1.233	-0.382	-0.114	-5.000	3	0.000	13
AD3	-1.526	1.288	-0.319	-0.422	-5.000	1	1.000	3
AD4	-1.555	1.202	-0.704	0.934	-6.000	1	1.000	1

TEST OF UNIVARIATE NORMALITY FOR CONTINUOUS VARIABLES

	SKEWNESS		KURTOSIS		SKEWNESS AND KURTOSIS	
	Z-SCORE	P-VALUE	Z-SCORE	P-VALUE	CHI-SQUARE	P-VALUE
PE1	2.398	0.008	1.274	0.101	7.371	0.025
PE2	-1.384	0.083	-0.064	0.475	1.920	0.383
PE3	-1.358	0.087	0.620	0.268	2.227	0.328
PE4	-0.401	0.344	-2.057	0.020	4.393	0.111
PE5	-0.411	0.341	-0.631	0.264	0.567	0.753
PE6	-0.910	0.181	-0.922	0.178	1.678	0.432
PE7	-0.631	0.264	-1.408	0.080	2.382	0.304
FE1	-0.634	0.263	-1.914	0.028	4.064	0.131
FE2	-1.320	0.093	0.322	0.374	1.847	0.397
FE3	-1.651	0.049	-0.487	0.313	2.963	0.227
FE4	-2.361	0.009	1.143	0.127	6.881	0.032
IE1	0.225	0.411	0.287	0.387	0.133	0.936
IE2	-1.628	0.052	0.431	0.333	2.837	0.242
IE3	-1.287	0.099	1.135	0.128	2.944	0.230
IE4	3.082	0.001	2.287	0.011	14.728	0.001
SE1	-0.911	0.181	-0.112	0.455	0.842	0.656
SE2	-3.402	0.000	2.198	0.014	16.401	0.000
SE3	-1.396	0.081	1.390	0.082	3.882	0.144
SE4	3.310	0.000	2.998	0.001	19.941	0.000
SE5	-1.958	0.025	1.331	0.092	5.607	0.061
CO1	-1.320	0.093	1.259	0.104	3.326	0.190
CO2	-1.798	0.036	-1.624	0.052	5.872	0.053
CO3	1.112	0.133	1.131	0.129	2.515	0.284
AD1	-0.779	0.218	-0.485	0.314	0.842	0.656
AD2	-1.544	0.061	0.070	0.472	2.389	0.303
AD3	-1.290	0.099	-0.762	0.223	2.244	0.326
AD4	-2.847	0.002	1.786	0.037	11.293	0.004

Appendix C6: Test of Normality of Exchange Variables based on Gap Scores (Architect Sub-sample n=89)

UNIVARIATE SUMMARY STATISTICS FOR CONTINUOUS VARIABLES

VARIABLE	MEAN	ST. DEV.	SKEWNESS	KURTOSIS	MINIMUM	FREQ.	MAXIMUM	FREQ.
PE1	-1.404	1.636	0.280	-0.414	-5.000	1	3.000	1
PE2	-1.843	1.186	0.106	-0.632	-4.000	7	1.000	1
PE3	-1.697	1.326	0.168	0.032	-5.000	1	2.000	1
PE4	-1.784	1.265	0.268	-0.349	-4.000	7	1.000	5
PE5	-1.438	1.296	0.165	-0.381	-4.000	4	2.000	1
PE6	-2.023	1.382	-0.091	-0.170	-6.000	1	1.000	2
PE7	-1.539	1.415	-0.546	0.479	-6.000	1	1.000	5
FE1	-1.831	1.424	-0.425	0.551	-6.000	2	2.000	1
FE2	-0.673	1.380	-0.001	0.778	-5.000	1	3.000	1
FE3	-1.354	1.390	-0.998	0.676	-6.000	1	1.000	1
FE4	-1.319	1.230	-0.598	0.004	-5.000	1	1.000	2
IE1	-0.775	1.826	0.025	0.185	-6.000	1	4.000	1
IE2	-1.169	1.680	0.360	2.060	-6.000	1	5.000	1
IE3	-1.764	1.493	-0.877	0.600	-6.000	3	1.000	1
IE4	-1.876	1.573	-0.352	-0.451	-6.000	2	1.000	2
SE1	-1.494	1.523	0.374	0.551	-5.000	2	3.000	2
SE2	-1.236	1.406	-0.170	0.065	-5.000	2	2.000	2
SE3	-1.348	1.523	0.198	0.900	-5.000	2	4.000	1
SE4	-0.124	1.397	-0.005	-0.470	-3.000	4	3.000	2
SE5	-0.719	1.382	0.086	-0.160	-4.000	2	3.000	1
CO1	-1.270	1.250	-0.256	0.578	-5.000	2	2.000	1
CO2	-1.697	1.584	-0.885	0.752	-6.000	4	1.000	3
CO3	-1.472	1.531	-0.774	0.916	-6.000	3	1.000	7
AD1	-2.315	1.628	-0.170	-0.357	-6.000	3	1.000	3
AD2	-2.067	1.731	-0.217	-0.564	-6.000	3	2.000	1
AD3	-1.393	1.535	-0.119	1.038	-6.000	1	3.000	2
AD4	-1.685	1.642	-0.096	-0.552	-6.000	1	2.000	2

TEST OF UNIVARIATE NORMALITY FOR CONTINUOUS VARIABLES

	SKEWNESS		KURTOSIS		SKEWNESS AND KURTOSIS	
	Z-SCORE	P-VALUE	Z-SCORE	P-VALUE	CHI-SQUARE	P-VALUE
PE1	1.092	0.137	-0.690	0.245	1.670	0.434
PE2	0.413	0.340	-1.428	0.077	2.209	0.331
PE3	0.652	0.257	0.399	0.345	0.585	0.746
PE4	1.042	0.149	-0.500	0.308	1.336	0.513
PE5	0.643	0.260	-0.593	0.277	0.764	0.682
PE6	-0.353	0.362	-0.042	0.483	0.127	0.939
PE7	-2.128	0.017	1.163	0.122	5.881	0.053
FE1	-1.656	0.049	1.267	0.103	4.347	0.114
FE2	-0.004	0.499	1.566	0.059	2.453	0.293
FE3	-3.885	0.000	1.437	0.075	17.160	0.000
FE4	-2.330	0.010	0.341	0.367	5.546	0.062
IE1	0.098	0.461	0.687	0.246	0.482	0.786
IE2	1.403	0.080	2.757	0.003	9.568	0.008
IE3	-3.416	0.000	1.335	0.091	13.453	0.001
IE4	-1.372	0.085	-0.802	0.211	2.525	0.283
SE1	1.455	0.073	1.267	0.103	3.724	0.155
SE2	-0.661	0.254	0.464	0.321	0.652	0.722
SE3	0.770	0.221	1.712	0.043	3.525	0.172
SE4	-0.020	0.492	-0.860	0.195	0.741	0.690
SE5	0.334	0.369	-0.018	0.493	0.112	0.946
CO1	-0.996	0.160	1.304	0.096	2.693	0.260
CO2	-3.444	0.000	1.534	0.062	14.218	0.001
CO3	-3.014	0.001	1.730	0.042	12.075	0.002
AD1	-0.663	0.254	-0.522	0.301	0.712	0.701
AD2	-0.844	0.199	-1.176	0.120	2.096	0.351
AD3	-0.465	0.321	1.867	0.031	3.700	0.157
AD4	-0.375	0.354	-1.135	0.128	1.429	0.489

Appendix C7: Test of Normality of Overall Evaluation Variables (Combined Sample n=185)

UNIVARIATE SUMMARY STATISTICS FOR CONTINUOUS VARIABLES

VARIABLE	MEAN	ST. DEV.	SKEWNESS	KURTOSIS	MINIMUM	FREQ.	MAXIMUM	FREQ.
ATM1	4.908	0.925	-0.357	0.047	2.000	1	7.000	4
ATM2	4.854	0.863	-0.431	0.054	3.000	16	7.000	2
ATM3	4.773	1.256	-0.659	0.039	1.000	2	7.000	7
SQ1	4.497	1.074	-0.645	-0.172	1.000	1	6.000	27
SQ2	4.659	1.127	-0.634	-0.286	2.000	9	7.000	1
SQ3	4.351	1.243	-0.368	-0.590	1.000	1	7.000	2
SAT1	4.432	1.126	-0.637	0.010	1.000	1	7.000	1
SAT2	4.243	1.099	-0.645	0.036	1.000	2	6.000	16
SAT3	4.416	1.081	-0.630	0.056	1.000	1	6.000	25
BEH1	4.573	1.205	-0.465	-0.013	1.000	1	7.000	6
BEH2	4.585	1.217	-0.529	0.124	1.000	2	7.000	6
BEH3	4.372	1.248	-0.297	-0.059	1.000	3	7.000	5
BEH4	4.272	1.220	-0.340	0.170	1.000	5	7.000	3
BEH5	4.294	1.241	-0.218	0.069	1.000	3	7.000	6

TEST OF UNIVARIATE NORMALITY FOR CONTINUOUS VARIABLES

	SKEWNESS		KURTOSIS		SKEWNESS AND KURTOSIS	
	Z-SCORE	P-VALUE	Z-SCORE	P-VALUE	CHI-SQUARE	P-VALUE
ATM1	-1.978	0.024	0.379	0.352	4.056	0.132
ATM2	-2.163	0.015	0.398	0.345	4.837	0.089
ATM3	-2.590	0.005	0.358	0.360	6.835	0.033
SQ1	-2.567	0.005	-0.290	0.386	6.675	0.036
SQ2	-2.551	0.005	-0.696	0.243	6.991	0.030
SQ3	-2.007	0.022	-2.096	0.018	8.420	0.015
SAT1	-2.556	0.005	0.277	0.391	6.608	0.037
SAT2	-2.568	0.005	0.350	0.363	6.717	0.035
SAT3	-2.544	0.005	0.405	0.343	6.633	0.036
BEH1	-2.239	0.013	0.210	0.417	5.059	0.080
BEH2	-2.368	0.009	0.585	0.279	5.949	0.051
BEH3	-1.797	0.036	0.073	0.471	3.235	0.198
BEH4	-1.928	0.027	0.704	0.241	4.214	0.122
BEH5	-1.507	0.066	0.439	0.330	2.465	0.292

Appendix C8: Test of Normality of Overall Evaluation Variables (Government Sub-sample n=96)

UNIVARIATE SUMMARY STATISTICS FOR CONTINUOUS VARIABLES

VARIABLE	MEAN	ST. DEV.	SKEWNESS	KURTOSIS	MINIMUM	FREQ.	MAXIMUM	FREQ.
ATM1	5.146	0.833	-0.393	-0.090	3.000	3	7.000	2
ATM2	5.042	0.767	-0.501	0.678	3.000	4	7.000	1
ATM3	5.062	1.113	-0.734	0.387	2.000	3	7.000	5
SQ1	4.698	0.953	-1.146	1.784	1.000	1	6.000	14
SQ2	4.865	1.022	-0.750	0.419	2.000	3	7.000	1
SQ3	4.604	1.218	-0.480	-0.391	2.000	7	7.000	2
SAT1	4.656	1.094	-0.804	0.888	1.000	1	7.000	1
SAT2	4.510	1.056	-0.931	0.911	1.000	1	6.000	13
SAT3	4.656	1.055	-0.863	0.902	1.000	1	6.000	20
BEH1	4.729	1.183	-0.702	0.598	1.000	1	7.000	3
BEH2	4.658	1.166	-0.840	1.024	1.000	2	7.000	2
BEH3	4.393	1.233	-0.454	0.449	1.000	3	7.000	2
BEH4	4.243	1.217	-0.775	0.773	1.000	5	6.000	14
BEH5	4.252	1.219	-0.612	0.440	1.000	3	7.000	1

TEST OF UNIVARIATE NORMALITY FOR CONTINUOUS VARIABLES

	SKEWNESS		KURTOSIS		SKEWNESS AND KURTOSIS	
	Z-SCORE	P-VALUE	Z-SCORE	P-VALUE	CHI-SQUARE	P-VALUE
ATM1	-1.589	0.056	0.124	0.451	2.539	0.281
ATM2	-2.023	0.022	1.465	0.072	6.240	0.044
ATM3	-2.966	0.002	1.037	0.150	9.876	0.007
SQ1	-4.631	0.000	2.608	0.005	28.248	0.000
SQ2	-3.029	0.001	1.089	0.138	10.360	0.006
SQ3	-1.939	0.026	-0.667	0.252	4.204	0.122
SAT1	-3.250	0.001	1.732	0.042	13.561	0.001
SAT2	-3.762	0.000	1.759	0.039	17.248	0.000
SAT3	-3.487	0.000	1.748	0.040	15.214	0.000
BEH1	-2.835	0.002	1.354	0.088	9.873	0.007
BEH2	-3.395	0.000	1.889	0.029	15.096	0.001
BEH3	-1.833	0.033	1.135	0.128	4.648	0.098
BEH4	-3.133	0.001	1.590	0.056	12.345	0.002
BEH5	-2.472	0.007	1.121	0.131	7.366	0.025

Appendix C9: Test of Normality of Overall Evaluation Variables (Architect Sub-sample n=89)

UNIVARIATE SUMMARY STATISTICS FOR CONTINUOUS VARIABLES

VARIABLE	MEAN	ST. DEV.	SKEWNESS	KURTOSIS	MINIMUM	FREQ.	MAXIMUM	FREQ.
ATM1	4.652	0.955	-0.206	0.129	2.000	1	7.000	2
ATM2	4.652	0.918	-0.236	-0.359	3.000	12	7.000	1
ATM3	4.461	1.332	-0.489	-0.335	1.000	2	7.000	2
SQ1	4.281	1.158	-0.213	-0.998	2.000	5	6.000	13
SQ2	4.438	1.196	-0.462	-0.829	2.000	6	6.000	17
SQ3	4.079	1.218	-0.308	-0.772	1.000	1	6.000	9
SAT1	4.191	1.117	-0.538	-0.663	2.000	9	6.000	6
SAT2	3.955	1.076	-0.469	-0.365	1.000	1	6.000	3
SAT3	4.157	1.054	-0.501	-0.467	2.000	8	6.000	5
BEH1	4.404	1.213	-0.241	-0.381	2.000	7	7.000	3
BEH2	4.506	1.271	-0.250	-0.501	2.000	7	7.000	4
BEH3	4.348	1.271	-0.143	-0.531	2.000	9	7.000	3
BEH4	4.303	1.228	0.111	-0.541	2.000	6	7.000	3
BEH5	4.340	1.269	0.146	-0.381	2.000	7	7.000	5

TEST OF UNIVARIATE NORMALITY FOR CONTINUOUS VARIABLES

	SKEWNESS		KURTOSIS		SKEWNESS AND KURTOSIS	
	Z-SCORE	P-VALUE	Z-SCORE	P-VALUE	CHI-SQUARE	P-VALUE
ATM1	-0.803	0.211	0.585	0.279	0.987	0.611
ATM2	-0.918	0.179	-0.529	0.298	1.123	0.570
ATM3	-1.905	0.028	-0.462	0.322	3.844	0.146
SQ1	-0.828	0.204	-3.283	0.001	11.466	0.003
SQ2	-1.799	0.036	-2.295	0.011	8.501	0.014
SQ3	-1.199	0.115	-2.016	0.022	5.504	0.064
SAT1	-2.097	0.018	-1.549	0.061	6.795	0.033
SAT2	-1.828	0.034	-0.547	0.292	3.641	0.162
SAT3	-1.951	0.026	-0.852	0.197	4.533	0.104
BEH1	-0.938	0.174	-0.593	0.277	1.231	0.540
BEH2	-0.975	0.165	-0.960	0.168	1.873	0.392
BEH3	-0.559	0.288	-1.061	0.144	1.437	0.487
BEH4	0.431	0.333	-1.096	0.136	1.387	0.500
BEH5	0.570	0.284	-0.591	0.277	0.674	0.714

APPENDIX D

Test of Discriminant Validity (Exchange Variables)

Appendix D1: Test of Discriminant Validity (Bagozzi and Phillips, 1982) (Combined Sample n=185)

Perception-based	χ^2	df	$\Delta\chi^2/\Delta df$	*p*
1. Unconstrained Model	489.12	237	----	----
2. Constrained Model				
PE and FE fixed at 1.0	692.42	238	203.30	< 0.001
PE and IE fixed at 1.0	570.59	238	81.30	< 0.001
PE and SE fixed at 1.0	654.04	238	164.92	< 0.001
PE and CO fixed at 1.0	588.22	238	99.10	< 0.001
PE and AD fixed at 1.0	752.69	238	263.57	< 0.001
FE and IE fixed at 1.0	627.2	238	138.08	< 0.001
FE and SE fixed at 1.0	719.4	238	230.28	< 0.001
FE and CO fixed at 1.0	619.96	238	130.84	< 0.001
FE and AD fixed at 1.0	729.77	238	240.65	< 0.001
IE and SE fixed at 1.0	582.93	238	93.81	< 0.001
IE and CO fixed at 1.0	572.28	238	83.16	< 0.001
IE and AD fixed at 1.0	626.62	238	137.50	< 0.001
SE and CO fixed at 1.0	523.75	238	34.63	< 0.001
SE and AD fixed at 1.0	687.37	238	198.25	< 0.001
CO and AD fixed at 1.0	546.51	238	57.39	< 0.001
Gap-based	χ^2	df	$\Delta\chi^2/\Delta df$	*p*
1. Unconstrained Model	541.49	237	----	----
2. Constrained Model				
PE and FE fixed at 1.0	615.29	238	73.80	< 0.001
PE and IE fixed at 1.0	582.92	238	41.43	< 0.001
PE and SE fixed at 1.0	647.61	238	106.12	< 0.001
PE and CO fixed at 1.0	615.09	238	73.60	< 0.001
PE and AD fixed at 1.0	642.12	238	100.63	< 0.001
FE and IE fixed at 1.0	600.12	238	58.63	< 0.001
FE and SE fixed at 1.0	651.00	238	109.51	< 0.001
FE and CO fixed at 1.0	655.11	238	113.62	< 0.001
FE and AD fixed at 1.0	670.31	238	128.82	< 0.001
IE and SE fixed at 1.0	593.39	238	51.90	< 0.001
IE and CO fixed at 1.0	602.98	238	61.49	< 0.001
IE and AD fixed at 1.0	619.85	238	78.36	< 0.001
SE and CO fixed at 1.0	612.21	238	70.72	< 0.001
SE and AD fixed at 1.0	694.56	238	153.07	< 0.001
CO and AD fixed at 1.0	588.44	238	46.95	< 0.001

Appendix D2: Test of Discriminant Validity (Bagozzi and Phillips, 1982) (Government Sub-sample n=96)

Perception-based	χ^2	df	$\Delta\chi^2/\Delta df$	*p*
1. Unconstrained Model	422.06	237	----	----
2. Constrained Model				
PE and FE fixed at 1.0	504.32	238	82.26	< 0.001
PE and IE fixed at 1.0	457.19	238	35.13	< 0.001
PE and SE fixed at 1.0	498.38	238	76.32	< 0.001
PE and CO fixed at 1.0	457.25	238	35.19	< 0.001
PE and AD fixed at 1.0	482.24	238	60.18	< 0.001
FE and IE fixed at 1.0	477.73	238	55.67	< 0.001
FE and SE fixed at 1.0	527.39	238	105.33	< 0.001
FE and CO fixed at 1.0	598.50	238	176.44	< 0.001
FE and AD fixed at 1.0	509.16	238	87.10	< 0.001
IE and SE fixed at 1.0	469.32	238	47.26	< 0.001
IE and CO fixed at 1.0	464.17	238	42.11	< 0.001
IE and AD fixed at 1.0	454.44	238	32.38	< 0.001
SE and CO fixed at 1.0	439.91	238	17.85	< 0.001
SE and AD fixed at 1.0	496.12	238	74.06	< 0.001
CO and AD fixed at 1.0	453.17	238	31.11	< 0.001

Gap-based	χ^2	df	$\Delta\chi^2/\Delta df$	*p*
1. Unconstrained Model	390.13	237	----	----
2. Constrained Model				
PE and FE fixed at 1.0	410.19	238	20.06	< 0.001
PE and IE fixed at 1.0	431.82	238	41.69	< 0.001
PE and SE fixed at 1.0	431.38	238	41.25	< 0.001
PE and CO fixed at 1.0	402.25	238	12.12	< 0.001
PE and AD fixed at 1.0	423.37	238	33.24	< 0.001
FE and IE fixed at 1.0	428.66	238	38.53	< 0.001
FE and SE fixed at 1.0	451.32	238	61.19	< 0.001
FE and CO fixed at 1.0	425.50	238	35.37	< 0.001
FE and AD fixed at 1.0	435.79	238	45.66	< 0.001
IE and SE fixed at 1.0	429.64	238	39.51	< 0.001
IE and CO fixed at 1.0	416.58	238	26.45	< 0.001
IE and AD fixed at 1.0	437.56	238	47.43	< 0.001
SE and CO fixed at 1.0	399.35	238	9.22	< 0.005
SE and AD fixed at 1.0	435.10	238	44.97	< 0.001
CO and AD fixed at 1.0	405.30	238	15.17	< 0.001

Appendix D3: Test of Discriminant Validity (Bagozzi and Phillips, 1982) (Architect Sub-sample n=89)

Perception-based	χ^2	df	$\Delta\chi^2/\Delta df$	*p*
1. Unconstrained Model	486.27	237	----	----
2. Constrained Model				
PE and FE fixed at 1.0	606.88	238	120.61	< 0.001
PE and IE fixed at 1.0	537.38	238	51.11	< 0.001
PE and SE fixed at 1.0	550.85	238	64.58	< 0.001
PE and CO fixed at 1.0	544.66	238	58.39	< 0.001
PE and AD fixed at 1.0	673.11	238	186.84	< 0.001
FE and IE fixed at 1.0	573.80	238	87.53	< 0.001
FE and SE fixed at 1.0	599.06	238	112.79	< 0.001
FE and CO fixed at 1.0	550.64	238	64.37	< 0.001
FE and AD fixed at 1.0	628.80	238	142.53	< 0.001
IE and SE fixed at 1.0	524.45	238	38.18	< 0.001
IE and CO fixed at 1.0	527.09	238	40.82	< 0.001
IE and AD fixed at 1.0	580.49	238	94.22	< 0.001
SE and CO fixed at 1.0	502.65	238	16.38	< 0.001
SE and AD fixed at 1.0	605.99	238	119.72	< 0.001
CO and AD fixed at 1.0	516.73	238	30.46	< 0.001
Gap-based	χ^2	df	$\Delta\chi^2/\Delta df$	*p*
1. Unconstrained Model	511.39	237	----	----
2. Constrained Model				
PE and FE fixed at 1.0	560.40	238	49.01	< 0.001
PE and IE fixed at 1.0	523.99	238	37.72	< 0.001
PE and SE fixed at 1.0	571.98	238	85.71	< 0.001
PE and CO fixed at 1.0	575.26	238	88.99	< 0.001
PE and AD fixed at 1.0	574.77	238	88.50	< 0.001
FE and IE fixed at 1.0	538.97	238	52.70	< 0.001
FE and SE fixed at 1.0	559.50	238	73.23	< 0.001
FE and CO fixed at 1.0	591.50	238	105.23	< 0.001
FE and AD fixed at 1.0	587.86	238	101.59	< 0.001
IE and SE fixed at 1.0	531.19	238	44.92	< 0.001
IE and CO fixed at 1.0	531.28	238	45.01	< 0.001
IE and AD fixed at 1.0	545.60	238	59.33	< 0.001
SE and CO fixed at 1.0	578.32	238	92.05	< 0.001
SE and AD fixed at 1.0	613.00	238	126.73	< 0.001
CO and AD fixed at 1.0	551.26	238	64.99	< 0.001

APPENDIX E

Test of Discriminant Validity (Exogenous and Endogenous Variables)

Appendix E1: Test of Discriminant Validity (Bagozzi and Phillips, 1982) (Combined Sample n=185)

Perception-based	χ^2	Df	$\Delta\chi^2/\Delta df$	*p*
1. Unconstrained Model	309.40	137	----	----
2. Constrained Model				
ATM and SQ fixed at 1.0	337.91	138	28.51	< 0.001
ATM and SAT fixed at 1.0	385.10	138	75.70	< 0.001
ATM and BI fixed at 1.0	435.54	138	126.14	< 0.001
ATM and TQ fixed at 1.0	401.00	138	91.60	< 0.001
ATM and RQ fixed at 1.0	366.31	138	56.91	< 0.001
SQ and SAT fixed at 1.0	337.17	138	27.77	< 0.001
SQ and BI fixed at 1.0	416.37	138	106.97	< 0.001
SQ and TQ fixed at 1.0	416.36	138	106.96	< 0.001
SQ and RQ fixed at 1.0	374.25	138	64.85	< 0.001
SAT and BI fixed at 1.0	516.28	138	206.88	< 0.001
SAT and TQ fixed at 1.0	520.99	138	211.59	< 0.001
SAT and RQ fixed at 1.0	403.81	138	94.41	< 0.001
BI and TQ fixed at 1.0	538.08	138	228.68	< 0.001
BI and RQ fixed at 1.0	403.13	138	93.73	< 0.001
TQ and RQ fixed at 1.0	323.52	138	14.12	< 0.001
Gap-based	χ^2	df	$\Delta\chi^2/\Delta df$	*p*
1. Unconstrained Model	292.05	137	----	----
2. Constrained Model				
ATM and SQ fixed at 1.0	320.73	138	28.68	< 0.001
ATM and SAT fixed at 1.0	367.61	138	75.56	< 0.001
ATM and BI fixed at 1.0	418.09	138	126.04	< 0.001
ATM and TQ fixed at 1.0	493.55	138	201.50	< 0.001
ATM and RQ fixed at 1.0	368.77	138	76.72	< 0.001
SQ and SAT fixed at 1.0	320.38	138	28.33	< 0.001
SQ and BI fixed at 1.0	399.51	138	107.46	< 0.001
SQ and TQ fixed at 1.0	485.49	138	193.44	< 0.001
SQ and RQ fixed at 1.0	366.13	138	74.08	< 0.001
SAT and BI fixed at 1.0	498.62	138	206.57	< 0.001
SAT and TQ fixed at 1.0	518.30	138	226.25	< 0.001
SAT and RQ fixed at 1.0	378.95	138	86.90	< 0.001
BI and TQ fixed at 1.0	517.36	138	225.31	< 0.001
BI and RQ fixed at 1.0	374.60	138	82.55	< 0.001
TQ and RQ fixed at 1.0	311.72	138	19.67	< 0.001

Appendix E2: Test of Discriminant Validity (Bagozzi and Phillips, 1982) (Government Sub-sample n=96)

Perception-based	χ^2	df	$\Delta\chi^2/\Delta df$	*p*
1. Unconstrained Model	219.82	137	----	----
2. Constrained Model				
ATM and SQ fixed at 1.0	241.75	138	21.93	< 0.001
ATM and SAT fixed at 1.0	266.88	138	47.06	< 0.001
ATM and BI fixed at 1.0	272.67	138	52.85	< 0.001
ATM and TQ fixed at 1.0	276.85	138	57.03	< 0.001
ATM and RQ fixed at 1.0	238.67	138	18.85	< 0.001
SQ and SAT fixed at 1.0	235.58	138	15.76	< 0.001
SQ and BI fixed at 1.0	250.15	138	30.33	< 0.001
SQ and TQ fixed at 1.0	279.67	138	59.85	< 0.001
SQ and RQ fixed at 1.0	244.49	138	24.67	< 0.001
SAT and BI fixed at 1.0	245.04	138	25.22	< 0.001
SAT and TQ fixed at 1.0	344.81	138	124.99	< 0.001
SAT and RQ fixed at 1.0	257.03	138	37.21	< 0.001
BI and TQ fixed at 1.0	328.53	138	108.71	< 0.001
BI and RQ fixed at 1.0	256.19	138	36.37	< 0.001
TQ and RQ fixed at 1.0	219.85	138	0.03	> 0.100
Gap-based	χ^2	df	$\Delta\chi^2/\Delta df$	*p*
1. Unconstrained Model	222.56	137	----	----
2. Constrained Model				
ATM and SQ fixed at 1.0	244.47	138	21.91	< 0.001
ATM and SAT fixed at 1.0	269.36	138	46.80	< 0.001
ATM and BI fixed at 1.0	275.13	138	52.57	< 0.001
ATM and TQ fixed at 1.0	331.50	138	108.94	< 0.001
ATM and RQ fixed at 1.0	255.95	138	33.39	< 0.001
SQ and SAT fixed at 1.0	239.03	138	16.47	< 0.001
SQ and BI fixed at 1.0	253.55	138	30.99	< 0.001
SQ and TQ fixed at 1.0	327.98	138	105.42	< 0.001
SQ and RQ fixed at 1.0	257.69	138	35.13	< 0.001
SAT and BI fixed at 1.0	247.81	138	25.25	< 0.001
SAT and TQ fixed at 1.0	340.82	138	118.26	< 0.001
SAT and RQ fixed at 1.0	258.40	138	35.84	< 0.001
BI and TQ fixed at 1.0	337.16	138	114.60	< 0.001
BI and RQ fixed at 1.0	258.87	138	36.31	< 0.001
TQ and RQ fixed at 1.0	223.10	138	0.54	> 0.100

Appendix E3: Test of Discriminant Validity (Bagozzi and Phillips, 1982) (Architect Sub-sample n=89)

Perception-based	χ^2	df	$\Delta\chi^2/\Delta df$	*p*
1. Unconstrained Model	252.95	137	----	----
2. Constrained Model				
ATM and SQ fixed at 1.0	261.34	138	8.39	< 0.005
ATM and SAT fixed at 1.0	280.20	138	27.25	< 0.001
ATM and BI fixed at 1.0	300.99	138	48.04	< 0.001
ATM and TQ fixed at 1.0	289.58	138	36.63	< 0.001
ATM and RQ fixed at 1.0	290.19	138	37.24	< 0.001
SQ and SAT fixed at 1.0	263.23	138	10.28	< 0.001
SQ and BI fixed at 1.0	310.25	138	57.30	< 0.001
SQ and TQ fixed at 1.0	302.05	138	49.10	< 0.001
SQ and RQ fixed at 1.0	291.71	138	38.76	< 0.001
SAT and BI fixed at 1.0	380.70	138	127.75	< 0.001
SAT and TQ fixed at 1.0	343.32	138	90.37	< 0.001
SAT and RQ fixed at 1.0	306.64	138	53.69	< 0.001
BI and TQ fixed at 1.0	374.75	138	121.80	< 0.001
BI and RQ fixed at 1.0	301.04	138	48.09	< 0.001
TQ and RQ fixed at 1.0	269.60	138	16.65	< 0.001

Gap-based	χ^2	df	$\Delta\chi^2/\Delta df$	*p*
1. Unconstrained Model	236.12	137	----	----
2. Constrained Model				
ATM and SQ fixed at 1.0	244.42	138	8.30	< 0.005
ATM and SAT fixed at 1.0	263.39	138	27.27	< 0.001
ATM and BI fixed at 1.0	284.28	138	48.16	< 0.001
ATM and TQ fixed at 1.0	296.60	138	60.48	< 0.001
ATM and RQ fixed at 1.0	274.24	138	38.12	< 0.001
SQ and SAT fixed at 1.0	246.10	138	9.98	< 0.005
SQ and BI fixed at 1.0	293.16	138	57.04	< 0.001
SQ and TQ fixed at 1.0	307.56	138	71.44	< 0.001
SQ and RQ fixed at 1.0	271.41	138	35.29	< 0.001
SAT and BI fixed at 1.0	364.09	138	127.97	< 0.001
SAT and TQ fixed at 1.0	326.62	138	90.50	< 0.001
SAT and RQ fixed at 1.0	282.35	138	46.23	< 0.001
BI and TQ fixed at 1.0	344.07	138	107.95	< 0.001
BI and RQ fixed at 1.0	278.04	138	41.92	< 0.001
TQ and RQ fixed at 1.0	253.33	138	17.21	< 0.001