

SERVICE QUALITY INDICATORS FOR BUSINESS SUPPORT SERVICES

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I confirm that the work presented in this thesis is my own. Where information has been derived from other sources, I confirm that this has been indicated in the thesis.

A handwritten signature in black ink, appearing to read 'Hermen Jan van Ree', written in a cursive style.

Hermen Jan van Ree

ABSTRACT

Quality is critical to corporate success as it plays a vital role in improving organisational productivity. It can be defined as 'the totality of inherent characteristics of a product or service that bear on its ability to increase the demand for that product or service at a fixed price' and can best be measured by capturing customer perceptions of the performance of those characteristics.

Customising the SERVPERF methodology to measure service quality in a business-to-business context and subsequently testing it on both customers and suppliers of cleaning, catering and security services, the research led to a number of important and valuable insights concerning the service quality construct in a business-to-business environment.

First, service quality in relation to cleaning, catering and security services consists of nine clear dimensions: *reliability, clout, reputation, awareness, competitiveness, collaboration, accessibility, competence* and *assurance*. The nine-dimensional construct identified shows high reliability and good validity in statistical terms.

Furthermore, eight of the nine service quality dimensions are strongly or moderately yet significantly related to customer perceived service quality and customer satisfaction - *clout* being the exception. The same eight dimensions are significantly, but moderately related to purchase intention - suggesting that there might be other constructs important in making a purchase decision (e.g. the costs of service delivery).

Third, relating the nine service quality dimensions to the financial performance of supplier organisations, it was identified that six of the nine dimensions have significant relationships with one or more of the ten financial performance measures investigated - *reliability, accessibility* and *competence* being the exceptions.

Finally, it was identified that customer organisations have significantly lower perceptions of the service quality they receive than do supplier organisations for *competitiveness, collaboration, accessibility* and *competence*. Moreover, customer perceived performance is significantly lower than customer perceived importance for eight of the nine service quality dimensions.

For customer organisations, the empirical findings can be used to develop a framework of Service Quality Indicators, which can be used for monitoring and benchmarking service quality perception. For supplier organisations, the findings can be used for resource-allocation decisions pertaining to improve service quality, customer satisfaction and ultimately purchase intentions.

It should be noted that the research is exploratory in nature and has only begun to address the many issues that are important in the management of business support services, but the questions addressed - what quality dimensions are important for customer satisfaction and what quality dimensions are important for supplier performance - are arguably among the most important in service quality management.

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Hermen Jan van Ree

“The quality of a person's life is in direct proportion to their commitment to excellence, regardless of their chosen field of endeavour.”

Vincent Thomas “Vince” Lombardi (1913-1970)

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1 GENERAL INTRODUCTION

In this introduction we first outline the context to this thesis through the use of five famous and widely used quotes. Second, we describe the problem area and subsequent research focus. From there, we define our main objective as well as our research questions. We conclude this introduction with an overview of the organisation of this thesis.

1.1 CONTEXT AND SCENE SETTING

Adding to John Ruskin's quote, Foster stated that "Quality is never an accident; it is always the result of high intention, sincere effort, intelligent direction and skilful execution" (n.d.). Although this quote may

"Quality is never an accident; it is always the result of intelligent effort"

John Ruskin (1819-1900)

demonstrate the thoughtful nature of quality, it is also well understood that quality is elusive and complex - in concept and definition, in production and delivery as well as in measurement and management. This is further complicated when looking at quality in relation to service operations (as opposed to product manufacturing), especially in a business-to-business environment (as opposed to a business-to-consumer context).

To elucidate the wider context of this thesis, before moving on to defining quality and describing its role in both service operations and business-to-business settings, we start by highlighting the importance of quality.

Relevance of quality - This quote by Orison Marden unambiguously reminds us of the importance of quality - in the wider society in general and the commercial marketplace more specifically. Although

"Quality is the deciding factor on how much offerings are valued by the world"

Orison S. Marden (1850-1924)

purchase decisions are still extensively driven by price, quality variables such as reliability and competence as well as reputation and communication are believed to become increasingly important. As both end-user consumers and institutional customers are no longer impressed by average quality products and services (George 1992), quality management has shifted from being an extracurricular activity to being an essential prerequisite (Chang et al. 1993). According to Harrington (1987) the debate has moved away from 'quality costs money' towards 'quality makes money'. In considering quality, it is not only necessary to realise that quality and profit are not mutually exclusive (Mizuno 1992), but also that quality has become a key differentiator to survive in an increasingly competitive marketplace. Put succinctly by the Juran Institute "To survive in today's environment of global competition, never-ending change and complexity, rising customer expectations and continuous cost pressures, focussing on quality is no longer a choice; it is mandatory" (1994).

Although quality is seen as essential to corporate success (Devlin and Dong 1994), one has to be able to measure it before being able to properly manage it (Drucker 1974). Consequently, a clear definition of quality is needed. However, adequate and commonly shared definitions of quality are rarely found within both academic and commercial circles (Tangen 2005).

Note: Business-to-business (B2B) describes commerce transactions (i.e. the exchange of products, services and/or information) between businesses, such as between a manufacturer and a retailer (cf. OECD 2000). In contrast, business-to-consumer (B2C) describes commerce transactions between a business and a consumer, such as between a retailer and a consumer.

Defining quality - In his illustrious book "Zen and the Art of Motorcycle Maintenance", Robert Pirsig repeatedly emphasised the notion that quality is an elusive and indistinct construct. Subsequently, it is not surprising that many researchers and practitioners found that quality is difficult to define and measure (e.g. Rathmell 1966, Crosby 1979, Parasuraman et al. 1985, Cronin and Taylor 1992, Grönroos 2000). Often mistaken for or misrepresented with imprecise adjectives like superiority or luxury (Crosby 1979), quality and especially its underlying characteristics are difficult to pin down for both customers and suppliers of both products and services (Takeuchi and Quelch 1983). Operationalisation of quality and its features also present serious challenges for academics and researchers who often bypass clear definitions to capture this complex construct (Parasuraman et al. 1985).

"Quality is neither mind nor matter, but a certain entity independent of the other two"

Robert M. Pirsig (1928-)

Researchers and practitioners from philosophy, economics, operations and marketing have offered rival opinions on what quality is (Forker et al. 1996). Following extensive research by Garvin (1984), these viewpoints can be classified into four categories of quality approaches:

- Philosophy: innate excellence - although difficult to define, it is absolute and universally recognised (Pirsig 1974) through experience (Forker et al. 1996)
- Economics: quantity of desired ingredients or attributes (Abbott 1955) or the weighted sum of desired attributes in a product or service (Leffler 1982)
- Operations: conformance to requirements (Crosby 1979) - specifications in the case of products (Gilmore 1974) and expectations in the case of services (Lewis and Booms 1983)
- Marketing: satisfaction of consumer preferences (Kuehn and Day 1962, Edwards 1968), simplified by Juran (1974) as fitness for use.

According to Garvin (1984) value-based definitions take these four approaches one step further by defining quality in terms of cost and price. A more value-based definition of quality would be 'a measure of not only the degree of excellence, quantity of desired attributes, conformance to requirements, and satisfaction of consumer preferences, but also conformance at an acceptable cost or price'. The difficulty is that this hybrid of 'affordable excellence' lacks well-defined limits and is therefore difficult to apply in practice (Garvin 1984).

To simplify the debate, whilst side-stepping the philosophical approach and avoiding the difficulties associated with a hybrid of 'affordable excellence', all non-price attributes can be grouped into one entity called 'quality' - defined as 'the totality of inherent characteristics of a product or service that bear on its ability to increase the demand for that product or service at a fixed price' (after ISO 9000 Series of Standards). In this definition a characteristic is a distinguishing feature that can be physical (e.g. mechanical or electrical), temporal (e.g. availability or punctuality), functional (e.g. capability or durability), ergonomic (e.g. physiological or safety-related), sensory (e.g. touch or sound), or behavioural (e.g. honesty or veracity).

Although this definition is applicable to both products and services, it can be argued that quality management in relation to services demands a different approach when compared to products - for the simple reason that services have different distinguishing features.

Quality in service operations - In our opinion, this quote by Philip Crosby may help to differentiate services from products with regards to quality. Similar

“Quality is ballet, not hockey”

Philip B. Crosby (1926-2001)

to hockey, where one can at least measure the final score of a match, product quality can be measured against predetermined specifications. Similar to ballet, however, where quality is much more in the eye of the audience, service quality can (only) be based on customer perceptions (Zeithaml et al. 1990, Grönroos 2000). Therefore, it is not surprising that quality measures for product manufacturing are widely understood and used, whereas quality measures specific for service operations have developed more slowly (Mills et al. 1983). This slower development has been mainly attributed to intangibility (e.g. Regan 1963, Drucker 1974, Zeithaml et al. 1985), labour intensity (Flipo 1988) and complexity (Schmenner 1986). Ignoring these characteristics, quality management in the services industry has for too long been dominated by the logic of manufacturing (which is seen as less complex, less labour intensive and less intangible). While comparing quality between service operations and product manufacturing, one of the basic claims has been that especially the complexity of service operations demands a more holistic approach including a customer-orientation to quality (e.g. Zeithaml et al. 1985, Grönroos 2000).

The management of quality is further complicated when considering quality in a business-to-business environment (as opposed to a business-to-consumer context) - for the simple reason that additional stakeholders are involved in the delivery process.

Quality in business-to-business settings - To use a pragmatic and well-worn cliché, quality - like beauty - is in the eye of the beholder. As a result, quality

“Beauty is in the eye of the beholder”

Margaret W. Hungerford (1855-1897)

management in a business-to-business environment is arguably more challenging when compared to a business-to-consumer context as additional ‘beholders’ play part in the delivery of products and services. Whereas a transaction in a business-to-consumer context takes place between two stakeholders (i.e. end-user consumer and operational staff), a transaction in a business-to-business environment takes place between four stakeholders (i.e. customer contract manager and end-user consumer as well as supplier account manager and operational staff). According to Bell and Shea (2000) all stakeholders in the delivery process must agree on the relevance, definition and measurement of quality. Consequently, quality management in business-to-business setting is more complex as there may be more discrepancies between the views of the stakeholders involved.

In summary, this thesis looks into the complex and indistinct construct of quality and does so in a specific area (i.e. business-to-business setting) and from a clear perspective (i.e. service quality). As this thesis progresses, the role and relevance of quality, the meaning and definition of quality, and the measurement and impact of quality will all be addressed in a clear and meaningful way.

1.2 PROBLEM AREA AND RESEARCH FOCUS

While the significance of quality for a competitive position in the marketplace has been emphasised for decades (e.g. Feigenbaum 1951, Regan 1963, Juran 1974, Crosby 1979, Garvin 1984, Parasuraman et al. 1985, Deming 1986, Cronin and Taylor 1992, Heskett et al. 1997, Grönroos 2000), the real contribution of service quality to organisational performance in a business-to-business setting has been largely unexplored (Forker et al. 1996) and the gap between customer perceived quality and supplier perceived quality is still to be closed (van Ree 2006). Therefore, it is important to determine the attributes that make up service quality as well as to examine whether and how service quality affects both customer satisfaction and supplier performance.

Problem area - Following the almost universal belief that services are different from products in certain key respects (see previous section), it seems unlikely that quality frameworks developed for manufacturing practices can be applied directly to service operations. Contrary to product manufacturing, where it is relatively easy to measure for example conformance to specifications or the durability of an end-product, much of the quality in service operations is in the eye of the customer. Consequently, data on service quality is to be obtained by capturing customer perceptions.

However, a series of dedicated round table discussions on business support services held during the second half of 2005 - involving not only contract managers from various large customer organisations, but also account managers from a broad range of supplier organisations (reception services, office cleaning, catering services, manned guarding and document management) - highlighted that quality in relation to services has a different meaning to almost each individual - indicating great heterogeneity of perception and definition. More in-depth questioning, nevertheless, revealed more commonly acknowledged attributes of service quality such as 'consistent and on-time service delivery' and 'company reputation' as well as 'pro-active and skilful service personnel' and 'open communication'. Exploring the impact of such characteristics on overall perceived service quality as well as customer and satisfaction supplier performance, however, led to lively and unresolved discussions.

Although both customers and suppliers of business support services believed that good service quality can have a positive impact on organisational performance for both sides, a number of problems were identified. First, it is difficult to reach agreement on the attributes that make up service quality. Second, it is hard to rank these attributes in order of importance. Third, it is very hard to understand and measure the impact of service quality on customer satisfaction and ultimately supplier performance. Finally, all problems mentioned are further complicated due to the involvement of multiple stakeholders from both suppliers and customers of business support services.

Research focus - By developing and testing a measurement instrument to assess service quality in a business-to-business setting, it is proposed to combine three legitimate paths to achieve the degree of Doctor of Philosophy: 1) focussing on a neglected aspect of a topic; 2) resolving the deficiency of existing approaches; and 3) testing a not previously used approach. This combination is expected to yield a contribution to knowledge and to improve our understanding in the field of service quality management.

Neglected aspect of a topic - Within the business-to-business environment, outsourced business support services continue to expand within both the public and private sector. Within the public sector, central government guidelines on competitive tendering and the use of the Private Finance Initiative (PFI) have been key drivers for outsourcing. Within the private sector the key drivers include: releasing capital for core business processes, reducing risk whilst increasing flexibility, and securing scarce skill resources. However, it is not usual to find service quality improvement as a key driver for outsourcing. We believe, however, that a continued focus on the financial benefits of outsourcing ultimately will lead to unsatisfactory service quality levels, which in turn will negatively impact the performance of both customers and suppliers of business support services. To summarise, service quality can be regarded as an underrepresented aspect in outsourcing business support services.

Note: Business support services refer to those services that aim to assist enterprises or entrepreneurs to successfully develop their business activity and to respond effectively to the challenges of their business, social and physical environment (cf. European Commission 2001). These services include consultancy services, financial accounting, facilities management, information technology, human resources, corporate marketing, event management and related services to support operations within businesses.

Deficiency of existing approaches - Most outsourced contracts are built around Service Level Agreements and Key Performance Indicators. Since Key Performance Indicators are to be measured and monitored throughout the life of a service contract, they tend to focus on the tangible aspects of service provision. Subsequently, it is unusual to find Key Performance Indicators that focus on the more intangible aspects of services (not least due to measurability issues). And although customer satisfaction levels are regularly included as a Key Performance Indicator within Service Level Agreements, such measures do not accurately capture the richness of the service quality construct. In short, there is a need to focus research efforts beyond the tangible aspect of service provision to fully capture the service quality construct in relation to business support services - not least by involving the customer in identifying the appropriate service quality attributes.

Not previously used approach - With service quality being seen as a neglected aspect of business support services and existing methods being regarded as insufficient to fully capture the service quality construct in relation to business support services, we are to develop and test a service quality measurement instrument for business support services. Whereas established data gathering and analysis tools such as SERVQUAL and SERVPERF (see Section 3.3) were developed with particular reference to measuring service quality in a business-to-consumer context (see B2C-gap as illustrated in Figure 1.1), measurement instruments to capture service quality in a business-to-business environment (see B2B-gap as illustrated in Figure 1.1) have yet to be developed and tested.

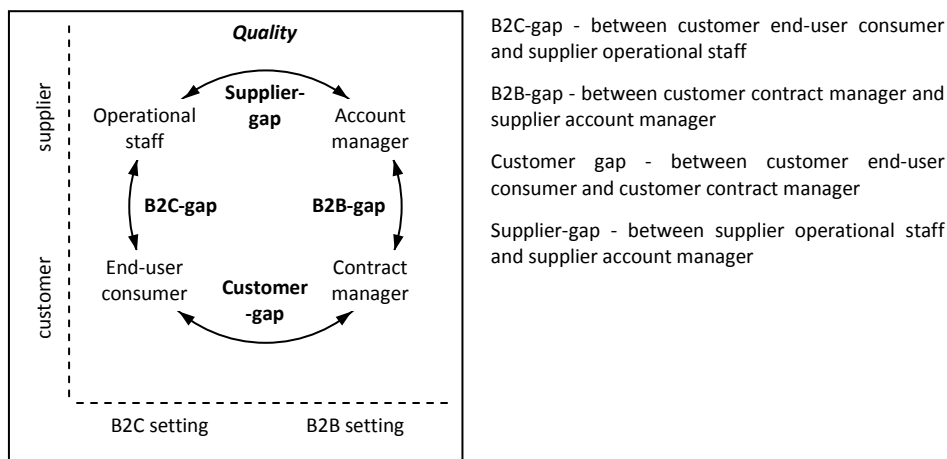


Figure 1.1 Quality gaps in business-to-consumer and business-to-business settings (van Ree 2007)

In short, this thesis focuses on the development and subsequent testing of a measurement instrument to assess service quality in a business-to-business setting - not least to identify clear attributes underlying service quality in relation to business support services and to close the gap in perceptions between customer contract managers and supplier account managers (see B2B-gap as illustrated in Figure 1.1).

1.3 RESEARCH AIM AND DEMARCATION

Translating the problem area and research focus as described in the previous section into a clear objective, our main aim is to identify service quality indicators that are beneficial to both customers and suppliers of business support services as typically found in the facilities management industry.

Research aim - The main aim of this thesis is to identify service quality indicators that are beneficial to both customer contract managers and supplier account managers of facilities management services associated with office buildings. Towards our main aim we will first explore the relevant literature available and subsequently use executive interviews to generate a number of service quality items perceived to be important to service quality. From here, we will develop two surveys to capture service quality perceptions - one for contract managers at customer organisations and one for account managers at supplier organisations. Finally, we will apply a variety of statistical tests to analyse the data gathered. In all cases we will verify and validate research findings against a number of focus group discussions. Outputs from the envisioned research will contribute to the understanding of the service quality construct in relation to business support services, the relationships between service quality and both overall customer satisfaction and supplier financial performance, as well as the discrepancies between the customer perspective and the supplier perspective.

Research questions - Focusing on services associated with office buildings such as cleaning, catering and security, our research will address the following questions:

- Focusing on customer contract managers: What service quality determinants are important for customer perceived service quality and customer satisfaction?
- Focusing on supplier account managers: What service quality determinants are important for supplier perceived service quality and financial performance?
- Focusing on the overlap: What service quality determinants are beneficial to both customers and suppliers and where are the potential gaps?

Answering these questions will involve three steps. First, customer perceptions on various service quality variables are to be captured and then compared with their overall perceived service quality and customer satisfaction. Second, supplier perceptions on the same service quality variables are to be collected and then compared with their perception of service quality as well as their financial performance. Finally, by combining the outcomes of the first two steps, we can begin to determine if there are mutual beneficial service quality indicators.

Demarcation - The three main reasons for focusing our research effort on cleaning, catering and security services are as follows. First, facilities management has been identified by Zeithaml et al. (1985) as a fruitful area for service quality research. Second, office cleaning, catering services and manned guarding are among the five most expensive business support services; collectively accounting for approximately 7.5% of Gross Domestic Product in the United Kingdom. Finally, cleaning, catering and security services sit adjacent to one another on the so-called products-to-services continuum.

First of all, Zeithaml et al. (1985) identified a need for researchers to think broadly about researchable issues and to be willing to investigate the role of service quality in areas not normally classified as finance, operations or marketing (e.g. human resources and facilities management). They stated that “a need exists for research in the area of services to enter a new phase of empirical work that integrates various disciplines and various service industries” (p. 44).

Note: Facilities management services, as a subset of business support services, refer to the provision of a combination of support services within a client’s facilities (cf. Office for National Statistics 2009). These services include interior cleaning, repair and maintenance, utilities provision, catering services, waste disposal, reception services, manned guarding and related services to support operations within facilities.

Second, the facilities management market in the United Kingdom - generally regarded as the most mature facilities management sector in Europe - was estimated to be worth £200bn in 2007 (Mintel 2009). With UK Gross Domestic Product in 2007 being £1,350bn (National Statistics 2008), the facilities management market accounted for 14.8% of Gross Domestic Product. Looking at support services alone we get to approximately £102bn, or 7.5% of Gross Domestic Product. Further examination of the IPD Occupiers database on occupancy costs highlighted that next to utilities and maintenance, cleaning, catering and security are among the most expensive business support services in the United Kingdom (see Table 1.1). Typically, the annual costs in a UK office building associated with office cleaning are £223 per workstation; the costs associated with catering services are £183 per workstation; and costs associated with manned guarding are £215 per workstation. With annual maintenance and repair costs adding up to £333 per workstation and utilities averaging £387 per workstation per annum, cleaning, catering and security are amongst the five most expensive business support services in the United Kingdom.

	per m2	per desk	per FTE
Utilities provision	£37.72	£387.48	£460.18
Maintenance and repair	£27.05	£333.40	£309.87
Office cleaning	£21.63	£223.13	£259.45
Manned guarding	£19.08	£214.93	£220.68
Catering services	£15.90	£182.65	£244.43

Table 1.1 Five most expensive business support services in the UK (IPD Occupiers 2008)

Finally, utilities, maintenance, cleaning, catering and security can be plotted adjacent to each other on the products-to-services continuum (see Figure 1.1). In doing so, utilities provision and maintenance and repair sit towards the tangible-dominant side of the spectrum, whilst manned guarding and office cleaning sit towards the intangible-dominant side of the spectrum. Catering services end up in the middle as the human component of service delivery is rather intangible whilst the actual food provided is more tangible. Furthermore, utilities are high in search properties, catering is high in experience properties and security is high in credence properties. Maintenance holds the middle between search and experience properties and cleaning holds the middle between experience and credence properties.

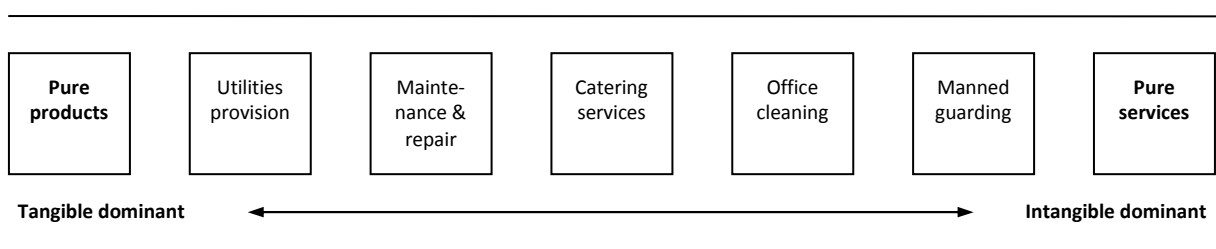


Figure 1.2 Business support services on the products-to-services continuum

Based on the different views currently existing amongst researchers and academics as described in our literature review (see Chapter 2 and Chapter 3) our rather general research interest will be translated into a more specific research proposition and subsequently split into a set of five concise hypotheses in Section 4.1.

1.4 ORGANISATION OF THESIS

The structure and content of this thesis adopts the ‘functionalist’ approach towards theory building as described in more detail in Annex A - Nature and Paradigm. Whereas Chapter 1 provides a general introduction to this thesis, including our main objective and research questions, the rest of this thesis is split into three parts. First, in part A of this thesis, we provide an overview of the relevant literature available regarding both the role of quality (Chapter 2) and the measurement of quality (Chapter 3) before describing both the research methodology and the research methods (Chapter 4). Next, in part B of this thesis, we investigate service quality in relation to cleaning, catering and security from both the customer perspective (Chapter 5 and 6) and the supplier perspective (Chapter 7 and 8) whilst ending with the discrepancies between these perspectives (Chapter 9). Finally, in part C of this thesis, findings from both the literature review and our empirical research are discussed (Chapter 10), relevant implications for both practitioners and academics are sketched (Chapter 11) and general conclusions are drawn (Chapter 12). Figure 1.3 provides a schematic representation of the organisation of this thesis.

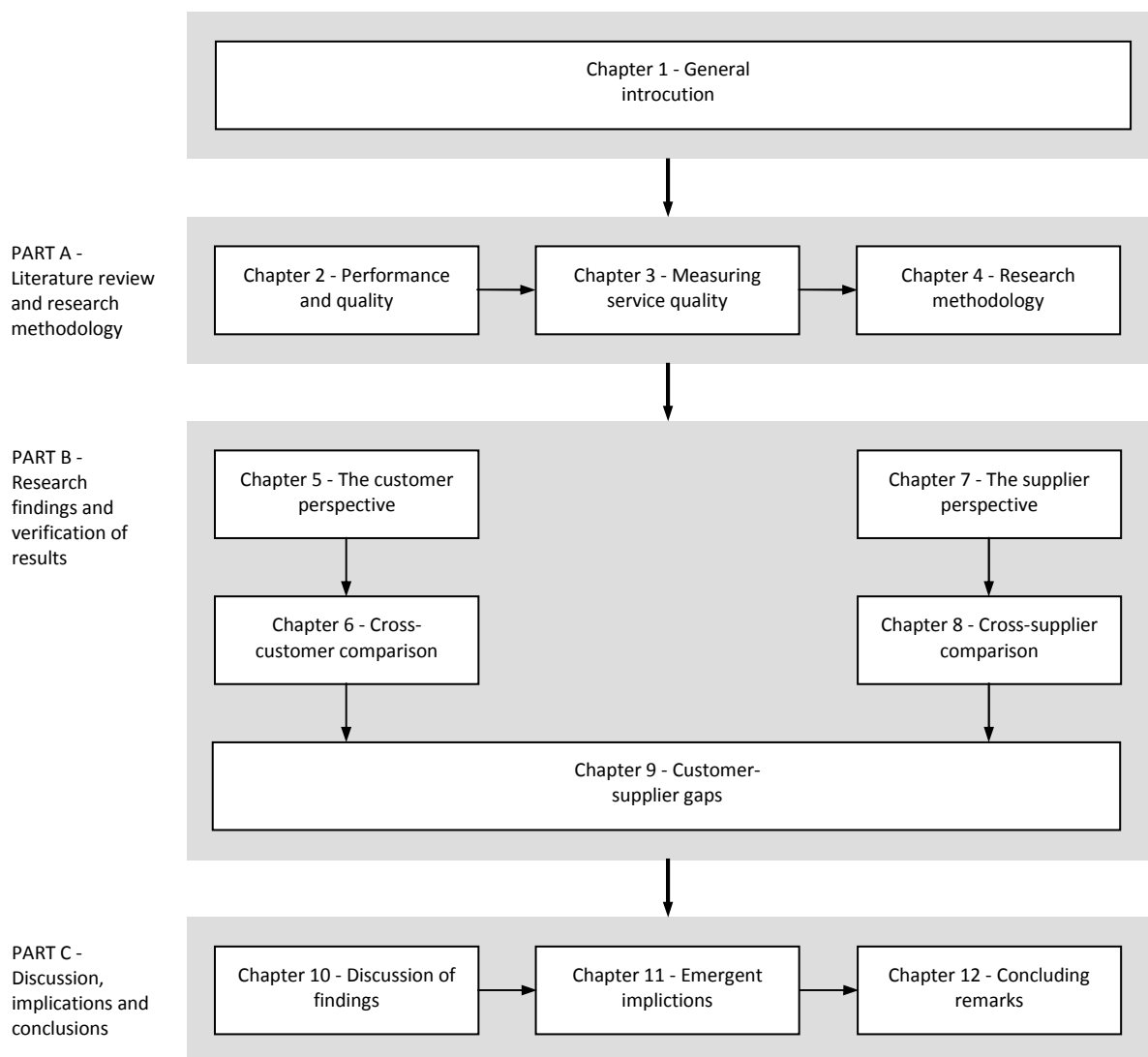


Figure 1.3 Thesis organisation and structure

To summarise Chapter 1, this thesis looks into the complex and indistinct construct of service quality and focuses on the development and subsequent testing of a measurement instrument to assess service quality in a business-to-business setting.

The main aim of this thesis is to identify service quality indicators that are beneficial to both customers and suppliers of cleaning, catering and security services associated with office buildings. This will be done by capturing customer perceptions and supplier perceptions of service quality, and subsequently contrasting these perceptions against customer satisfaction and supplier performance respectively, before ultimately determining mutual beneficial service quality indicators.

Following the outline of the organisation of this thesis, the first part of this thesis will provide a thorough overview of the literature available in relation to defining and measuring service quality as well a detailed overview of our research methodology.

Box 1 Summary of general thesis introduction

PART A - LITERATURE REVIEW AND RESEARCH METHODOLOGY

As highlighted in Section 1.4, Part A of this thesis provides an overview of the relevant literature on service quality management as well as a thorough description of the research methodology underlying this thesis. In Chapter 2, we describe the relationship between performance and quality in more detail. Chapter 3 provides an overview of various concepts and models to measure service quality. In Chapter 4, we describe the research methodology, forming the basis for Part B of this thesis.

PART A -
Literature review
and research
methodology

Chapter 2 - Performance
and quality

Chapter 3 - Measuring
service quality

Chapter 4 - Research
methodology

2 PERFORMANCE AND QUALITY

This chapter describes the relationship between performance and quality in more detail. In the first section we focus on organisational performance and the generic performance criteria as well as the role of quality therein. Second, we describe the origins of quality management by summarising the product quality movement. From there, we shift to service quality by describing the service quality revolution. Finally, our literature review is verified and validated against feedback provided by customer and supplier representatives at a dedicated seminar held in spring 2006.

2.1 ORGANISATIONAL PERFORMANCE

The current debate on terms like performance, productivity and quality is still confusing since adequate and commonly shared definitions are rarely found within both academic and commercial circles (Tangen 2005). Therefore, we will start by elucidating these three closely related constructs whilst attempting to keep them analytically distinct from one another.

Conceptual underpinnings - The profitability or performance of an organisation depends to a great extent on meeting the generic performance criteria: effectiveness, efficiency, productivity, flexibility, and creativity (van Ree 2002). According to Kohnstamm and Regterschot (1994) an organisation should strive to simultaneously meet all five criteria sufficiently in order to optimally contribute to its profitability. The five performance criteria are considered in further detail as follows.

The classic criterion to evaluate the functioning of an organisation is **effectiveness**. Fulfilling the needs of the customer as effectively as possible is of overriding importance to the competitiveness between organisations (Douma 1996). According to Sink and Tuttle (1989), effectiveness can be defined as the ratio between actual output and expected output and involves doing the right things, at the right time, and with the right quality. Similarly, Sumanth (1994) defines effectiveness as the degree of accomplishment of objectives - showing how well a set of results is accomplished. In a broader and less specific definition by Neely et al. (1995), effectiveness refers to the extent to which customer requirements are met. In our definition, effectiveness refers to what extent the actual result (output in quality and quantity) corresponds to the aimed for result. A clear definition is (after Veld 1998):

$$\frac{\text{actual result (output in quantity and quality)}}{\text{aimed result (output in quantity and quality)}}$$

Note that the closer the actual result approaches the beforehand aimed for result, the more effective an organisation is. If the actual result is better or more than the aimed for result, the transformation process has a so-called 'overshoot'. If the actual result is worse or less than the aimed for result, it has an 'undershoot'. In both cases the organisation is not optimally effective.

In the first decades after World War II, **efficiency** became more and more important, if not the most important criterion to evaluate the functioning of an organisation. An efficient organisation produces products or services at the lowest possible resource use: people and means (for simplification reasons we use the term people instead of labour and the term means instead of capital, materials and technology). Until the 1960s, this criterion was of overriding importance because raw materials were scarce and a relatively low price for a product or service was very important for the average customer (Douma 1996). According to Sink and Tuttle (1989), efficiency is an input and transformation process question. They define efficiency as the ratio between

resources expected to be consumed and resources actually consumed. Both Sumanth (1994) and Neely et al. (1995) are less specific and state that efficiency reflects how well or how economically resources are utilised to accomplish certain results or customer satisfaction levels. In our definition, efficiency refers to the ratio between the aimed for resource use and the actual resource use, in order to transform an input to an output. A formal definition is (after Veld 1998):

$$\frac{\text{aimed resource use (input in people and means)}}{\text{actual resource use (input in people and means)}}$$

According to this definition the efficiency of an organisation increases as the actual resource use is lower than the aimed for resource use. Therefore, to increase organisational efficiency it is important to reduce the use of resources as much as possible.

Increasing prosperity, especially in the 1970s, led to a new criterion for organisational focus: **productivity**. Customers became more and more conscious of the value of a product or service as well as its quality and other aspects. The price remained important, but the customer was also looking for good quality and enhanced product or service characteristics. The customer was actually asking for a better product or service at a lower price. In order to fulfil this need, the term productivity was introduced. According to Sink and Tuttle (1989), productivity can be defined as the ratio between actual output and expected resource use. Similarly, Hill (1993) defines productivity as the ratio of what is produced to what is required to produce it. Productivity measures the relationship between outputs (such as products and services) and inputs (including labour, capital, materials and technology). In our definition, productivity refers to the ratio between the actual result of the transformation process and the actual resource use - in fact productivity relates effectiveness to efficiency - thereby making both criteria simultaneously controllable. A proper definition is (after Veld 1998):

$$\frac{\text{actual result (output in quantity and quality)}}{\text{actual resource use (input in people and means)}}$$

Based on this definition, we can conclude that the organisational productivity is optimal when an organisation produces as great a result as possible at the lowest possible resource use. However, a so-called 'overshoot' or 'undershoot' is still not desirable. So at the level of an organisation as a whole, we can optimise the productivity by focussing on efficiency, thus by reducing the actual resource use as much as possible.

At the beginning of the 1980s, a fourth criterion was added: **flexibility**. An organisation is flexible if it is able to respond quickly and adequately to unexpected problems and challenges. These unexpected developments appeared more and more at the beginning of the 1980s. For many products and services, growth in established markets was declining, while other (sometimes new) markets were growing very fast. Such developments made organisations more dependent on the preferences and the behaviour of their customers. Besides becoming more demanding concerning the price and the quality of a product or service, customers also demanded faster and more accurate delivery as well as more highly tailored products or services (Douma 1996).

Flexibility refers to the ability to recognise and adapt to changing circumstances. An appropriate definition of flexibility is: the ability to recognise internal and external changes as well as opportunities and threats, and respond successfully to them (i.e. adequately and quickly). According to Veld (1998) and Wijnen et al. (1999) responding adequately means reviewing the aimed for result (output in quality and quantity) and, if necessary, reorganising the transformation process and/or adjusting the aimed for resource use (input in people and

means). Therefore, flexibility is in fact built-in productivity; flexibility enables an organisation to stay effective as well as efficient.

During the 1990s, a fifth criterion arose: **creativity**. Under the influence of several demographical, political, economical, technological, social and ecological changes, the environment of organisations became more turbulent and increasingly competitive. These developments required a creative approach to manage the tension between effectiveness and efficiency as well as to guarantee certain flexibility.

In Figure 2.1 one can see how all organisational performance criteria are interrelated to each other (please note that we have added flexibility to the original model and replaced innovation by creativity). In addition, one can see that quality plays an important role on both the input side and the output side, and therefore in both the efficiency equation and the effectiveness equation.

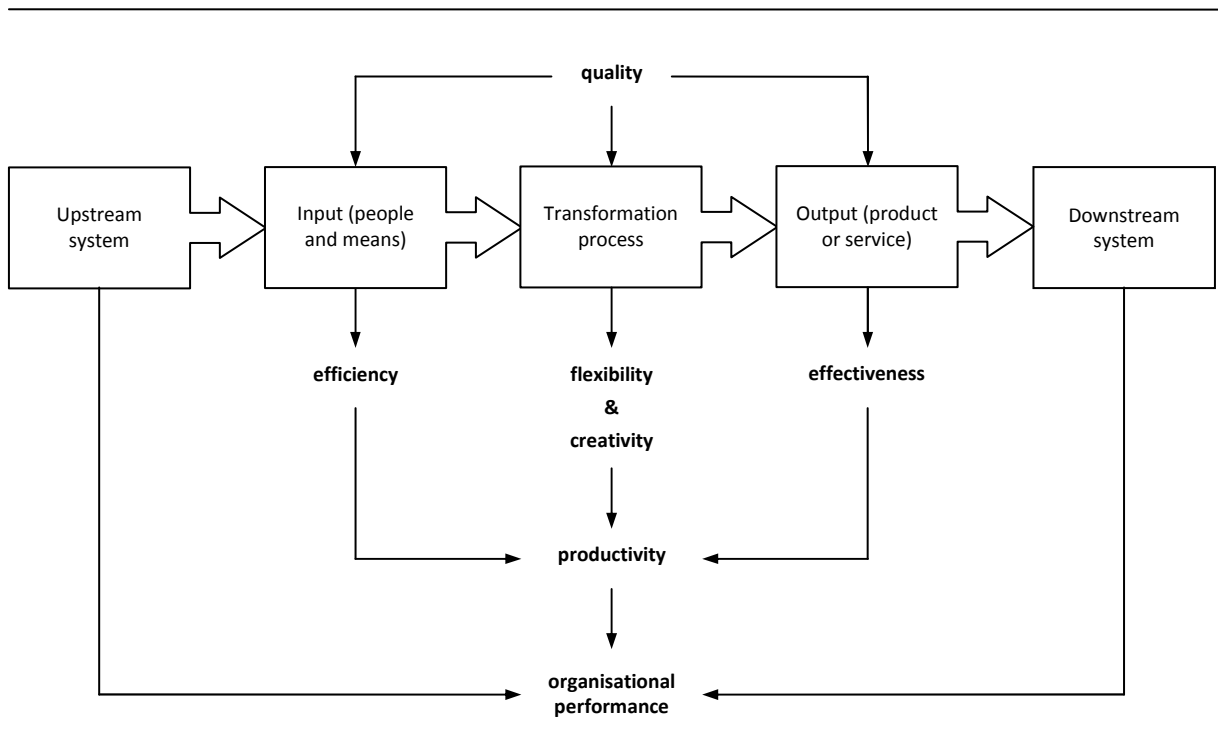


Figure 2.1 Transformation process from input to output within an organisation (cf. Sink and Tuttle 1989)

The development of performance criteria that an organisation should meet is provided in Figure 2.2. One can see that the development is cumulative, which indicates that organisations should meet more and more criteria simultaneously.

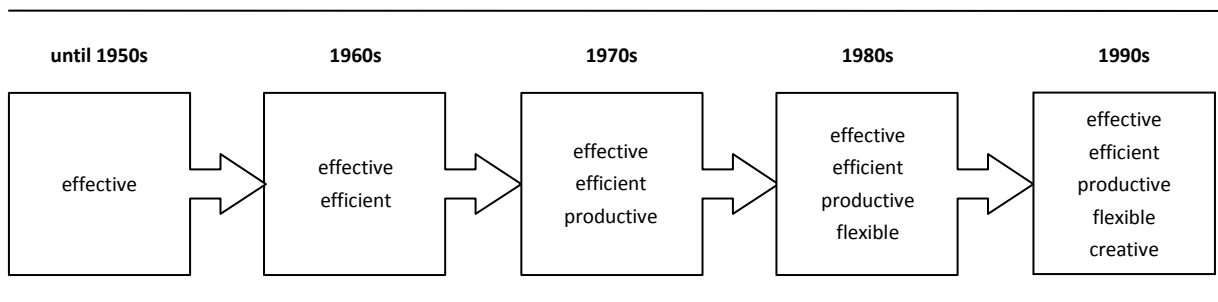


Figure 2.2 Performance criteria organisations should meet (van Ree 2002)

In short, each organisation should have a base of being effective in order to closely achieve their aimed for results. In addition, an organisation should be efficient in order to minimise their resource use in achieving these results. Referring to the ratio between actual results and actual resource use, productivity is important in order to simultaneously control effectiveness and efficiency. Anticipating possible changes, opportunities and/or treats an organisation should also be flexible in order to stay productive towards the future. Finally, finding the right balance in meeting these performance criteria sufficiently and simultaneously asks for certain creativity.

The role of quality - Although many authors still regard productivity and quality as separate concepts (e.g. Heskett et al. 1994), several researchers (e.g. Grönroos 2000) argue that quality and productivity cannot be dealt with separately - especially when looking at services. Consequently, there seems to be a growing need for a thorough analysis of the quality component of the productivity concept.

Regarding the quantitative aspects of productivity, the input factors are the same for both product manufacturing and service operations, namely people and means. Owing to the labour-intensiveness of service operations, however, labour represents a proportionally larger input to productivity as salaries, benefits and social expenses can account for more than 80% of total operating costs (van Ree 2002). The quantitative output factor for product manufacturing can be expressed in units produced and the quantitative output factor for service operations can be based on service volume. The latter can be increased by selling a larger variety of services to existing customers and/or attracting new customers.

Unfortunately, the qualitative aspects of productivity are more difficult to define objectively (Vuorinen et al. 1998). In the case of product manufacturing, the qualitative output dimension has usually been operationalised as conformance to specifications or as actual product performance. However, this notion of output quality has been regarded as inadequate in the case of services. The qualitative output dimension of service operations can (only) be based on customer perceptions. The qualitative input factor for both product manufacturing and service operations are again the same, namely the expertise and skills of the people employed.

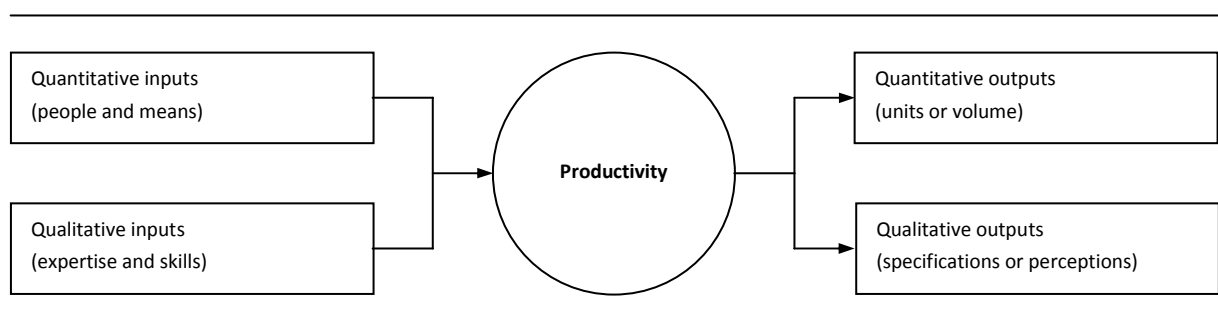


Figure 2.3 The content of productivity (cf. Vuorinen et al. 1998)

It is important to recognise that most elements of the quantity and quality components of productivity equation are interrelated. As the components constitute a whole it is difficult to consider each component separately. Furthermore, it is important to recognise that the way customers perceive a product or service outcome and how the delivery process is organised are not to be considered in isolation from each other.

One interesting model that recognised and conceptualised the notion that quality evaluations are not made solely based on the outcome, but also involve evaluations of the process of delivery, is the value profit chain (Heskett et al. 1994, 1997 and 2003).

The widely accepted value profit chain established the true links between organisational performance, output value (i.e. output quality in relation to costs) and input quality. In the value profit chain, quality plays a dominant - not to say vital - role. There are seven fundamental propositions that form the links of the chain: 1) input quality drives employee satisfaction; 2) employee satisfaction drives loyalty; 3) employee loyalty drives productivity; 4) employee productivity drives value; 5) output value drives customer satisfaction; 6) customer satisfaction drives loyalty; and 7) customer loyalty drives profitability and revenue growth (Heskett et al. 1994 and 1997).

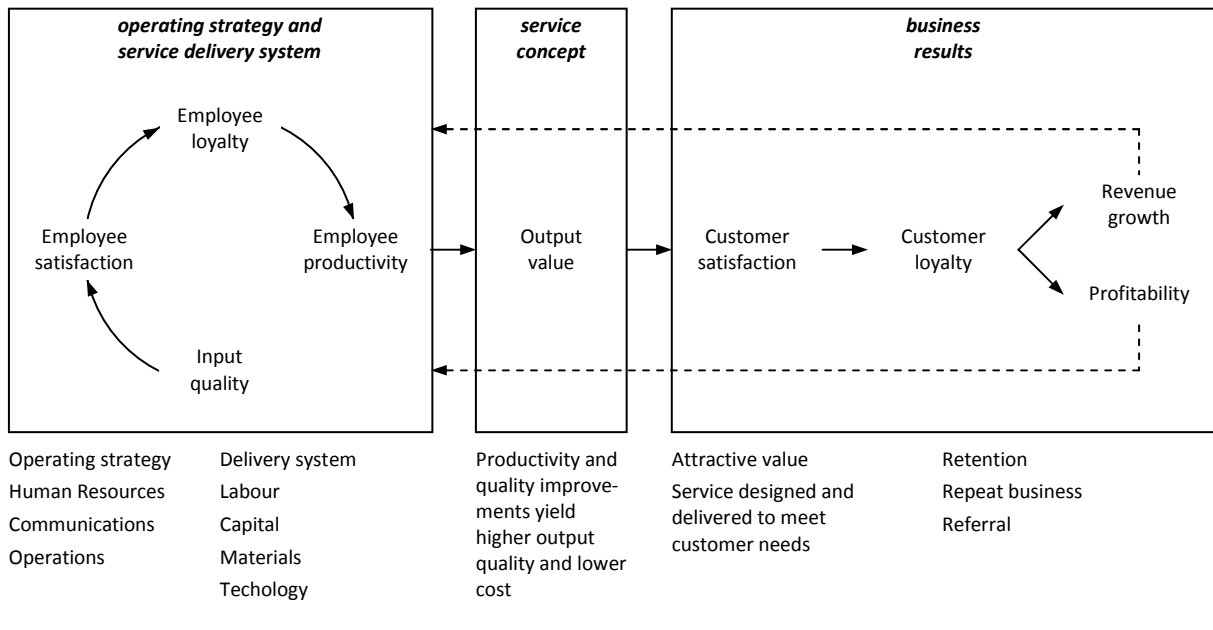


Figure 2.4 The value profit chain (cf. Heskett et al. 1997 and 2003)

Central to the value profit chain is the customer value equation, suggesting that the value of products and services delivered to customers is equivalent to the results created for them (in terms of both quantity and quality) as well as the quality of the delivery process, all in relation to the costs of the results created as well as the other costs incurred by the customer in acquiring the product or service (Heskett et al. 1997). It is a 'customer's eye view' of products and services, influencing decisions to buy and use them.

2.2 PRODUCT QUALITY MOVEMENT

At the beginning of the 20th century the Western society was dominated by product manufacturing. This section provides a comprehensive overview of the gurus that contributed to the product quality movement and the evolution from quality control to quality improvement to quality assurance.

Early beginnings (1920s and 1930s) - Shewhart is considered to be the 'grandfather' of quality control. He pioneered statistical quality control and improvement methods when he worked for Western Electric and Bell Telephone in the early decades of the 20th century. He developed quality control charts and introduced the term 'quality assurance'.

Working at Western Electric as an engineer, he was able to make a serious contribution to a major problem: reliability of equipment buried underground. Control charts created by him were used to differentiate between assignable sources of variation and pure chances of variation. Shewhart studied randomness and recognised

that variability exists in all manufacturing processes. In his opinion, reducing variability was equivalent to quality improvement.

Working in the Bell Laboratories, Shewhart was engaged in a search for practical methods of quality control for the emerging telephone industry, which required mass production on a huge scale. His ideas, published in the 1930s, formed the basis for a process oriented approach to quality control, by viewing any repetitive activity as a process and using statistics to understand and manage the variations that would occur.

First product quality wave (early 1950s) - Deming introduced the concept of variation to the Japanese and developed a systematic approach to problem solving, which later became known as the Deming or PDCA (plan, do, check, act) cycle. Back in the United States, he concentrated on management issues and produced his famous 14 points. He is considered the originator of the modern quality movement.

Being particularly interested in the work of Shewhart, Deming became a statistics professor at New York University in the 1940s. During World War II, he started teaching statistical quality control techniques to engineers and executives of military supply companies in the United States. After the war he went to Japan and got involved in assisting Japanese companies to be rebuilt.

In post-war Japan, Deming encouraged the Japanese to adopt a systematic approach to quality improvement, which later became known as the PDCA cycle. Deming argued that collecting the facts, amassing data, setting standards, measuring results, and getting prompt and accurate feedback on these results so as to 'eliminate variations to the standard' was the best way to improve quality (Basu and Wright 2003). Japanese companies and the quality of their products still have a strong root in applying these principles extensively. Deming emphasised the role of management in achieving quality, arguing that approximately 85% of poor quality was due to bad management and improper processes and systems (with the remaining 15% because of underperforming manufacturing staff). He believed that managers should involve employees in solving problems and that quality was everyone's business.

Deming returned to the United States and spent some years in obscurity before the publication of his book "Out of the crisis" in 1986. In this book, Deming set out 14 points for effective management (see Figure 2.5). He argued that applying these principles to the United States manufacturing industry would enable Japanese efficiencies to be realised and save the United States from industrial defeat by the Japanese.

-
- 1 Create constancy of purpose toward improvement of a product
 - 2 Adopt a new philosophy for a new economic age
 - 3 Cease dependence on inspection to achieve quality
 - 4 End the practice of awarding business on the basis of price tag alone
 - 5 Constantly improve the system for planning, production and service
 - 6 Institute training on the job and become a learning organisation
 - 7 Institute leadership to help people and machines to do a better job
 - 8 Drive out fear so that everyone may work effectively
 - 9 Break down barriers between departments in order to work as a team
 - 10 Eliminate slogans, exhortations and targets for the workforce
 - 11 Eliminate management by objectives or numerical goals
 - 12 Remove barriers to pride of workmanship and worker satisfaction
 - 13 Institute a vigorous programme of education and self-improvement
 - 14 Put everybody in the company to work to accomplish the transformation
-

Figure 2.5 Deming's 14 point for effective management (1986)

Juran focused on quality control as an integral part of management in his lectures to the Japanese in the early 1950s. He believed that quality must be planned and that quality planning is part of the quality trilogy of planning, control and improvement (Juran 1986). After Deming, Juran is considered to be the most important contributor to quality management.

Working closely with Shewhart at Western Electric, Juran got acquainted with statistical process control. In 1954 he followed Deming to Japan to help rebuild its devastated economy. He became well known after publishing his book "Quality control handbook" in 1951. Working with Japanese manufacturers and teaching classes in quality, Juran is also associated with Japan's emergence as the benchmark for quality of products. Similar to Deming, Juran highlighted managerial responsibility for quality. Contrary to Deming's emphasis on the need for organisational transformation, however, Juran believed that implementation of quality initiatives does not need dramatic changes. His approach had a strong managerial flavour and focussed on planning, organisational issues, management's responsibility for quality, and the need to set goals and targets for improvement. He emphasised that quality control should be conducted as an integral part of management. Taking customer needs into account, Juran defined quality as 'fitness for use'.

Intrinsically, Juran believed that quality does not happen by accident, but that it must be planned, and that quality planning is part of the quality trilogy of planning (i.e. identifying customers and their needs - both external and internal - and work to meet those needs), control (i.e. creating measures of quality, establishing optimal quality goals and organise to meet them) and improvement (i.e. creating processes capable of meeting quality goals in real operating conditions). Building on his quality trilogy, Juran developed the quality planning roadmap in which he identified nine key steps in attaining quality products (see Figure 2.6).

-
- 1 Identify the customers (both external and internal)
 - 2 Determine the needs of those customers
 - 3 Translate those needs into our language
 - 4 Develop a product that can respond to those needs
 - 5 Optimise the product features so as to meet customer needs as well as our needs
 - 6 Develop a process which is able to produce the product
 - 7 Optimise the product delivery process
 - 8 Prove that the process can produce the product under operating conditions
 - 9 Transfer the process to operations
-

Figure 2.6 Juran's quality planning roadmap (1989)

Feigenbaum is the originator of Total Quality Control. He took a systems approach to quality improvement and defined quality as 'best for the customer use and selling price'. He regarded quality as a business method rather than technically and believed that quality had become the single most important force leading to organisational success and company growth.

Feigenbaum is recognised for his work in raising quality awareness in the United States. He was General Electric's worldwide director of manufacturing, operations and quality control for a decade until the late 1960s. The term Total Quality Control originated from his book "Quality control: principles, practice and administration", first published in 1951. Feigenbaum argued for a systematic or total approach to quality, requiring the involvement of all functions in the quality process, not just manufacturing. The idea was to build in quality at an early stage, rather than inspecting and controlling upon production. He added that a total quality system is "the agreed company-wide operating work structure, documented in integrated technical and managerial procedures, for guiding the co-ordinated actions of the people, the machines and the information

of the company in the most practical ways to ensure customer quality satisfaction and economical costs of quality". He defined Total Quality Control as "an effective system for co-ordinating the quality maintenance and quality improvement efforts of the various groups in an organisation so as to enable production at the most economical levels which allow for full customer satisfaction" (Feigenbaum 1951).

In his book "Total quality control" (2004), Feigenbaum identified four steps towards Total Quality Control: 1) setting quality standards; 2) appraising conformance to these standards; 3) acting when standards are exceeded; and 4) planning for improvements in the standards. Subsequently, he operationalised Total Quality Control in the form of ten crucial benchmarks for total quality success in the 1990s (see Figure 2.7). They make quality a way of totally focusing the company on the customer - whether it be the end-user or a colleague at the next workstation. Most importantly, they provide the company with foundation points for successful implementation of its internal quality leadership.

-
- 1 Quality is a company-wide process
 - 2 Quality is what the customer says it is
 - 3 Quality and costs are a sum, not a difference
 - 4 Quality requires both individual and team enthusiasm
 - 5 Quality is a way of managing
 - 6 Quality and innovation are mutually dependent
 - 7 Quality is an ethic
 - 8 Quality requires continuous improvement
 - 9 Quality is the most cost-effective route to productivity
 - 10 Quality is implemented with customers and suppliers
-

Figure 2.7 Feigenbaum's ten crucial benchmarks for total quality success (2004)

Feigenbaum emphasised that there are three keys to achieving the quality competitive leadership that is so crucial in the global markets of the 1990s. First is a clear understanding of international markets and of how people buy in these markets; second is a thorough grasp of a total quality strategy that provides the business foundation for satisfying these customers; and third is the hands-on management know-how for creating the necessary company environment for quality and for establishing the goals required for quality leadership.

In short, Feigenbaum's approach is not substantially different to that of Deming and Juran, but his emphasis is different. He defines quality from a customer's perspective and he takes a financial approach to the cost of quality. Like Deming and Juran, he found that measurement is necessary, but whereas Deming and Juran tended to measure production and outputs, Feigenbaum concentrated on measurement to evaluate whether products met the desired level of customer satisfaction (Basu and Wright 2003).

Second product quality wave (early 1960s) - Ishikawa's three main contributions to the product quality movement were his inputs to company-wide quality control, the introduction of Quality Circles and the simplification and spread of statistical tools as a unified system throughout all levels of Japanese organisations.

After working at Nissan as a technician for several years, Ishikawa became a professor at the University of Tokyo. Turning to organisational, rather than technical contributions to quality, Ishikawa is associated with the 'company-wide quality control movement' which started in Japan in the mid 1950s following the visits of Deming and Juran. He believed that quality must be company-wide - from top management to lower-ranking employees - in order to be successful and sustainable. Ishikawa built on Feigenbaum's concept of Total Quality

Control and was able to translate, integrate and expand the concepts of Deming and Juran into the Japanese system.

One major characteristic of company-wide quality control is the use of Quality Circles - a Japanese philosophy which Ishikawa drew from obscurity in 1962. Starting in Japan's manufacturing industry, they have now spread to banks and retailing, and have been exported world-wide. The nature and role of Quality Circles varies between companies. In Japan a quality circle is a typically voluntary group of some five to ten employees from the same business unit who meet at regular intervals. Led by a supervisor or team leader, they aim to contribute to and improve processes and activities, build up job satisfaction and company loyalty, and utilise existing and hidden resource potential.

All members of the circle should be fully conversant with statistical quality control techniques and related methodologies and all utilise them to achieve significant results in quality improvement, cost reduction and productivity. The seven 'tools of quality control' are taught to all employees (see Figure 2.8).

-
- 1 Cause-and-effect diagram - identifies many possible causes for an effect or problem and sorts ideas into useful categories
 - 2 Check sheet - a structured form for collecting and analysing data that can be adapted for a wide variety of purposes
 - 3 Control charts - graphs used to study how a process changes over time
 - 4 Histogram - the most commonly used graph for showing frequency distributions
 - 5 Pareto chart - shows on a bar graph which factors are more significant
 - 6 Scatter diagram - graphs pairs of numerical data, one variable on each axis, to look for a relationship
 - 7 Stratification - a technique that separates data gathered from a variety of sources so that patterns can be seen
-

Figure 2.8 Ishikawa's seven tools of quality control (1985)

Many, including Juran (see first product quality wave) and Crosby (see third product quality wave), consider Ishikawa's teachings to be more successful in Japan than in the Western world. Whereas Crosby warned against the fashion for Quality Circles as a cure-all for poor employee motivation or inadequate quality, Juran threw in doubts on their likely effectiveness in Europe and America where few executives fully understand statistical quality management techniques.

Taguchi is a Japanese quality expert known for the Quality Loss Function and for methodologies to optimise quality at the design stage. He considered quality loss all the way through to the customer, including the cost of scrap, rework, downtime, warranty claims and ultimately reduced market share.

Working in both the Ministry of Education and the Ministry of Public Health and Welfare, Taguchi learned much of experimental design techniques and the use of orthogonal arrays. In the 1950s he joined NTT with the purpose of increasing the productivity of its research and development activities by training engineers in effective techniques. In the mid 1950s he met Shewhart and subsequently visited the AT&T Bell Laboratories in the mid 1960s. In the early 1970s Taguchi developed the concept of the Quality Loss Function.

In contrast with Western definitions, Taguchi worked in terms of quality loss rather than quality. He defined quality loss as "loss imparted by the product to society from the time the product is shipped". This loss included not only the loss to the company through costs of reworking or scrapping, downtime due to equipment failure, and warranty claims, but also costs to the customer through poor product performance and inadequate reliability, leading to further losses to the manufacturer as his market share falls. Taking a target value for the quality characteristic under consideration as the best possible value of this characteristic, Taguchi associated a simple quadratic loss function with deviations from this target. His Quality Loss Function shows

that a reduction in variability about the target leads to a decrease in loss and a subsequent increase in quality. With this conception a loss will occur even when the product is within the specification allowed, but is minimal when the product is on target. The Quality Loss Function may be used to evaluate design decisions on a financial basis to decide whether additional costs in production will actually prove to be worthwhile in the market place.

$$\text{Loss} = c(x - T)^2 + k$$

where x is a particular quality characteristics with target T , c is the cost of failing to meet target; k represents the minimum loss to society

In addition, Taguchi developed a set of practices known as the Taguchi Methods, for improving quality while reducing costs. Based on his estimation that 80% of all defective items are caused by poor design, he pushed the concepts of quality back to the design stage. His methods focused on the design of efficient experiments; an engineering approach which is based on developing robust designs, resulting in products that can perform over a wide range of conditions. It enabled engineers or designers to identify the optimal settings to produce a robust product which can survive manufacturing time after time, piece after piece, in order to provide the functionality required by the customer. Applied off-line in design, his methods provide an efficient technique to design robust products prior to entering the manufacturing phase; applied on-line in production, his methods can be used as a trouble-shooting methodology to sort out pressing manufacturing problems.

Emphasising quality through robust design over quality through inspection, Taguchi advocated three stages of quality design: 1) system design (which involves experimentation with materials and creating a feasible prototype); 2) parameter design (which involves experimenting to determine which factors influence product performance most and which factors are unimportant); and 3) tolerance design (which involves setting tight tolerance limits for the critical factors and looser tolerance limits for less important factors). This approach allows designers to subsequently determine the quality level (as expressed in his Quality Loss Function), improve the quality level in cost-effective manner (by parameter and tolerance design) and to monitor the quality of performance (by use of feedback and statistical control).

In short, Ishikawa's Quality Circles have been fashionable for a while, but the Taguchi methods have been more widely adopted in Europe and America. The main reason is that the Taguchi methods were developed and used by engineers rather than statisticians. Consequently, the Taguchi methods are tailored directly to the engineering context - highlighting the importance addressing the noise variables which disrupt production in addition to the control variables introduced.

Third product quality wave (1970s to 1980s) - Crosby is perhaps best known in relation to the concepts of 'quality is free' and 'zero defects'. He is a controversial figure, who has based his quality improvement approach on 'four absolutes of quality management' and 'fourteen steps to quality improvement'.

During his job as a quality controller in the US Navy, Crosby decided his goal would be to teach management that preventing problems was more profitable than being good at fixing them. Later on he worked his way up within ITT where he became corporate vice president with world-wide responsibility for quality. In 1979 he published the bestseller 'Quality is free', followed by 'Quality without tears' in 1984.

Crosby considered traditional quality control, acceptable quality limits and waivers of sub-standard products to represent failure rather than assurance of success. Crosby therefore defined quality as 'conformance to requirements' which the company itself should establish for its products based directly on its customers' needs.

He believed that, since most companies have processes and systems that allow deviation from what is really required, manufacturing companies spend as much as 20% of revenues doing things wrong and doing them over and over again. According to Crosby this can be as much as 30% of operating expenses for service companies.

Crosby is famous for saying that 'quality is free' (1979). He emphasised cultural and behavioural issues ahead of the statistical approach of Deming and Feigenbaum. Crosby argued that if staff have the right attitude, know what the standards are, and do things right the first time every time, the cost of conformance is free. The flow-on effect is that motivated employees go further than just doing things right; they detect problems in advance, are proactive in correcting situations, and are quick to suggest improvements. Crosby stated that employees should not be blamed for errors, but rather that management should set the tone on quality for employees to follow their example. Similar to Deming, Crosby suggested that 85% of quality problems are within management control.

During the 1960s Crosby developed the concept of 'zero defects'. He argued that this does not mean that people never make mistakes, but that the company does not start out expecting them to make mistakes. With this philosophy Crosby took a much softer approach than did Deming, Juran or Feigenbaum. His concept of 'zero defects' is based on the assumption that it is always cheaper to do things right the first time (Basu and Wright 2003).

Crosby's quality improvement process is based upon the 'four absolutes of quality management': 1) quality is defined as conformance to requirements; 2) quality prevention is preferable to quality inspection; 3) zero defects is the quality performance standard; and 4) quality is measured in monetary terms. Subsequently, he identified 'fourteen steps to quality improvement' to implement such a quality improvement process in an organisation (see Figure 2.9). They are a management tool which evolved out of a conviction that the 'four absolutes of quality management' should be defined, understood and communicated in a practical manner to every member of the organisation.

-
- 1 Make it clear to all that management is committed to quality
 - 2 Create quality improvement teams with senior representatives from all departments
 - 3 Measure processes to determine current and potential quality issues
 - 4 Evaluate the cost of (poor) quality and explain its use as a management tool
 - 5 Raise quality awareness (and personal concern) of all employees
 - 6 Take actions to correct problems identified through previous steps
 - 7 Monitor progress of quality improvement and establish a zero defects committee
 - 8 Train supervisors and managers in quality improvement
 - 9 Hold zero defects days (to raise awareness and management commitment)
 - 10 Encourage employees to create their own improvement goals
 - 11 Encourage employee communication to management on obstacles to quality
 - 12 Recognise and appreciate those who participate in quality improvement
 - 13 Establish quality councils to communicate on a regular basis
 - 14 Do it all over again - quality improvement is an ongoing process
-

Figure 2.9 Crosby's fourteen steps to quality improvement (1984)

Garvin felt that, if quality is to be managed, it must first be understood. By investigating the air conditioning industry in both Japan and the United States, he found that most companies talk a good deal about quality, but often misinterpret what their customers need.

Garvin worked as an economist for both the Federal Trade Commission and the Sloan Commission on Government and Higher Education before joining the Harvard Business School faculty in 1979. He is the author or co-author of nine books, including “Managing quality” (1988) and many more articles in leading business journals. Garvin identified (1984) and examined (1987) quality in terms of eight critical dimensions (in four key areas), some of which reinforce one another, others of which can be attained only by sacrificing another dimension (see Table 2.1).

	Dimensions of manufacturing quality	Operational requirements
Technological advantage	Performance: the product’s primary operating characteristics	Excellence in performance requires superior product design and a strong engineering function
	Features: attributes that supplement the product’s primary operating characteristics	Distinction in features is achieved with exceptional marketing and design departments
Adherence to specifications	Reliability: the probability of a product failing within a specified time period	Outstanding reliability requires careful attention to product and process design to ensure superior fits and minimal piece-to-piece variation
	Conformance: the extent to which a product’s design and operating characteristics meet predetermined standards	Exceptional conformance is achieved by a production function that pays careful attention to engineering specifications and emphasizes precision in product assembly
Expected performance (time- and cost-based)	Durability: the amount of use a product offers a consumer before the product deteriorates	Premium durability depends on the procurement of long-lived components, thus highlighting the importance of the purchasing function
	Serviceability: how fast, how easily, and with what degree of courtesy and competence repairs are performed	Superb serviceability requires responsive and capable field support personnel as well as a knowledgeable and efficiently-run customer service department
Consumer judgement	Aesthetics: how a product appeals to the five senses	First-class aesthetics and perceived quality are usually the result of a finely-tuned marketing department that is on top of customer needs and aggressive in promoting the company’s brands and desired image
	Perceived quality: reputation, image, or other inferences regarding the attributes of a product	

Table 2.1 Garvin’s dimensions and operational requirements of manufacturing quality (1987)

Garvin suggested that companies do not need to excel on all dimensions of quality in order to be successful; pursuing a ‘quality niche’ can lead to better organisational performance, especially if the dimension singled out is one that other companies have not targeted. Each quality dimension has its own operational requirements, however, that necessitate different core competences within a company. While all members of an organisation are responsible for assuring quality, Garvin’s quality niche taxonomy demonstrated that different functional areas have primary responsibility for assuring different dimensions of quality.

In short, both Crosby and Garvin felt that quality must be understood in order to be managed properly. However, whereas Crosby mainly focussed on preventing quality shortfalls over fixing them (i.e. focussing on the qualitative inputs to a manufacturing process), Garvin was one of the first to focus quality in terms of its critical dimensions (i.e. focussing on the qualitative outputs to a manufacturing process). Both approaches are widely adopted throughout the world.

2.3 SERVICE QUALITY REVOLUTION

Around the second half of the 20th century the quality debate shifted from product quality to service quality, as service operations became more important than product manufacturing. This section provides a comprehensive overview of academics and practitioners that contributed to the service quality revolution and the shift from product quality to service quality.

First service quality wave (1960s to 1990s) - The initial period of service deliberation was a period of debate over the definition of services and the delineation of services from products. One of the first to recognise that

service operations are distinctive in nature from product manufacturing was Regan. He claimed that “intangibility, perishability, heterogeneity and ubiquity make the total comprehension of services difficult” (Regan 1963, p. 58). With his article “The service revolution” (1963), he marked the beginning of the service quality revolution and laid the foundation for the contemporary approach to definition and delineation.

By reviewing almost 50 publications by more than 30 authors, Zeithaml et al. (1985) determined that the most frequently cited characteristic differences between products and services were: intangibility (mentioned by all authors), simultaneity (cited by the great majority), heterogeneity (noted by almost 75%) and perishability (stated by over 50%). Among the authors to cite all four characteristics - and only these four - were Sasser et al. (1978), Zeithaml et al. (1985) and Fisk et al. (1993). Parasuraman et al. (1985) argued that these four well documented characteristics must be acknowledged for a full understanding of service quality.

Intangibility is the fundamental characteristic difference between products and services universally cited (e.g. Regan 1963, Drucker 1974, Sasser 1976, Berry 1980, Zeithaml et al. 1985). Because services are performances, rather than objects, they can not be seen, felt, tasted, heard or smelled in the same manner which products can be sensed. A consequence of the relative intangibility of services is that customers may perceive them differently than the producer desires. Hence, service organisations may make additional efforts to make their services ‘visible’. First, service providers can stress tangible cues (Berry 1980) by making special efforts to make customers aware that they care about them (e.g. a recorded message from a helpdesk informing a queuing caller on estimated waiting time). Second, service providers can explicitise the service (Rathmell 1974) by communicating or displaying what customers are receiving for a certain price (e.g. leaving a note at the reception desk to communicate that a late evening security check on the building has been done). Finally, service providers can stress the tangible artefacts supporting the service by focusing on the physical appearance of service personnel and their equipment (e.g. the care shown in service delivery by well dressed and neat-appearing cleaning personnel). Intangibility is seen as the critical products-services distinction from which all other differences emerge (e.g. Bateson 1977, Zeithaml et al. 1985).

Perishability means that services can not be inventoried (Sasser 1976, Bateson 1977). In other words, the unused service capacity at a certain moment in time cannot be saved or stored for future use (Pride and Ferrell 2006). In addition, services can not be returned or resold upon service delivery (Zeithaml and Bitner 2003). This characteristic difference between products and services makes it more difficult to synchronise supply and demand (e.g. revenue from vacant space or unoccupied buildings will be lost for ever). To match a limited supply of services with an unpredictable demand for these services, service organisations can either increase capacity and efficiency or shift demand to off-peak periods. Also perceptual mechanisms may be used to maintain customer satisfaction when delays in service are unavoidable (e.g. installing flat screen televisions at company restaurants).

Heterogeneity concerns the potential for high variations in service delivery outputs (Zeithaml et al. 1985) - not least because they are delivered by humans. According to Zeithaml et al. (1985), “the quality and essence of a service can vary from producer to producer, from customer to customer and from day to day” (p. 34). And although standardisation is difficult to achieve (Sasser 1976), service organisations can basically adopt two strategies to overcome the obstacle of heterogeneity and achieve consistency in service delivery: customisation (Berry 1980) or industrialisation (Levit 1976). Concerning customisation, specific techniques can be employed to provide customised and unique services. Here especially human resource practices such as recruitment and training play an important role. Concerning industrialisation, specific techniques can be employed to substitute customisation. Here a service company can provide multiple options and programmes to choose from to obviate the need for tailoring involved in customisation. Lovelock and Gummesson (2004) refer to the word

modularisation, where customers make selections from a variety of modules (standardised in themselves) to create a 'customised' service package that best suits their needs. A third, less preferred way to manage the problem of heterogeneity is by providing service guarantees to customers. Pride and Ferrell (2006) emphasised that heterogeneity usually increases as the degree of labour intensiveness increases.

Simultaneity involves the inseparability of production and consumption which characterises most services (Zeithaml et al. 1985). Whereas products are first produced, then sold and then consumed, services are first sold, then produced and consumed simultaneously (e.g. Regan 1963, Grönroos 1978, Zeithaml et al. 1985). As a consequence, quality can not be engineered but occurs during service delivery, usually in interaction between the producer and the consumer (Lethinen and Lethinen 1982). In addition, since service jobs are inherently multifunctional in a way that manufacturing jobs are not, it becomes more difficult to separate functions such as marketing, sales and operations (e.g. the responsibilities of catering staff includes not only the service transaction, but often also production and customer service). Again, human resource practices such as recruitment, selection and training can play an important role to overcome this hurdle (e.g. Grönroos 1978).

In short, Sasser et al. (1978), Zeithaml et al. (1985) and Fisk et al. (1993) all argue that there are four characteristic differences between services and products, namely: intangibility, perishability, heterogeneity and simultaneity. Based on this delineation of services from products, a service can be defined as 'a set of intangible and perishable benefits to an entity that are subject to variation in performance and rendered and consumed during the same period of time'.

Second service quality wave (1980s and ongoing) - The second period of service deliberation is a period of debate counteracting the delineation of services from products. Rathmell (1966) initiated this debate by arguing that all economic offerings can be arranged along a products-to-services continuum. Over the last few years the debate intensified as various authors have argued that the four well-documented characteristics that have been used to differentiate services from products are inaccurate.

Vargo and Lusch (2004) argued that the four characteristic differences between services and products fail to delineate services from products adequately. In addition, they noted that the delineation represents the producer's orientation, rather than the consumer's view. Lovelock and Gummesson (2004) confirmed that the traditional division between products and services is long outdated and that it is time to redefine services based on a customer perspective as opposed to a producer perspective.

Although **intangibility** is universally cited as the fundamental difference between products and services, the concept emerges as unambiguous to differentiate pure products from pure services only. In her article "Breaking free from product marketing", Shostack (1977) already implied that there are very few pure products or pure services. Instead, she noted that most entities are "combinations of discrete elements which are linked in molecule-like wholes and that those elements may have either a tangible or intangible nucleus" (p. 75).

Shostack (1977) was among the first authors to propose that market offerings may be arranged on a tangibility spectrum ranging from tangible-dominant to intangible-dominant. Offerings defined as products are arranged on the tangible-dominant half of the spectrum and offerings defined as services are arranged on the intangible-dominant half of the spectrum (cf. Kerin et al. 2003, Solomon and Stuart 2005, Pride and Ferrell 2006). Although pure products and pure services lie at the extremities, most offerings contain a mix of tangible and intangible elements (Lovelock and Gummesson 2004). Consequently, many products contain intangible attributes that cannot be experienced through all five senses simultaneously (e.g. a can of soft drink) and many

services contain tangible attributes that can be experienced through one or more of the five senses (e.g. medical treatment).

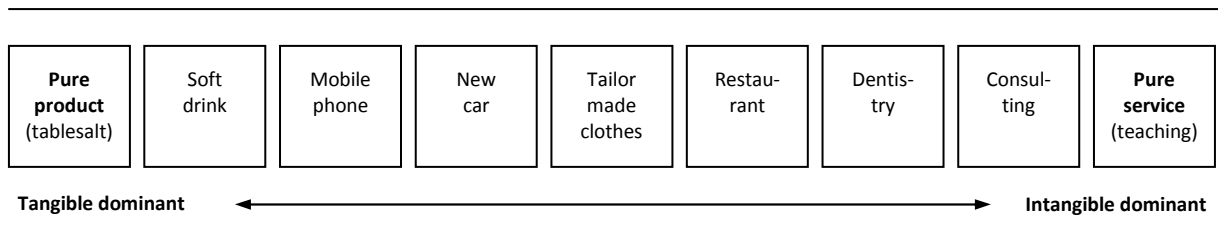


Figure 2.10 Products-to-services continuum (cf. Barnes 2007)

Taking a slightly different perspective, Zeithaml (1981) argued that many products are high in search qualities (i.e. attributes can be determined and evaluated prior to purchase), some products and some services are high in experience qualities (i.e. attributes can only be determined upon purchase and/or consumption), and that most services are high in credence qualities (i.e. customers can only rely on faith because attributes are hard to evaluate even after consumption). She also hypothesised that products can be arranged on a spectrum, with most products falling to the easy-to-evaluate half of the spectrum and most services falling to the difficult-to-evaluate half of the spectrum.

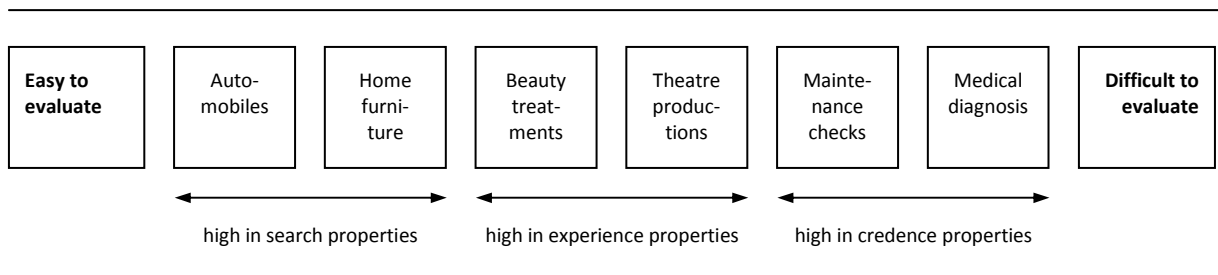


Figure 2.11 Properties of products and services (cf. Zeithaml 1981)

Vargo and Lusch (2004) confirmed that essentially all products have a service component, whereas essentially all services have some form of tangible representation (cf. Swartz et al. 1992). Following Gummesson (1995), they reiterated that tangibility can at best be used to arrange products and services on a continuum according to the relative degree of tangibility. In addition, they argued that customer do not buy products or services, they buy offerings which create value regardless of their relative tangibility or intangibility (cf. Gummesson 1995). With the marketing implication most associated with the intangibility distinction being the fact that service marketers should strive to “tangibilise” their offerings, Vargo and Lusch (2004, p.328) argued that “this normative prescription seems to confuse tangibility with image”.

Although many authors regard **perishability** or the inability to inventory as another characteristic difference between products and services, Kerin et al. (2003) argued that perishability and inventory can present a bigger challenge for many product manufacturers than they do for most service organisations - not least when the products produced themselves are perishable. In addition, they highlighted the financial implications associated to inventories; not only do manufacturers incur costs for storage, security and insurance, inventories also have a significant impact on returns on investment. The challenge of optimising capacity utilisation, however, is universal: perishability of productive capacity is as relevant to a manager of a furniture

manufacturer exposed to falling demand as it is to a manager of a property portfolio exposed to falling demand.

The generalisation that inherent perishability makes services distinctively different from products requires significant qualification. As stated above, productive capacity is equally perishable for product manufacturers and service organisations as it is wasted if unused in both instances. In addition, carrying inventory comes with a price tag: although product manufacturers can use their inventory as a buffer between production and variations in demand, service organisations are better positioned to smooth demand through price variations and other marketing strategies (Lovelock 1984).

Vargo and Lusch (2004) confirmed that both products and services can be perishable and that inventoriability is not exclusively limited to products. Following Gummesson (2000), they emphasised that many services are stored in systems, buildings, machines, knowledge and people (e.g. universities can inventory educational services by accurate planning and students can inventory knowledge and skills for lifelong learning). In addition, they highlighted that customers typically find all offerings perishable as both products and services are equally subject to variable customer needs as well as fashion trends, style and taste, and personal expectations. With the marketing implication most associated with the perishability distinction being the idea that service marketers should strive to “increase capacity and efficiency, or shift demand to off-peak periods”, Vargo and Lusch (2004, p.331) argued that “both product and service marketers should always assume perishability”. Subsequently, they proposed that the normative goal should be to maximise value to the customer.

Although the case for **heterogeneity** or non-standardisation in services is based primarily on variations in producer performance, Zeithaml and Bitner (2003) noted that no two customers are the same and thus by definition will have unique demands or experience the service in a unique way. Subsequently, Solomon and Stuart (2005) argued that standardisation is not even desirable for many services as most individuals appreciate customisation to meet their specific needs. Lovelock and Gummesson (2004) highlighted that this is not unique to services as customer demands and experiences in relation to physical products can also vary widely.

Vargo and Lusch (2004) argued that products cannot be inherently more homogeneous than services as both offerings require human input. In addition, they reiterated that customers have heterogeneous judgements, regardless of the relative homogeneity or heterogeneity of products or services. With the marketing implication most associated with the heterogeneity distinction being the idea that service marketers should strive to “standardise” their offerings, Vargo and Lusch (2004, p.329) proposed that, “in reality, the situation may be the exact opposite as the normative prescription for customer orientation necessitates heterogeneity”.

Although the **simultaneity** or inseparability of production and consumption claim for services, there is a large group of separable services that do not involve the customer directly, with the result that production and consumption need not be simultaneous (Lovelock and Gummesson 2004). Numerous widely used customer and business services are delivered in the customer’s absence. Most individual consumers are willing to pay the mail service to deliver a parcel as it saves them time and effort (and to allow professionals to do the job better than they could themselves). Similarly, corporate customers outsource such tasks as office cleaning, catering services and manned guarding in order to disengage from performing these activities (and to focus on the core business). Although there may be some initial interaction between customer and supplier, there is usually little interaction once the service delivery process is in progress. Rightfully, Lovelock and Gummesson (2004) concluded that there are far too many separable services to justify the generalisation that inseparability is a distinctive characteristic of all services

Vargo and Lusch (2004) confirmed that many products are produced with the active involvement of the customer and that many services are partially produced separate from the customer (cf. Lovelock 2000). In addition, they stated that customers typically find separability undesirable as they want to be involved to some degree in the production and/or delivery of both products and services. With the marketing implication most associated with the inseparability distinction being the idea that service marketers should strive to “remove as much of the service provision from the service encounter as possible”, Vargo and Lusch (2004, p. 330) argued that “much of what makes a service special derives from the fact that it is a lived-through event (cf. Beaven and Scotti 1990) and the current trend towards mass customisation and true partnerships point toward maximising customer-supplier interaction”.

Lovelock and Gummesson (2004) took the service quality debate even further by inverting the four characteristic differences from intangibility into tangibility, from perishability into durability, from heterogeneity into homogeneity and from simultaneity into separability.

Previously, Lovelock (1983) identified four service categories based on whether the service act is physical or non-physical in nature and whether owned objects, information, or people represent the central element in the service act (see Table 2.2). The four service categories he identified are: a) physical acts to the customer itself (i.e. people processing); b) physical acts to an object belonging to the customer (i.e. possession processing); c) non-physical acts directed at the customer’s mind (i.e. mental stimulus processing); and d) non-physical acts directed at data or intangible assets (i.e. information processing).

	Physical acts to customers (e.g. catering)	Physical acts to objects (e.g. cleaning)	Non-physical acts to customer minds (e.g. security)	Non-physical acts to information (e.g. PhD research)
Intangibility	Experiences may be highly tangible and even result in physical changes	Performance may physically transform possession in tangible ways	Yes	Yes
Heterogeneity	Yes	Depending, as many services can be standardised (or modularised)	Depending, as many services can be standardised (or modularised)	Depending, as many services can be standardised (or modularised)
Inseparability	Yes	Depending, as customer can be absent during production	Depending, as customer can be absent during production	Depending, as customer can be absent during production
Perishability	Yes	Yes	Depending, as many services can be stored in electronic or printed form	Depending, as many services can be stored in electronic or printed form

Table 2.2 Service characteristics of different types of services (Lovelock and Gummesson 2004)

Table 2.2 clearly indicates that there are numerous exceptions to the idea that all services possess each of the four characteristic differences between services and products (intangibility, perishability, heterogeneity and simultaneity). Lovelock and Gummesson (2004) even argued that “many services actually possess one or more of the opposite characteristics, namely: tangibility, durability, homogeneity and separability” (p. 31).

Tangibility - Services that entail physical acts to customer itself will involve tangible processes with tangible outcomes by definition. People will see and feel (and sometimes taste, hear and smell) something happening to them when they dine in a restaurant, go to the dentist, or receive counselling. Similarly, there are tangible impacts to objects belonging to the customer as a result of services such as maintenance checks.

Durability - Service delivery outputs that can be captured through memory or recordings are highly durable. This category affects a broad range of service industries, including music and film as well as education and entertainment. The service outputs inherent in intellectual property such as CDs and DVDs as well as software can not only be saved or stored for future use, but also be returned or resold.

Homogeneity - Service quality improvements have made it possible to significantly improve both reliability and consistency in the delivery of possession processing services such as dry cleaning and retail banking. In addition, information carriers such as DVDs and CDs can be viewed or listened to many times with zero variation and broadcasters can transmit one and the same programme to various audiences in many locations.

Separability - Many possession, mental stimulus, and information processing services do not involve customer participation in the actual production process. Examples include maintenance checks, broadcasting services, and payroll administration respectively. Apart from ordering and paying, consumption is entirely separate from the production process.

In short, both Vargo and Lusch (2004) and Lovelock and Gummesson (2004) noted that product manufacturers are trying to become more service-like by focusing on the intangible value of their offerings and by mass customisation and that service providers are trying to become more product-oriented by 'tangibilising' and 'standardising' their service offering. As for simultaneity, they argued that both product manufacturers and service providers are intensifying provider-customer interaction to create true partnerships. Finally, they highlighted that both products and services are subject to perishability, but that both can be inventoried (the former post-production, the latter pre-production). Arguing that intangibility, perishability, heterogeneity and simultaneity are not sufficient to delineate services from products and that the common denominator of most service definitions is 'activities' or 'processes', Vargo and Lusch (2004) defined a service as "the application of specialised competences (skills and knowledge) through activities, processes and performances for the benefit of an entity" (p. 326).

2.4 EXPERT VIEW ON PERFORMANCE AND QUALITY

In spring 2006, the literature review on 'performance and quality' as described in the previous three sections was presented at a dedicated seminar involving approximately 45 executives from over 30 customer and supplier organisations (involving both contract managers and account managers for cleaning, catering and security services) as well as representatives of the British Institute of Facilities Management (BIFM), University College London (UCL) and the Investment Property Databank (IPD). The executives were screened to ensure that they were current customers or suppliers of the three service lines investigated. The subsequent panel discussion and workshops during this seminar provided valuable feedback on the relationships organisational performance and quality.

Discussions during the morning focussed on obtaining constructive feedback in relation to the presented literature review. Questions asked by the moderator covered topics such as:

- The role of quality in organisational performance
- The differences between products and services
- The definition of product quality and service quality

Both customers and suppliers reiterated the importance of quality in assuring successful business results. Following the guiding principles of the value profit chain, both stakeholder groups confirmed that internal quality has a significant impact on employee satisfaction and that external quality has a significant impact on

customer satisfaction. Whereas the first leads to more loyal employees and subsequently better external quality, the latter leads to more loyal customers and subsequently increased profitability.

Although the above applies to both product quality and service quality, it was confirmed that pure services are fundamentally different from pure products - not least due the more intangible nature of services. It was questioned, however, to what extent cleaning, catering and security were pure services. Although one can argue that the quality of these services is judged partly on tangible cues such as the equipment used (e.g. trolleys, servery and/or CCTV systems) and associated materials (e.g. safety floor signs, menus and displays and/or escape floor plans), it was recognised that intangible variables such as reliability and reputation are arguably of greater importance in delivering good service quality.

Considering both products and services as offerings (rather than distinguishing between the two) and to simplify the discussion, it was agreed to group all non-price attributes into one entity called 'quality' - defined as 'the totality of inherent characteristics of a product or service that bear on its ability to increase the demand for that product or service at a fixed price' (after ISO 9000 Series of Standards). In this definition a characteristic is a distinguishing feature that can be physical (e.g. mechanical or electrical), temporal (e.g. availability or punctuality), functional (e.g. capability or durability), ergonomic (e.g. physiological or safety-related), sensory (e.g. touch or sound), or behavioural (e.g. honesty or veracity).

To summarise Chapter 2, the profitability or performance of an organisation depends to a great extent on meeting the generic performance criteria: effectiveness, efficiency, productivity, flexibility, and creativity. Furthermore, quality plays a crucial role in the productivity equation of organisations. An appropriate and appealing model for conceptualising these issues can be found in the widely accepted value profit chain, in which quality plays a dominant role.

Concerning the literature on quality, definitions over the last century have ranged from 'elimination of variations to the standard' and 'fitness for use' to 'best for the customer use' and 'conformance to requirements and/or needs'. Delineating services from products, it has been argued that services are different from products in certain key respects. In a more current view, however, it has been argued that there are very few pure products and services and that most 'offerings' hold the middle between a pure product and a pure service.

Considering both products and services as offerings (rather than distinguishing between the two) and to simplify the discussion, it was decided to group all non-price attributes into one entity called 'quality' - defined as 'the totality of inherent characteristics of a product or service that bear on its ability to increase the demand for that product or service at a fixed price'.

The next chapter will provide an overview of various concepts and models to measure service quality - not least in a business-to-business context.

Box 2 Summary of performance and the role of quality

3 MEASURING SERVICE QUALITY

In this chapter we provide an overview of various concepts and models to measure service quality. First, we discuss two contradicting paradigms that form the basis for measuring service quality. Next, we highlight the differences between service quality and customer satisfaction. Third, we discuss the various service quality models as developed by various leading academics. From here, we describe the arguments supporting both the SERVQUAL and the SERVPERF methodology. Fifth, we look at service quality in a business-to-business context. Finally, our review of the literature is verified and validated against the views from customer and supplier executives as expressed at a dedicated seminar held in spring 2006.

3.1 TWO CONTRADICTING PARADIGMS

As stated at the beginning of this thesis, service quality is an elusive and indistinct construct that is difficult to define and measure (e.g. Rathmell 1966, Pirsig 1974, Crosby 1979, Garvin 1983, Parasuraman et al. 1985, Carman 1990, Cronin and Taylor 1992, Grönroos 2000). Over the last three decades, however, various researchers have sought to define and measure the concept of service quality (e.g. Lewis and Booms 1983, Grönroos 1984, Parasuraman et al. 1985 and 1988, Carman 1990, Cronin and Taylor 1992, Teas 1993, Westbrook and Peterson 1998).

Although the operationalisation of service quality differs from researcher to researcher, one can clearly identify two schools of thought: one group of researchers supporting the disconfirmation paradigm of perceptions-minus-expectations; and one group supporting the performance-based paradigm of a perceptions only version of service quality.

Disconfirmation paradigm - According to Grönroos (1984), consumers evaluate (perceived) service quality by comparing expectations with experiences of the service received. In line with this thinking Lewis and Booms (1983) stated that service quality is a measure of how well the service level delivered matches customer expectations. Delivering quality service therefore means conforming to customer expectations on a consistent basis.

Following the writings of Sasser et al. (1978), Lethinen and Lethinen (1982) and Grönroos (1984), extensive focus group interviews held by Parasuraman et al. (1985) affirmed that service quality is derived from the comparison between a consumer's expectations for service quality performance versus the actual perceived performance of service quality (perceptions-minus-expectations). In addition, Parasuraman et al. (1988) stated that "perceived service quality is viewed as the level of discrepancy between consumers' perceptions and expectations" (p.17).

Based on extensive focus group interviews and subsequent research, Parasuraman et al. (1985 and 1988) concluded that: 1) service quality is an overall evaluation similar to attitude, 2) the 'expectancy-disconfirmation' model is an appropriate operationalisation of service quality, and 3) service quality (as a form of attitude) results from the comparison of perceptions with expectations.

Performance-based paradigm - Carman (1990) argued that there is little, if any, theoretical evidence supporting the relevance of perceptions-minus-expectations gaps as the appropriate basis for assessing service quality. In addition, Brown et al. (1993) concluded that there are serious problems in conceptualising service quality as a difference score.

Following considerable support for simple performance-based measures of service quality in the marketing literature (e.g. Mazis et al. 1975, Woodruff et al. 1983, Bolton and Drew 1991), research by Cronin and Taylor (1992) affirmed that an unweighted performance-based approach is a more appropriate basis for assessing service quality. Similarly, Babakus and Boller (1992) reported results supporting the use of performance-based measures of service quality over gap measures.

Based on extensive literature review and subsequent research, Cronin and Taylor (1992) concluded that: 1) perceived service quality is best conceptualised as an attitude, 2) the 'adequacy-importance' model is the most effective 'attitude-based' operationalisation of service quality (cf. Mazis et al. 1975), and 3) current performance adequately captures consumers' perceptions of the service quality offered by a specific service provider (p. 58).

Additional comparison of weighted versus unweighted models by Teas (1993) indicated that unweighted models generally perform better than weighted models in terms of concurrent and construct validity.

3.2 QUALITY VERSUS SATISFACTION

Based on a combination of literature review and empirical investigation, Oliver (1980), Parasuraman et al. (1988) and Cronin and Taylor (1992) all suggest that service quality and consumer satisfaction are related, but distinct constructs. Their explanation of the difference between the two is that service quality is a long-term overall evaluation, whereas consumer satisfaction is a transaction-specific measure (cf. Parasuraman et al. 1988, Carman 1990, Cronin and Taylor 1992). By taking a closer look at the service quality literature and the consumer satisfaction literature, we not only aim to clarify the difference between service quality and consumer satisfaction, but also to resolve the confusion related to the definition and operationalisation of service quality.

Service quality literature - Parasuraman et al. (1994) argued that the disconfirmation of perception-minus-expectations conceptualisation of service quality is supported by various researchers (e.g. Parasuraman et al. 1988, Bolton and Drew 1991b, Parasuraman et al. 1991).

Based on empirical evidence, Parasuraman et al. (1988) argued that in measuring service quality the level of comparison is what a consumer *should* expect, whereas in measuring satisfaction the level of comparison is what a consumer *would* expect. This differentiation stems from their recognition that "the term 'expectation' as used in the service quality literature differs from the way it is used in the consumer satisfaction literature. Specifically, in the consumer satisfaction literature, expectations are viewed as *predictions* made by consumers about what is likely to happen during an impending transaction. In contrast, in the service quality literature, expectations are viewed as *desires* of consumers, i.e. what they feel a service provider *should* offer rather than *would offer*" (p.17).

As stated previously, Parasuraman et al. (1988) concluded that service quality results from the comparison of perceptions with expectations. Similarly, Bolton and Drew (1991b) concluded in their research that the gap between performance and expectations is a key determinant of overall service quality. In the same article, however, Bolton and Drew also stated that "a consumer's assessment of overall service quality is directly affected by perceptions of performance levels" (p. 383).

Following the suggestion by Woodruff et al. (1983) that expectations are to be based on experience norms (i.e. what consumers *should* expect from a given service provider given their experience with that specific type of service organisation), Parasuraman et al. (1991) found two different comparison norms for the assessment of

service quality: desired service (i.e. the level of service a consumer believes can be delivered) and adequate service (i.e. the level of service the consumer considers acceptable).

Consumer satisfaction literature - Oliver (1980) found that service quality (as a form of attitude) is initially a function of expectations and subsequently a function of the prior attitude toward satisfaction. In addition, he suggested that this attitude affects purchase intentions. The initial attitude, however, can be affected by the level of (dis)satisfaction experienced and subsequently influence purchase intentions.

Bolton and Drew (1991a) affirmed that satisfaction mediates prior perceptions of service quality to form current perceptions of service quality. However, Cronin and Taylor (1992) noted that “their results suggest that perceived service quality is strongly affected by current performance and that the impact of disconfirmation (at the satisfaction level) is relatively weak (p. 57)”.

According to Oliver (1980), it is consumer satisfaction that is determined by disconfirmation judgements (better-than-expected or worse-than-expected) on the basis of comparing the actual performance of a product with consumer expectations. In the case of services, however, where performance dimensions are hard to quantify, consumers may not be able to make such calculated comparisons between (perceived) performance and expectations.

In line with this observation, Smith and Houston (1982) claimed that consumer satisfaction with services is related to confirmation or disconfirmation of expectations. In addition, Churchill and Suprenaut (1982) argued that satisfaction is related to the size and direction of the disconfirmation experience where disconfirmation is related to a consumer’s initial expectations.

By using these latter two references in defining service quality as resulting from the comparison of perceived performance with expectations and arguing that perceived service quality is a function of the discrepancy between consumers’ perceptions and expectations, Parasuraman et al. (1985 and 1988) are partially to blame for the confusion related to the operationalisation of service quality.

In our opinion, the above overview of the ‘service quality literature’ and the ‘consumer satisfaction literature’ solves a range of issues related to service quality. First and foremost, it implies that service quality (as a form of attitude) is a function of expectations (prior to any service encounter) or a function of experiences (upon the first service encounter) only. This suggests using performance perceptions as a measure of service quality (cf. Cronin and Taylor 1992). Second, it implies that consumer satisfaction mediates the effect of prior perceptions of service quality to cause revised perceptions of current service quality. This finding suggests that the disconfirmation paradigm of perceptions-minus-expectations is closer related to consumer satisfaction than to service quality. Third, it implies that service quality is an antecedent of consumer satisfaction.

In line with Cronin and Taylor (1992) we believe that service quality should not be derived from the difference between consumers’ expectations about the performance of a general class of service providers and their assessment of the actual performance of a specific firm within that class.

Relationship between quality and satisfaction - According to Cronin and Taylor (1992), Teas (1993) and Parasuraman et al. (1994), both the service quality literature and consumer satisfaction literature have left confusion as to the nature and causal direction of the relationship between service quality and consumer satisfaction. Many researchers (e.g. Parasuraman et al. 1988, Carman 1990, Cronin and Taylor 1992, Parasuraman et al. 1994), however, agree that service quality is an overall evaluation or a global value

assessment (consistent with the service quality literature) whereas customer satisfaction is a transaction-specific assessment (consistent with the customer satisfaction literature).

Based on this distinction, some service quality researchers (e.g. Bolton and Drew 1991) argued that an accumulation of transaction-specific assessments leads to a global assessment (i.e. customer satisfaction is an antecedent of service quality). Based on theoretical and empirical evidence by Parasuraman et al. (1988) and Cronin and Taylor (1992), however, we believe that the reverse is true in that service quality is an antecedent of customer satisfaction (i.e. higher levels of perceived service quality results in increased consumer satisfaction).

Furthermore, it is implied that both service quality and customer satisfaction are antecedents of purchase intentions. According to Oliver (1980) perceived service quality modifies a consumer’s purchase intentions. In addition, Oliver (1981) stated that “satisfaction soon decays into one’s overall attitude towards purchasing products” (p. 27). In addition, both Parasuraman et al. (1988) and Cronin and Taylor (1992) have proven that both service quality and customer satisfaction affect purchase intentions. Cronin and Taylor (1992), however, noted that customer satisfaction exerts a stronger influence on purchase intentions than does service quality.

3.3 SERVICE QUALITY MEASUREMENT MODELS

In line with the disconfirmation paradigm, Grönroos (1984) developed a model in which he contends that consumers compare the service as experienced with the service as expected in evaluating service quality. The model created by Grönroos attempts to understand how the quality of a given service is perceived by customers. Furthermore, it divides the customer's experience of any particular service into two dimensions: technical quality (i.e. what the consumer receives or the technical outcome of the service delivery process) and functional quality (i.e. how the consumer receives that technical outcome). Grönroos suggested that, in the context of services, functional quality is generally perceived to be more important than technical quality, assuming that the service is provided at a technically satisfactory level.

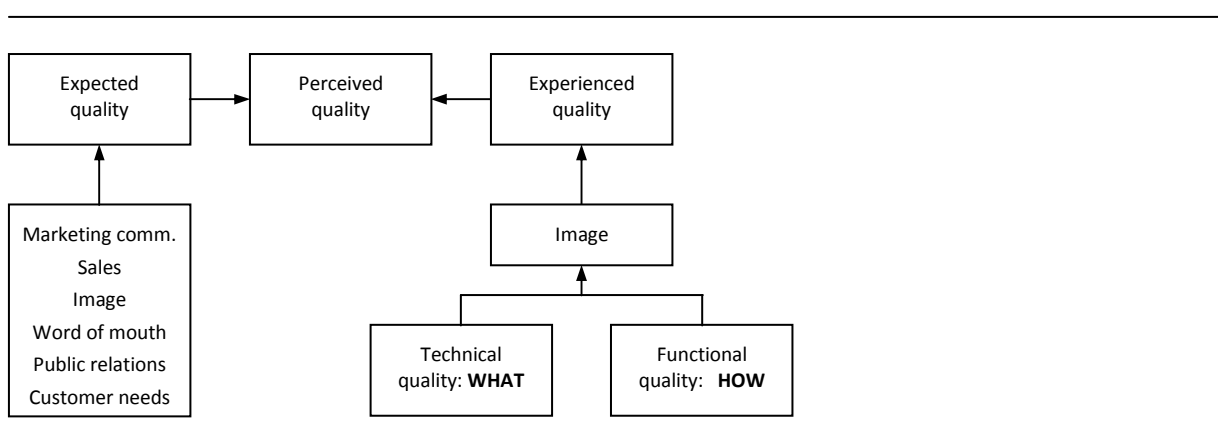


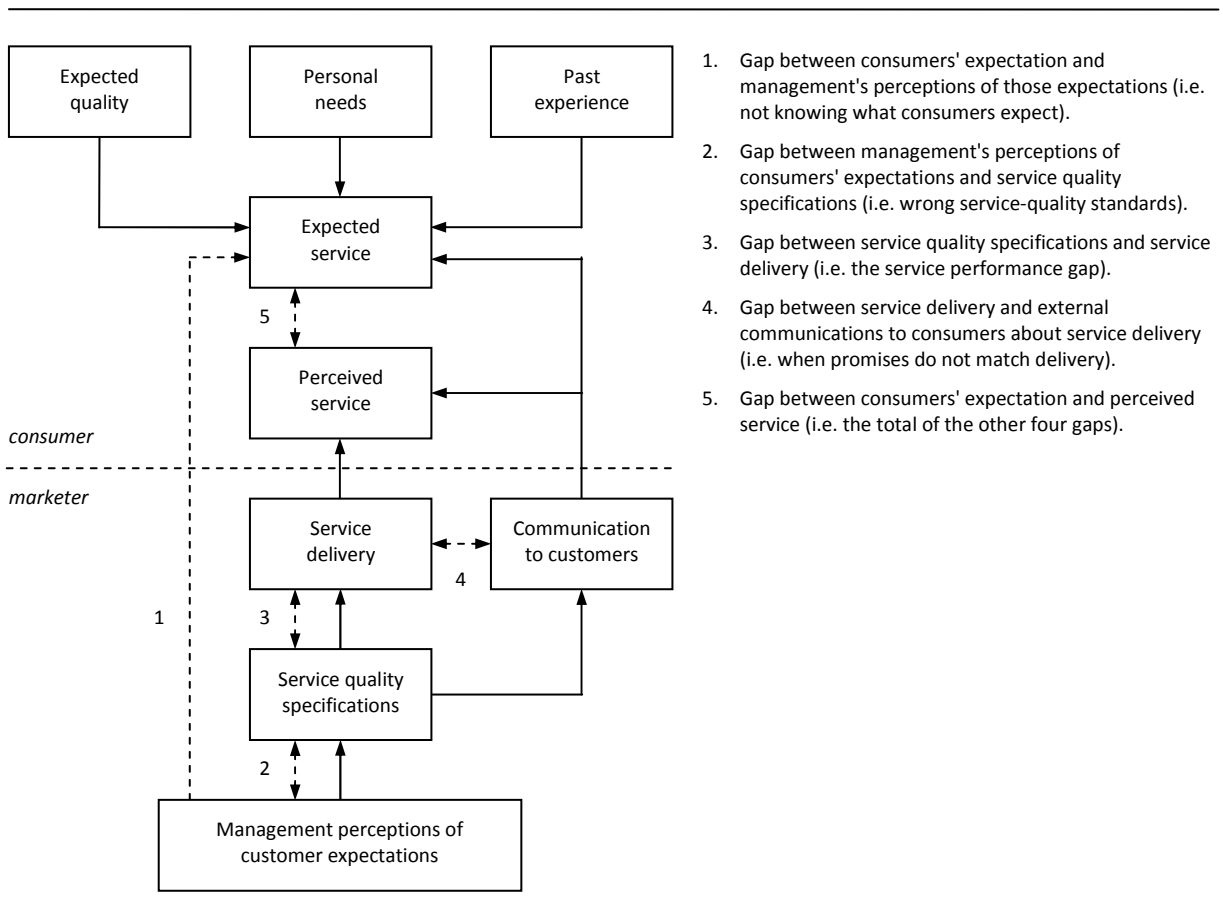
Figure 3.1 Service quality model (Grönroos 1984)

Good perceived quality is obtained when the experienced quality meets the expectations of the customer; that is the expected quality. The level of perceived quality is not determined simply by the level of technical quality and functional quality, but rather by the gap between the expected and experienced quality. Consequently, every quality program should involve not only those involved in operations, but also those responsible for marketing and communications. Grönroos's model is important because it reminds us that service quality must include the manner in which it is delivered.

Subsequent exploratory research by Parasuraman et al. (1985) revealed several insights and propositions concerning consumers' perceptions of service quality. They propose a more elaborate service quality model including various service quality determinants based on an interpretation of qualitative data generated through a number of in-depth executive interviews and focus group discussions in four different service areas (retail banking, credit card, securities brokerage, and product repair and maintenance).

In-depth interviews of executives in four nationally recognised service firms and a set of focussed discussions with groups of consumers were conducted to gain insights about the following questions: What do managers of service firms perceive to be key determinants of service quality? What do consumers perceive to be key determinants of service quality? Do discrepancies exist between the perceptions of consumers and service marketers? Can consumer and marketer perceptions be combined in a general model that explains service quality from the consumer's standpoint?

The in-depth executive interviews revealed four discrepancies or 'gaps' on the service provider's side that are likely to affect service quality as perceived by consumers. A fifth gap, depending on the nature of the first four gaps, was identified on the consumer's side. The major insights gained through the interviews suggest a conceptual service quality model; also known as the Gap-model (see Figure 3.2).



1. Gap between consumers' expectation and management's perceptions of those expectations (i.e. not knowing what consumers expect).
2. Gap between management's perceptions of consumers' expectations and service quality specifications (i.e. wrong service-quality standards).
3. Gap between service quality specifications and service delivery (i.e. the service performance gap).
4. Gap between service delivery and external communications to consumers about service delivery (i.e. when promises do not match delivery).
5. Gap between consumers' expectation and perceived service (i.e. the total of the other four gaps).

Figure 3.2 Service quality Gap-model (Parasuraman et al. 1985)

Since the magnitude and direction of the fifth 'gap' directly affects the service quality as perceived by the consumer, it is seen as the most significant gap. Supported by the focus group discussions, Parasuraman et al. (1985) noted that consumers would have perceptions of high service quality to the extent that their expectations are lower than the perceived service performance. If the converse were true, consumers would

have perceptions of low service quality. In short, the discussions supported the notion that the solution to ensuring good service quality is meeting or exceeding consumers' expectations.

The focus group discussions also revealed that, regardless of the type of service, consumers use basically similar criteria in forming expectations about and perceptions of services. These criteria seem to fall into ten categories, labelled as 'service quality determinants': reliability, responsiveness, competence, courtesy, credibility, security, access, communication, understanding, and tangibles. For each determinant, examples of service specific criteria were provided.

Based on further review of the literature and empirical investigation (retail banking, credit card, product repair and maintenance, and long-distance phoning) to flesh out the ten determinants and condense the 36 statements, Parasuraman et al. (1988) developed the **SERVQUAL** instrument based on five dimensions to characterise consumers' perceptions of service quality: tangibles, reliability, responsiveness, assurance, and

empathy (see Figure 3.3). The instrument was designed to uncover broad areas of good or bad service quality and can be used to show service quality trends over time and for benchmarking purposes. Emphasising that service quality was derived from the comparison between consumers' perceptions of actual service quality upon service delivery with consumers' expectations of service quality prior to service delivery, the instrument is based on the disconfirmation paradigm of perceptions-minus-expectations. Parasuraman et al. (1988) reported that their SERVQUAL scale had a reliability rating of 0.92 (i.e. indicating a high degree of internal consistency) and that the five dimensions could be ranked in order of importance: reliability, assurance, tangibles, responsiveness, and empathy.

Later on Zeithaml et al. (1990) added a section to assess relative importance to appropriately weight each dimension. The final SERVQUAL questionnaire featured 22 expectation statements and 22 perception statements on a 7-point Likert scale bounded by 'strongly agree' and 'strongly disagree' as well as five point-allocation importance features. Empirical evidence indicates that their SERVQUAL scale has a reliability rating of between 0.80 and 0.93, good trait validity and good predictive validity.

Tangibles - Appearance of physical facilities and personnel

1. Up-to-date appearing equipment
2. Visually appealing physical facilities
3. Well dressed and neat-appearing personnel
4. Visually appealing materials associated with the service

Reliability - Ability to perform service dependably and accurately

5. Doing something by certain times promised
6. Showing sincere interest in solving problems
7. Performing the service right the first time
8. Providing service at the time promised
9. Insisting on error-free records

Responsiveness - Willingness to help and provide prompt service

10. Telling you exactly when services will be performed
11. Giving you prompt service
12. Willingness to help you
13. Never being too busy to respond to requests

Assurance - Knowledge and courtesy of employees

14. Confidence instilling behaviour
15. Feeling safe in your transactions
16. Being consistently courteous
17. Having the knowledge to answer questions

Empathy - Caring attention the firm provides its customers

18. Giving you individualised attention
 19. Having convenient operating hours
 20. Giving you personal attention
 21. Having your best interests at heart
 22. Understanding your specific needs
-

Figure 3.3 Five determinants of service quality (Zeithaml et al. 1990)

Additional examination and testing of the SERVQUAL scale, however, has not always been supportive of its author's claims. For instance, various researchers claim that the five dimensions are not always generic and that they can vary depending on the type of service industry investigated (e.g. Carman 1990, Babakus and Boller 1992). Others call into question the collection of expectation data after actual consumption of the

service (Oliver 1980). Further criticism on the SERVQUAL scale is related to its reliability and validity (e.g. Cronin and Taylor 1992, Teas 1993).

Cronin and Taylor (1992) suggested that the conceptualisation and operationalisation of the SERVQUAL scale is inadequate. This is supported by the fact that various researchers have failed to replicate SERVQUAL's five distinct dimensions (Carman 1990, Babakus and Boller 1992, Cronin and Taylor 1992) and validity (Cronin and Taylor 1992, Teas 1993).

Cronin and Taylor (1992) reiterated that the perception-expectation gap theory of service quality is supported by little, if any, theoretical and empirical evidence as an appropriate basis for measuring service quality (cf. Carman 1990). Other arguments against the perception-expectation gap theory come from the notion that expectations are based on experience norms (Woodruff et al. 1983). Similarly, Oliver (1980) suggests that consumers form expectations on the basis of prior experiences with a certain service delivery firm, and that these experiences affect their expectations. Expectations, however, should ideally be formed before any service encounter. In addition, the marketing literature appears to offer considerable support for the superiority of simple performance-based measures of service quality (e.g. Mazis et al. 1975, Woodruff et al. 1983, Bolton and Drew 1991). According to Cronin and Taylor (1992) all this suggests using only performance perceptions as a measure of service quality.

Based on their theoretical concerns, Cronin and Taylor (1992) assessed three alternatives to the original SERVQUAL scale. Specifically, they examined the original SERVQUAL scale, an importance-weighted SERVQUAL scale, a performance-based approach to the measurement of service quality called **SERVPERF**, and an importance-weighted version of the SERVPERF scale in four types of service firms (retail banking, pest control, dry cleaning, and fast food). The results of their oblique rotation analyses suggested that the five-dimensional structure proposed by Parasuraman et al. (1988) is not confirmed in any of the four research samples and that all 22 attributes loaded on one single factor. In addition, the stepwise regression analyses affirmed that the unweighted performance-based approach (SERVPERF) is the most appropriate basis for measuring service quality. In all four service industries examined, the unweighted SERVPERF scale explained more of the variation in the global measure of service quality than any of the other three scales.

In short, arguing that the perception-expectation gap theory of service quality (Parasuraman et al. 1985 and 1988, Zeithaml et al. 1990) is supported by little theoretical and empirical evidence (Carman 1990), Cronin and Taylor (1992) developed a 'performance-based' service quality measurement instrument called SERVPERF. According to Cronin and Taylor (1992), their unweighted performance-based SERVPERF instrument was a better method of measuring service quality. Their SERVQUAL scale had a reliability rating ranging from 0.88 to 0.96 (i.e. indicating a high degree of internal consistency), depending on the type of service industry, and exhibited good convergent validity as well as good discriminant validity.

3.4 SERVQUAL VERSUS SERVPERF

The SERVQUAL versus SERVPERF debate is ongoing as both groups of researchers have presented further arguments to support their respective perspectives (Parasuraman et al. 1994, Cronin and Taylor 1994).

The major arguments in favour of SERVQUAL by Parasuraman et al. (1994) are:

- **There is significant theoretical and empirical research to support their perception-expectation gap theory.** The writings of Sasser et al. (1978), Lethinen and Lethinen (1982) and Gronroos (1984), in combination with extensive research by Parasuraman et al. (1985, 1988 and 1991), support the notion that service quality as perceived by consumers stems from a comparison their expectations from a service provider with their

perceptions of actual service delivery. "Perceived service quality is therefore viewed as the level of discrepancy between consumers' perceptions and expectations" (Parasuraman et al. 1988, p. 17).

- **The SERVQUAL instrument is designed to measure perceived service quality** at a given point in time (i.e. the attitude level), regardless of the process by which it was formed. To counteract SERVQUAL, however, Cronin and Taylor (1992) cited studies (Oliver 1980, Bolton and Drew 1991) that focus on how the perception of service quality was developed (i.e. the formation of attitudes).
- **SERVQUAL's convergent and discriminant validity is as good as SERVPERF's validity.** Concerning convergent validity, the virtually identical average pairwise correlations for SERVPERF (0.689) and SERVQUAL (0.687) with overall service quality does not warrant the conclusion that the former has higher convergent validity than the latter. Concerning discriminant validity, the average pairwise correlations for SERVPERF with consumer satisfaction and purchase intentions (0.481) is again almost identical for SERVQUAL (0.457).

Finally, Parasuraman et al. (1994) argued that while their perceptions-minus-expectations measures may show less predictive power than perceptions only measures, their measures do have better diagnostic value. With managers using service quality measurements being more interested in accurately identifying service quality shortfalls, the superior diagnostic value of SERVQUAL more than offsets the loss in predictive power.

The major arguments in favour of SERVPERF by Cronin and Taylor (1994) are:

- **The SERVPERF conceptualisation represents just one of a number of recent challenges to the SERVQUAL conceptualisation of service quality** (Carman 1990, Babakus and Boller 1992, Oliver 1993). In addition, emerging literature largely has supported the performance-based paradigm over the disconfirmation-based paradigm. Perhaps most telling is the report by one of the co-authors of SERVQUAL that their results are incompatible with the 'gap' formation for service quality (Boulding et al. 1993). Instead they found that service quality is directly influenced only by perceptions of performance.
- **The disconfirmation-based SERVQUAL instrument is not measuring service quality**, but rather it appears at best an operationalisation of only one of the many forms of expectancy-disconfirmation (Boulding et al. 1993, Oliver 1993). Again, it is suggested that performance-based measures better reflect long-term service quality attitudes (Cronin and Taylor 1992).
- **SERVPERF has greater construct validity when compared to SERVQUAL** based on a review of the available literature and the fact that SERVPERF measures also exhibit convergent and discriminant validity. Nowhere in Cronin and Taylor (1992) is there any consideration or comparison of the convergent and discriminant validity of the SERVQUAL scale.

Finally, Cronin and Taylor (1994) asserted that since perceptions-minus-expectations measures seem to have little conceptual and empirical support, the real question that should be asked is whether or not perceptions only measures can adequately measure service quality. Based on the emerging literature and their own empirical findings, they insist that the SERVPERF instrument can provide a reliable and valid tool for measuring levels of service quality.

3.5 BUSINESS-TO-BUSINESS CONTEXT

Exploratory research by Westbrook and Peterson (1998) confirmed that the original works by Parasuraman et al. (1988) and Cronin and Taylor (1992) are solid theoretical underpinnings for understanding consumer perceptions concerning service quality in a business-to-consumer setting. For business-to-business service encounters, however, they found additional salient quality variables being important.

Based on a review of available literature and further personal interviews with 300 customers (manufacturing companies, services organisations, government departments, and publicly-owned companies) of a large

insurance brokerage company, Westbrook and Peterson (1998) identified 40 service quality variables perceived to be important to service quality by the respondents.

By calculating frequency distributions for the entire sample, twelve service quality dimensions emerged that could be ranked in order of importance: responsiveness, competence, consultative selling, reliability, price, accessibility, interpersonal skills, product offering, credibility, market clout, geographical presence, and finally tangibles (see Figure 3.4).

Responsiveness - willingness and readiness for conducting the service

- Reduced cycle time and delivery for service
- Being on time to scheduled meetings and events
- Meeting deadlines for projects and assignments
- Having an aggressive spirit or being proactive to unmet needs or unperceived problems before being asked to respond

Competence - possession of required skills and knowledge to properly perform the needed service

- Having expertise in the area of the provided service
- Possessing good problem-solving skills

Consultative selling - service provider's ability to embed within the client's operation

- Establishing partnerships with joint planning and goal setting
- Acting as an advocate with senior company executives
- Incurring risk for the client
- Absorbing duties and responsibilities for the client
- Providing profit driven alternatives
- Understanding and knowing the client's business
- Offering advice to include programmes, operational procedures and processes, or training and education

Reliability - salesperson's accuracy and dependability of the service performance

- Proper follow-through on projects and assignments
- Doing it right the first time
- Consistently performing the service correctly

Price - monetary allocation in return for the service

- Meeting the client's budget objectives
- Securing multiple competitive bids for most cost effective options

Accessibility - having approachability and being easily contacted

- Being solely dedicated to the account
- Having technical resources and other experts that can assist the client when needed
- Being available at all times to assist the client

Interpersonal skills - willingness to openly communicate, to show respect and courtesy, and to be likable during the encounter

- Promoting a highly interactive environment
- Being sociable and friendly
- Being polite and respecting the privacy of others

Product offering - extends to the scope (amount) of services available to the client

- Having multiple options and programmes to choose
- Being a 'one-stop-shop' vendor
- Having the ability to assemble creative packages of services from multiple providers if needed
- Providing customised and unique services

Credibility - extends to the perceptions of a salesperson's character and integrity

- Being believable and honest
- Having a good personal and company reputation in the market
- Demonstrating ethical conduct
- Protecting confidential and proprietary information

Market clout - ability to secure the best service offerings and the lowest prices for other suppliers in the market

- Having leverage in the market
- Having a large market share or presence in the market
- Having ability to coordinate and consolidate resources with other companies
- Acting as an advocate with other companies in the market

Geographical presence - being able to offer services in other distil markets

- Having the ability to offer standardised services in other cities nationally
- Having the ability to coordinate standardised services in other countries

Tangibles - relates to provisions of offering on-line computer services or other automation for access and information

- Offering computer processing capabilities like hardware or software
- Offering database management systems, fax machines, order entry devices, etc.

Figure 3.4 Service quality determinants in a business-to-business setting (Westbrook and Peterson 1998)

It should be noted that of the service quality dimension as identified by Parasuraman et al. (1988), reliability, responsiveness and tangibles remained distinct, whilst assurance split into competence and credibility, and empathy split into accessibility and interpersonal skills. However, additional underlying service quality dimensions being important in a business-to-business context identified by Westbrook and Peterson (1998) corresponded to: consultative selling, monetary value, scope of product offering, market clout, and geographical service area. These findings provide a fruitful starting point for further empirical investigation concerning service quality perceptions in a business-to-business environment.

3.6 EXPERT VIEW ON MEASURING SERVICE QUALITY

At the same seminar as described in Section 2.4, the literature review on 'measuring service quality' as described in the previous five sections was presented. Again, the panel discussion and the workshops during the seminar provided useful feedback on the existent ways to measure service quality.

Discussions during the morning focussed on obtaining constructive feedback in relation to the presented literature review. Questions asked by the moderator covered topics such as:

- The disconfirmation paradigm versus the performance-based paradigm
- The SERVQUAL methodology versus the SERVPERF methodology
- The differences between a business-to-consumer setting and a business-to-business setting

Discussions on how to measure service quality revealed it to be rather complex. Even though our literature review identified two different perspectives on how to best evaluate service quality, there was general consensus that service quality is a function of perceptions only. The main reason for this was the fact that previous experiences in certain service encounters will influence expectations and therefore impact the gap between expectations and current experiences. Therefore, the performance-based paradigm was seen as a better method to evaluate service quality. As for measuring customer satisfaction, however, the disconfirmation paradigm was seen as an appropriate method for evaluation. One would be satisfied when the quality delivered was better than expected and dissatisfied when the quality delivered was less than expected. Following this line of reasoning, the delegates felt that service quality precedes customer satisfaction which in turn precedes purchase intention.

Most delegates were only familiar with the SERVQUAL methodology, whereas only a few were familiar with the SERVPERF methodology. After careful explanation of the difference between the two methodologies in combination with the discussions described above, the delegates unanimously preferred the use of the SERVPERF methodology to investigate service quality in relation to cleaning, catering and security - not least because the SERVPERF methodology is based on the performance-based paradigm (whereas the SERVQUAL methodology is based on the disconfirmation paradigm).

It was recognised, however, that determinants needed to be added to the existing SERVPERF methodology when service quality is to be evaluated at a business-to-business level as the methodology in its existing form only evaluates service quality at a business-to-consumer level. Although service quality determinants such as communication and price can not be evaluated by end-user consumers, they are seen as critical determinants in a business-to-business context.

Further discussions led to the development of a new conceptual quality model. In an attempt to amalgamate all views currently existing regarding the measurement of quality and building on the definition of quality as provided in Section 2.4, a model was developed that is applicable to both products and services in both a business-to-consumer context and a business-to-business environment (see Figure 3.5).

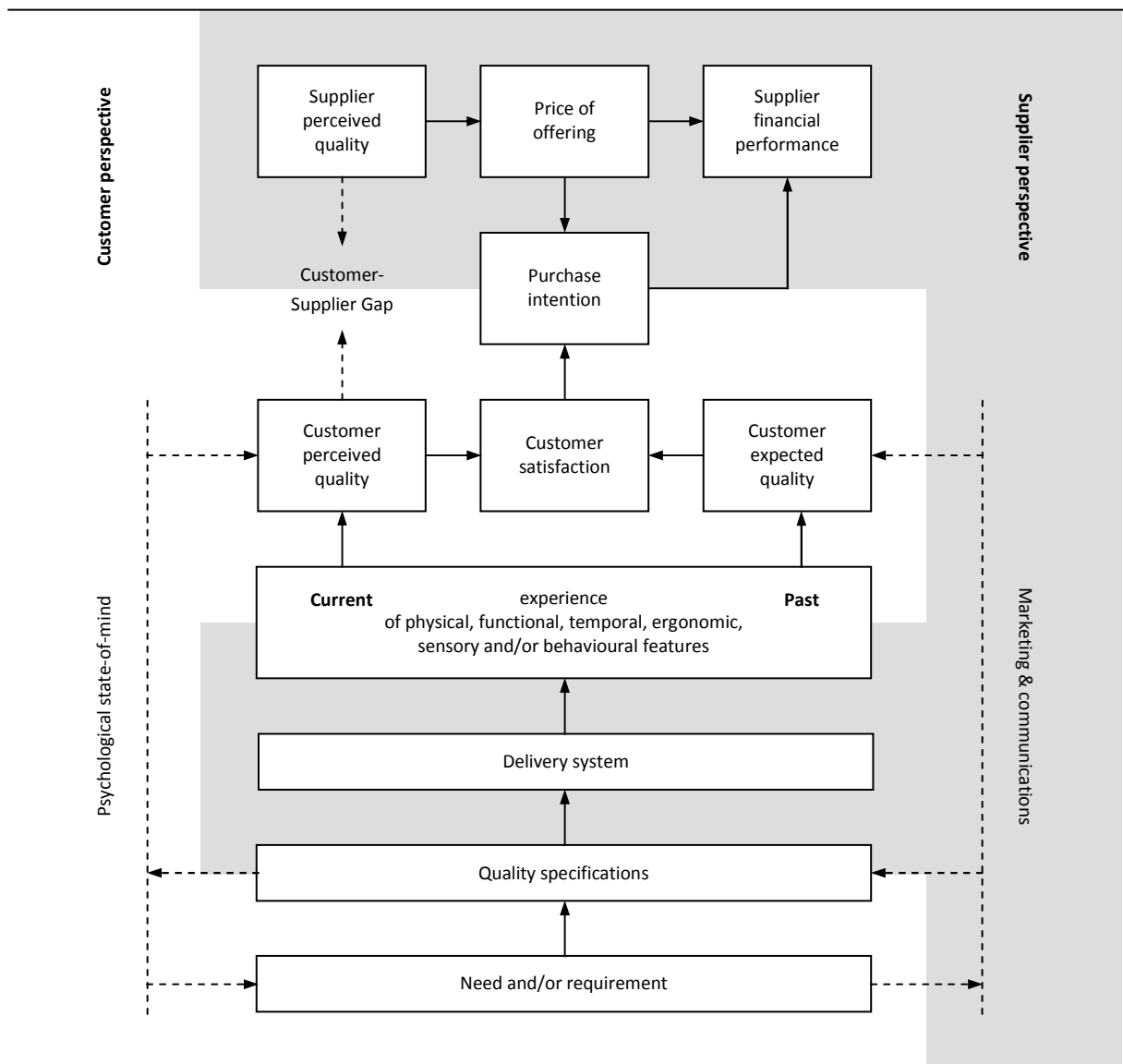


Figure 3.5 Generic quality model for any offering in any context

The bottom end of the model is very much in line with the service quality gap-model as developed by Parasuraman et al. (1985). Here a need and/or requirement is translated into quality specifications which in turn will serve as input to the delivery system of the supplier. The outcome of the service delivery system (on the interface of the customer and the supplier) is an experience of certain product or service features as stated in our definition of quality (see Section 2.4). In line with research by Cronin and Taylor (1992), a current experience will result in customer perceptions of quality and a past experience will partly render customer expectations of quality. The resulting gap between perceptions and expectations of quality will subsequently lead to customer satisfaction regarding the product or service delivered (cf. Oliver 1980). Similarly the gap between customer satisfaction and the price of the offering will largely determine a customer's purchase intention. Such purchase intention in combination with the price of the product or service will then influence the financial performance of supplier organisations. Also supplier perceptions of quality may influence the price

they set for the product or service. The anticipated gap between customer perceptions of quality and supplier perceptions of quality is highlighted in the upper left-hand corner of the model.

Added to the sides of the model were the customer's psychological state-of-mind and the supplier's marketing and communications. The customer's psychological state-of-mind was seen to influence both the initial need and/or requirement and customer perceptions of quality as well as be influenced itself by the quality specifications of the product or the service. The supplier's marketing and communications was seen to influence both the quality specifications of the product or service and the customer expectations of quality as well as be influenced itself by the customer needs and/or requirements.

To summarise Chapter 3, concerning the measurement of service quality, there is one group of researchers supporting the disconfirmation paradigm of perceptions-minus-expectations, and one group supporting the performance-based paradigm of a perceptions only version of service quality. Despite the wide spread use of perceptions-minus-expectations measures, there is considerable support for the superiority of simple performance-based measures of service quality as the basis for testable research enquiries.

Subsequently, there is growing support for using the SERVPERF instrument as this method is based on the performance-based paradigm of perceptions only measures, whereas the SERVQUAL instrument is based on the disconfirmation paradigm of perceptions-minus-expectations measures. With the existing SERVPERF instrument being developed to measure service quality in a business-to-consumer context, however, it was recognised that service quality determinants and service quality items needed to be added to evaluate service quality in a business-to-business environment.

In an attempt to amalgamate all views currently existing regarding the measurement of quality and building on the definition of quality as provided in Section 2.4, a generic quality model was developed that is applicable to both products and services in both a business-to-consumer context and a business-to-business environment (for more details see Figure 3.5).

The next chapter will provide a complete overview of our research methodology - predominantly in line with findings from our literature review.

Box 3 Summary of defining and measuring service quality

4 RESEARCH METHODOLOGY

This chapter describes the research methodology, forming the basis for Part B of this thesis. Following the ‘functionalist’ approach towards theory building (for more details see Annex A - Nature and Paradigm), the first section highlights our research proposition and subsequent research hypotheses. Following our research framework, the subsequent sections are used to describe how a number of focus group discussions and executive interviews led to measure definition and development as well as how further review of the literature led to survey development and data collection, customer and supplier data analyses, and finally the assessment of customer-supplier gaps.

4.1 RESEARCH PROPOSITION AND HYPOTHESES

Aiming to uncover what quality dimensions are important for customer satisfaction and what quality dimensions are important for supplier performance (see Section 1.3), whilst taking into account the different views expressed by researchers in the past as well as their empirical findings (see Chapter 2 and Chapter 3), our study will test the following proposition and subsequently five relevant hypotheses.

Proposition Service quality in the context of business support services is a multi-dimensional construct (i.e. service quality in cleaning, catering and security consists of various dimensions).

In case empirical investigation leads us to accept this proposition we will subsequently test the five hypotheses as outlined below. However, in case we fail to accept our proposition the word ‘dimensions’ should be replaced by ‘attributes’ for all five hypotheses (i.e. in case service quality proves to be a one-dimensional construct, we will investigate the impact of all service quality attributes instead of the anticipated service quality dimensions).

	Research hypothesis	Empirical investigation
Hypothesis 1	For customer organisations, all service quality dimensions identified positively influence overall perceived service quality, customer satisfaction and purchase intention.	Chapter 5 with discussion in Section 10.3 and conclusions in Section 12.1
Hypothesis 2	From the customer perspective, there are no significant differences between cleaning, catering and security services concerning all service quality dimensions as well as overall perceived service quality, customer satisfaction and purchase intention.	Chapter 6 with discussion in Section 10.3 and conclusions in Section 12.1
Hypothesis 3	For supplier organisations, all service quality dimensions identified positively influence supplier financial performance.	Chapter 7 with discussion in Section 10.4 and conclusions in Section 12.1
Hypothesis 4	From the supplier perspective, there are no significant differences between cleaning, catering and security services concerning all service quality dimensions as well as supplier financial performance.	Chapter 8 with discussion in Section 10.4 and conclusions in Section 12.1
Hypothesis 5	Customers and suppliers of business support services have different perceptions of overall perceived service quality, all service quality dimensions and their underlying service quality attributes.	Chapter 9 with discussion in Section 10.5 and conclusions in Section 12.1

Table 4.1 Research hypotheses and empirical investigation

The remainder of this chapter describes our research methodology in more detail based on Figure 4.1.

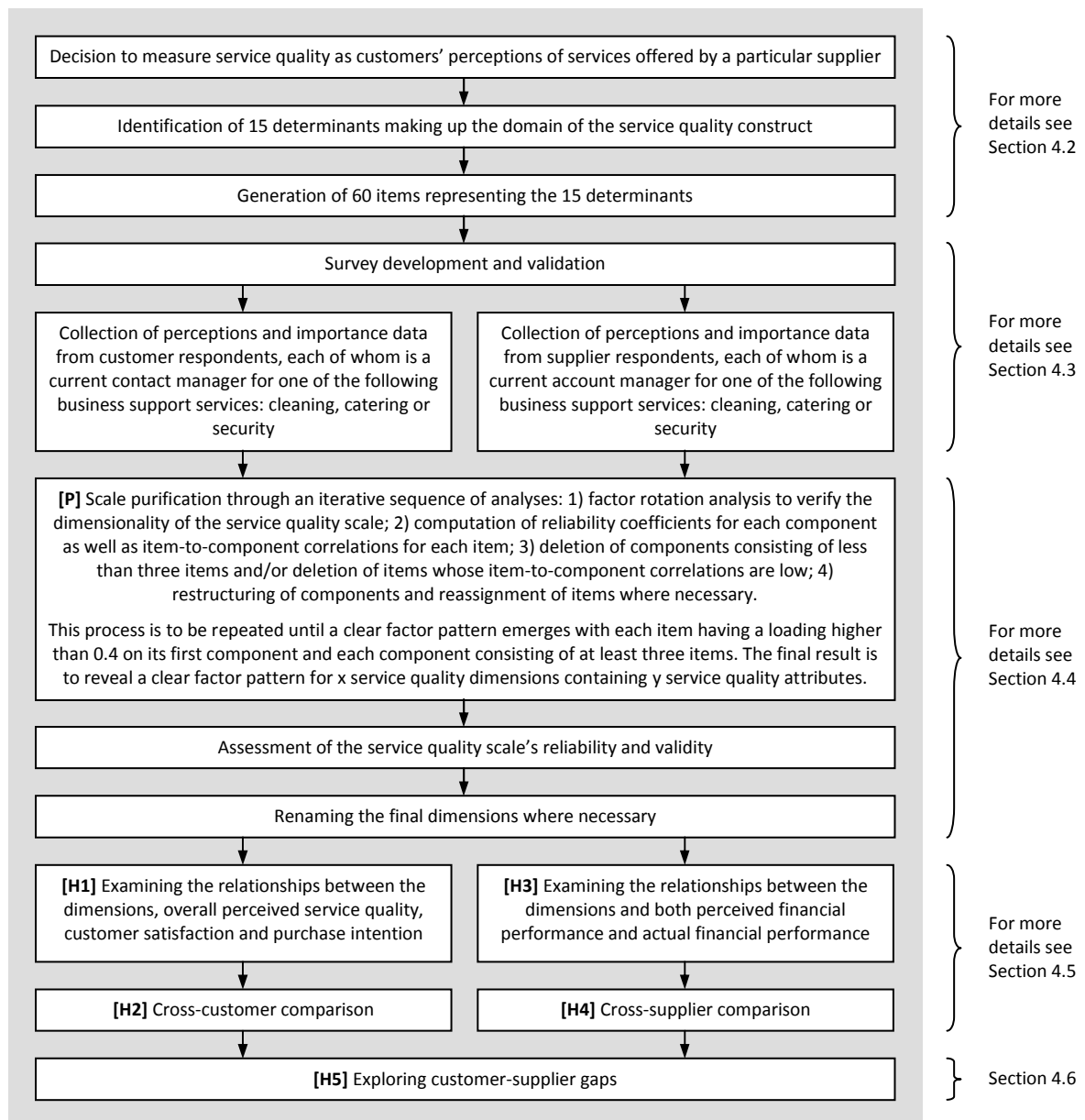


Figure 4.1 Research framework for statistical analyses

Note: As there is no clear consensus in the available literature concerning terminology, we have decided to consistently use the phrases 'service quality determinant' and 'service quality item' before any statistical analyses, 'service quality component' and 'service quality variable' during our statistical analyses, and 'service quality dimension' and 'service quality attribute' after the statistical analyses.

Before analysis	During analysis	After analysis
service quality determinant	service quality component	service quality dimension
service quality item	service quality variable	service quality attribute

4.2 MEASURE DEFINITION AND DEVELOPMENT

As stated in Section 2.4 and Section 3.6, the literature review provided in Chapter 2 and Chapter 3 was presented at a dedicated seminar involving approximately 45 executives from over 30 customer and supplier organisations as well as representatives of the BIFM, UCL and IPD.

Whereas discussions during the morning focused on defining and measuring service quality, workshops during the afternoon focussed on identifying determinants that make up the domain of the service quality construct in the context of cleaning, catering and security as well as generating items representing the various determinants. Questions asked by the moderator included:

- What do contract managers of customer organisations perceive to be key ingredients of quality in cleaning, catering and security services?
- What do account managers of supplier organisations perceive to be key ingredients of quality in cleaning, catering and security services?
- What discrepancies exist between the perspectives offered by customers and suppliers of cleaning, catering and security services?

Combining the research by Parasuraman et al. (1985), Zeithaml et al. (1990), Westbrook and Peterson (1998) and Grönroos (2000), with the outcome of the workshops, it was agreed that service quality of business support services should be evaluated using 15 service quality determinants: reliability, responsiveness, assurance, empathy, tangibles, competence, credibility, accessibility, communication, understanding, consulting, price, offering, clout, and geographics (see Table 4.2).

	Parasuraman et al. (1985)	Zeithaml et al. (1990)	Westbrook and Peterson (1998)	Grönroos (2000)	Our research
Reliability	✓	✓	✓	✓ ¹	✓
Responsiveness	✓	✓	✓	✓ ²	✓
Assurance		✓ ^a		✓ ³	✓
Competence	✓		✓		✓
Courtesy	✓				
Credibility	✓		✓	✓ ⁴	✓
Security	✓				
Empathy		✓ ^b		✓ ⁵	✓
Accessibility	✓		✓	✓ ⁶	✓
Communication	✓		✓ [*]		✓
Understanding	✓				✓
Tangibles	✓	✓	✓	✓ ⁷	✓
Consulting			✓		✓
Price			✓		✓
Offering			✓		✓
Clout			✓		✓
Geographics			✓		✓

a encompassing items of the previous determinants competence, courtesy, credibility and security, b encompassing items of the previous determinants accessibility, communication and understanding

* Westbrook and Peterson (1998) called this dimension interpersonal skills

1 reliability and trustworthiness, 2 service recovery, 3 professionalism and skills, 4 reputation and credibility, 5 attitudes and behaviour, 6 accessibility and flexibility, and 7 servscape were the names by Grönroos (2000) for each dimension

Table 4.2 Service quality determinants to be investigated

Items representing various facets of the 15 service quality determinants were generated to form the initial pool for our survey. This process resulted in the generation of 60 items (neatly becoming four items per determinant). Each item was recast into two statements - one to measure perceived performance about a particular supplier whose service quality was being assessed and the other to measure perceived importance of each service quality item (the statements on perceived importance were included to enhance the diagnostic value of the SERVPERF methodology). An overview of the 15 service quality determinants and their underlying service quality items can be found in Table 4.3.

Reliability - ability to perform the services dependably and accurately

- 1 Consistent and correct service delivery
- 2 Service provision at promised timeslots
- 3 Sincere interest in solving problems as they occur
- 4 Consistent response within promised timeframes

Responsiveness - willingness to help and provide prompt service

- 5 Helpful service personnel
- 6 Receiving prompt service if needed
- 7 Meeting deadlines for projects and assignments
- 8 Proactive service personnel

Assurance - service personnel's knowledge and courtesy

- 9 Consistently courteous service personnel
- 10 Confidence instilling behaviour by service personnel
- 11 Skilful service personnel
- 12 Knowledgeable service personnel

Empathy - caring and individualised attention by service personnel

- 13 Understanding customers' specific needs
- 14 Having customers' best interests at heart
- 15 Provision of personal attention by service personnel
- 16 Showing signs of recognition towards customers

Tangibles - physical appearance of service personnel and their equipment

- 17 Well dressed and neat-appearing service personnel
- 18 Up-to-date appearing service equipment (e.g. trolleys, servery or CCTV systems)
- 19 Accurate paperwork and record keeping by service personnel
- 20 Visually appealing materials associated with the services (e.g. safety floor signs, menus and displays or escape floor plans)

Competence - possession of the required skills and knowledge

- 21 Having sufficient expertise in the area of the services
- 22 Having good problem-solving skills
- 23 Having the required knowledge and skills to manage the service
- 24 Having sufficient research capability

Credibility - involves trustworthiness and believability

- 25 Having a good reputation in the market
- 26 Being believable and honest
- 27 Protection of confidential and proprietary information
- 28 Demonstration of ethical conduct

Accessibility - approachability and ease of contact

- 29 Being available at all times to assist customers
- 30 Being easily contacted (face-to-face, phone or e-mail)
- 31 Having convenient operating hours
- 32 Having technical resources that ease the spread of information

Communication - being informed in language customers can understand

- 33 Promotion of an interactive environment with open communication
- 34 Explanation of the service itself including associated costs
- 35 Explanation of the trade-offs between service quality and cost
- 36 Assurance that a problem will be handled effectively and efficiently

Table 4.3 Service quality items for 15 determinants

Understanding - efforts to understand customers' needs

- 37 Having a basic understanding of customers' businesses
- 38 Willingness to learn customers' specific requirements
- 39 Provision of individualised attention by service provider
- 40 Willingness to include programmes to train and educate customers' staff

Consulting - ability to align with customers' operations

- 41 Willingness to establish partnerships with joint planning and goal setting
- 42 Willingness to act as an advocate with senior customers' executives
- 43 Willingness to incur risk for customers
- 44 Willingness to provide profit driven alternatives

Price - monetary allocation in return for the service

- 45 Pricing that meets customers' budget objectives
- 46 Pricing that is competitive compared to other suppliers
- 47 Provision of multiple competitive bids
- 48 Pricing that relates to the quality delivered

Offering - scope of services made available to customers

- 49 Having multiple options and programmes to choose from
- 50 Ability to offer an extended scope of the basic services provided
- 51 Ability to provide customised and unique services
- 52 Ability to offer other support services (cleaning, catering and/or security)

Clout - ability to secure the best service offerings at the lowest price

- 53 Having sufficient leverage in the market
- 54 Having a large presence in the market
- 55 Ability to coordinate and consolidate resources with other suppliers
- 56 Ability to act as an advocate with other suppliers in the market

Geographics - ability to offer services in different locations

- 57 Ability to offer standardised services in other cities nationally
- 58 Ability to coordinate standardised services in other countries
- 59 Ability to offer customised services other cities nationally
- 60 Ability to coordinate customised services in other countries

Table 4.3 Service quality items for 15 determinants (continued)

4.3 SURVEY DEVELOPMENT AND DATA COLLECTION

With the SERVPERF instrument being the preferred method to investigate service quality in relation to cleaning, catering and security and following the identification of 15 service quality determinants and the generation of 60 service quality items representing those 15 determinants, we developed one survey instrument for customer organisations and one for supplier organisations. The data collected through these surveys subsequently serves as input for our data analyses aiming to test our proposition and hypotheses.

Customer survey - The customer survey started with a background section, in which we asked company size, company classification, current service provider, length of current contract and annual spend on the service per employee. In order to assess the performance, the service quality items were transformed into statements and measured against perceived performance on a 7-point Likert scale from 'strongly disagree' (=1) to 'strongly agree' (=7). Sixty percent of the statements were worded positively and the rest were worded negatively, in accordance with recommended procedures for scale development (Churchill 1979). At the end of this section we added a question on overall performance on the same 7-point Likert scale from 'strongly disagree' (=1) to 'strongly agree' (=7). In order to assess the importance of all service quality items in relation to overall perceived service quality, all service quality items were measured against importance on a 7-point Likert scale from 'very unimportant' (=1) to 'very important' (=7). The survey ended with a question on overall satisfaction on a 7-point Likert scale from 'very dissatisfied' (=1) to 'very satisfied' (=7) and a final question about the renewal of the contract, to be answered by 'yes', 'no' or 'no idea'.

During spring 2006, the customer survey was validated for comprehension and completeness in advance through three structured interviews with contract managers from various customer organisations with outsourced cleaning, catering and security services. Apart from some minor wording changes no significant changes were made (for more details see Annex B - Customer Survey).

The customer survey on service quality was sent out to contract managers at 75 end-user organisations in the United Kingdom. The targeted managers were responsible for the cleaning, catering and/or security services purchased from an external service provider (i.e. the internal delivery of facility services was excluded from this research). When a manager was responsible for more than one service, he or she was asked to complete all relevant surveys. This resulted in the potential for $3 \times 75 = 225$ responses. By guaranteeing to analyse the surveys anonymously and promising a full report in return, we received 72 usable surveys for the three service lines combined - a 32% response rate.

Supplier survey - The supplier survey started with a background section, in which we asked company name, contract name, company size as well as percentage of operational staff and management staff. In order to assess the performance, the same statements as used for the customer survey were measured against perceived performance on a 7-point Likert scale from 'strongly disagree' (=1) to 'strongly agree' (=7). The same 36 statements were worded positively, with the remaining 24 worded negatively. At the end of this section we added a question on overall performance on the same 7-point Likert scale from 'strongly disagree' (=1) to 'strongly agree' (=7). In order to assess the importance of all service quality items in relation to financial performance, all service quality items were measured against importance on a 7-point Likert scale from 'very unimportant' (=1) to 'very important' (=7). The survey ended with five statements related to the financial performance of the supplier. Profitability, efficiency, growth, liquidity and solvency were measured on a 7-point Likert scale from 'worst in industry' (=1) to 'best in industry' (=7).

During autumn 2006, the supplier survey was validated for comprehension and completeness in advance through three structured interviews with account managers from various supplier organisations that offer cleaning, catering and security services. As a result of these interviews, the last section of the survey focusing on the financial performance of the supplier was fully revised.

Initially it was proposed to evaluate business performance using ten financial measures commonly used in service industries (Stolowy and Lebas 2006): profit margin and return on capital employed (as measures of profitability), debtor collection period and salaries over turnover (as measures of efficiency), turnover growth and employee growth (as measures of growth), liquidity ratio and current ratio (as measures of liquidity), and finally solvency ratio and gearing ratio (as measures of solvency). Performance relative to each of the ten measures was to be assessed in two ways: subjectively (i.e. the firm's performance relative to its major competitors on a seven-point Likert scale from 'worst in industry' (=−3) to 'best in industry' (=+3) and objectively (i.e. actual values for each of the ten financial measures from respondent willing to release such information). Anticipating only a third of respondents willing to reveal actual performance measures, but high and significant correlations between the subjective ratings and the actual values, the idea was to use perceived financial performance in all subsequent analyses (cf. Forker et al. 1996).

Following the executive interviews it was decided to evaluate business performance subjectively only, using just five financial measures: profitability, efficiency, growth, liquidity, and solvency. The executives involved felt that assessing financial performance measures objectively would take too much additional time from respondents and that actual financial performance could also be obtained from annual reports and/or existing databases. In addition, the ten measures proposed were seen as too complex to be properly assessed by

account managers. Last but not least, it was anticipated that simplification of the last section of the survey would positively impact response rates (for more details see Annex C - Supplier Survey).

To allow for one-on-one comparisons, the supplier survey on service quality was initially sent out to account managers at 13 cleaning, 12 catering, and 14 security companies identified via the customer surveys returned. In addition, the survey was sent out to a further 35 internationally recognised service providers with revenues over GBP 5,000,000 and/or more than 5,000 employees. Following disappointing response rates, the supplier survey was made available online and posted to the British Cleaning Council, the Association for Catering Excellence and the British Security Industry Association to be forwarded to their respective member organisations. In addition, news items with a link to the survey were published in industry magazine FM World and on the website of the British Institute of Facilities Management. Although guaranteeing to analyse the surveys anonymously and promising a full report in return, we only received 30 surveys for the three service lines combined.

4.4 CUSTOMER DATA ANALYSES

The data collected through our customer survey served as input for our data analyses aiming to test our proposition and our first two hypotheses (see Section 4.1). The respective analyses were carried out using SPSS (Statistical Package for Social Sciences) and are reported in detail in Chapter 5 and Chapter 6 (for more details on the statistical tests used see Annex D - Statistical Concepts).

Customer perspective - As a first step in our data analyses we are to examine the dimensionality of the 60 service quality items using factor rotation analysis; orthogonal rotation analysis (Principal Factoring Analysis) or in case of failure oblique rotation analysis (Principal Component Analysis). The latter procedure has been used successfully in similar studies (e.g. Parasuraman et al. 1988, Carmen 1990, Babakus and Boller 1992) and consists of an iterative process of: 1) oblique rotation analysis to verify the dimensionality of the scale; 2) computation of reliability coefficients for each component as well as item-to-component correlations for each item; 3) deletion of components consisting of less than three items and/or deletion of items whose item-to-component correlations are low; 4) reassignment of items and restructuring of dimensions where necessary. This process is to be repeated until a clear factor pattern emerges with each item having a loading higher than 0.4 on its first component and each dimension consisting of at least three attributes (cf. Dancey and Reidy 2004).

In a next step, the emergent factor pattern is to be assessed in terms of reliability and validity. For reliability, all dimensions should have a coefficient of reliability - or a Cronbach's alpha value higher than 0.8 to indicate a high degree of internal consistency. For validity, the factor pattern has to show both content and construct validity. The first can be assessed by confirmation against literature reviews, focus group discussions and/or executive interviews. The latter can be assessed by determining both convergent validity and discriminant validity using correlation analysis.

Upon name-tagging the dimensions of the emergent pattern, the relationships between the dimensions and overall perceived service quality, customer satisfaction and purchase intentions are to be explored using correlation analyses and two types of relationship analyses.

- Correlation analyses will be used to explore the relationship (both magnitude and direction) between the dimensions and the three output measures.
- Simple regression analyses will be used to determine to what extent changes in the output measures can be attributed to changes in the dimensions.

- Stepwise regression analyses will be used to identify dimensions that explain additional variance in the output measures.

In a final step, we are first to examine the gaps between perceived importance and perceived performance for the dimensions - not least to develop resource allocation priorities. By subsequently multiplying these gaps with their coefficient of determination - or R square value (as determined via the simple regression analysis in the previous step) we can rank the dimensions by relative priority. Similarly, we are also to rank all service quality attributes within each dimension by relative priority. In addition, potential differences between importance and performance are to be investigated using differences analyses.

Cross-customer comparison - In order to investigate whether differences exist between the three service lines cleaning, catering and security we are to perform a number of statistical tests on both the three output measures and the service quality dimensions.

As for overall perceived service quality, customer satisfaction and purchase intentions, potential differences between cleaning, catering and security are to be investigated using univariate analyses as well as non-parametric analyses in case we fail to meet the assumptions for parametric tests.

- Variances analyses (univariate analyses) will be used for all three output measures to assess whether there are significant differences between the means for cleaning, catering and security by comparing variances.
- Post-hoc tests will be used to determine the exact differences between the three output measures by comparing the mean of each group to the means of every other group.
- Non-parametric analyses will be used instead when our data is not normally distributed and/or when variances are not similar for the three output measures investigated.

In order to investigate potential differences between all dimensions simultaneously, we are to use multivariate analyses or - in case we fail to meet the assumptions for parametric tests - non-parametric analyses.

- Variances analyses (multivariate analyses) will be used to both explore the degree of variation between the dimensions and to determine the exact differences between them.
- Non-parametric analyses will be used instead when our data is not normally distributed and/or when variance-covariance matrices are not similar for all dimensions investigated.

In case differences do exist between the three service lines, we are to repeat the regression analyses as described at the end of the 'customer perspective' to develop resource allocation priorities for cleaning, catering and security separately.

4.5 SUPPLIER DATA ANALYSES

The data collected through our supplier survey served as input for our data analyses aiming to test our third and fourth hypothesis (see Section 4.1). The respective analyses were again carried out using SPSS and are reported in detail in Chapter 7 and Chapter 8 (for more details on the statistical tests used see Annex D - Statistical Concepts).

Supplier perspective - As a first step in our data analyses we are to examine the relationships between perceived strategic importance and perceived financial performance. Strategic importance measures are to be determined by calculating averages from the supplier surveys for the service quality dimensions as identified via the customer data analyses. Financial performance measures (profitability, efficiency, growth, liquidity and solvency relative to its major competitors) are to be taken directly from the supplier surveys. The relationships

between perceived strategic importance and perceived financial performance are to be explored using correlation analyses and two types of relationship analyses.

- Correlation analyses will be used to explore the relationship (both magnitude and direction) between perceived strategic importance and the five financial measures as perceived by suppliers.
- Simple regression analyses will be used to determine to what extent changes in the five financial measures can be attributed to changes in perceived strategic importance.
- Stepwise regression analyses will be used to identify dimensions that explain additional variance in the five financial measures.

In a second step, we are to examine the relationships between perceived financial performance and actual financial performance to check whether supplier perceptions of financial performance are reliable indicators for actual financial performance. Perceived financial measures (profitability, efficiency, growth, liquidity and solvency relative to its major competitors) are again to be taken from the supplier surveys. Actual financial measures (profit margin and return on capital employed, debtor collection period and salaries over turnover, turnover growth and employee growth, liquidity ratio and current ratio, and solvency ratio and gearing ratio) for the financial year 2006/2007 are to be taken from the FAME (Financial Analysis Made Easy) database where possible. The relationships between perceived financial performance and actual financial performance are to be explored using correlation analyses.

- Correlation analyses will be used to explore the relationship (both magnitude and direction) between the five 'subjective' financial measures and the ten 'objective' financial measures.

In case there are no significant correlations between the five subjective financial measures and the ten objective financial measures, we are to repeat the first step using the ten actual financial measures instead of the five perceived financial measures. Strategic importance measures are again to be determined by calculating averages from the supplier surveys for the service quality dimensions as identified via the customer data analyses. Actual financial measures (profit margin and return on capital employed, debtor collection period and salaries over turnover, turnover growth and employee growth, liquidity ratio and current ratio, and solvency ratio and gearing ratio) are again to be taken from the FAME database where possible. The relationships between perceived strategic importance and the actual financial measures are to be explored using correlation analyses and two types of relationship analyses.

- Correlation analyses will be used to explore the relationship (both magnitude and direction) between perceived strategic importance and the ten actual financial measures.
- Simple regression analyses will be used to determine to what extent changes in the ten actual financial measures can be attributed to changes in perceived strategic importance.
- Stepwise regression analyses will be used to identify dimensions that explain additional variance in the ten actual financial measures.

In case there are not enough complete data sets to perform this last step, customer perceived quality as identified via the customer data analyses are to be used instead of supplier perceived importance.

Cross-supplier comparison - In order to investigate whether differences exist between the three service lines cleaning, catering and security we are to perform a number of statistical tests on the ten actual financial measures as obtained from the FAME (Financial Analysis Made Easy) database.

As for the ten actual financial measures, potential differences between cleaning, catering and security are to be investigated using variance analysis and univariate analyses as well as non-parametric analyses in case we fail to meet the assumptions for parametric tests.

- Variances analyses (univariate analyses) will be used for all ten financial measures to assess whether there are significant differences between the means for cleaning, catering and security by comparing variances.
- Post-hoc tests will be used to determine the exact differences between the ten actual financial measures by comparing the mean of each group to the means of every other group.
- Non-parametric analyses will be used instead when our data is not normally distributed and/or when variances are not similar for the ten financial measures investigated.

In case differences do exist between the three service lines, we are to repeat the regression analyses as described at the end of the 'supplier perspective' to develop resource allocation priorities for cleaning, catering and security separately.

4.6 EXPLORING CUSTOMER-SUPPLIER GAPS

The data collected through both our customer survey and our supplier survey served as input for our data analyses aiming to test our last hypothesis (see Section 4.1). The respective analyses were again be carried out using SPSS and are reported in detail in Chapter 9 (for more details on the statistical tests used see Annex D - Statistical Concepts).

In order to investigate whether differences exist between the customer perspective and the supplier perspective we are to perform differences analyses on overall perceived service quality, all underlying service quality dimensions as well as all service quality attributes within each dimension.

All potential differences between the customer perspective and the supplier perspective are to be investigated using differences analyses or - in case we fail to meet the assumptions for parametric tests - non-parametrics analyses.

- Differences analyses between the two independent groups will be used to explore all differences between the two groups by assessing the differences between both the means and confidence intervals around the means.
- Non-parametrics analyses will be used instead when our data is not normally distributed and/or when variances are not similar for the two groups investigated.

In a final step, we are to investigate whether differences exist between the customer perspective and the supplier perspective concerning perceived importance of all service quality dimensions by using the exact same procedure as described above.

4.7 VERIFYING AND VALIDATING RESEARCH RESULTS

All research results emerging from the steps as described in the previous three sections are to be presented and discussed at various dedicated seminars involving account managers from a variety of supplier organisations as well as contract managers from a variety of customer organisations for the three service lines investigated. Further attendance by representatives from BIFM, UCL and IPD was anticipated.

Planned discussions for these seminars are to focus on obtaining constructive feedback in relation to the research results presented. In addition, workshops are to focus on practical implications and/or next steps emerging from our findings.

To summarise Chapter 4, our initial and rather general research interest (see Section 1.3) has been translated and refined into a more specific research proposition and five relevant hypotheses (see Section 4.1). Subsequent focus group discussions led to general consensus to measure service quality as customers' perceptions of services offered by a particular supplier. Furthermore, these discussions led to the identification of 15 service quality determinants and generation of 60 service quality items representing those 15 determinants, which in turn served as the basis for our service quality surveys.

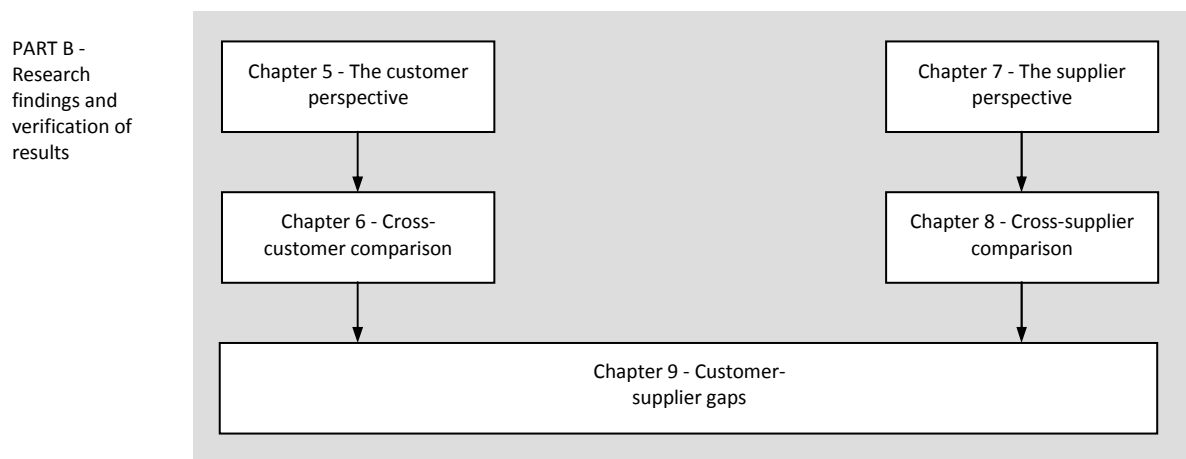
Focussing on the analyses of data collected through these surveys, we identified all statistical tests to be employed in uncovering what quality dimensions are important for customer satisfaction and what quality dimensions are important for supplier performance. Furthermore, it was decided to validate all research results via focus group discussions.

The next part of this thesis will provide a detailed overview of all analyses carried out to test both our proposition and our hypotheses.

Box 4 Summary of underlying research methodology

PART B - RESEARCH FINDINGS AND VERIFICATION OF RESULTS

As described in Section 1.4, Part B of this thesis investigates service quality in relation to cleaning, catering and security from both the customer perspective as well as the supplier perspective. In Chapter 5, we focus on the customer perspective with regards to service quality in relation to cleaning, catering and security services associated with office buildings. Chapter 6 subsequently focuses on the differences between the three service lines as perceived by customer organisations. In Chapter 7, we focus on the supplier perspective with regards to service quality in relation to cleaning, catering and security services. Chapter 8 subsequently focuses on the differences between the three service lines as delivered by supplier organisations. In Chapter 9, we focus on exploring the differences between the customer perspective and the supplier perspective. In all instances, findings are verified and validated against feedback provided through panel discussions and workshops at dedicated seminars held in spring 2007 or spring 2008.



As highlighted in Section 4.4, Section 4.5 and Section 4.6, all analyses in Part B of this thesis were carried out using SPSS (for more details on the statistical tests used see Annex D - Statistical Concepts).

5 THE CUSTOMER PERSPECTIVE

As explained in our research methodology, this chapter focuses on the customer perspective with regards to service quality in relation to cleaning, catering and security services associated with office buildings (see Section 4.4). First, we examine the dimensionality of service quality as well as the reliability of the multi-dimensional scale identified. Subsequently, we explore the relationships between service quality, customer satisfaction and purchase intention. Next, we examine the gaps between importance and performance as perceived by customer organisations. Finally, all findings are verified and validated through focus group discussions at a dedicated seminar held in spring 2007. The raw data used in this chapter were in the form of perceived performance scores and taken directly from the customer surveys (see Annex B - Customer Survey).

5.1 EXAMINING THE DIMENSIONALITY OF SERVICE QUALITY

Our conceptual 60-item instrument as described in Section 4.2 was refined by analysing pooled data (i.e. data from all three service lines considered together). The pooling of the data was deliberate because the basic purpose of this research stage was to develop a concise scale that would be reliable and meaningful in assessing service quality in a variety of service sectors. In other words, the purpose was to produce a scale that would have general applicability for business support services (cf. Parasuraman et al. 1988).

Purification of our scale started with computing reliability coefficients (Cronbach's alphas), in accordance with Churchill's (1979) recommendation. Because of the multidimensionality of the service quality construct, Cronbach's alpha was computed separately for the original 15 service quality determinants to ascertain the extent to which the items making up each determinant shared a common core.

Service quality determinant*	Cronbach's alpha
Reliability	0.91
Responsiveness	0.92
Assurance	0.88
Empathy	0.89
Tangibles	0.85
Competence	0.89
Credibility	0.82
Accessibility	0.89
Communication	0.93
Understanding	0.89
Consulting	0.86
Price	0.87
Offering	0.63
Clout	0.87
Geographics	0.87

* each determinant consists of four service quality items

Table 5.1 Reliability coefficients of the 15 service quality determinants

As the values of Cronbach's alpha range from 0.82 to 0.93 (offering being the exception at 0.63) across the 15 determinants there is no need for the deletion of items to improve the Cronbach's alpha values.

Purification continued with examining the dimensionality of our conceptual 60-item instrument and was accomplished by factor analysing the perceived performance scores on the 60 service quality items.

First, orthogonal rotation analysis (Principal Factoring Analysis using the Varimax procedure in SPSS) was used and the analysis was constrained *a priori* to 15 factors. However, when the 15-factor solution was rotated orthogonally, no clear factor pattern emerged. With the exception of ten items, all items loaded predictably on a single factor. In addition, two-thirds of the original 60 items had relatively high loadings on several factors, thereby implying that the factors may not be independent of one another. Moreover, some degree of overlap among the original 15 determinants was anticipated (following previous research by Parasurman et al. 1988 and Westbrook and Peterson 1998).

Subsequently, the factor solution was subjected to oblique rotation analyses (Principal Component Analysis using the Direct Oblimin procedure in SPSS) to allow for inter-correlations among the dimensions. As indicated in Section 4.4, this procedure consists of an iterative process of: 1) oblique rotation analysis to verify the dimensionality of the scale; 2) computation of coefficient alpha for each component as well as item-to-component correlations for each item; 3) deletion of components consisting of less than three items and/or deletion of items whose item-to-component correlations are low; 4) reassignment of items and restructuring of dimensions where necessary. This process was repeated until a clear factor pattern emerged with each item having a loading higher than 0.4 on its first component and each dimension consisting of at least three attributes.

- The first result revealed a clear factor pattern for eleven different components (rotation converged in 76 iterations). As the last component consisted of item 52 only (see Table 4.3) and this item had near-zero correlations with all other items (lower than 0.10), this apparently irrelevant item was deleted from the data set. With item 58 and 60 also having near-zero correlations with the remaining items, these items were also deleted before we reran the oblique rotation analysis under the same conditions.
- The resulting factor pattern now contained ten components (rotation converged in 46 iterations), but because of the deletion of the previous items, the second component consisted of items 57 and 59 only (see Table 4.3). To increase the reliability of the scale, these items were also deleted before we reran the oblique rotation analysis under the same conditions.
- The resulting factor pattern now contained nine components (rotation converged in 57 iterations), but items 12, 39, 40, 34 and 5 (see Table 4.3) had a relatively low loading (lower than 0.40) on their first dimension and a relatively low item-to-component correlations (lower than 0.10). To increase the reliability of the scale, these items were also deleted before we reran the oblique rotation analysis under the same conditions.
- The resulting factor pattern still contained nine components (rotation converged in 37 iterations), but item 49 (see Table 4.3) had a relatively low loading (lower than 0.40) on their first dimension and a relatively low item-to-component correlation (lower than 0.10). To increase the reliability of the scale, this item was also deleted before we reran the oblique rotation analysis under the same conditions.
- The resulting factor pattern still contained nine components (rotation converged in 35 iterations), but items 3 and 15 (see Table 4.3) had a relatively low loading (lower than 0.40) on their first dimension and a relatively low item-to-component correlation (lower than 0.10). To increase the reliability of the scale, these items were also deleted before we reran the oblique rotation analysis under the same conditions.
- The resulting factor pattern still contained nine components (rotation converged in 38 iterations), but items 2, 4 and 11 (see Table 4.3) did not have any loadings higher than 0.40 on any of the components. In a last step these items were also deleted before we reran the oblique rotation analysis under the same conditions.

The final result revealed a clear factor pattern for nine different components (rotation converged in 44 iterations) containing 44 items. The total variance explained by those nine components was 79.7%. The factor loadings of the items on the components are illustrated in Table 5.2. Each item has a loading on its first component of 0.40 or higher and the loadings on other components are all lower. Thus, the resulting factor pattern exposes a clear nine-dimensional construct.

	COM 01	COM 02	COM 03	COM 04	COM 05	COM 06	COM 07	COM 08	COM 09
VAR 01	0.61			0.35					
VAR 14	0.57						0.38		
VAR 08	0.54						0.26		
VAR 07	0.54						0.33		
VAR 26	0.41				-0.39				
VAR 54		0.96							
VAR 53		0.91							
VAR 55		0.75						-0.26	
VAR 56		0.69		-0.30					
VAR 28			0.75						
VAR 25			0.67			-0.27			
VAR 17			0.60					-0.37	
VAR 19			0.52	0.39					
VAR 35	0.36		0.47						
VAR 13	0.36		0.42						0.27
VAR 37				0.68					
VAR 38				0.59				-0.28	
VAR 27			0.30	0.55			0.29		
VAR 20			0.32	0.46					
VAR 46					-0.82				
VAR 47			0.35		-0.59				
VAR 48	0.28			0.32	-0.56				
VAR 45				0.52	-0.55				
VAR 18	-0.27		0.31		-0.43		0.41		
VAR 43						-0.72			0.27
VAR 42						-0.65			
VAR 44						-0.63		-0.42	
VAR 41						-0.57		-0.27	
VAR 33	0.32					-0.48	0.27		
VAR 36	0.28					-0.41	0.27		
VAR 30							0.79		
VAR 29							0.72		
VAR 31				0.33			0.67		
VAR 32							0.56	-0.32	
VAR 21								-0.81	
VAR 24								-0.72	
VAR 23					-0.31			-0.64	
VAR 51	0.28					-0.28		-0.58	
VAR 50	0.31							-0.51	0.30
VAR 22						-0.31		-0.47	
VAR 09									0.84
VAR 16			0.47						0.56
VAR 10	0.29								0.43
VAR 06	0.37								0.40
Eigenvalue	20.59	2.96	2.74	2.15	1.93	1.35	1.23	1.10	1.02
% of variance	46.8%	6.7%	6.2%	4.9%	4.4%	3.1%	2.8%	2.5%	2.3%
cumulative %	46.8%	53.5%	59.7%	64.6%	69.0%	72.1%	74.9%	77.4%	79.7%
Cronbach's alpha	0.90	0.87	0.91	0.88	0.85	0.91	0.89	0.91	0.86

Table 5.2 Factor loadings for the nine service quality components

5.2 ASSESSING THE RELIABILITY OF THE SERVICE QUALITY SCALE

The reliability of our service quality scale and its nine dimensions was investigated by computing their corresponding reliability coefficients (Churchill 1979). As can be seen in Table 5.2, all dimensions have a high reliability coefficient as each Cronbach's alpha is 0.85 or higher (i.e. indicating a high degree of internal consistency). Although high reliability coefficients of the nine dimensions provide some support for the scale's validity, other conditions are necessary to assess the scale's content validity and construct validity.

Content validity deals with the extent to which the content of the scale is representative of the construct measured. As our scale is based on the exploratory research by Parasuraman et al. (1988) to define the determinants of perceived service quality in a business-to-consumer setting and on exploratory research by Westbrook and Peterson (1998) to define the determinants of perceived service quality in a business-to-business setting, this gives an indication of good content validity.

Construct validity can be assessed by its convergent validity and its discriminant validity (Churchill 1979). Convergent and discriminant validity were examined using the correlation matrix of all our service quality attributes. Convergence in measurement refers to the degree in which attributes of the same dimension correlate highly with each other in a uniform pattern (Bagozzi 1981). Discrimination in measurement refers to the extent to which attributes of a distinct dimension correlate at a lower level with attributes representing another dimension than with attributes representing the distinct dimension (Bagozzi 1981). According to the rules of Bagozzi (1981), each within-dimension correlation should also be higher than the corresponding cross-dimension correlations. As this was not the case, we made an overall assessment of construct validity by computing for each attributes the convergent validity (CV) by averaging the within-dimension correlations and the discriminant validity (DV) by averaging the cross-dimension correlations. These results reveal a high average within-dimension correlation and a lower average cross-dimension correlation for each of our service quality attributes (see Table 5.3). Therefore, it can be concluded that our service quality scale has good convergent validity and good discriminant validity.

	COM 01					COM 02				COM 03					COM 04				COM 05						
	VAR 01	VAR 14	VAR 08	VAR 07	VAR 26	VAR 54	VAR 53	VAR 55	VAR 56	VAR 28	VAR 25	VAR 17	VAR 19	VAR 35	VAR 13	VAR 37	VAR 38	VAR 27	VAR 20	VAR 46	VAR 47	VAR 48	VAR 45	VAR 18	
COM 01	VAR 01	1.00																							
	VAR 14	0.53**	1.00																						
	VAR 08	0.72**	0.75**	1.00																					
	VAR 07	0.71**	0.70**	0.82**	1.00																				
	VAR 26	0.50**	0.60**	0.60**	0.61**	1.00																			
COM 02	VAR 54	0.03	0.09	0.12	0.00	0.04	1.00																		
	VAR 53	0.12	0.27*	0.25*	0.11	0.19	0.78**	1.00																	
	VAR 55	0.16	0.33**	0.22	0.19	0.31**	0.61**	0.58**	1.00																
	VAR 56	0.24*	0.44**	0.38**	0.34**	0.41**	0.53**	0.53**	0.76**	1.00															
COM 03	VAR 28	0.37**	0.37**	0.42**	0.39**	0.49**	-0.01	0.14	0.31**	0.24*	1.00														
	VAR 25	0.31**	0.51**	0.48**	0.45**	0.60**	0.17	0.33**	0.27*	0.25*	0.58**	1.00													
	VAR 17	0.53**	0.46**	0.52**	0.56**	0.53**	0.02	0.21	0.38**	0.27*	0.58**	0.62**	1.00												
	VAR 19	0.36**	0.36**	0.51**	0.44**	0.46**	0.07	0.32**	0.24*	0.19	0.59**	0.64**	0.76**	1.00											
	VAR 35	0.63**	0.61**	0.65**	0.62**	0.64**	0.10	0.32**	0.36**	0.42**	0.57**	0.68**	0.72**	0.61**	1.00										
	VAR 13	0.56**	0.67**	0.68**	0.66**	0.58**	0.16	0.33**	0.40**	0.42**	0.52**	0.64**	0.60**	0.53**	0.65**	1.00									
COM 04	VAR 37	0.54**	0.30*	0.46**	0.53**	0.45**	0.12	0.23	0.15	0.10	0.44**	0.35**	0.60**	0.59**	0.48**	1.00									
	VAR 38	0.60**	0.43**	0.59**	0.60**	0.55**	0.02	0.20	0.17	0.11	0.42**	0.44**	0.64**	0.67**	0.59**	0.81**	1.00								
	VAR 27	0.50**	0.49**	0.60**	0.54**	0.44**	0.11	0.31**	0.19	0.20	0.65**	0.51**	0.56**	0.67**	0.57**	0.63**	0.66**	1.00							
	VAR 20	0.46**	0.26*	0.46**	0.37**	0.31**	-0.10	0.10	0.11	0.04	0.47**	0.41**	0.60**	0.65**	0.53**	0.63**	0.62**	0.57**	1.00						
COM 05	VAR 46	0.35**	0.46**	0.34**	0.38**	0.58**	0.08	0.14	0.29*	0.41**	0.32**	0.37**	0.31**	0.33**	0.50**	0.44**	0.27*	0.29*	0.32**	0.29*	1.00				
	VAR 47	0.28*	0.26*	0.29*	0.29*	0.45**	0.04	0.11	0.27*	0.32**	0.40**	0.55**	0.51**	0.50**	0.50**	0.37**	0.31**	0.33**	0.39**	0.38**	0.64**	1.00			
	VAR 48	0.60**	0.52**	0.55**	0.58**	0.76**	0.04	0.17	0.32**	0.35**	0.38**	0.50**	0.58**	0.55**	0.64**	0.59**	0.57**	0.67**	0.49**	0.45**	0.69**	0.52**	1.00		
	VAR 45	0.55**	0.36**	0.46**	0.36**	0.51**	0.17	0.26*	0.25*	0.23	0.21	0.43**	0.50**	0.52**	0.55**	0.46**	0.52**	0.62**	0.44**	0.44**	0.62**	0.51**	0.81**	1.00	
	VAR 18	0.26*	0.30*	0.28*	0.31**	0.35**	0.08	0.18	0.26*	0.13	0.38**	0.47**	0.57**	0.47**	0.51**	0.27*	0.36**	0.29*	0.38**	0.47**	0.38**	0.48**	0.39**	0.33**	1.00
COM 06	VAR 43	0.36**	0.26*	0.41**	0.44**	0.48**	-0.07	0.10	0.07	0.21	0.29*	0.32**	0.30**	0.39**	0.42**	0.40**	0.41**	0.44**	0.32**	0.44**	0.46**	0.26*	0.51**	0.40**	0.32**
	VAR 42	0.32**	0.37**	0.47**	0.45**	0.39**	0.15	0.36**	0.19	0.14	0.29*	0.53**	0.49**	0.57**	0.48**	0.52**	0.52**	0.59**	0.40**	0.55**	0.21	0.22	0.40**	0.35**	0.32**
	VAR 44	0.35**	0.29*	0.36**	0.39**	0.46**	0.15	0.33**	0.25*	0.27*	0.19	0.47**	0.48**	0.41**	0.54**	0.44**	0.44**	0.51**	0.27*	0.38**	0.36**	0.43**	0.40**	0.41**	0.29*
	VAR 41	0.46**	0.38**	0.50**	0.56**	0.59**	0.07	0.19	0.18	0.20	0.15	0.40**	0.45**	0.47**	0.54**	0.45**	0.55**	0.70**	0.36**	0.46**	0.43**	0.27*	0.63**	0.58**	0.27*
	VAR 33	0.53**	0.60**	0.67**	0.66**	0.62**	0.12	0.33**	0.26*	0.35**	0.44**	0.52**	0.56**	0.49**	0.74**	0.67**	0.55**	0.61**	0.51**	0.45**	0.46**	0.37**	0.53**	0.43**	0.35**
	VAR 36	0.55**	0.56**	0.70**	0.68**	0.65**	0.09	0.27*	0.23	0.28*	0.37**	0.58**	0.64**	0.57**	0.82**	0.64**	0.69**	0.73**	0.51**	0.57**	0.47**	0.44**	0.68**	0.63**	0.40**
COM 07	VAR 30	0.42**	0.52**	0.54**	0.57**	0.46**	0.02	0.11	0.19	0.22	0.36**	0.47**	0.49**	0.40**	0.52**	0.46**	0.46**	0.51**	0.49**	0.47**	0.32**	0.35**	0.35**	0.26*	0.43**
	VAR 29	0.48**	0.66**	0.68**	0.69**	0.54**	0.02	0.19	0.24*	0.34**	0.33**	0.42**	0.51**	0.45**	0.63**	0.55**	0.49**	0.61**	0.59**	0.50**	0.41**	0.28*	0.49**	0.39**	0.37**
	VAR 31	0.43**	0.52**	0.55**	0.56**	0.37**	0.03	0.09	0.18	0.19	0.50**	0.45**	0.59**	0.55**	0.54**	0.50**	0.64**	0.67**	0.69**	0.63**	0.30*	0.36**	0.44**	0.38**	0.40**
	VAR 32	0.49**	0.45**	0.56**	0.57**	0.38**	0.18	0.22	0.25*	0.23	0.17	0.27*	0.44**	0.35**	0.44**	0.45**	0.50**	0.57**	0.42**	0.47**	0.23*	0.23*	0.45**	0.30*	0.23
COM 08	VAR 21	0.47**	0.36**	0.41**	0.42**	0.53**	0.18	0.23*	0.41**	0.33**	0.24*	0.41**	0.62**	0.48**	0.48**	0.51**	0.46**	0.66**	0.27*	0.42**	0.29*	0.35**	0.53**	0.46**	0.21
	VAR 24	0.34**	0.31**	0.3**	0.42**	0.43**	0.19	0.21	0.34**	0.29*	0.08	0.26*	0.45**	0.39**	0.35**	0.35**	0.40**	0.50**	0.29*	0.28*	0.31**	0.35**	0.43**	0.33**	0.37**
	VAR 23	0.60**	0.38**	0.49**	0.49**	0.62**	0.14	0.15	0.34**	0.32**	0.28*	0.47**	0.54**	0.51**	0.57**	0.49**	0.50**	0.68**	0.42**	0.42**	0.50**	0.49**	0.69**	0.67**	0.36**
	VAR 51	0.55**	0.41**	0.56**	0.51**	0.54**	0.18	0.29*	0.29*	0.34**	0.17	0.46**	0.54**	0.45**	0.61**	0.62**	0.45**	0.63**	0.28*	0.51**	0.29*	0.33**	0.55**	0.54**	0.14
	VAR 50	0.55**	0.30**	0.41**	0.56**	0.53**	0.07	0.12	0.14	0.32**	0.08	0.24*	0.39**	0.27*	0.44**	0.45**	0.39**	0.47**	0.16	0.29*	0.39**	0.27*	0.61**	0.46**	0.07
	VAR 22	0.48**	0.36**	0.50**	0.48**	0.54**	0.07	0.15	0.27*	0.23*	0.27*	0.37**	0.52**	0.51**	0.50**	0.50**	0.50**	0.66**	0.41**	0.50**	0.40**	0.41**	0.55**	0.56**	0.34**
COM 09	VAR 09	0.40**	0.42**	0.59**	0.58**	0.48**	-0.09	0.06	0.08	0.21	0.26*	0.31**	0.40**	0.39**	0.33**	0.48**	0.42**	0.45**	0.33**	0.33**	0.36**	0.42**	0.48**	0.35**	0.21
	VAR 16	0.37**	0.51**	0.59**	0.50**	0.35**	-0.01	0.19	0.29*	0.31**	0.54**	0.46**	0.68**	0.65**	0.57**	0.69**	0.46**	0.51**	0.58**	0.56**	0.40**	0.46**	0.48**	0.41**	0.30*
	VAR 10	0.63**	0.58**	0.71**	0.70**	0.73**	0.06	0.22	0.33**	0.44**	0.38**	0.50**	0.58**	0.55**	0.60**	0.65**	0.60**	0.66**	0.49**	0.45**	0.50**	0.44**	0.76**	0.59**	0.32**
	VAR 06	0.61**	0.65**	0.71**	0.79**	0.66**	-0.06	0.14	0.14	0.22	0.32**	0.51**	0.58**	0.48**	0.58**	0.61**	0.50**	0.59**	0.44**	0.45**	0.48**	0.39**	0.67**	0.50**	0.34**
CV		0.62	0.65	0.72	0.71	0.58	0.64	0.63	0.65	0.61	0.57	0.63	0.66	0.63	0.65	0.59	0.69	0.70	0.62	0.61	0.58	0.54	0.60	0.57	0.39
DV		0.43	0.42	0.49	0.48	0.49	0.07	0.21	0.25	0.27	0.32	0.42	0.49	0.45	0.53	0.50	0.45	0.51	0.43	0.41	0.36	0.35	0.51	0.43	0.32

* Correlation is significant at the 0.05 level
 ** Correlation is significant at the 0.01 level

Table 5.3 Correlation matrix for all 44 service quality attributes

		COM 06					COM 07				COM 08					COM 09					
		VAR 43	VAR 42	VAR 44	VAR 41	VAR 33	VAR 36	VAR 30	VAR 29	VAR 31	VAR 32	VAR 21	VAR 24	VAR 23	VAR 51	VAR 50	VAR 22	VAR 09	VAR 16	VAR 10	VAR 06
COM 01	VAR 01 VAR 14 VAR 08 VAR 07 VAR 26																				
COM 02	VAR 54 VAR 53 VAR 55 VAR 56																				
COM 03	VAR 28 VAR 25 VAR 17 VAR 19 VAR 35 VAR 13																				
COM 04	VAR 37 VAR 38 VAR 27 VAR 20																				
COM 05	VAR 46 VAR 47 VAR 48 VAR 45 VAR 18																				
COM 06	VAR 43 VAR 42 VAR 44 VAR 41 VAR 33 VAR 36	1.00 0.62** 0.55** 0.65** 0.57** 0.51**	1.00 0.60** 0.61** 0.55** 0.59**	1.00 0.68** 0.59** 0.64**	1.00 0.65** 0.74**	1.00 0.83**															
COM 07	VAR 30 VAR 29 VAR 31 VAR 32	0.36** 0.36** 0.31** 0.33**	0.36** 0.40** 0.44** 0.43**	0.32** 0.36** 0.30* 0.42**	0.44** 0.51** 0.41** 0.52**	0.53** 0.60** 0.50** 0.60**	0.60** 0.69** 0.60** 0.62**	1.00 0.78** 0.75** 0.57**	1.00 1.00 0.76** 0.59**	1.00 1.00 1.00 1.00											
COM 08	VAR 21 VAR 24 VAR 23 VAR 22 VAR 51 VAR 50 VAR 22	0.39** 0.25* 0.43** 0.40** 0.48** 0.52**	0.50** 0.42** 0.46** 0.58** 0.39** 0.48**	0.67** 0.45** 0.60** 0.64** 0.51** 0.63**	0.62** 0.52** 0.68** 0.63** 0.57** 0.74**	0.52** 0.35** 0.49** 0.56** 0.48** 0.70**	0.59** 0.39** 0.62** 0.69** 0.56** 0.68**	0.45** 0.33** 0.41** 0.42** 0.30* 0.42**	0.46** 0.41** 0.45** 0.50** 0.34** 0.52**	0.42** 0.33** 0.45** 0.36** 0.24* 0.49**	0.59** 0.47** 0.49** 0.50** 0.48** 0.54**	1.00 0.66** 0.78** 0.76** 0.60** 0.68**	1.00 1.00 1.00 1.00 0.47** 0.58**	0.64** 0.45** 0.64** 1.00 0.61** 0.73**	1.00 0.47** 0.61** 0.75** 0.63** 0.63**	1.00 0.52** 1.00 0.52** 1.00 0.52**	1.00 0.47** 0.61** 0.75** 0.63** 0.52**	1.00 0.47** 0.61** 0.75** 0.63** 0.52**	1.00 0.47** 0.61** 0.75** 0.63** 0.52**	1.00 0.47** 0.61** 0.75** 0.63** 0.52**	
COM 09	VAR 09 VAR 16 VAR 10 VAR 06	0.46** 0.34** 0.53** 0.48**	0.42** 0.49** 0.47** 0.48**	0.22 0.33** 0.42** 0.35**	0.36** 0.29* 0.59** 0.58**	0.49** 0.53** 0.62** 0.67**	0.51** 0.56** 0.65** 0.72**	0.54** 0.45** 0.50** 0.63**	0.47** 0.52** 0.53** 0.59**	0.42** 0.63** 0.44** 0.51**	0.40** 0.34** 0.54** 0.55**	0.29* 0.37** 0.57** 0.47**	0.27* 0.28* 0.52** 0.37**	0.33** 0.39** 0.64** 0.46	0.35** 0.41** 0.59** 0.55**	0.47** 0.28* 0.61** 0.60**	0.39** 0.39** 0.56** 0.45**	1.00 0.58** 0.69** 0.69**	1.00 1.00 0.50** 0.51**	1.00 1.00 1.00 0.76**	0.65 0.65 0.65 1.00
	CV	0.58	0.59	0.61	0.67	0.64	0.66	0.70	0.71	0.70	0.59	0.70	0.58	0.69	0.65	0.59	0.63	0.65	0.53	0.65	0.65
	DV	0.36	0.41	0.40	0.46	0.51	0.56	0.41	0.47	0.44	0.41	0.44	0.35	0.48	0.46	0.38	0.46	0.37	0.44	0.53	0.49

* Correlation is significant at the 0.05 level
 ** Correlation is significant at the 0.01 level

Table 5.3 Correlation matrix for all 44 service quality attributes (continued)

5.3 NAME TAGGING THE SERVICE QUALITY DIMENSIONS

The nine dimensions of our service quality scale were named based on the 15 original determinants we started with. As shown in Table 5.4, four of the original 15 determinants - *clout*, *understanding*, *price* and *accessibility* - remain completely or largely distinct. Based on the commonality of their underlying attributes, however, *understanding* was renamed into *awareness* and *price* was renamed into *competitiveness*. Of the remaining eleven dimensions, ten collapsed into five distinct dimensions, each consisting of items from several of the original ten dimensions: *reliability* and *responsiveness* collapsed into one distinct dimension and was named *reliability*; *tangibles* and *credibility* collapsed into one dimension and was renamed *reputation*; *communication* and *consulting* collapsed into one dimension and was renamed *collaboration*; *competence* and *offering* collapsed into one dimension and was named *competence*; and *assurance* and *empathy* collapsed into one dimension and was named *assurance*. The original determinant *geographics* disappeared all together (for more details on the name tagging process see Section 5.6).

Dimension	Underlying attributes
Reliability (COM 01)	Consistent and correct service delivery (VAR 01) Meeting deadlines for projects and assignments (VAR 14) Proactive service personnel (VAR 08) Having your best interests at heart (VAR 07) Being believable and honest (VAR 26)
Clout (COM 02)	Having a large presence in the market (VAR 54) Having sufficient leverage in the market (VAR 53) Ability to coordinate and consolidate resources with other suppliers (VAR 55) Ability to act as an advocate with other suppliers in the market (VAR 56)
Reputation (COM 03)	Demonstration of ethical conduct (VAR 28) Having a good reputation in the market (VAR 25) Well dressed and neat-appearing service personnel (VAR 17) Accurate paperwork and record keeping by service personnel (VAR 19) Explanation of the trade-offs between service quality and cost (VAR 35) Understanding your specific needs (VAR 13)
Awareness (COM 04)	Having a basic understanding of your businesses (VAR 37) Willingness to learn your specific requirements (VAR 38) Protection of confidential and proprietary information (VAR 27) Visually appealing materials associated with the services (VAR 20)
Competitiveness (COM 05)	Pricing that is competitive compared to other suppliers (VAR 46) Provision of multiple competitive bids (VAR 47) Pricing that relates to the quality delivered (VAR 48) Pricing that meets your company's budget objectives (VAR 45) Up-to-date appearing service equipment (VAR 18)
Collaboration (COM 06)	Willingness to incur risk for your company (VAR 43) Willingness to act as an advocate with senior company executives (VAR 42) Willingness to provide profit driven alternatives (VAR 44) Willingness to establish partnerships with joint planning and goal setting (VAR 41) Promotion of an interactive environment with open communication (VAR 33) Assurance that a problem will be handled effectively and efficiently (VAR 36)
Accessibility (COM 07)	Being easily contacted (face-to-face, phone or e-mail) (VAR 30) Being available at all times to assist you (VAR 29) Having convenient operating hours (VAR 31) Having technical resources that ease the spread of information (VAR 32)
Competence (COM 08)	Having sufficient expertise in the area of the services (VAR 21) Having sufficient research capability (VAR 24) Having the required knowledge and skills to manage the service (VAR 23) Ability to provide customised and unique services (VAR 51) Ability to offer an extended scope of the basic services provided (VAR 50) Having good problem-solving skills (VAR 22)
Assurance (COM 09)	Consistently courteous service personnel (VAR 09) Showing signs of recognition towards you (VAR 16) Confidence instilling behaviour by service personnel (VAR 10) Receiving prompt service if needed (VAR 06)

Table 5.4 The nine service quality dimensions for cleaning, catering and security services

In short, four of our final service quality dimensions are similar to our original determinants; five of our final service quality dimensions consist of items from several of the original determinants; and one determinant disappeared completely. As reported in Table 5.2, all dimensions have a high reliability (as each Cronbach's alpha is 0.85 or higher) as well as good content validity and good construct validity.

5.4 SERVICE QUALITY, CUSTOMER SATISFACTION AND PURCHASE INTENTION

To empirically assess further aspects of the scale's validity we examined both the associations and the relationships between the nine service quality dimensions and overall perceived service quality, customer satisfaction as well as purchase intention.

Correlation analysis - To assess the associations between each service quality dimension, overall perceived service quality, customer satisfaction and purchase intention, correlation analysis was used (see Table 5.5).

The results of the correlation analysis indicate that six of the nine service quality dimensions are strongly and highly significantly related to overall perceived service quality ($r > 0.70$, $p < 0.010$). With *reputation* and *accessibility* having a moderate yet highly significant correlation with overall perceived service quality ($r = 0.67$, $p < 0.010$ and $r = 0.62$, $p < 0.010$ respectively), only *clout* has a weak but moderately significant relationship with overall perceived service quality ($r = 0.22$, $p = 0.060$).

Similarly, the results of our analysis indicate that five of the nine dimensions are strongly and highly significantly related to customer satisfaction ($r > 0.70$, $p < 0.010$). Furthermore, *reputation*, *awareness* and *accessibility* have a moderate yet highly significant correlation with customer satisfaction ($r = 0.64$, $p < 0.010$, $r = 0.68$, $p < 0.010$ and $r = 0.60$, $p < 0.010$ respectively). Again, however, *clout* has a weak but moderately significant relationship with customer satisfaction ($r = 0.22$, $p = 0.059$).

Furthermore, eight of the nine dimensions show a moderate yet highly significant correlation with purchase intention ($r > 0.30$, $p < 0.010$). However, *clout* has no relationship with purchase intention ($r = 0.04$, $p = 0.711$).

Finally, the relationship between overall perceived service quality and customer satisfaction is strong and highly significant ($r = 0.89$, $p < 0.010$) and the relation between service quality and purchase intention is moderate yet highly significant ($r = 0.69$, $p < 0.010$). In addition, the relation between customer satisfaction and purchase intention also is strong and highly significant ($r = 0.72$, $p < 0.010$). These findings support the idea that service quality is an antecedent of customer satisfaction and that customer satisfaction is an antecedent of purchase intention.

Dimension	Reliability	Clout	Reputation	Awareness	Competitiveness	Collaboration	Accessibility	Competence	Assurance	Service quality	Customer satisfaction	Contract renewal
Reliability	1.00											
Clout	0.28*	1.00										
Reputation	0.73**	0.35**	1.00									
Awareness	0.64**	0.16	0.77**	1.00								
Competitiveness	0.62**	0.30*	0.70**	0.61**	1.00							
Collaboration	0.69**	0.27*	0.70**	0.71**	0.63**	1.00						
Accessibility	0.71**	0.23*	0.63**	0.72**	0.50**	0.65**	1.00					
Competence	0.64**	0.33**	0.60**	0.61**	0.62**	0.76**	0.60**	1.00				
Assurance	0.81**	0.22	0.74**	0.68**	0.67**	0.70**	0.69**	0.64**	1.00			
Service quality	0.72**	0.22	0.67**	0.71**	0.71**	0.78**	0.62**	0.77**	0.70**	1.00		
Customer satisfaction	0.73**	0.22	0.64**	0.68**	0.72**	0.76**	0.60**	0.80**	0.70**	0.89**	1.00	
Contract renewal	0.58**	0.04	0.42**	0.55**	0.42**	0.67**	0.42**	0.55**	0.51**	0.69**	0.72**	1.00

* Correlation is significant at the 0.05 level

** Correlation is significant at the 0.01 level

Table 5.5 Correlations between the nine service quality dimensions, service quality, customer satisfaction and purchase intention

To assess the exact relationships between the nine service quality dimensions and overall perceived service quality, customer satisfaction and purchase intention, two types of regression analysis were used. First, simple regression analyses were performed using each of the nine service quality dimensions as independent variables, and overall perceived service quality, customer satisfaction and purchase intention, one at a time as dependent variables (a total of 27 simple regression analyses were run). Second, stepwise regression analyses were performed using all nine service quality dimensions as potential independent variables.

Simple regression analyses - Tables 5.6 to 5.8 present the results of the separate simple regression analyses of each of the three output measures on each of the nine quality dimensions. The coefficients of determination (R square value), the regression coefficients (Beta coefficient) and the p-values for the significance of each relationship are reported. The sign and statistical significance of each regression coefficient are of primary interest here rather than the magnitude, since our intent is to determine if a positive relationship exists, in contrast to using the models for prediction.

Dimension	R Square	Adjusted R Square	Beta Coefficient	p value
Reliability	0.512	0.505	0.716	0.000
Clout	0.050	0.036	0.223	0.060
Reputation	0.447	0.439	0.669	0.000
Awareness	0.510	0.503	0.714	0.000
Competitiveness	0.508	0.501	0.713	0.000
Collaboration	0.615	0.609	0.784	0.000
Accessibility	0.383	0.374	0.619	0.000
Competence	0.599	0.594	0.774	0.000
Assurance	0.492	0.485	0.701	0.000

Table 5.6 Simple regression analysis with service quality as dependent variable

Dimension	R Square	Adjusted R Square	Beta Coefficient	p value
Reliability	0.532	0.525	0.729	0.000
Clout	0.050	0.037	0.224	0.059
Reputation	0.414	0.405	0.643	0.000
Awareness	0.462	0.455	0.680	0.000
Competitiveness	0.513	0.506	0.716	0.000
Collaboration	0.582	0.576	0.763	0.000
Accessibility	0.356	0.346	0.596	0.000
Competence	0.646	0.640	0.803	0.000
Assurance	0.490	0.482	0.700	0.000

Table 5.7 Simple regression analysis with customer satisfaction as dependent variable

Dimension	R Square	Adjusted R Square	Beta Coefficient	p value
Reliability	0.332	0.323	0.576	0.000
Clout	0.002	-0.012	0.044	0.711
Reputation	0.180	0.168	0.424	0.000
Awareness	0.298	0.288	0.546	0.000
Competitiveness	0.173	0.162	0.416	0.000
Collaboration	0.447	0.439	0.669	0.000
Accessibility	0.173	0.161	0.416	0.000
Competence	0.307	0.297	0.554	0.000
Assurance	0.263	0.253	0.513	0.000

Table 5.8 Simple regression analysis with purchase intention as dependent variable

As can be observed from Tables 5.6 to 5.8, none of the 27 regression coefficients (Beta coefficient) have negative signs. Thus, our first observation is that there are no inverse relationships between the nine service quality dimensions and overall perceived service quality, customer satisfaction and purchase intention. The second issue to be addressed is whether any of the nine service quality dimensions is positively and significantly related to one or more of the three output measures.

The results of the regression analyses show that eight of the nine service quality dimensions have moderate or even strong and highly significant relationships with all three output measures ($R^2 > 0.17$, $p < 0.001$). Although *clout* is the exception, this dimension has a weak yet moderately significant relationship with both service quality ($R^2 = 0.05$, $p = 0.060$) and customer satisfaction ($R^2 = 0.05$, $p = 0.059$).

Stepwise regression analyses - The stepwise procedure used was the forward selection procedure. It should be noted that stepwise regression analyses identify independent variables which explain additional variance in the dependent variable, given the variables already in the model. Thus, it is possible that a significant predictor of an output measure in simple regression analysis might not enter the stepwise regression model.

Table 5.7 presents the results of the stepwise regression analyses. For each of the three output measures, the final model p-value, the coefficients of determination (R square value), the independent variables entered in the model, their regression coefficients (Beta coefficient) and the p-values for the independent variables are reported. All models were highly significant at the $p < 0.010$ significance level.

Dependent variable	Model p value	R Square	Dimension entered	Beta Coefficient	Entry p value
Service quality	0.000(a)	0.751	Collaboration	0.261	0.019
			Competitiveness	0.235	0.008
			Competence	0.309	0.002
			Awareness	0.196	0.035
Customer satisfaction	0.000(b)	0.759	Competence	0.470	0.000
			Reliability	0.267	0.002
			Competitiveness	0.259	0.002
Purchase intention	0.000(c)	0.447	Collaboration	0.669	0.000

a. Predictors: (Constant) COM 06, COM 05, COM 08 and COM 04

b. Predictors: (Constant) COM 08, COM 01 and COM 05

c. Predictors: (Constant) COM 06

Table 5.9 Stepwise regression analyses with service quality, customer satisfaction and purchase intentions as dependent variables

Several things should be noted concerning the stepwise regression results in Table 5.9. First, service quality had four variables enter the model, customer satisfaction had three variables enter the model, and purchase intention had only one variable enter the model.

Of the nine service quality dimensions, *collaboration*, *competitiveness*, *competence* and *awareness* were the four predictors for service quality. This model had a very strong coefficient of determination ($R^2 = 0.75$). Furthermore, *competence*, *reliability* and *competitiveness* were the three predictors for customer satisfaction. This model had a coefficient of determination ($R^2 = 0.76$), which was the strongest for any of the three stepwise regression models. Finally, *collaboration* was the only predictor for purchase intention. This model had a moderate coefficient of determination ($R^2 = 0.45$). *Clout*, *reputation*, *accessibility* and *assurance* were not significantly related to service quality, customer satisfaction or purchase intention.

The stepwise results highlight the relative significance of *collaboration*, *competitiveness*, *competence*, *awareness* and *reliability* for the three output measures as perceived by customer organisations (i.e. customer perceptions of service quality, customer satisfaction and purchase intention).

5.5 EXAMINING THE IMPORTANCE-PERFORMANCE GAPS

Importance-performance gap analysis involves the concurrent examination of customer views on the importance of salient service quality dimensions (or service quality attributes) and their perceptions concerning the performance of service providers in meeting customer needs related to each of these service quality dimensions (cf. Hawes and Rao 1985). Measures of perceived importance are useful information when developing resource allocation priorities in service organisations. Likewise, measures of perceived performance of a service provider in providing a particular feature may identify certain areas in need of improvement. The key advantage offered by importance-performance analysis, however, is the synergetic effect of the simultaneously examination of both measures.

The data analyses in our importance-performance gap study were conducted in the following manner. First, mean values for each service quality dimension's importance and its performance were computed. Subsequently, a two-dimensional graph, with the importance rating representing the vertical axis and the performance rating constituting the horizontal axis, was conducted. Finally, the mean importance rating and the mean performance rating for each dimension were plotted as points on the importance-performance grid. When constructing the importance-performance grid so that each of the axes intersects at the other's midpoint, we get to Figure 5.1.

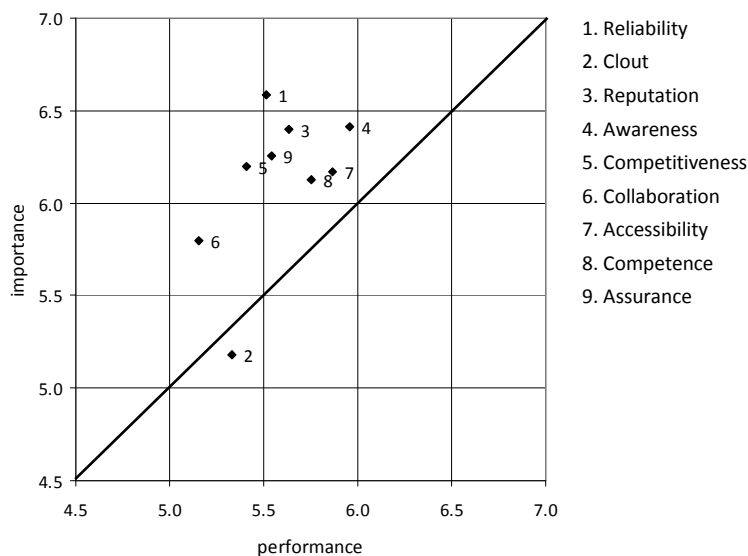


Figure 5.1 Importance-performance grid for the nine service quality dimensions

Any service quality dimension that is plotted above the iso-rating diagonal has an importance rating that exceeds its performance rating. Consequently, customers are not optimally content with this dimension and any service provider that can do a better job on this dimension would find a receptive market. Thus, any dimensions on the grid above the iso-rating diagonal represent 'market opportunities'. On the other hand, any service quality dimension that is plotted below the iso-rating diagonal has a performance rating that exceeds its importance rating. Very little customer discontent exists in this case, and it is unlikely that a service provider

could gain a competitive edge with a strategy that emphasises superior provision on this dimension. Consequently, dimensions plotted below the diagonal represent ‘satiated needs’.

Martilla and James (1977) contend that positioning the vertical and the horizontal axis on the grid is a matter of judgement, and that placement should suggest relative rather than absolute levels of importance and performance. Although we believe that the importance-performance grid should be constructed as described on the previous page, we recognise the potential benefits of their approach in order to develop appropriate resource allocation priorities.

Dimension	Importance (1 to 7 scale)		Performance (1 to 7 scale)	
	Mean	Rank	Mean	Rank
Reliability	6.59	1	5.51	6
Clout	5.18	9	5.33	8
Reputation	6.40	3	5.64	4
Awareness	6.41	2	5.96	1
Competitiveness	6.20	5	5.41	7
Collaboration	5.80	8	5.16	9
Accessibility	6.17	6	5.87	2
Competence	6.13	7	5.76	3
Assurance	6.25	4	5.55	5

Table 5.10 Means and rank orders for importance and performance scores

The most significant characteristic of the mean importance scores for the nine dimensions is that all fall at the high end of the seven-point scale used for evaluation purposes (i.e. all means are greater than five). Thus, all dimensions are important in the business supports services industry. The three most important dimensions as perceived by customers are: *reliability*, *awareness* and *reputation*. Similarly, all nine dimensions also have mean performance scores above five. The three best rated dimensions are: *awareness*, *accessibility* and *competence* (see Table 5.10).

With each of the nine service quality dimensions having a different impact on ‘overall perceived service quality’ (see Section 5.4), the importance-performance gaps (IP gaps) alone do not provide a sufficient picture for resource allocation purposes. Therefore, we decided to multiply the IP gaps with the coefficient of determination (R square value) that each service quality dimension had on overall perceived service quality. Listed in descending order, the main priorities identified as such are: *reliability*, *competitiveness*, *collaboration*, *assurance*, *reputation*, *awareness*, *competence*, *accessibility*, and finally *clout* (see Table 5.11).

Dimension	IP Gap	R2 COM	Relative priority	Rank
Reliability	1.08	0.512	0.55	1
Clout	-0.15	0.050	-0.01	9
Reputation	0.76	0.447	0.34	5
Awareness	0.45	0.510	0.23	6
Competitiveness	0.79	0.508	0.40	2
Collaboration	0.64	0.615	0.39	3
Accessibility	0.30	0.383	0.12	8
Competence	0.37	0.600	0.22	7
Assurance	0.71	0.492	0.35	4

Table 5.11 Importance-performance gaps prioritised based on R square values

To further assess the importance-performance gaps, our hypothesis was that there would be significant differences between the perceived performance and the perceived importance of the nine service quality dimensions, such that the scores for perceived importance would be significantly higher. Note that this is a one-tailed hypothesis, because we specified the direction of the difference. This directional hypothesis is based on the idea that people tend to find service quality more important than what is actually delivered. With both conditions being negatively skewed, we used the Wilcoxon signed-ranks test (non-parametric alternative to the paired t-test) in order to test whether the expected differences are indeed significant.

Ranks

Dimension		N	Mean Rank	Sum of Ranks
Reliability	Negative Ranks	3 ^a	14.50	43.50
	Positive Ranks	62 ^b	33.90	2,101.50
	Ties	7 ^c		
	Total	72		
Clout	Negative Ranks	40 ^a	27.49	1,099.50
	Positive Ranks	20 ^b	36.53	730.50
	Ties	12 ^c		
	Total	72		
Reputation	Negative Ranks	10 ^a	15.05	150.50
	Positive Ranks	54 ^b	35.73	1,929.50
	Ties	8 ^c		
	Total	72		
Awareness	Negative Ranks	15 ^a	21.23	318.50
	Positive Ranks	42 ^b	31.77	1,334.50
	Ties	15 ^c		
	Total	72		
Competitiveness	Negative Ranks	10 ^a	21.55	215.50
	Positive Ranks	49 ^b	31.72	1,554.50
	Ties	13 ^c		
	Total	72		
Collaboration	Negative Ranks	16 ^a	22.69	363.00
	Positive Ranks	53 ^b	38.72	2,052.00
	Ties	3 ^c		
	Total	72		
Accessibility	Negative Ranks	21 ^a	24.17	507.50
	Positive Ranks	36 ^b	31.82	1,145.50
	Ties	15 ^c		
	Total	72		
Competence	Negative Ranks	21 ^a	23.81	500.00
	Positive Ranks	41 ^b	35.44	1,453.00
	Ties	10 ^c		
	Total	72		
Assurance	Negative Ranks	14 ^a	17.39	243.50
	Positive Ranks	50 ^b	36.73	1,836.50
	Ties	8 ^c		
	Total	72		

a. importance < performance

b. importance > performance

c. importance = performance

Table 5.12 Wilcoxon signed-ranks tests for the nine service quality dimensions

Test Statistics^c

	Reliability	Clout	Reputation
Z	-6.737 ^a	-1.362 ^b	-5.957 ^a
Asymp. Sig. (2-tailed)	0.000	0.173	0.000
Asymp. Sig. (1-tailed)	0.000	0.087	0.000
	Awareness	Competitiveness	Collaboration
Z	-4.069 ^a	-5.064 ^a	-5.056 ^a
Asymp. Sig. (2-tailed)	0.000	0.000	0.000
Asymp. Sig. (1-tailed)	0.000	0.000	0.000
	Accessibility	Competence	Assurance
Z	-2.549 ^a	-3.347 ^a	-5.348 ^a
Asymp. Sig. (2-tailed)	0.011	0.001	0.000
Asymp. Sig. (1-tailed)	0.005	0.000	0.000

a. Based on negative ranks

b. Based on positive ranks

c. Wilcoxon Signed Ranks Test

Table 5.12 Wilcoxon signed-ranks tests for the nine service quality dimensions (continued)

The Wilcoxon signed-rank tests in Table 5.12 show that perceived importance is indeed higher than perceived performance for eight of the nine service quality dimensions. In addition, the differences between perceived importance and perceived performance for these eight dimensions are significant with z-scores ranging from -2.55 to -6.74 and p-values all being lower than 0.050. It therefore can be concluded that customers find these service quality dimensions more important than what is delivered, and that such a difference is highly unlikely to have arisen by sampling error. The one exception is *clout*, where perceived importance is lower than perceived performance, but here the difference is non-significant ($z = -1.36$, $p = 0.087$) indicating that this difference might have arisen by sampling error.

Reliability gaps - When constructing the importance-performance grid for the *reliability* dimension, we get to Figure 5.2.

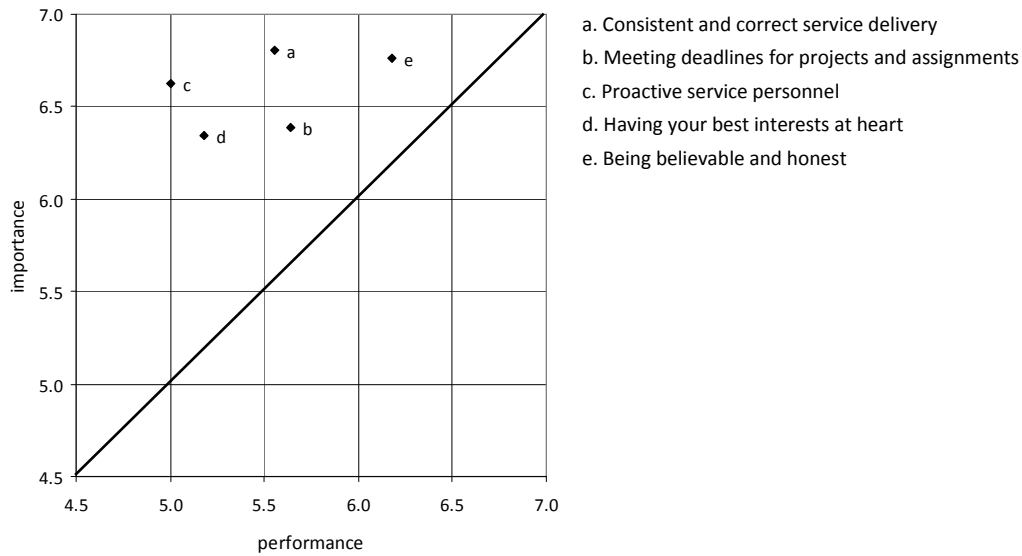


Figure 5.2 Importance-performance grid for the reliability dimension

With each of the five service quality attributes having a different impact on the *reliability* dimension, we again multiplied the importance-performance gaps (IP gaps) with the coefficient of determination (or R square value) each service quality attribute had on its dimension (see Table 5.13). As can be seen, the main priority to enhance *reliability* is 'proactive service personnel'.

Reliability	IP Gap	R2 VAR	Relative priority	Rank
Consistent and correct service delivery	1.25	0.667	0.83	3
Meeting deadlines for projects and assignments	0.75	0.701	0.53	4
Proactive service personnel	1.63	0.859	1.40	1
Having your best interests at heart	1.17	0.830	0.97	2
Being believable and honest	0.58	0.576	0.34	5

Table 5.13 Reliability gaps prioritised based on R square values

For all service quality attributes of the *reliability* dimension, the Wilcoxon signed-rank tests confirmed that perceived importance is higher than perceived performance and that all differences between importance and performance are highly significant ($p < 0.001$).

Clout gaps - When constructing the importance-performance grid for the *clout* dimension, we get to Figure 5.3.

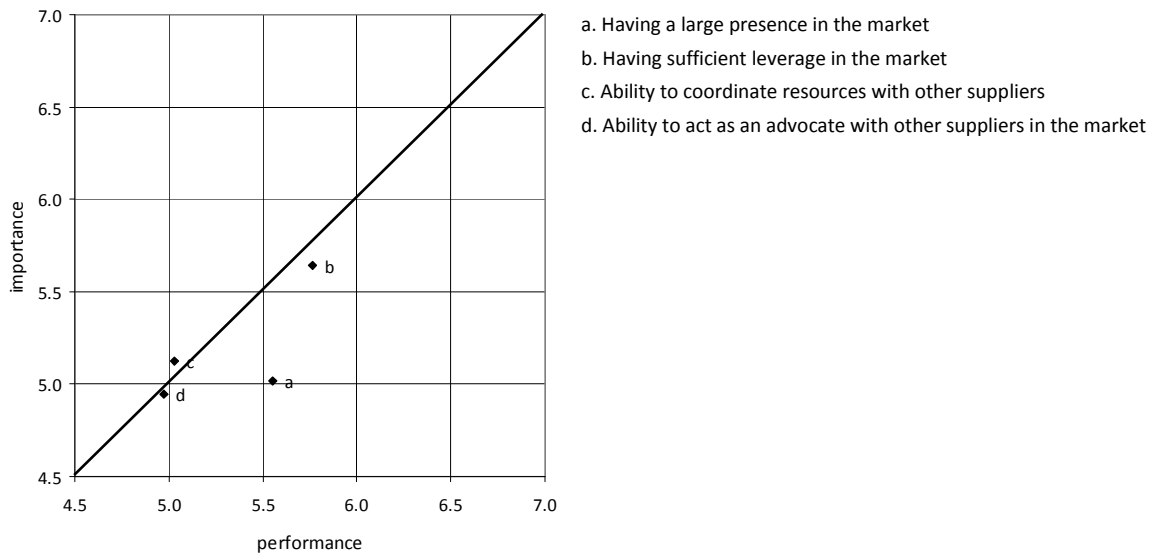


Figure 5.3 Importance-performance grid for the *clout* dimension

With each of the four service quality attributes having a different impact on the *clout* dimension, we again multiplied the importance-performance gaps (IP gaps) with the coefficient of determination (or R square value) each service quality attribute had on its dimension (see Table 5.14). As can be seen, the main priority to enhance *clout* is the ‘ability to coordinate and consolidate resources with other companies’.

Clout	IP Gap	R2 VAR	Relative priority	Rank
Having a large presence in the market	-0.54	0.744	-0.40	4
Having sufficient leverage in the market	-0.13	0.703	-0.09	3
Ability to coordinate and consolidate resources with other suppliers	0.10	0.767	0.07	1
Ability to act as an advocate with other suppliers in the market	-0.03	0.686	-0.02	2

Table 5.14 Clout gaps prioritised based on R square values

For most service quality attributes of the *clout* dimension, the Wilcoxon signed-rank tests showed that there is no significant difference between perceived importance and perceived performance. However, ‘having a large presence in the market’ is significantly less important than is delivered ($z = -3.42$, $p = 0.001$).

Reputation gaps - When constructing the importance-performance grid for the *reputation* dimension, we get to Figure 5.4.

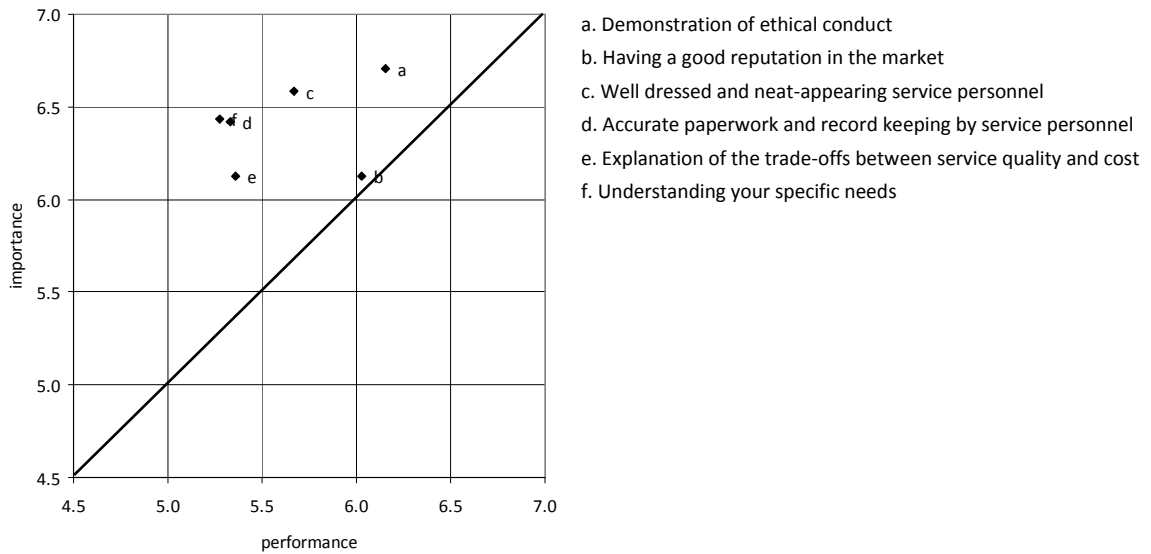


Figure 5.4 Importance-performance grid for the reputation dimension

With each of the six service quality attributes having a different impact on the *reputation* dimension, we again multiplied the importance-performance gaps (IP gaps) with the coefficient of determination (or R square value) each service quality attribute had on its dimension (see Table 5.15). As can be seen, the main priority to enhance *reputation* is ‘accurate paperwork and record keeping by service personnel’.

Reputation	IP Gap	R2 VAR	Relative priority	Rank
Demonstration of ethical conduct	0.56	0.576	0.32	5
Having a good reputation in the market	0.10	0.691	0.07	6
Well dressed and neat-appearing service personnel	0.92	0.754	0.69	3
Accurate paperwork and record keeping by service personnel	1.08	0.697	0.76	1
Explanation of the trade-offs between service quality and cost	0.76	0.742	0.57	4
Understanding your specific needs	1.15	0.639	0.74	2

Table 5.15 Reputation gaps prioritised based on R square values

For most service quality attributes of the *reputation* dimension, the Wilcoxon signed-rank tests confirmed that perceived importance is higher than perceived performance and that the differences between importance and performance are highly significant ($p < 0.001$). However, for ‘having a good reputation in the market’ there is no significant difference between importance and performance ($z = -0.60$, $p = 0.274$).

Awareness gaps - When constructing the importance-performance grid for the *awareness* dimension, we get to Figure 5.5.

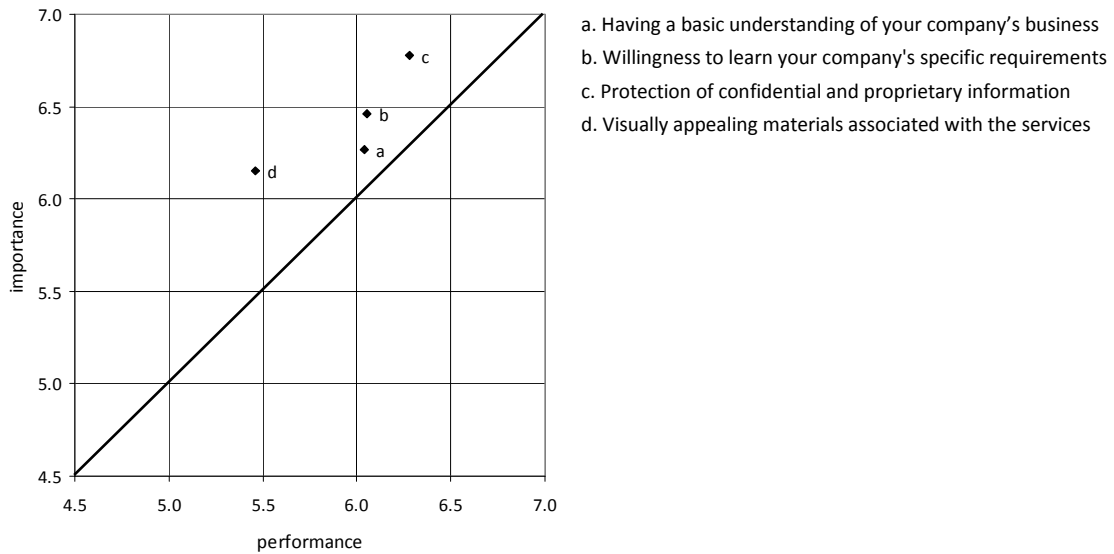


Figure 5.5 Importance-performance grid for the awareness dimension

With each of the four service quality attributes having a different impact on the *awareness* dimension, we again multiplied the importance-performance gaps (IP gaps) with the coefficient of determination (or R square value) each service quality attribute had on its dimension (see Table 5.16). As can be seen, the main priority to enhance *awareness* is 'visually appealing materials associated with the services'.

Awareness	IP Gap	R2 VAR	Relative priority	Rank
Having a basic understanding of your company's business	0.22	0.795	0.18	4
Willingness to learn your company's specific requirements	0.40	0.806	0.32	3
Protection of confidential and proprietary information	0.50	0.654	0.33	2
Visually appealing materials associated with the services	0.69	0.705	0.49	1

Table 5.16 Awareness gaps prioritised based on R square values

For all service quality attributes of the *awareness* dimension, the Wilcoxon signed-rank tests confirmed that perceived importance is higher than perceived performance and that all differences between importance and performance are highly significant ($p < 0.050$).

Competitiveness gaps - When constructing the importance-performance grid for the *competitiveness* dimension, we get to Figure 5.6.

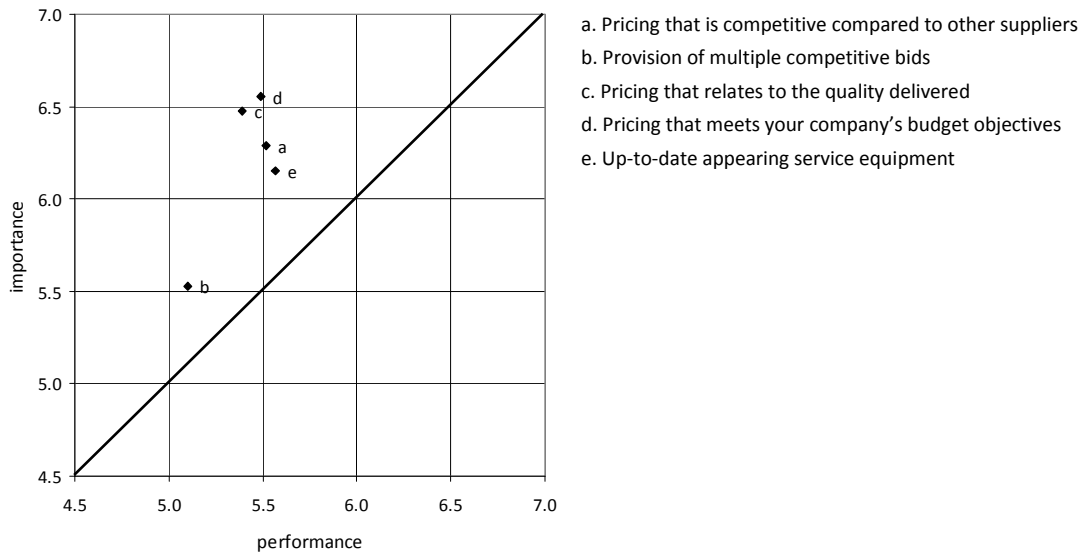


Figure 5.6 Importance-performance grid for the competitiveness dimension

With each of the five service quality attributes having a different impact on the *competitiveness* dimension, we again multiplied the importance-performance gaps (IP gaps) with the coefficient of determination (or R square value) each service quality attribute had on its dimension (see Table 5.17). As can be seen, the main priority to enhance *competitiveness* is 'pricing that relates to the quality delivered'.

Competitiveness	IP Gap	R2 VAR	Relative priority	Rank
Pricing that is competitive compared to other suppliers	0.78	0.694	0.54	3
Provision of multiple competitive bids	0.43	0.611	0.26	4
Pricing that relates to the quality delivered	1.08	0.768	0.83	1
Pricing that meets your company's budget objectives	1.07	0.707	0.76	2
Up-to-date appearing service equipment	0.58	0.398	0.23	5

Table 5.17 Competitiveness gaps prioritised based on R square values

For all service quality attributes of the *competitiveness* dimension, the Wilcoxon signed-rank tests confirmed that perceived importance is higher than perceived performance and that all differences between importance and performance are highly significant ($p < 0.010$).

Collaboration gaps - When constructing the importance-performance grid for the *collaboration* dimension, we get to Figure 5.7.

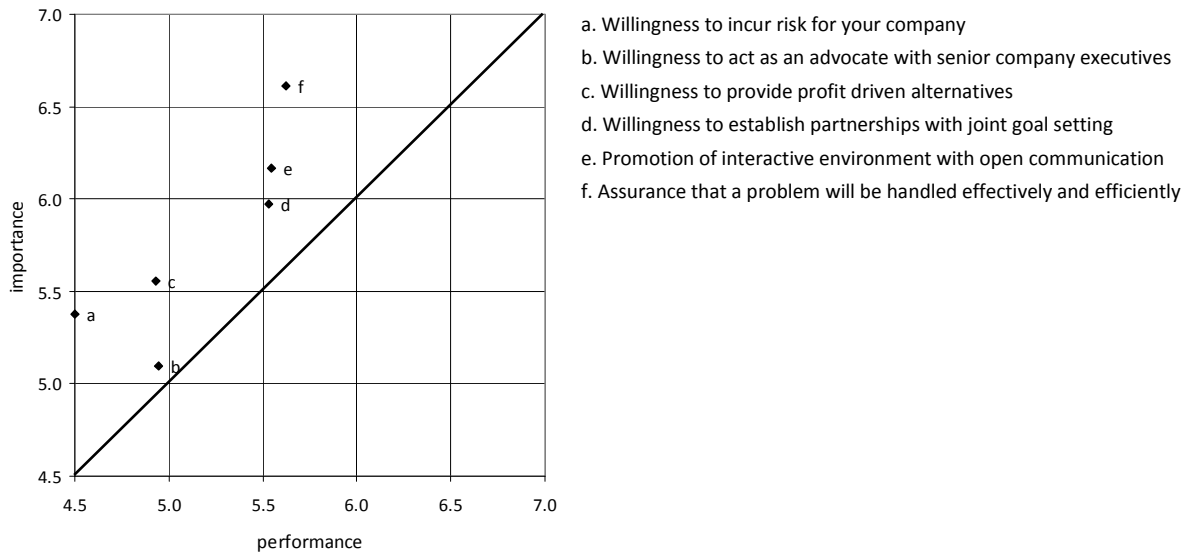


Figure 5.7 Importance-performance grid for the collaboration dimension

With each of the six service quality attributes having a different impact on the *collaboration* dimension, we again multiplied the importance-performance gaps (IP gaps) with the coefficient of determination (or R square value) each service quality attribute had on its dimension (see Table 5.18). As can be seen, the main priority to enhance *collaboration* is ‘assurance that a problem will be handled effectively and efficiently’.

Collaboration	IP Gap	R2 VAR	Relative priority	Rank
Willingness to incur risk for your company	1.00	0.618	0.62	2
Willingness to act as an advocate with senior company executives	0.15	0.638	0.10	6
Willingness to provide profit driven alternatives	0.63	0.650	0.41	4
Willingness to establish partnerships with joint planning and goal setting	0.44	0.759	0.34	5
Promotion of an interactive environment with open communication	0.63	0.709	0.44	3
Assurance that a problem will be handled effectively and efficiently	0.99	0.760	0.75	1

Table 5.18 Collaboration gaps prioritised based on R square values

For most service quality attributes of the *collaboration* dimension, the Wilcoxon signed-rank tests confirmed that perceived importance is higher than perceived performance and that the differences between importance and performance are highly significant ($p < 0.001$). However, for ‘willingness to act as an advocate with senior company executives’ there is no significant difference between importance and performance ($z = -0.67$, $p = 0.252$).

Accessibility gaps - When constructing the importance-performance grid for the *accessibility* dimension, we get to Figure 5.8.

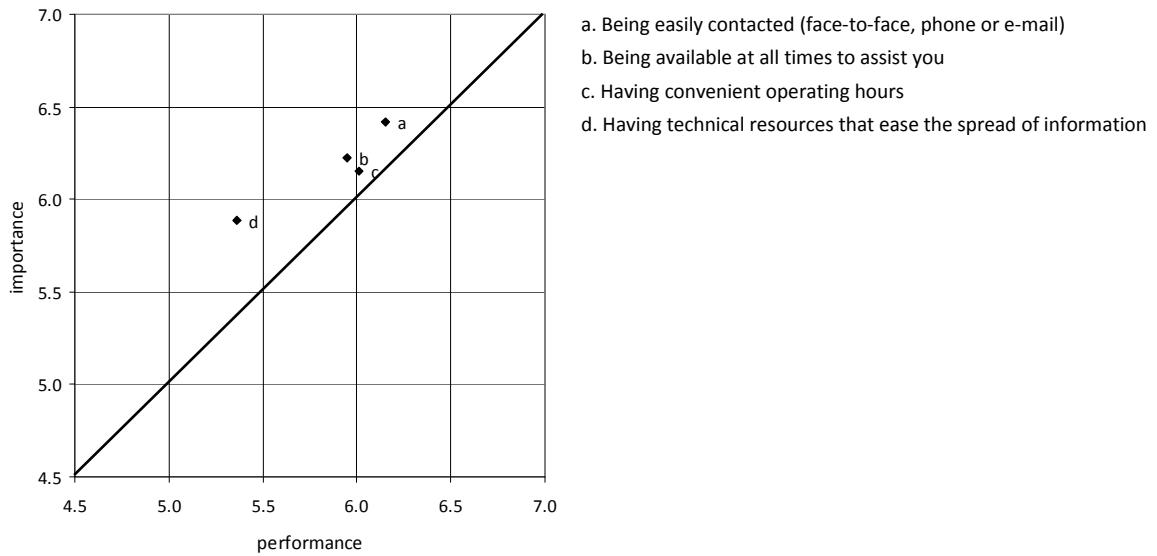


Figure 5.8 Importance-performance grid for the accessibility dimension

With each of the four service quality attributes having a different impact on the *accessibility* dimension, we again multiplied the importance-performance gaps (IP gaps) with the coefficient of determination (or R square value) each service quality attribute had on its dimension (see Table 5.19). As can be seen, the main priority to enhance *accessibility* is ‘having technical resources that ease the spread of information’.

Accessibility	IP Gap	R2 VAR	Relative priority	Rank
Being easily contacted (face-to-face, phone or e-mail)	0.26	0.784	0.21	3
Being available at all times to assist you	0.28	0.809	0.22	2
Having convenient operating hours	0.14	0.776	0.11	4
Having technical resources that ease the spread of information	0.53	0.656	0.35	1

Table 5.19 Accessibility gaps prioritised based on R square values

For most service quality attributes of the *accessibility* dimension, the Wilcoxon signed-rank tests confirmed that perceived importance is higher than perceived performance and that the differences between importance and performance are highly significant ($p < 0.050$). However, for ‘having convenient operating hours’ there is no significant difference between importance and performance ($z = -1.17, p = 0.122$).

Competence gaps - When constructing the importance-performance grid for the *competence* dimension, we get to Figure 5.9.

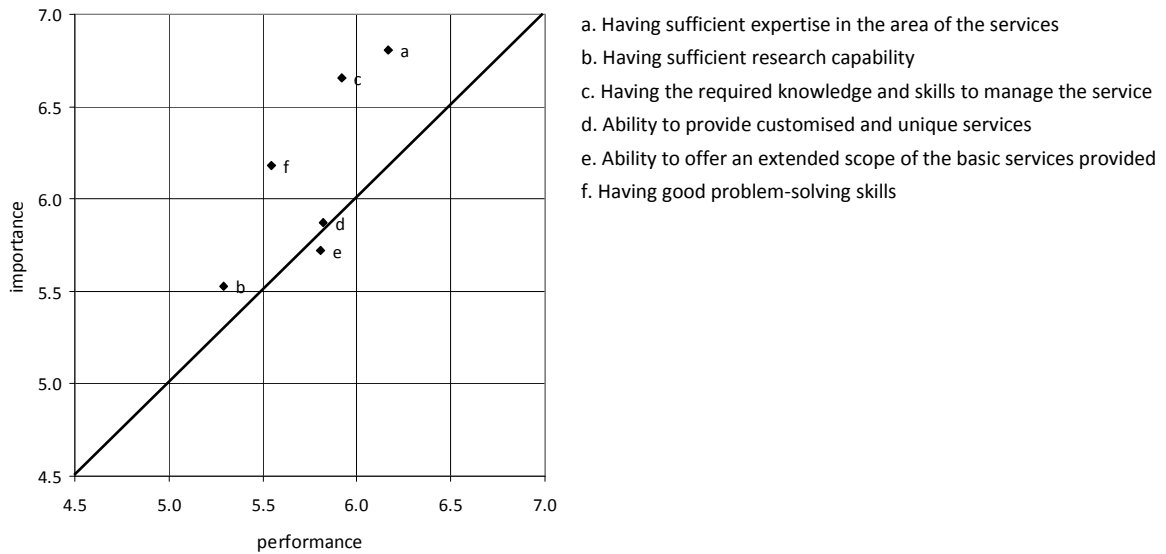


Figure 5.9 Importance-performance grid for the competence dimension

With each of the six service quality attributes having a different impact on the *competence* dimension, we again multiplied the importance-performance gaps (IP gaps) with the coefficient of determination (or R square value) each service quality attribute had on its dimension (see Table 5.20). As can be seen, the main priority to enhance *competence* is ‘having the required knowledge and skills to manage the service’.

Competence	IP Gap	R2 VAR	Relative priority	Rank
Having sufficient expertise in the area of the services	0.64	0.785	0.50	2
Having sufficient research capability	0.24	0.612	0.14	4
Having the required knowledge and skills to manage the service	0.74	0.776	0.57	1
Ability to provide customised and unique services	0.06	0.735	0.04	5
Ability to offer an extended scope of the basic services provided	-0.08	0.637	-0.05	6
Having good problem-solving skills	0.64	0.661	0.42	3

Table 5.20 Competence gaps prioritised based on R square values

For three service quality attributes of the *competence* dimension, the Wilcoxon signed-rank tests confirmed that perceived importance is higher than perceived performance and that the differences between importance and performance are highly significant ($p < 0.050$). The exceptions are ‘having sufficient research capability’, ‘ability to provide customised and unique services’ and ‘ability to offer an extended scope of the basic services provided’ ($p > 0.050$).

Assurance gaps - When constructing the importance-performance grid for the *assurance* dimension, we get to Figure 5.10.

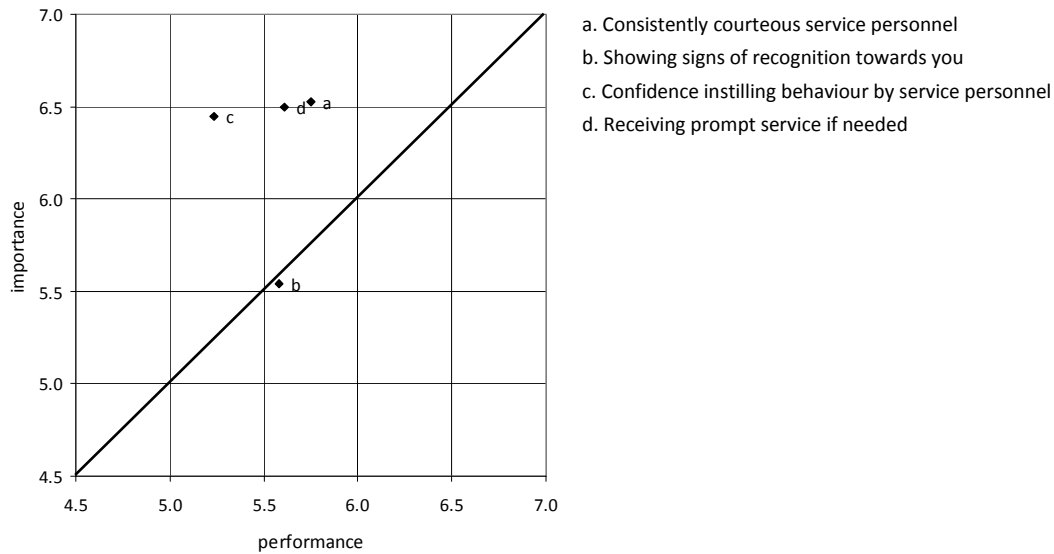


Figure 5.10 Importance-performance grid for the assurance dimension

With each of the four service quality attributes having a different impact on the *assurance* dimension, we again multiplied the importance-performance gaps (IP gaps) with the coefficient of determination (or R square value) each service quality attribute had on its dimension (see Table 5.21). As can be seen, the main priority to enhance *assurance* is ‘confidence instilling behaviour by service personnel’.

Assurance	IP Gap	R2 VAR	Relative priority	Rank
Consistently courteous service personnel	0.78	0.743	0.58	3
Showing signs of recognition towards you	-0.04	0.584	-0.02	4
Confidence instilling behaviour by service personnel	1.21	0.771	0.93	1
Receiving prompt service if needed	0.89	0.768	0.68	2

Table 5.21 Assurance gaps prioritised based on R square values

For most service quality attributes of the *assurance* dimension, the Wilcoxon signed-rank tests confirmed that perceived importance is higher than perceived performance and that the differences between importance and performance are highly significant ($p < 0.001$). However, for ‘showing signs of recognition towards you’ there is no significant difference between importance and performance ($z = -0.22, p = 0.414$).

In short, in the eye of contract managers from customer organisations, there are 33 service quality attributes spread over eight service quality dimensions where perceived importance is significantly higher when compared perceived performance. The three dimensions for which all underlying service quality attributes were significantly different are *reliability*, *awareness* and *competitiveness*. The one dimension for which no significant differences appeared for the underlying service quality attributes is *clout*.

5.6 VERIFICATION OF THE CUSTOMER PERSPECTIVE

In spring 2007, the results of the ‘customer perspective’ as described in the previous five sections were presented at a dedicated seminar involving approximately 35 executives from over 25 customer and supplier organisations (involving both contract managers and account managers for cleaning, catering and security services) as well as representatives from BIFM, UCL and IPD. The subsequent panel discussion and workshops during this seminar provided valuable feedback on the identified service quality dimensions and their underlying service quality attributes as well as on the identified relationships between service quality, customer satisfaction and purchase intention. Furthermore, practical recommendations were given on how to close the importance-performance gaps in relation to the service quality dimensions and their underlying attributes (for more details see Section 11.3).

Dimensions and attributes of service quality - Discussions around the name tagging of the nine service quality dimensions revealed that the delegates preferred to use one-worded dimensions, resulting in the following changes to our initially proposed names and the alternative names suggested by various delegates during the name tagging process (see Table 5.22).

Dimension	Proposed name	Alternative names	Agreed name
COM 01	Reliability and responsiveness	Service delivery	Reliability
COM 02	Clout	Market presence / brand value	Clout
COM 03	Tangible and credibility	Governance / expertise	Reputation
COM 04	Understanding	Client knowledge	Awareness
COM 05	Price	Commercial capability / positioning	Competitiveness
COM 06	Communication and consulting	Business relationship / co-operation	Collaboration
COM 07	Accessibility	Customer service	Accessibility
COM 08	Competence and offering	Service delivery / capability	Competence
COM 09	Assurance and empathy	Trust	Assurance

Table 5.22 Name tagging the nine service quality dimensions

Further discussions around the nine service quality dimensions themselves revealed the following. First, all nine dimensions identified were generally recognised as important ingredients to overall perceived service quality - especially upon closer examination of their underlying attributes. Second, however, some delegates questioned whether *clout* actually belonged to the service quality construct. Further debate highlighted that some large organisations operating throughout the country certainly regarded *clout* as part of service quality, whereas others argued that they would simply contract the best value-for-money service provider in each location or region. In addition, there was general consensus that *clout* definitely has less influence on overall perceived service quality for small and medium-sized organisations operating from one single office or a few premises in one region. Finally, it was asked by one of the delegates why *innovation* was not seen as part of the service quality construct. Here it was generally agreed that the innovative capacity of a service provider might have an impact on purchase intention or even customer satisfaction, but that *innovation* is a construct in its own, separate to service quality.

Discussions around the service quality attributes revealed the following. First, for four service quality attributes it was questioned whether they were allocated to the right service quality dimension as they were seen to fit better in another dimension. Second, two service quality attributes were not necessarily regarded as a service quality attribute.

For four service quality attributes it was questioned whether they were allocated to the right service quality dimension as they were seen to fit better in another dimension. Closer examination of the attributes in question revealed that they also had a relatively high loadings on the dimension proposed.

- Reputation - VAR 13 'Understanding your specific needs' was seen to better fit under *reliability*. With a loading of 0.36 on this dimension and VAR 14 'Having your best interests at heart', being part of the same dimension this observation was considered as being reasonable.
- Awareness - VAR 27 'Protection of confidential and proprietary information' was seen to better fit under *reputation*. With a loading of 0.30 on this dimension and VAR 25 'Having a good reputation in the market' and VAR 28 'Demonstration of ethical conduct', both being part of the same dimension this remark was considered as being explicable.
- Competitiveness - VAR 18 'Up-to-date appearing service equipment' was seen to better fit under *reputation*. With a loading of 0.31 on this dimension and VAR 17 'Well dressed and neat-appearing service personnel' and VAR 19 'Accurate paperwork and record keeping by service personnel', both being part of the same dimension this suggestion was considered as being understandable.
- Assurance - VAR 06 'Receiving prompt service if needed' was seen to better fit under *reliability*. With a loading of 0.37 on this dimension and VAR 07 'Meeting deadlines for projects and assignments' and VAR 08 'Proactive service personnel', both being part of the same dimension this remark was considered as being explicable.

Two service quality attributes were not necessarily regarded as part of the service quality construct. Although the attributes in question are agreeable more tangible than most other service quality attributes, it was reiterated that all original variables were based on previous research.

- Awareness - VAR 20 'Visually appealing materials associated with the services' was not necessarily regarded as a service quality attribute, as this is all about appearance
- Competitiveness - VAR 18 'Up-to-date appearing service equipment' was not necessarily regarded as a service quality attribute, again as this is all about appearance

In short, discussions around the dimensions and attributes of service quality highlighted that various delegates found it difficult to fully understand the nature of the interrelationships between the 44 service quality attributes in our nine-dimensional construct.

From service quality to purchase intention - Discussions around the relationships between service quality, customer satisfaction and purchase intention revealed the following. First as already highlighted in Section 4.1, most delegates agreed that service quality is a function of perceptions only and that customer satisfaction is related to the comparison of expectations with these perceptions. Therefore, it was argued that customer satisfaction cannot be assessed without assessing service quality first. This emphasised the idea that service quality is an antecedent of customer satisfaction. Second, the stronger relationship between customer satisfaction and purchase intention ($r = 0.72, p < 0.010$) when compared to the relationship between service quality and purchase intention ($r = 0.69, p < 0.010$) was seen as a strong indication that customer satisfaction is an antecedent of purchase intention more than service quality is. Following the above idea that service quality is an antecedent of customer satisfaction, this only seemed logic. Third, it was mentioned that situational factors and personal factors also play an important role in shaping expectations and therefore impact customer satisfaction. Similarly, it was highlighted that next to customer satisfaction, the actual cost or price of the service delivered plays an important role in arriving at a purchase intention.

Although some delegates still found it difficult to distinguish between service quality and customer satisfaction, there was a general consensus that service quality is an antecedent of customer satisfaction and that customer satisfaction is an antecedent of purchase intention.

Importance-performance gaps - Discussions around the differences between importance and performance for the nine service quality dimensions as perceived by customers revealed the following. First, the group expected to find significant gaps between importance and performance for all nine service quality dimensions. Second, the delegates expected to find the largest and most significant gaps between importance and performance for *reliability*, *competitiveness* and *reputation* - especially when considering their underlying service quality attributes.

In line with expectations, importance-performance gaps were found for eight service quality dimensions - *clout* being the exception. As for the size and significance of the importance-performance gaps, our findings as reported in Section 5.5 were also in line with expectations. It was explained, however, that the importance-performance gaps identified were multiplied with the coefficient of determination (R square value) each service quality dimension had on overall perceived service quality in order to prioritise the gaps for resource allocation purposes. The fact that *collaboration* had the strongest coefficient of determination on overall perceived service quality in combination with the fact that *reputation* had a relatively weak coefficient of determination on overall perceived service quality, provided a plausible explanation as to how *reliability*, *competitiveness* and *collaboration* came out as the most relevant dimensions to improve service delivery on.

The significant differences found in the underlying service quality attributes of these three dimensions were seen as useful indicators for supplier organisations to close the importance-performance gaps for *reliability*, *competitiveness* and *collaboration*. For more details on how to close the importance-performance gaps identified, please consult Section 11.3 - Closing the quality gaps.

To summarise Chapter 5, service quality in relation to cleaning, catering and security services consists of nine clear dimensions: *reliability*, *clout*, *reputation*, *awareness*, *competitiveness*, *collaboration*, *accessibility*, *competence* and *assurance*. The total variance explained by these nine dimensions is 80% and the nine-dimensional construct shows high reliability and good validity in statistical terms.

Furthermore, eight of the nine service quality dimensions are strongly or moderately yet highly significantly related to service quality, customer satisfaction and purchase intention - *clout* being the exception with weak and moderately significant relationships to both service quality and customer satisfaction. The latter finding suggests that there might be other constructs important in arriving at a purchase decision - for example the costs of service delivery. Also, there are strong indications that service quality is an antecedent of customer satisfaction and that customer satisfaction is an antecedent of purchase intention.

Concerning eight of the nine dimensions, customer perceived importance is significantly higher than customer perceived performance - *clout* again being the exception. The three areas in greatest need of improvement in performance are: *reliability*, *competitiveness* and *collaboration*. Striving to optimally meet customer needs, these findings provide useful information for service providers when developing their resource allocation priorities.

The next chapter will seek to identify whether the above findings are generally applicable across all three service lines or whether there are differences between cleaning, catering and security as perceived by customer organisations.

Box 5 Summary of the customer perspective

6 CROSS-CUSTOMER COMPARISON

In line with our research methodology, this chapter focuses on the differences between cleaning, catering and security services as perceived by customer organisations (see Section 4.4). First, we examine the differences between the three service lines with regards to service quality, customer satisfaction and purchase intention. Furthermore, we examine the differences between the three service lines with regards to the nine service quality dimensions. Where significant differences occur, we re-run some of the analyses as performed in Chapter 5. Finally, all findings are verified and validated through the outcome of focus group discussions that took place in spring 2007. Again, the raw data used in this chapter were in the form of perceived performance scores and taken directly from the customer surveys (see Annex B - Customer Survey).

6.1 DIFFERENCES ANALYSES ON OUTPUT MEASURES

In order to assess whether there are differences in overall perceived service quality, customer satisfaction and purchase intention between cleaning, catering and security, we first investigated the descriptive statistics for each output measure (see Table 6.1 and Figure 6.1)

		N	Mean	Std. Dev.	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
Service						Lower B.	Upper B.		
Service quality	cleaning	25	5.44	1.47	0.29	4.83	6.05	1.00	7.00
	catering	24	5.50	1.18	0.24	5.00	6.00	2.00	7.00
	security	23	6.00	0.85	0.18	5.63	6.37	3.00	7.00
	Total	72	5.64	1.21	0.14	5.35	5.92	1.00	7.00
Customer satisfaction	cleaning	25	5.52	1.73	0.35	4.80	6.24	1.00	7.00
	catering	24	5.58	1.25	0.25	5.06	6.11	3.00	7.00
	security	23	6.00	0.852	0.18	5.63	6.37	3.00	7.00
	Total	72	5.69	1.34	0.16	5.38	6.01	1.00	7.00
Purchase intention	cleaning	25	5.36	1.38	0.28	4.79	5.93	2.00	6.00
	catering	24	5.25	1.15	0.24	4.76	5.74	2.00	6.00
	security	23	5.83	0.58	0.12	5.58	6.08	4.00	6.00
	Total	72	5.47	1.11	0.13	5.21	5.73	2.00	6.00

Table 6.1 Descriptive statistics for service quality, customer satisfaction and purchase intention

Plotting the means on a graph, with the confidence intervals around the means, we get to Figure 6.1.

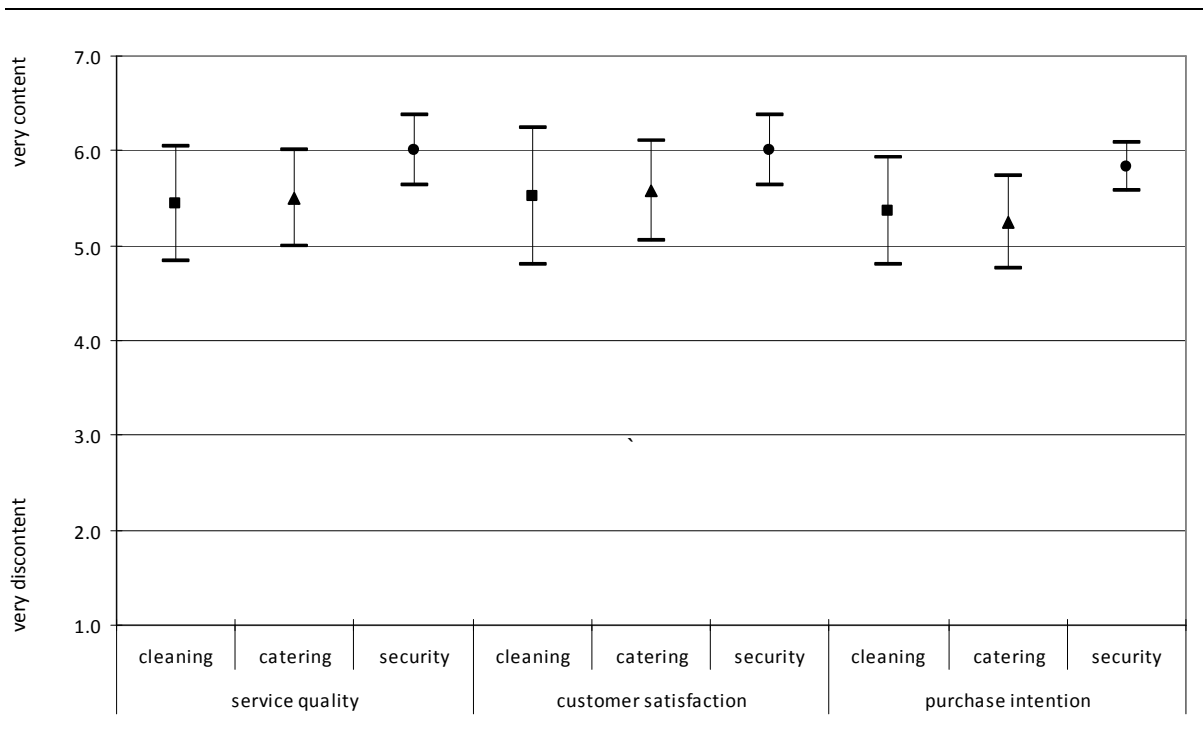


Figure 6.1 Confidence limits for service quality, customer satisfaction and purchase intention

In all three cases both the means and the confidence intervals around the means for cleaning and catering appear relatively similar. The means for security, however, are higher for all three output measures and the confidence intervals around the means appear to be less. The latter observation indicates that customer organisations are more content with security services and that there is less variation in their perceptions when compared to cleaning and catering services.

Looking at overall perceived service quality, the means for cleaning (5.44) and catering (5.50) are very similar and the confidence intervals overlap substantially. Thus, any difference we see between the means could be due to sampling error. After all, the confidence limits for cleaning tell us that we are 95% confident that the population mean is between 4.83 and 6.05; the confidence limits for catering tell us that we are 95% confident that the population mean is between 5.00 and 6.00. Thus, if we ran the experiment again on a different sample, we might find that the means were exactly the same. The mean for security (6.00), however, is higher than the other two means and, more importantly, the confidence interval of this group (ranging between 5.63 and 6.37) overlaps less with cleaning and catering. Thus, we suspect some effect between security and the other two service lines. With similar findings for both customer satisfaction and purchase intention, we also suspect some effect between security and both cleaning and catering for these two output measures.

In order to empirically assess whether there are significant differences in overall perceived service quality, customer satisfaction and purchase intention between cleaning, catering and security, we used independent ANOVAs (the parametric equivalent of the t-test for more than two groups).

Service quality - The test statistics for the independent ANOVA and the Levene's test of equality of error variances for overall perceived service quality are provided in Table 6.2.

Tests of Between-Subjects Effects

Dependent Variable: overall perceived service quality

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	4.451 ^a	2	2.226	1.533	0.223	0.043
Intercept	2,293.050	1	2,293.050	1,579.677	0.000	0.958
Service	4.451	2	2.226	1.533	0.223	0.043
Error	100.160	69	1.452			
Total	2,394.000	72				
Corrected Total	104.611	71				

a. R Squared = .043 (Adjusted R Squared = .015)

Levene's Test of Equality of Error Variances^a

Dependent variable: overall perceived service quality

F	df1	df2	Sig.
3.137	2	69	0.050

a. Design: Intercept+Service

Table 6.2 Test of between-subjects effects for service quality

The 'service' row is the between-groups statistic, and is the row of interest (the 'error' row contains the figures relating to the within-groups variation). The results of the variances analysis shows that the differences in overall perceived service quality per service line are non-significant $F(2,69) = 1.53$, $p = 0.223$. In addition, only 4.3% of the variation in overall perceived service quality is accounted for by the service lines investigated (partial $\eta^2 = 0.043$).

However, the Levene's test of equality of error variances shows that the variances of the three service lines are significantly different from each other ($p = 0.050$), indicating that we have not met the assumption of homogeneity of variance. Consequently we must consider performing a non-parametric alternative to the ANOVA on the three service lines (see Section 6.2).

Customer satisfaction - The test statistics for the independent ANOVA and the Levene's test of equality of error variances for customer satisfaction are as follows (see Table 6.3).

Tests of Between-Subjects Effects

Dependent Variable: customer satisfaction

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	3.204 ^a	2	1.602	0.891	0.415	0.025
Intercept	2,337.482	1	2,337.482	1,299.927	0.000	0.950
Service	3.204	2	1.602	0.891	0.415	0.025
Error	124.073	69	1.798			
Total	2,462.000	72				
Corrected Total	127.278	71				

a. R Squared = .025 (Adjusted R Squared = -.003)

Table 6.3 Test of between-subjects effects for customer satisfaction

Levene's Test of Equality of Error Variances^a

Dependent variable: overall perceived service quality

F	df1	df2	Sig.
4.394	2	69	0.016

a. Design: Intercept+Service

Table 6.3 Test of between-subjects effects for customer satisfaction (continued)

The results of the variances analysis shows that the differences in customer satisfaction per service line are also non-significant $F(2,69) = 0.89$, $p = 0.415$. In addition, only 2.5% of the variation in customer satisfaction is accounted for by the service lines investigated (partial $\eta^2 = 0.025$).

Again, the Levene's test of equality of error variances shows that the variances of the three service lines are significantly different from each other ($p = 0.016$). Again, we must consider performing a non-parametric alternative to the ANOVA on the three service lines (see Section 6.2).

Purchase intention - The test statistics for the independent ANOVA and the Levene's test of equality of error variances for purchase intention are highlighted in Table 6.4.

Tests of Between-Subjects Effects

Dependent Variable: purchase intention

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	4.380 ^a	2	2.190	1.808	0.172	0.050
Intercept	2,158.657	1	2,158.657	1,782.427	0.000	0.963
Service	4.380	2	2.190	1.808	0.172	0.050
Error	83.564	69	1.211			
Total	2,244.000	72				
Corrected Total	127.278	71				

a. R Squared = .050 (Adjusted R Squared = .022)

Levene's Test of Equality of Error Variances^a

Dependent variable: overall perceived service quality

F	df1	df2	Sig.
8.406	2	69	0.001

a. Design: Intercept+Service

Table 6.4 Test of between-subjects effects for purchase intention

The results of the variances analysis shows that the differences in purchase intention per service line are non-significant $F(2,69) = 1.81$, $p = 0.172$. In addition, only 5.0% of the variation in purchase intention is accounted for by the service line investigated (partial $\eta^2 = 0.050$).

The Levene's test of equality of error variances shows that the variances of the three service lines are significantly different from each other ($p = 0.001$). Consequently we must consider performing a non-parametric alternative to the ANOVA on the three service lines (see Section 6.2).

6.2 NON-PARAMETRIC ANALYSES ON OUTPUT MEASURES

Following the fact that all three Levene's tests in Section 6.1 indicated violations of the assumption of homogeneity of variance, we used Kruskal-Wallis ANOVAs (the non-parametric alternative to ANOVA) to assess whether there are significant differences in overall perceived service quality, customer satisfaction and purchase intention between cleaning, catering and security.

Service quality - The ranks and test statistics for the Kruskal-Wallis ANOVA for overall perceived service quality are provided in Table 6.5.

Ranks

	Service	N	Mean Rank
service quality	cleaning	25	34.14
	catering	24	33.04
	security	23	42.67
	Total	72	

Test Statistics^{a,b}

	Service quality
Chi-Square	3.588
df	2
Asymp. Sig.	0.166

a. Kruskal Wallis Test

b. Grouping Variable: Service

Table 6.5 Kruskal-Wallis test for service quality

The first part of the Kruskal-Wallis ANOVA shows the mean rank of overall perceived service quality for each service line. Catering contact managers had the lowest level of overall perceived service quality (mean rank = 33.04), closely followed by cleaning contact managers (mean rank = 34.14). Security contract managers had the highest level of overall perceived service quality (mean rank = 42.67). The test statistics show that χ^2 is 3.59, with an associated probability value of 0.166. Therefore, it can be concluded that there are no significant differences in the overall perceived service quality for cleaning, catering and security services.

Customer satisfaction - The ranks and test statistics for the Kruskal-Wallis ANOVA for customer satisfaction are as follows (see Table 6.6).

Ranks

	Service	N	Mean Rank
service quality	cleaning	25	36.12
	catering	24	33.46
	security	23	40.09
	Total	72	

Table 6.6 Kruskal-Wallis test for customer satisfaction

Test Statistics^{a,b}

	Customer satisfaction
Chi-Square	1.352
df	2
Asymp. Sig.	0.509

a. Kruskal Wallis Test

b. Grouping Variable: Service

Table 6.6 Kruskal-Wallis test for customer satisfaction (continued)

The first part of the Kruskal-Wallis ANOVA shows the mean rank of customer satisfaction for each service line. Again, catering contact managers had the lowest level of customer satisfaction (mean rank = 33.46), closely followed by cleaning contact managers (mean rank = 36.12). Security contract managers had the highest level of customer satisfaction (mean rank = 40.09). The test statistics show that χ^2 is 1.35, with an associated probability value of 0.509. Thus, it can be concluded that there are no significant differences in the customer satisfaction for cleaning, catering and security services.

Purchase intention - The ranks and test statistics for the Kruskal-Wallis ANOVA for purchase intention are highlighted in Table 6.7.

Ranks

	Service	N	Mean Rank
service quality	cleaning	25	36.30
	catering	24	32.35
	security	23	41.04
	Total	72	

Test Statistics^{a,b}

	Purchase intention
Chi-Square	4.055
df	2
Asymp. Sig.	0.132

a. Kruskal Wallis Test

b. Grouping Variable: Service

Table 6.7 Kruskal-Wallis test for purchase intention

The first part of the Kruskal-Wallis ANOVA shows the mean rank of purchase intention for each service line. Catering contact managers had the lowest level of purchase intention (mean rank = 32.35), closely followed by cleaning contact managers (mean rank = 36.30). Security contract managers had the highest level of purchase intention (mean rank = 41.04). The test statistics show that χ^2 is 4.05, with an associated probability value of 0.132. Hence, it can be concluded that there are no significant differences in the purchase intention for cleaning, catering and security services.

6.3 DIFFERENCES ANALYSES ON DIMENSIONS

Although no significant differences in overall perceived service quality for cleaning, catering and security services were found, there may still be differences in the nine service quality dimensions. In order to assess whether there are differences in the nine service quality dimensions between cleaning, catering and security, we first investigated the descriptive statistics for each dimension (see Table 6.8 and Figure 6.2)

	Service	N	Mean	Std. Dev.	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
						Lower B.	Upper B.		
Reliability	cleaning	25	5.20	1.33	0.27	4.65	5.75	1.40	6.80
	catering	24	5.49	1.04	0.21	5.05	5.93	3.40	7.00
	security	23	5.87	0.86	0.18	5.50	6.24	3.60	7.00
	Total	72	5.51	1.12	0.13	5.25	5.77	1.40	7.00
Clout	cleaning	25	4.89	1.37	0.27	4.33	5.45	1.00	7.00
	catering	24	5.64	1.26	0.26	5.10	6.17	2.50	7.00
	security	23	5.49	1.16	0.24	4.99	5.99	3.00	7.00
	Total	72	5.33	1.29	0.15	5.03	5.63	1.00	7.00
Reputation	cleaning	25	5.25	1.33	0.27	4.70	5.80	2.00	6.83
	catering	24	5.84	1.00	0.20	5.42	6.26	2.83	7.00
	security	23	5.84	0.91	0.19	5.45	6.23	3.17	7.00
	Total	72	5.64	1.12	0.13	5.37	5.90	2.00	7.00
Awareness	cleaning	25	5.91	0.99	0.20	5.50	6.32	2.50	7.00
	catering	24	5.95	0.89	0.18	5.57	6.32	4.00	7.00
	security	23	6.02	0.96	0.20	5.61	6.44	3.50	7.00
	Total	72	5.96	0.94	0.11	5.74	6.18	2.50	7.00
Competitiven.	cleaning	25	5.26	1.07	0.21	4.81	5.70	3.00	7.00
	catering	24	5.23	1.31	0.27	4.68	5.79	1.80	7.00
	security	23	5.77	0.94	0.20	5.36	6.17	3.60	7.00
	Total	72	5.41	1.13	0.13	5.15	5.68	1.80	7.00
Collaboration	cleaning	25	4.85	1.37	0.27	4.29	5.42	1.50	6.67
	catering	24	5.36	1.04	0.21	4.92	5.80	3.00	6.67
	security	23	5.28	0.97	0.20	4.86	5.69	2.67	7.00
	Total	72	5.16	1.15	0.14	4.89	5.43	1.50	7.00
Accessibility	cleaning	25	5.91	0.75	0.15	5.60	6.22	3.75	7.00
	catering	24	5.83	0.75	0.15	5.52	6.15	3.50	7.00
	security	23	5.86	1.18	0.25	5.35	6.37	2.50	7.00
	Total	72	5.87	0.90	0.11	5.66	6.08	2.50	7.00
Competence	cleaning	25	5.47	1.31	0.26	4.92	6.01	1.33	6.83
	catering	24	5.95	0.58	0.12	5.71	6.19	5.00	7.00
	security	23	5.87	0.79	0.16	5.53	6.21	3.83	7.00
	Total	72	5.76	0.96	0.11	5.53	5.98	1.33	7.00
Assurance	cleaning	25	5.40	1.19	0.24	4.91	5.89	3.00	7.00
	catering	24	5.41	1.06	0.22	4.96	5.85	3.25	7.00
	security	23	5.85	0.79	0.17	5.50	6.19	4.00	7.00
	Total	72	5.55	1.04	0.12	5.30	5.79	3.00	7.00

Table 6.8 Descriptive statistics for the nine service quality dimensions

Plotting the means on a graph, with the confidence intervals around the mean, we get to Figure 6.2.

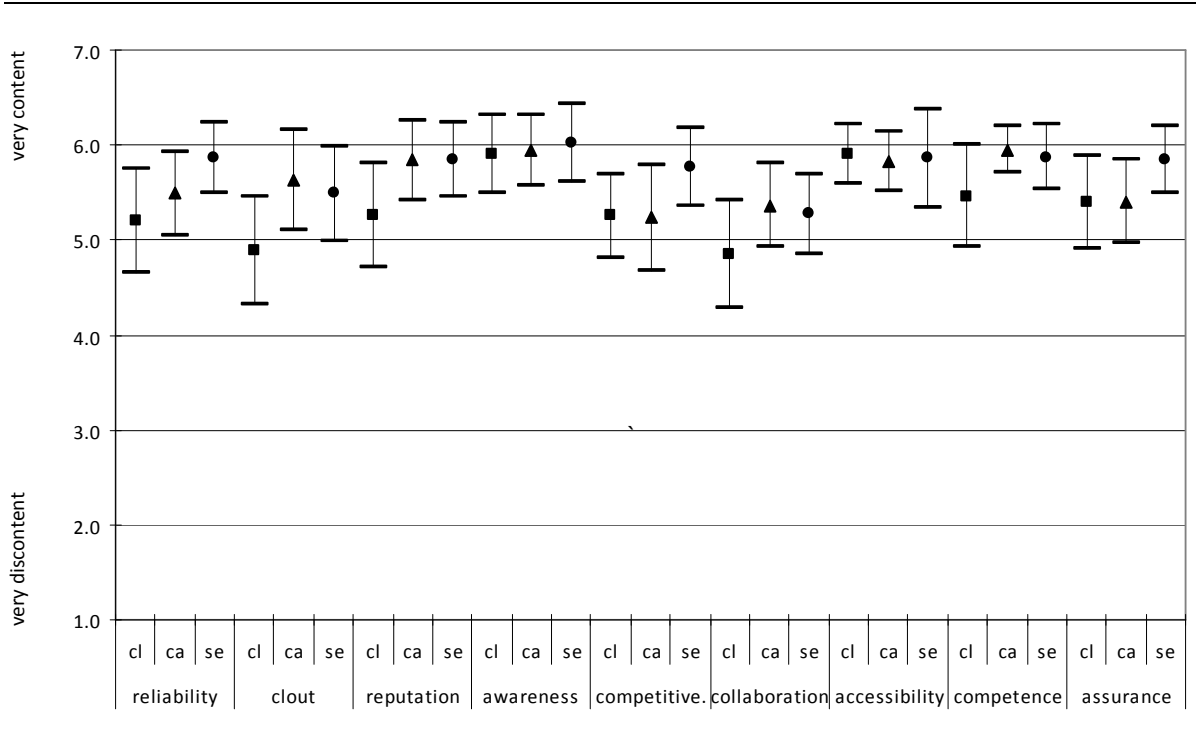


Figure 6.2 Confidence limits for the nine service quality dimensions

Although the confidence intervals around the means appear relatively similar for most service quality dimensions, the means appear to be different for some of the nine dimensions. For *reliability*, *clout*, *reputation*, *collaboration* and *competence* the mean for cleaning is clearly lower than the means for both catering and security. Similarly, for *reliability*, *competitiveness* and *assurance* the mean for catering is clearly lower than the mean for security. With all confidence intervals clearly overlapping, however, we do not necessarily suspect a clear effect between the three service lines.

In order to empirically assess whether there are significant differences in the nine service quality dimensions we used MANOVA (the multivariate equivalent of ANOVA, which could be used as all data sets were fully complete).

The test statistics for the MANOVA and the Levene's test of equality of error variances for all nine service quality dimensions are provided in Table 6.9.

Multivariate Tests^c

Effect		Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared
Intercept	Pillai's Trace	0.985	445.384 ^a	9.000	61.000	0.000	0.985
	Wilks' Lambda	0.015	445.384 ^a	9.000	61.000	0.000	0.985
	Hotelling's Trace	65.712	445.384 ^a	9.000	61.000	0.000	0.985
	Roy's Largest Root	65.712	445.384 ^a	9.000	61.000	0.000	0.985
Service	Pillai's Trace	0.424	1.855	18.000	124.000	0.026	0.212
	Wilks' Lambda	0.616	1.861 ^a	18.000	122.000	0.025	0.215
	Hotelling's Trace	0.560	1.866	18.000	120.000	0.025	0.219
	Roy's Largest Root	0.397	2.733 ^b	9.000	62.000	0.009	0.284

a. Exact statistic

b. The statistic is an upper bound on F that yields a lower bound on the significance level.

c. Design: Intercept+Service

Levene's Test of Equality of Error Variances^a

Dependent variables: all nine dimensions

	F	df1	df2	Sig.
Reliability	3.003	2	69	0.056
Clout	0.194	2	69	0.824
Reputation	1.968	2	69	0.147
Awareness	0.127	2	69	0.881
Competitiveness	2.003	2	69	0.143
Collaboration	1.540	2	69	0.222
Accessibility	1.737	2	69	0.184
Competence	1.910	2	69	0.156
Assurance	3.390	2	69	0.039

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Design: Intercept+Service

Table 6.9 Multivariate test for the nine service quality dimensions

SPSS gives us several different multivariate tests (i.e. SPSS uses four different ways of combining the dependent variables and calculating the F-value). As we get different F-values from these four tests, we need to decide which one to use. Consistent with the advice of Tabachnick and Fidell (1997), we report the Wilks' lambda as this is the most commonly reported of the four tests.

The Wilks' lambda F-value (1.86, $p = 0.025$) shows that the combined service quality dimensions (dependent variables) successfully distinguish the three service lines (independent variables). That is, given that the null hypothesis is true, the probability of finding a multivariate difference between the three service lines as large as that observed with these data is so small that it is unlikely to be the result of sampling error.

The Levene's test of equality of error variances shows that the variances of the three service lines for eight service quality dimensions are not significantly different from each other ($p > 0.050$). Therefore, we have met the assumption of homogeneity of variance. As for *assurance*, however, we have not met the assumption of homogeneity of variance ($p = 0.039$).

To also assess the homogeneity of the variance-covariance matrices for the service lines and the nine service quality dimensions, we used the Box's M test. The test statistics for the between-subjects effects and the Box's M test of equality of covariance matrices are as follows (see Table 6.10).

Tests of Between-Subjects Effects

Dependent Variable: all nine dimension

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	reliability	5.384 ^a	2	2.692	2.219	0.116	0.060
Model	clout	7.661 ^b	2	3.831	2.382	0.100	0.065
	reputation	5.620 ^c	2	2.810	2.322	0.106	0.063
	awareness	0.153 ^d	2	0.077	0.085	0.919	0.002
	Competitive.	4.244 ^e	2	2.122	1.690	0.192	0.047
	collaboration	3.645 ^f	2	1.822	1.397	0.254	0.039
	accessibility	0.075 ^g	2	0.037	0.045	0.956	0.001
	competence	3.323 ^h	2	1.662	1.838	0.167	0.051
	assurance	3.097 ⁱ	2	1.548	1.447	0.242	0.040
	Intercept	reliability	2,191.654	1	2,191.654	1,806.157	0.000
clout		2,049.350	1	2,049.350	1,274.584	0.000	0.949
reputation		2,291.548	1	2,291.548	1,893.783	0.000	0.965
awareness		2,554.495	1	2,554.495	2,832.784	0.000	0.976
Competitive.		2,111.236	1	2,111.236	1,681.636	0.000	0.961
collaboration		1,917.125	1	1,917.125	1,469.621	0.000	0.955
accessibility		2,475.781	1	2,475.781	2,994.550	0.000	0.977
competence		2,387.562	1	2,387.562	2,640.547	0.000	0.975
assurance		2,216.296	1	2,216.296	2,071.615	0.000	0.968
Service	reliability	5.384	2	2.692	2.219	0.116	0.060
	clout	7.661	2	3.831	2.382	0.100	0.065
	reputation	5.620	2	2.810	2.322	0.106	0.063
	awareness	0.153	2	0.077	0.085	0.919	0.002
	Competitive.	4.244	2	2.122	1.690	0.192	0.047
	collaboration	3.645	2	1.822	1.397	0.254	0.039
	accessibility	0.075	2	0.037	0.045	0.956	0.001
	competence	3.323	2	1.662	1.838	0.167	0.051
	assurance	3.097	2	1.548	1.447	0.242	0.040
Error	reliability	83.727	69	1.213			
	clout	110.942	69	1.608			
	reputation	83.493	69	1.210			
	awareness	62.222	69	0.902			
	Competitive.	86.627	69	1.255			
	collaboration	90.011	69	1.305			
	accessibility	57.047	69	0.827			
	competence	62.389	69	0.904			
	assurance	73.819	69	1.070			

Table 6.10 Test of between-subjects effects for the nine service quality dimensions

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Total	reliability	2,275.920	72				
	clout	2,163.938	72				
	reputation	2,376.697	72				
	awareness	2,618.500	72				
	Competitive.	2,199.040	72				
	collaboration	2,008.635	72				
	accessibility	2,536.375	72				
	competence	2,451.391	72				
	assurance	2,290.813	72				
Corrected Total	reliability	89.111	71				
	clout	118.603	71				
	reputation	89.112	71				
	awareness	62.375	71				
	Competitive.	90.871	71				
	collaboration	93.655	71				
	accessibility	57.122	71				
	competence	65.713	71				
	assurance	76.916	71				

- a. R Squared = .060 (Adjusted R Squared = .033)
- b. R Squared = .065 (Adjusted R Squared = .037)
- c. R Squared = .063 (Adjusted R Squared = .036)
- d. R Squared = .002 (Adjusted R Squared = -.026)
- e. R Squared = .047 (Adjusted R Squared = .019)
- f. R Squared = .039 (Adjusted R Squared = .011)
- g. R Squared = .001 (Adjusted R Squared = -.028)
- h. R Squared = .051 (Adjusted R Squared = .023)
- i. R Squared = .040 (Adjusted R Squared = .012)

Box's Test of Equality of Covariance Matrices^a

Box's M	226.270
F	2.039
df1	90
df2	12,925.821
Sig.	0.000

Tests the null hypothesis that the observed covariance matrices of the dependent variables are equal across groups.

a. Design: Intercept+Service

Table 6.10 Test of between-subjects effects for the nine service quality dimensions (continued)

The 'service' row is the between-groups statistic, and is the row of interest (the 'error' row contains the figures relating to the within-groups variation). The outputs show us that $F(2,69)$ ranges from 0.05 to 2.38. With the p-value ranging from 0.956 to 0.100 respectively, none of the F-values are significant. In addition, only 0.1% to 6.5% of the variation in the nine dimensions is accounted for by the service line investigated.

The Box's M test of equality of covariance matrices shows that the variances investigated are significantly different from each other ($p < 0.001$), indicating that we have violations of the assumption of homogeneity of the variance-covariance matrices. Consequently we must consider performing a non-parametric alternative to MANOVA (see Section 6.4).

6.4 NON-PARAMETRIC ANALYSES ON DIMENSIONS

Following the fact that all the Box's M test in Section 6.3 indicated violations of the assumption of homogeneity of the variance-covariance matrices, we used Kruskal-Wallis MANOVA (the non-parametric alternative to MANOVA) to assess whether there are significant differences in the nine service quality dimensions between cleaning, catering and security. The ranks and test statistics for the Kruskal-Wallis MANOVA for the nine service quality dimensions are highlighted in Table 6.11.

Ranks

	Service	N	Mean Rank
Reliability	cleaning	25	31.34
	catering	24	36.04
	security	23	42.59
	Total	72	
Clout	cleaning	25	29.56
	catering	24	41.81
	security	23	38.50
	Total	72	
Reputation	cleaning	25	30.44
	catering	24	40.23
	security	23	39.20
	Total	72	
Awareness	cleaning	25	34.70
	catering	24	36.08
	security	23	38.89
	Total	72	
Competitiveness	cleaning	25	33.14
	catering	24	33.75
	security	23	43.02
	Total	72	
Collaboration	cleaning	25	31.80
	catering	24	41.63
	security	23	36.26
	Total	72	
Accessibility	cleaning	25	36.48
	catering	24	33.69
	security	23	39.46
	Total	72	
Competence	cleaning	25	32.38
	catering	24	39.13
	security	23	38.24
	Total	72	
Assurance	cleaning	25	34.74
	catering	24	33.44
	security	23	41.61
	Total	72	

Table 6.11 Kruskal-Wallis test for the nine service quality dimensions

Test Statistics^{a,b}

	Reliability	Clout	Reputation
Chi-Square	3.528	4.536	3.258
df	2	2	2
Asymp. Sig.	0.171	0.103	0.196
	Awareness	Competitiveness	Collaboration
Chi-Square	0.503	3.309	2.716
df	2	2	2
Asymp. Sig.	0.778	0.191	0.257
	Accessibility	Competence	Assurance
Chi-Square	0.913	1.517	2.083
df	2	2	2
Asymp. Sig.	0.633	0.468	0.353

a. Kruskal Wallis Test

b. Grouping Variable: Service

Table 6.11 Kruskal-Wallis test for the nine service quality dimensions (continued)

The first part of the Kruskal-Wallis MANOVA shows the mean rank of the nine service quality dimensions for each service line. Cleaning contract managers produced the lowest rating for seven of the nine service quality dimensions. Catering contract managers and security contract managers both produced the highest rating for four and five of the nine service quality dimensions respectively. The test statistics show that χ^2 ranges from 0.50 to 4.54, but that none of them are significant as the associated probability values range from 0.778 to 0.103 respectively. Therefore, it can be concluded that there are no significant differences in the nine dimensions for cleaning, catering and security services.

6.5 VERIFICATION OF CROSS-CUSTOMER COMPARISON

At the same seminar as described in Section 5.6, the results of the 'cross-customer comparison' as described in the previous four sections were presented. Again, the panel discussion and the workshops during the seminar provided very useful feedback on the non-significant differences between customer perceptions of cleaning, catering and security services.

Differences in output measures - In line with our findings as described in Section 6.1, the delegates expected that both customer perceived service quality and customer satisfaction would be lowest for cleaning and highest for security. Main reasons for these expectations were slightly higher salaries for security staff when compared with cleaning and catering staff and the lack of face-to-face contact between cleaning operatives and end-user consumers as a result of evening cleaning (i.e. there is more direct interaction between consumers and operatives for catering and security services). The fact that no significant differences were found for service quality, customer satisfaction and purchase intention between cleaning, catering and security in Section 6.2, emphasised the fact that all three service lines investigated belong to one and the same group of business support services - that is facilities management services.

Differences in service quality dimensions - As for the nine service quality dimensions, it was again expected that cleaning would score lowest on many dimensions and security highest. Main reasons were the fact that security is seen as the most mature sector of the three and the low direct interaction between cleaning operatives and end-user consumers. As highlighted in Section 6.3, however, catering scored better when compared to security on *clout*, *collaboration* and *competence*. Although the delegates found it difficult to explain the differences on *clout*, differences on *collaboration* and *competence* could be explained by the fact

that catering operatives and end-user consumers have direct interaction on a daily basis and by the fact that operatives tend to work in catering based on a personal passion respectively. The fact that no significant differences were found for the nine service quality dimensions between cleaning, catering and security in Section 6.4, again emphasised the fact that the three service lines are of a similar order.

To summarise Chapter 6, there are no significant differences in service quality, customer satisfaction and purchase intention for cleaning, catering and security services. Furthermore, there are no significant differences in the nine service quality dimensions for cleaning, catering and security services. These findings indicate that all three service lines investigated belong to one and the same group of business support services - that is facilities management services.

The next chapter will seek to identify whether any of the nine service quality dimensions have a positive impact on the financial performance of supplier organisations.

Box 6 Summary of cross-customer comparison

7 THE SUPPLIER PERSPECTIVE

As explained in our research methodology, this chapter focuses on the supplier perspective with regards to service quality in relation to cleaning, catering and security services associated with office buildings (see Section 4.5). First, we examine the relationships between strategic importance and financial performance as perceived by suppliers. Second, we investigate the relationships between perceived financial performance and actual financial performance. Third, we examine the relationships between the service quality dimensions as perceived by customers and the financial performance as achieved by suppliers. Finally, all findings are verified and validated through focus group discussions at a dedicated seminar held in spring 2008.

7.1 STRATEGIC IMPORTANCE VERSUS FINANCIAL PERFORMANCE

To assess the associations between the strategic importance of each service quality dimension and the financial performance as perceived by suppliers, correlation analyses were used (see Table 7.1). Perceived strategic importance scores were determined by calculating averages from the supplier surveys for the nine service quality dimensions as identified in Chapter 5. Perceived financial performance scores (profitability, efficiency, growth, liquidity and solvency relative to major competitors) were taken directly from the supplier surveys (see Annex C - Supplier Survey). Please note that the findings in this section may be affected by sample size as only 21 of the 30 datasets available were fully complete.

The results of the correlation analysis indicate that only a few significant relationships exist between supplier perceived performance of the nine service quality dimensions and the five financial performance measures as perceived by suppliers (see Table 7.1). For profitability, there are no significant correlations to any of the nine service quality dimensions. For efficiency and growth, there is a moderate yet significant relationship with *competitiveness* ($r = 0.45$, $p = 0.043$ and $r = 0.52$, $p = 0.015$ respectively). For liquidity, there are moderate and highly significant correlations to *reliability* ($r = 0.58$, $p = 0.006$), *reputation* ($r = 0.56$, $p = 0.09$) and *competence* ($r = 0.60$, $p = 0.004$). In addition, liquidity has moderate yet significant relationships with *awareness* ($r = 0.49$, $p = 0.026$), *accessibility* ($r = 0.47$, $p = 0.031$) and *assurance* ($r = 0.48$, $p = 0.028$). For solvency, there are moderate yet significant correlations to both *reputation* and *accessibility* ($r = 0.51$, $p = 0.019$ and $r = 0.45$, $p = 0.041$ respectively).

Furthermore, the relationship between profitability and efficiency is strong and highly significant ($r = 0.71$, $p < 0.001$), the relation between efficiency and growth is moderate and highly significant ($r = 0.57$, $p = 0.007$) and the relation between liquidity and solvency is moderate to strong and highly significant ($r = 0.66$, $p = 0.001$).

Dimension	Reliability	Clout	Reputation	Awareness	Competi- tiveness	Colla- boration	Accessi- bility	Compe- tence	Assurance	Profitability	Efficiency	Growth	Liquidity	Solvency
Reliability	1.00													
Clout	0.17	1.00												
Reputation	0.82**	0.23	1.00											
Awareness	0.72**	0.28	0.67**	1.00										
Competitiveness	0.46*	0.23	0.63**	0.38*	1.00									
Collaboration	0.58**	0.35	0.64**	0.65**	0.68**	1.00								
Accessibility	0.77**	0.30	0.69**	0.81**	0.45*	0.70**	1.00							
Competence	0.71**	0.37*	0.73**	0.70**	0.63**	0.80**	0.83**	1.00						
Assurance	0.89**	0.20	0.76**	0.74**	0.35	0.50**	0.76**	0.67**	1.00					
Profitability	0.21	0.21	0.01	0.14	0.33	0.25	0.17	0.36	0.06	1.00				
Efficiency	0.16	0.28	-0.01	0.13	0.45*	0.34	0.17	0.20	0.01	0.71**	1.00			
Growth	0.33	0.08	0.38	0.15	0.52*	0.41	0.21	0.24	0.20	0.23	0.57**	1.00		
Liquidity	0.58**	0.22	0.56**	0.49*	0.08	0.43	0.47*	0.60**	0.48*	0.12	-0.22	-0.03	1.00	
Solvency	0.43	-0.03	0.51*	0.37	0.30	0.41	0.45*	0.41	0.25	0.23	-0.06	-0.09	0.66**	1.00

* Correlation is significant at the 0.05 level

** Correlation is significant at the 0.01 level

Table 7.1 Correlations between suppliers perceived strategic importance and perceived financial performance

To further assess the exact relationships between the nine service quality dimensions and the five financial performance measures, two types of regression analysis were used. First, simple regression analyses were performed using each of the nine service quality dimensions as independent variables, and profitability, efficiency, growth, liquidity and solvency, one at a time as dependent variables (a total of 45 simple regression analyses were run). Second, stepwise regression analyses were performed using all nine service quality dimensions as potential independent variables.

Simple regression analyses - Tables 7.2 to 7.6 present results of the separate simple regression analyses of each of the five financial measures on each of the nine quality dimensions. The coefficients of determination (R square value), the regression coefficients (Beta coefficient) and the p-values for the significance of each relationship are reported. The sign and statistical significance of each regression coefficient are of primary interest here rather than the magnitude, since our intent is to determine if a positive relationship exists, in contrast to using the models for prediction.

Dimension	R Square	Adjusted R Square	Beta Coefficient	p value
Reliability	0.044	-0.006	0.211	0.359
Clout	0.045	-0.005	0.213	0.355
Reputation	0.000	-0.053	0.011	0.962
Awareness	0.020	-0.032	0.141	0.542
Competitiveness	0.107	0.060	0.327	0.148
Collaboration	0.063	0.013	0.250	0.274
Accessibility	0.030	-0.021	0.173	0.453
Competence	0.129	0.084	0.360	0.109
Assurance	0.003	-0.049	0.057	0.806

Table 7.2 Impact of the nine service quality dimensions on supplier perceived profitability

Dimension	R Square	Adjusted R Square	Beta Coefficient	p value
Reliability	0.024	-0.027	0.155	0.502
Clout	0.081	0.033	0.285	0.211
Reputation	0.000	-0.053	-0.008	0.974
Awareness	0.016	-0.036	0.125	0.589
Competitiveness	0.198	0.156	0.445	0.043
Collaboration	0.118	0.071	0.343	0.128
Accessibility	0.028	-0.023	0.167	0.469
Competence	0.041	-0.009	0.203	0.379
Assurance	0.000	-0.053	0.006	0.981

Table 7.3 Impact of the nine service quality dimensions on supplier perceived efficiency

Dimension	R Square	Adjusted R Square	Beta Coefficient	p value
Reliability	0.106	0.059	0.326	0.149
Clout	0.006	-0.046	0.079	0.734
Reputation	0.142	0.097	0.377	0.092
Awareness	0.021	-0.030	0.145	0.530
Competitiveness	0.274	0.236	0.524	0.015
Collaboration	0.165	0.121	0.406	0.068
Accessibility	0.044	-0.006	0.210	0.360
Competence	0.059	0.009	0.243	0.289
Assurance	0.041	-0.009	0.204	0.376

Table 7.4 Impact of the nine service quality dimensions on supplier perceived growth

Dimension	R Square	Adjusted R Square	Beta Coefficient	p value
Reliability	0.334	0.334	0.578	0.006
Clout	0.050	0.000	0.223	0.331
Reputation	0.310	0.274	0.557	0.009
Awareness	0.235	0.195	0.485	0.026
Competitiveness	0.006	-0.046	0.080	0.729
Collaboration	0.184	0.141	0.429	0.052
Accessibility	0.221	0.180	0.471	0.031
Competence	0.355	0.321	0.596	0.004
Assurance	0.230	0.189	0.480	0.028

Table 7.5 Impact of the nine service quality dimensions on supplier perceived liquidity

Dimension	R Square	Adjusted R Square	Beta Coefficient	p value
Reliability	0.185	0.142	0.430	0.052
Clout	0.001	-0.052	-0.025	0.913
Reputation	0.257	0.218	0.507	0.019
Awareness	0.134	0.088	0.365	0.103
Competitiveness	0.089	0.041	0.298	0.189
Collaboration	0.168	0.124	0.410	0.065
Accessibility	0.202	0.160	0.449	0.041
Competence	0.167	0.123	0.409	0.066
Assurance	0.062	0.012	0.249	0.277

Table 7.6 Impact of the nine service quality dimensions on supplier perceived solvency

As can be observed from Tables 7.2 to 7.6, only two of the 45 regression coefficients (Beta coefficient) have negative signs (*reputation* on perceived efficiency and *clout* on perceived solvency). Thus, our first observation is that there are hardly any inverse relationships between the nine service quality dimensions and supplier perceived financial performance. The second issue to be addressed is whether any of the nine service quality dimensions is positively and significantly related to one or more of the five financial measures.

The results of the simple regression analyses show that hardly any significant relationships exist between the nine service quality dimensions and the five financial performance measures (see Tables 7.2 to 7.6). However, *competitiveness* has moderate yet significant relationships with both efficiency and growth ($R^2 = 0.20$, $p = 0.043$ and respectively $R^2 = 0.27$, $p = 0.015$). In addition, six of the nine service quality dimensions have significant relationships with liquidity ($R^2 > 0.22$, $p < 0.050$) - *clout*, *competitiveness* and *collaboration* being the exceptions. Also, both *reputation* and *accessibility* have moderate yet significant relationships with solvency ($R^2 = 0.26$, $p = 0.019$ and $R^2 = 0.20$, $p = 0.041$ respectively).

Stepwise regression analyses - Table 7.7 presents the results of the stepwise regression analyses. For each of the five financial measures as perceived by suppliers, the final model p-value, the coefficients of determination (R square value), the independent variables entered in the model, their regression coefficients (Beta coefficient) and the p-values for the independent variables are reported. One model was highly significant at the $p < 0.010$ significance level and three models were significant at the $p < 0.050$ significance level.

Dependent variable	Model p value	R Square	Dimension entered	Beta Coefficient	Entry p value
Efficiency	0.043(a)	0.198	Competitiveness	0.445	0.043
Growth	0.015(b)	0.274	Competitiveness	0.524	0.015
Liquidity	0.004(c)	0.355	Competence	0.596	0.004
Solvency	0.019(d)	0.257	Reputation	0.507	0.019

a. Predictors: (Constant) COM 05

b. Predictors: (Constant) COM 05

c. Predictors: (Constant) COM 08

d. Predictors: (Constant) COM 03

Table 7.7 Stepwise regression analyses with perceived financial performance as dependent variables

Several things should be noted concerning the stepwise regression results in Table 7.7. First, *profitability* had no variables enter the model and efficiency, growth, liquidity and solvency all had only one variable enter the model.

Competitiveness was the only predictor for both efficiency and growth and both models had a moderate coefficients of determination ($R^2 = 0.20$ and $R^2 = 0.27$ respectively). *Competence* was the only predictor for liquidity and this model had a moderate coefficient of determination ($R^2 = 0.36$). *Reputation* was the only predictor for solvency and this model also had a moderate coefficient of determination ($R^2 = 0.26$).

The stepwise results highlight the relative significance of *competitiveness*, *competence* and *reputation* for the five financial performance measures as perceived by supplier organisations (i.e. supplier perceptions of profitability, efficiency, growth, liquidity and solvency relative to their major competitors).

7.2 PERCEIVED VERSUS ACTUAL FINANCIAL PERFORMANCE

To assess whether suppliers have accurate perceptions of their financial performance, the associations between perceived financial performance and actual financial performance were investigated using correlation analyses (see Table 7.8 to 7.12). Perceived performance scores (profitability, efficiency, growth, liquidity and solvency relative to major competitors) were again taken directly from the supplier surveys (see Annex C - Supplier Survey). As for the actual performance scores we used the FAME (Financial Analysis Made Easy) database to extract two profitability ratios (profit margin and return on capital employed), two efficiency measures (debtor collection period and salaries over turnover), two growth measures (turnover growth and employee growth), two liquidity ratios (liquidity ratio and current ratio) and two solvency ratios (solvency ratio and gearing ratio) for each supplier organisation that completed the supplier survey. Again, findings in this section may very well be distressed by the size of the sample as only 12 of the 30 datasets available were fully complete.

	Profitability	Profit margin	Return on capital
Profitability	1.00		
Profit margin	0.00	1.00	
Return on capital	0.21	0.70**	1.00

* Correlation is significant at the 0.05 level

** Correlation is significant at the 0.01 level

Table 7.8 Correlations between perceived and actual supplier profitability

	Efficiency	Debtor collection	Salaries over turnover
Efficiency	1.00		
Debtor collection	0.02	1.00	
Salaries over turnover	-0.37	0.42	1.00

* Correlation is significant at the 0.05 level

** Correlation is significant at the 0.01 level

Table 7.9 Correlations between perceived and actual supplier efficiency

	Growth	Turnover growth	Employee growth
Growth	1.00		
Turnover growth	0.12	1.00	
Employee growth	-0.36	0.19	1.00

* Correlation is significant at the 0.05 level

** Correlation is significant at the 0.01 level

Table 7.10 Correlations between perceived and actual supplier growth

	Liquidity	Liquidity ratio	Current ratio
Liquidity	1.00		
Liquidity ratio	0.28	1.00	
Current ratio	0.32	0.99**	1.00

* Correlation is significant at the 0.05 level

** Correlation is significant at the 0.01 level

Table 7.11 Correlations between perceived and actual supplier liquidity

	Solvency	Solvency ratio	Gearing ratio
Solvency	1.00		
Solvency ratio	0.22	1.00	
Gearing ratio	-0.01	-0.84**	1.00

* Correlation is significant at the 0.05 level

** Correlation is significant at the 0.01 level

Table 7.12 Correlations between perceived and actual supplier solvency

The results of the correlation analyses indicate that no significant relationships exist between perceived financial performance and actual financial performance. Consequently there is no need for further assessment of the relationships using regression analysis. As for the actual performance measures, however, there are strong and highly significant relationships between profit margin and return on capital employed ($r = 0.70$, $p = 0.003$), between liquidity ratio and current ratio ($r = 0.99$, $p < 0.001$), and between solvency ratio and gearing ratio ($r = 0.84$, $p = 0.001$). Conversely, there are no significant relationships between debtor collection period and salaries over turnover ($p = 0.107$) and between turnover growth and employee growth ($p = 0.474$).

7.3 CUSTOMER PERCEPTIONS VERSUS SUPPLIER PERFORMANCE

In a final step, the associations between customer perceptions of each service quality dimensions and actual financial performance of suppliers were investigated using correlation analyses (see Table 7.13). Customer perception scores were determined by calculating averages from the customer surveys for the nine service quality dimensions as identified in Chapter 5. As for the actual performance scores we again used the FAME database to extract the ten financial measures (profit margin and return on capital employed, debtor collection period and salaries over turnover, turnover growth and employee growth, liquidity ratio and current ratio as well as solvency ratio and gearing ratio) for all supplier organisations mentioned in the customer survey (see Annex B - Customer Survey). It should be noted that the findings in this section are less likely to be affected by sample size as 52 of the 72 datasets available were fully complete.

The results of the correlation analysis indicate that various significant relationships exist between customer perceived performance of the nine service quality dimensions and the ten financial performance measures as extracted from the FAME database (see Table 7.13). For profit margin, there is a moderate yet highly significant correlation with *reputation* ($r = 0.37$, $p = 0.006$). For salaries over turnover, there are moderate and significant correlations with both *competitiveness* and *assurance* ($r = 0.34$, $p = 0.014$ and $r = 0.28$, $p = 0.047$ respectively). For turnover growth, there is a moderate and significant correlation with *reputation* ($r = 0.28$, $p < 0.050$). For employee growth, there are moderate yet highly significant correlations with both *reputation* and *competitiveness* ($r = 0.42$, $p = 0.002$ in both cases) as well as moderate and significant correlations with both *awareness* and *assurance* ($r = 0.31$, $p = 0.027$ and $r = 0.30$, $p = 0.034$ respectively). For both liquidity ratio and current ratio, there are moderate and significant correlations with both *clout* and *collaboration* ($r > 0.30$, $p < 0.050$ in all cases). For return on capital employed, debtor collection period, solvency ratio and gearing ratio, however, there are no significant correlations to any of the nine service quality dimensions.

Dimension	Reliability	Clout	Reputation	Awareness	Competitiveness	Collaboration	Accessibility	Competence	Assurance	Service quality	Customer satisfaction	Contract renewal
Reliability	1.00											
Clout	0.28*	1.00										
Reputation	0.73**	0.35**	1.00									
Awareness	0.64**	0.16	0.77**	1.00								
Competitiveness	0.62**	0.30*	0.70**	0.61**	1.00							
Collaboration	0.69**	0.27*	0.70**	0.71**	0.63**	1.00						
Accessibility	0.71**	0.23*	0.63**	0.72**	0.50**	0.65**	1.00					
Competence	0.64**	0.33**	0.60**	0.61**	0.62**	0.76**	0.60**	1.00				
Assurance	0.81**	0.22	0.74**	0.68**	0.67**	0.70**	0.69**	0.64**	1.00			
Service quality	0.72**	0.22	0.67**	0.71**	0.71**	0.78**	0.62**	0.77**	0.70**	1.00		
Customer satisfaction	0.73**	0.22	0.64**	0.68**	0.72**	0.76**	0.60**	0.80**	0.70**	0.89**	1.00	
Contract renewal	0.58**	0.04	0.42**	0.55**	0.42**	0.67**	0.42**	0.55**	0.51**	0.69**	0.72**	1.00
Profit margin	-0.34*	0.04	0.37**	-0.22	-0.17	-0.13	-0.19	-0.24	-0.34*	-0.17	-0.15	-0.11
Return on capital	-0.17	-0.22	0.01	-0.01	-0.20	0.08	0.09	0.06	-0.04	0.04	0.07	-0.01
Debtor collection	-0.01	-0.08	-0.20	-0.19	0.06	-0.23	-0.09	-0.14	0.07	0.06	-0.01	-0.04
Salaries over turnover	0.16	0.10	0.19	0.19	0.34*	0.15	0.09	0.13	0.28*	0.31*	0.26	0.37**
Turnover growth	0.12	-0.15	0.28*	0.13	0.16	0.05	0.00	0.13	0.17	0.28	0.26	0.22
Employee growth	0.22	-0.10	0.42**	0.31*	0.42**	0.19	0.07	0.23	0.30*	0.28	0.27	0.21
Liquidity ratio	0.14	0.34*	0.24	0.14	0.11	0.30*	0.13	0.24	0.04	0.10	0.06	0.16
Current ratio	0.15	0.31*	0.26	0.16	0.11	0.31*	0.13	0.24	0.04	0.09	0.05	0.15
Solvency ratio	0.06	0.21	0.13	0.07	0.20	0.12	-0.03	0.19	0.04	0.11	0.10	0.20
Gearing ratio	0.08	-0.17	0.04	0.02	-0.04	0.08	0.09	-0.04	0.18	0.13	0.05	0.02

* Correlation is significant at the 0.05 level

** Correlation is significant at the 0.01 level

Table 7.13 Correlations between customer perceived service quality and actual supplier financial performance

Dimension	Profit margin	Return on capital	Debtor collection	Salaries over turnover	Turnover growth	Employee growth	Liquidity ratio	Current ratio	Solvency ratio	Gearing ratio
Reliability										
Clout										
Reputation										
Awareness										
Competitiveness										
Collaboration										
Accessibility										
Competence										
Assurance										
Service quality										
Customer satisfaction										
Contract renewal										
Profit margin	1.00									
Return on capital	0.35*	1.00								
Debtor collection	0.05	-0.12	1.00							
Salaries over turnover	0.18	-0.03	0.29*	1.00						
Turnover growth	-0.40**	0.12	0.18	-0.02	1.00					
Employee growth	-0.28*	-0.02	0.18	0.20	0.50**	1.00				
Liquidity ratio	-0.02	-0.10	-0.47**	0.27	-0.45**	-0.23	1.00			
Current ratio	-0.10	-0.15	-0.55**	0.16	-0.44**	-0.19	0.98**	1.00		
Solvency ratio	0.06	-0.04	-0.24	0.48**	-0.19	0.14	0.65**	0.64**	1.00	
Gearing ratio	-0.10	0.18	0.64**	-0.13	0.38*	0.12	-0.53**	-0.59**	-0.76**	1.00

* Correlation is significant at the 0.05 level

** Correlation is significant at the 0.01 level

Table 7.13 Correlations between customer perceived service quality and supplier financial performance (continued)

To further assess the exact relationships between the nine service quality dimensions and the ten financial performance measures, two types of regression analysis were used. First, simple regression analyses were performed using each of the nine service quality dimensions as independent variables, and the ten financial performance measures, one at a time as dependent variables (a total of 90 simple regression analyses were run). Second, stepwise regression analyses were performed using all nine service quality dimensions as potential independent variables.

Simple regression analyses - Tables 7.14 to 7.23 present results of the separate simple regression analyses of each of the ten financial measures on each of the nine quality dimensions. The coefficients of determination (R square value), the regression coefficients (Beta coefficient) and the p-values for the significance of each relationship are reported. The sign and statistical significance of each regression coefficient are of primary interest here rather than the magnitude, since our intent is to determine if a positive relationship exists, in contrast to using the models for prediction.

Dimension	R Square	Adjusted R Square	Beta Coefficient	p value
Reliability	0.116	0.099	-0.341	0.013
Clout	0.002	-0.018	0.044	0.756
Reputation	0.140	0.122	-0.374	0.006
Awareness	0.047	0.028	-0.217	0.123
Competitiveness	0.030	0.010	-0.173	0.221
Collaboration	0.018	-0.001	-0.135	0.340
Accessibility	0.037	0.018	-0.193	0.171
Competence	0.060	0.041	-0.245	0.081
Assurance	0.117	0.100	-0.342	0.013

Table 7.14 Impact of the nine service quality dimensions on actual profit margin

Dimension	R Square	Adjusted R Square	Beta Coefficient	p value
Reliability	0.029	0.006	-0.169	0.267
Clout	0.050	0.028	-0.224	0.140
Reputation	0.000	-0.023	0.012	0.937
Awareness	0.000	-0.023	-0.013	0.935
Competitiveness	0.039	0.016	-0.196	0.196
Collaboration	0.006	-0.017	0.077	0.615
Accessibility	0.008	-0.015	0.087	0.569
Competence	0.004	-0.019	0.061	0.692
Assurance	0.002	-0.021	-0.044	0.774

Table 7.15 Impact of the nine service quality dimensions on actual return on capital employed

Dimension	R Square	Adjusted R Square	Beta Coefficient	p value
Reliability	0.000	-0.020	-0.012	0.933
Clout	0.007	-0.013	-0.082	0.563
Reputation	0.041	0.022	-0.202	0.151
Awareness	0.036	0.016	-0.188	0.181
Competitiveness	0.003	-0.017	0.056	0.695
Collaboration	0.054	0.035	-0.232	0.097
Accessibility	0.008	-0.012	-0.087	0.538
Competence	0.018	-0.001	-0.136	0.337
Assurance	0.005	-0.014	0.074	0.604

Table 7.16 Impact of the nine service quality dimensions on actual debtor collection period

Dimension	R Square	Adjusted R Square	Beta Coefficient	p value
Reliability	0.025	0.005	0.158	0.268
Clout	0.011	-0.009	0.104	0.466
Reputation	0.037	0.017	0.193	0.176
Awareness	0.038	0.018	0.195	0.170
Competitiveness	0.118	0.100	0.343	0.014
Collaboration	0.022	0.002	0.149	0.296
Accessibility	0.007	-0.013	0.086	0.547
Competence	0.017	-0.003	0.131	0.361
Assurance	0.078	0.059	0.279	0.047

Table 7.17 Impact of the nine service quality dimensions on actual salaries over turnover

Dimension	R Square	Adjusted R Square	Beta Coefficient	p value
Reliability	0.016	-0.005	0.125	0.384
Clout	0.024	0.004	-0.155	0.278
Reputation	0.076	0.058	0.276	0.050
Awareness	0.016	-0.004	0.127	0.374
Competitiveness	0.025	0.005	0.157	0.270
Collaboration	0.003	-0.017	0.055	0.703
Accessibility	0.000	-0.020	0.001	0.997
Competence	0.016	-0.004	0.126	0.379
Assurance	0.029	0.009	0.170	0.233

Table 7.18 Impact of the nine service quality dimensions on actual turnover growth

Dimension	R Square	Adjusted R Square	Beta Coefficient	p value
Reliability	0.050	0.030	0.224	0.118
Clout	0.011	-0.010	-0.104	0.471
Reputation	0.178	0.161	0.422	0.002
Awareness	0.098	0.079	0.313	0.027
Competitiveness	0.179	0.162	0.423	0.002
Collaboration	0.037	0.017	0.192	0.183
Accessibility	0.005	-0.015	0.074	0.609
Competence	0.054	0.034	0.231	0.106
Assurance	0.090	0.071	0.300	0.034

Table 7.19 Impact of the nine service quality dimensions on actual employee growth

Dimension	R Square	Adjusted R Square	Beta Coefficient	p value
Reliability	0.019	-0.001	0.136	0.335
Clout	0.116	0.098	0.340	0.014
Reputation	0.056	0.037	0.237	0.091
Awareness	0.020	0.000	0.140	0.323
Competitiveness	0.013	-0.007	0.112	0.427
Collaboration	0.088	0.070	0.297	0.032
Accessibility	0.016	-0.004	0.126	0.373
Competence	0.056	0.037	0.236	0.092
Assurance	0.002	-0.018	0.043	0.762

Table 7.20 Impact of the nine service quality dimensions on actual liquidity ratio

Dimension	R Square	Adjusted R Square	Beta Coefficient	p value
Reliability	0.023	0.003	0.151	0.285
Clout	0.097	0.079	0.311	0.025
Reputation	0.066	0.047	0.256	0.067
Awareness	0.024	0.005	0.156	0.268
Competitiveness	0.012	-0.008	0.109	0.441
Collaboration	0.093	0.075	0.305	0.028
Accessibility	0.017	-0.003	0.129	0.362
Competence	0.058	0.039	0.240	0.086
Assurance	0.002	-0.018	0.039	0.784

Table 7.21 Impact of the nine service quality dimensions on actual current ratio

Dimension	R Square	Adjusted R Square	Beta Coefficient	p value
Reliability	0.003	-0.017	0.058	0.682
Clout	0.046	0.027	0.214	0.128
Reputation	0.017	-0.003	0.130	0.360
Awareness	0.005	-0.015	0.068	0.633
Competitiveness	0.039	0.019	0.197	0.163
Collaboration	0.014	-0.005	0.120	0.397
Accessibility	0.001	-0.019	-0.033	0.815
Competence	0.036	0.017	0.190	0.177
Assurance	0.001	-0.019	0.036	0.800

Table 7.22 Impact of the nine service quality dimensions on actual solvency ratio

Dimension	R Square	Adjusted R Square	Beta Coefficient	p value
Reliability	0.006	-0.021	0.077	0.640
Clout	0.028	0.002	-0.168	0.306
Reputation	0.001	-0.026	0.037	0.825
Awareness	0.000	-0.027	0.020	0.903
Competitiveness	0.001	-0.026	-0.037	0.825
Collaboration	0.007	-0.020	0.085	0.608
Accessibility	0.009	-0.018	0.095	0.566
Competence	0.001	-0.026	-0.037	0.824
Assurance	0.033	0.007	0.183	0.265

Table 7.23 Impact of the nine service quality dimensions on actual gearing ratio

As can be observed from Tables 7.14 to 7.23, 26 of the 90 regression coefficients (Beta coefficient) have negative signs. Thus, our first observation is that there are multiple inverse relationships between the nine service quality dimensions as perceived by customers and actual supplier financial performance. The second issue to be addressed is whether any of the nine service quality dimensions is positively and significantly related to one or more of the ten financial performance measures.

The results of the simple regression analyses show that various significant relationships exist between the nine service quality dimensions and the ten financial performance measures (see Tables 7.14 to 7.23). *Clout* has moderate yet significant relationships with both liquidity ratio and current ratio ($R^2 = 0.12$, $p = 0.014$ and $R^2 = 0.10$, $p = 0.025$ respectively), *reputation* has moderate and significant relationships with both turnover growth and employee growth ($R^2 = 0.08$, $p = 0.050$ and $R^2 = 0.18$, $p = 0.002$ respectively), *awareness* has a moderate yet significant relationship with employee growth ($R^2 = 0.10$, $p = 0.027$), *competitiveness* has

moderate and significant relationships with both salaries over turnover and employee growth ($R^2 = 0.12$, $p = 0.014$ and $R^2 = 0.18$, $p = 0.002$ respectively), *collaboration* has moderate yet significant relationships with both liquidity ratio and current ratio ($R^2 = 0.09$, $p = 0.032$ and $R^2 = 0.09$, $p = 0.028$ respectively) and *assurance* has moderate and significant relationships with both salaries over turnover and employee growth ($R^2 = 0.08$, $p = 0.047$ and $R^2 = 0.09$, $p = 0.034$ respectively).

In addition, *reliability*, *reputation* and *assurance* all have a moderate yet significant relationship with profit margin, but here the regression coefficients (Beta coefficient) have negative signs, indicating that the relationships are inverse. *Accessibility* and *competence* have no significant relationships with any of the ten financial performance measures. Similarly, return on capital employed, debtor collection period, solvency ratio and gearing ratio show no significant relations to any of the nine service quality dimensions.

Stepwise regression analyses - Table 7.24 presents the results of the stepwise regression analyses. For each of the ten financial measures as extracted from the FAME database, the final model p-value, the coefficients of determination (R square value), the independent variables entered in the model, their regression coefficients (Beta coefficient) and the p-values for the independent variables are reported. Two models were significant at $p < 0.010$ significance level and four models were significant at $p < 0.050$ significance level.

Dependent variable	Model p value	R Square	Dimension entered	Beta Coefficient	Entry p value
Profit margin	0.006(a)	0.140	Reputation	-0.374	0.006
Salaries over turnover	0.014(b)	0.118	Competitiveness	0.343	0.014
Turnover growth	0.050(c)	0.076	Reputation	0.276	0.050
Employee growth	0.002(d)	0.179	Competitiveness	0.423	0.002
Liquidity ratio	0.014(e)	0.116	Clout	0.340	0.014
Current ratio	0.025(f)	0.097	Clout	0.311	0.025

a. Predictors: (Constant) COM 03

b. Predictors: (Constant) COM 05

c. Predictors: (Constant) COM 03

d. Predictors: (Constant) COM 05

e. Predictors: (Constant) COM 02

f. Predictors: (Constant) COM 02

Table 7.24 Stepwise regression analyses with actual financial performance as dependent variables

Several things should be noted concerning the stepwise regression results in Table 7.24. First, return on capital employed, debtor collection period, solvency ratio and gearing ratio had no variables enter the model and the remaining six financial performance measures all had only one variable enter the model.

Reputation was the only predictor for both profit margin and turnover growth, with the first model having a moderate coefficients of determination ($R^2 = 0.14$) and the second model having a weak coefficients of determination ($R^2 = 0.08$). As for profit margin, however, the regression coefficient (Beta coefficient) has a negative sign. *Competitiveness* was the only predictor for both salaries over turnover and employee growth and both models had a moderate coefficients of determination ($R^2 = 0.12$ and $R^2 = 0.18$ respectively). *Clout* was the only predictor for both liquidity ratio and current ratio and both models had a moderate coefficients of determination ($R^2 = 0.12$ and $R^2 = 0.10$ respectively).

The stepwise results highlight the relative significance of *competitiveness*, *reputation* and *clout* for the actual financial performance by suppliers.

7.4 VERIFICATION OF THE SUPPLIER PERSPECTIVE

In spring 2008, the results of the 'supplier perspective' as described in the previous three sections were presented at a dedicated seminar involving approximately 30 executives from over 20 customer and supplier organisations (involving both contract managers and account managers for cleaning, catering and security services) as well as representatives from BIFM, UCL and IPD. The subsequent panel discussion and workshops during this seminar provided valuable feedback on the identified relationships between the service quality dimensions and the financial performance of supplier organisations.

Strategic importance versus financial performance - Discussions revealed that it was generally found disturbing that there were only eight (out of a possible 45) significant relationships between the strategic importance of the nine service quality dimensions and the five financial measures as perceived by suppliers. Further discussion around these findings led to two hypotheses:

- Service quality is only one determinant of financial performance such that there are other determinants that impact financial performance.
- Account managers within supplier organisations do not have a clear picture of the financial performance of the organisations they work for.

In addition, it was found remarkable that none of the nine quality dimensions were significantly related to profitability and that six out of nine quality dimensions were significantly related to liquidity. With these findings being based on a sample size of only 21 fully complete datasets, the delegates unanimously agreed that more supplier data needed to be collected (for more detail see Section 11.4).

Perceived versus actual financial performance - Discussions revealed that it was found even more concerning that there were no significant correlations between supplier perceived financial performance and actual financial performance. Further discussion around these findings confirmed the hypothesis that account managers within supplier organisations do not always have a clear picture of the financial performance of the organisations they work for.

As for actual financial performance, it was generally found encouraging that there were significant correlations between profit margin and return on capital employed, between liquidity ratio and current ratio and between solvency ratio and gearing ratio. The non-significant correlation between debtor collection period and salaries over turnover was explained by the fact that these two efficiency measures are of dissimilar order. However, the non-significant correlation between turnover growth and employee growth was more difficult to explain. Although employee growth was generally seen as a driver to increase turnover, it was also recognised that for example efficiency programmes can drive turnover growth without increasing the number of employees. As our findings were based on a sample size of only 12 fully complete datasets, the delegates reiterated that more supplier data needed to be collected (for more detail see Section 11.4).

Customer perceptions versus supplier performance - Discussion revealed that the group found it encouraging that there were various significant relationships between the nine service quality dimensions as perceived by customers and the actual financial performance of suppliers. Further discussion around these findings confirmed the idea that supplier organisations have different perceptions of service quality when compared with customer organisations. The fact that there were only 14 (out of a possible 90) significant relationships confirmed the hypothesis that service quality is only one determinant of financial performance.

Furthermore, it was found encouraging that profit margin had a significant correlation with return on capital employed and that turnover growth had a significant correlation with employee growth. The fact that liquidity ratio had a significant correlation with current ratio and that solvency ratio had a significant correlation with gearing ratio was seen as logical as both liquidity measures and both solvency measures are arrived at through similar formulae. However, it was found slightly remarkable that debtor collection period had a significant correlation with salaries over turnover as these two efficiency measures were perceived to be of a dissimilar order.

To summarise Chapter 7, there are hardly any significant relationships between the strategic importance of the nine service quality dimensions and the financial performance as perceived by suppliers. Furthermore, there are no significant correlations between supplier perceived financial performance and actual financial performance. These findings indicate that account managers within supplier organisations do not have accurate perceptions of the financial performance of the organisations they work for.

Fortunately, there are various significant relationships between the nine service quality dimensions as perceived by customers and the actual financial performance of suppliers. These findings indicate that supplier organisations have different perceptions of service quality when compared with customer organisations.

The next chapter will seek to identify whether the financial performance of supplier organisations is similar for the three service lines investigated or whether there are differences between cleaning, catering and security services.

Box 7 Summary of the supplier perspective

8 CROSS-SUPPLIER COMPARISON

In line with our research methodology, this chapter focuses on the differences between cleaning, catering and security services as delivered by supplier organisations (see Section 4.5). Specifically, we examine the differences between the three service lines with regards to ten financial measures. Where significant differences occur, we re-run some of the analyses as performed in Chapter 7. Again, all findings are verified and validated through the outcome of focus group discussions that took place in spring 2008.

As the data obtained through our supplier surveys was very limited (see Section 4.3), it was deemed inappropriate to run variance analysis to assess whether there are significant differences between the quality perceptions of cleaning providers, catering providers and security providers. Instead, we decided to investigate potential differences in financial performance between providers of the three services lines. In order to do so we extracted data from the FAME (Financial Analysis Made Easy) database to serve as the basis for this chapter. Focussing on service providers with revenues over GBP 5,000,000 and/or more than 5,000 employees, we identified 93 cleaning companies, 98 catering companies and 55 security companies (a total of 246 companies). For each company we extracted two profitability ratios (profit margin and return on capital employed), two efficiency measures (debtor collection period and salaries over turnover), two growth measures (turnover growth and employee growth), two liquidity measures (liquidity ratio and current ratio) and two solvency measures (solvency ratio and gearing ratio).

8.1 DIFFERENCES ANALYSES ON FINANCIAL MEASURES

In order to assess whether there are differences in the ten financial performance measures, we first investigated the descriptive statistics for each financial measure (see Table 8.1 and Figure 8.1)

	Service	N	Mean	Std. Dev.	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
						Lower B.	Upper B.		
Profit margin	cleaning	87	3.86	4.72	0.51	2.86	4.87	-16.17	18.99
	catering	86	2.59	5.59	0.60	1.39	3.79	-14.19	19.00
	security	52	3.60	4.25	0.59	2.42	4.78	-9.42	13.21
	Total	225	3.32	4.99	0.33	2.66	3.97	-16.17	19.00
Return on capital	cleaning	76	30.38	30.49	3.50	23.40	37.34	-48.83	95.24
	catering	83	19.82	33.19	3.64	12.58	27.07	-69.14	95.10
	security	47	22.90	29.32	4.28	14.29	31.50	-75.65	86.98
	Total	206	24.42	31.56	2.20	20.09	28.75	-75.65	95.24
Debtor collection	cleaning	81	56.12	20.70	2.30	51.54	60.69	11.63	97.37
	catering	70	38.48	16.93	2.02	34.45	42.52	9.58	82.23
	security	51	59.65	19.67	2.75	54.12	65.18	13.16	94.13
	Total	202	50.90	21.19	1.49	47.96	53.84	9.58	97.37
Salaries / turnover	cleaning	74	62.60	17.18	2.00	58.62	66.58	20.27	87.95
	catering	73	40.15	13.35	1.56	37.03	43.26	20.10	99.53
	security	44	68.58	21.82	3.29	61.94	75.21	21.46	93.20
	Total	191	55.40	20.94	1.52	52.41	58.39	20.10	99.53
Turnover growth	cleaning	80	11.70	16.47	1.84	8.03	15.36	-36.66	47.83
	catering	81	5.32	15.30	1.70	1.94	8.70	-39.11	44.69
	security	42	7.67	18.84	2.91	1.80	13.54	-27.28	46.61
	Total	203	8.32	16.70	1.17	6.01	10.63	-39.11	47.83
Employee growth	cleaning	65	5.10	17.22	2.14	0.83	9.37	-44.44	47.07
	catering	68	4.53	18.09	2.19	0.15	8.91	-49.14	47.35
	security	38	5.74	14.50	2.35	0.97	10.51	-20.19	46.06
	Total	171	5.02	16.93	1.29	2.46	7.57	-49.14	47.35
Liquidity ratio	cleaning	90	1.32	0.62	0.07	1.19	1.45	0.34	4.12
	catering	85	1.15	0.75	0.08	0.99	1.31	0.29	4.41
	security	53	1.27	0.52	0.07	1.13	1.41	0.09	2.89
	Total	228	1.25	0.65	0.04	1.16	1.33	0.09	4.41
Current ratio	cleaning	92	1.36	0.62	0.06	1.23	1.49	0.34	4.12
	catering	86	1.31	0.94	0.10	1.11	1.51	0.31	6.31
	security	53	1.33	0.61	0.08	1.16	1.49	0.09	4.12
	Total	231	1.33	0.75	0.05	1.23	1.43	0.09	6.31
Solvency ratio	cleaning	91	28.16	22.09	2.32	23.56	32.76	-19.25	77.18
	catering	86	24.31	27.90	3.01	18.33	30.29	-85.87	88.21
	security	53	29.33	24.26	3.33	22.64	36.02	-19.98	93.75
	Total	230	26.99	24.88	1.64	23.76	30.22	-85.87	93.75
Gearing ratio	cleaning	66	115.44	128.78	15.85	83.78	147.10	0.39	498.07
	catering	59	109.05	137.00	17.84	73.35	144.75	0.42	489.92
	security	45	99.61	112.64	16.79	65.77	133.45	1.10	424.62
	Total	170	109.03	127.13	9.75	89.78	128.28	0.39	498.07

Table 8.1 Descriptive statistics for the ten financial measures within cleaning, catering and security

Plotting the means on a graph, with the confidence intervals around the means, we get to Figure 8.1.

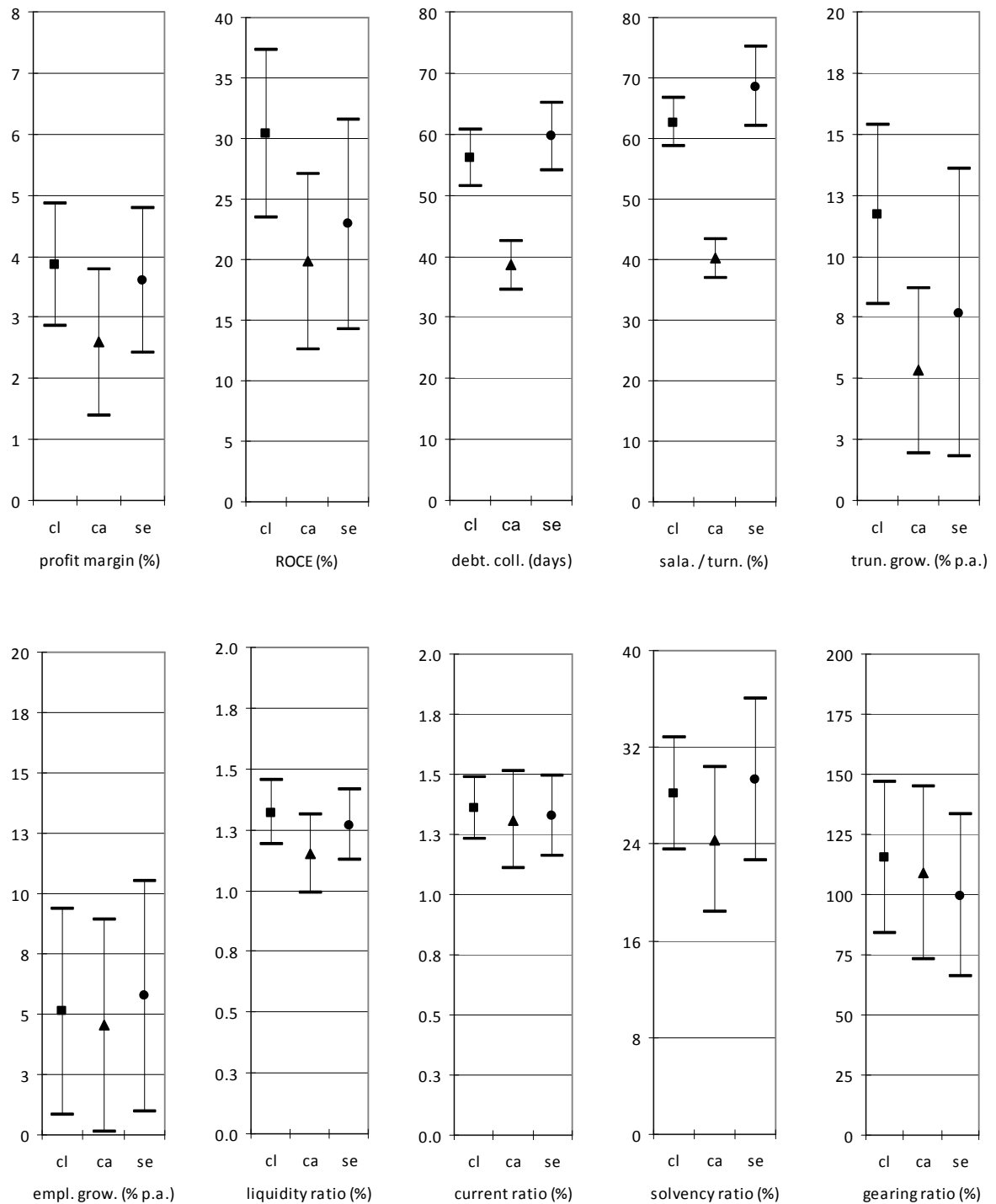


Figure 8.1 Confidence limits for the ten financial performance measures

For all profitability, growth, liquidity and solvency measures both the means and the confidence intervals around the means for cleaning, catering and security appear similar. With relatively similar means and clear overlap in the confidence intervals any differences between the three service lines could be due sampling error. Therefore, we suspect no effect between any three service lines for these measures.

For both efficiency measures (debtor collection period and salaries over turnover), however, the means for catering (38 days and 40% respectively) appear lower than those for cleaning (56 days and 61% respectively) and security (60 days and 69% respectively). Furthermore, there is clearly no overlap in the confidence intervals around the means for the three service lines. Thus we suspect some effect between catering and both cleaning and security.

In order to empirically assess whether there are significant differences in the ten financial performance measures between cleaning, catering and security, we used independent ANOVAs (MANOVA could not be used as only 93 out of 246 datasets were fully complete).

Profit margin - The test statistics for the independent ANOVA and the Levene's test of equality of error variances for profit margin are provided in Table 8.2.

Tests of Between-Subjects Effects
Dependent Variable: profit margin

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	75.633 ^a	2	37.816	1.528	0.219	0.014
Intercept	2,385.394	1	2,385.394	96.382	0.000	0.303
Service	75.633	2	37.816	1.528	0.219	0.014
Error	5,494.358	222	24.749			
Total	8,042.865	225				
Corrected Total	5,569.991	224				

a. R Squared = .014 (Adjusted R Squared = .005)

Levene's Test of Equality of Error Variances^a
Dependent variable: profit margin

F	df1	df2	Sig.
1.699	2	222	0.185

a. Design: Intercept+Service

Table 8.2 Test of between-subjects effects with profit margin as dependent variable

The 'service' row is the between-groups statistic, and is the row of interest (the 'error' row contains the figures relating to the within-groups variation). The results of the variances analysis show that the differences in profit margin per service line are non-significant $F(2,222) = 1.53$, $p = 0.219$. In addition, only 1.4% of the variation in profit margin is accounted for by the service line investigated (partial $\eta^2 = 0.014$).

Furthermore, the Levene's test of equality of error variances shows that the variances of the three service lines are not significantly different from each other ($p = 0.185$), indicating that we have met the assumption of homogeneity of variance. Thus, it can be concluded that there are no significant differences in profit margin for cleaning, catering and security services.

Return on capital employed - The test statistics for the independent ANOVA and the Levene's test of equality of error variances for return on capital employed are as follows (see Table 8.3).

Tests of Between-Subjects Effects

Dependent Variable: return on capital

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	4555.617 ^a	2	2,277.809	2.317	0.101	0.022
Intercept	114,960.868	1	114,960.868	116.933	0.000	0.365
Service	4,555.617	2	2,277.809	2.317	0.101	0.022
Error	199,576.558	203	983.136			
Total	326,975.032	206				
Corrected Total	204,132.175	205				

a. R Squared = .022 (Adjusted R Squared = .013)

Levene's Test of Equality of Error Variances^a

Dependent variable: return on capital

F	df1	df2	Sig.
0.637	2	203	0.530

a. Design: Intercept+Service

Table 8.3 Test of between-subjects effects with return on capital employed as dependent variable

The results of the variances analysis show that the differences in return on capital employed per service line are also non-significant $F(2,203) = 2.32$, $p = 0.101$. In addition, only 2.2% of the variation in return on capital employed is accounted for by the service line investigated (partial $\eta^2 = 0.022$).

Again, the Levene's test of equality of error variances shows that the variances of the three service lines are not significantly different from each other ($p = 0.530$), indicating that we have met the assumption of homogeneity of variance. Hence, it can be concluded that there are no significant differences in return on capital employed for the three service lines investigated.

Debtor collection period - The test statistics for the independent ANOVA and the Levene's test of equality of error variances for debtor collection period are highlighted in Table 8.4.

Tests of Between-Subjects Effects
 Dependent Variable: debtor collection

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	16904.665 ^a	2	8,452.332	22.921	0.000	0.187
Intercept	514,576.173	1	514,576.173	1,395.415	0.000	0.875
Service	16,904.665	2	8,452.332	22.921	0.000	0.187
Error	73,383.650	199	368.762			
Total	613,606.485	202				
Corrected Total	90,288.315	201				

a. R Squared = .187 (Adjusted R Squared = .179)

Levene's Test of Equality of Error Variances^a
 Dependent variable: debtor collection

F	df1	df2	Sig.
1.116	2	199	0.330

a. Design: Intercept+Service

Table 8.4 Test of between-subjects effects with debtor collection period as dependent variable

The results of the variances analysis show that the differences in debtor collection period per service line are significant $F(2,199) = 22.92$, $p < 0.001$. In addition, 18.7% of the variation in debtor collection period is accounted for by the service lines investigated (partial $\eta^2 = 0.187$).

The Levene's test of equality of error variances shows that the variances of the three service lines are not significantly different from each other ($p = 0.330$), indicating that we have met the assumption of homogeneity of variance. Consequently we must consider performing additional multiple comparison procedures to assess which group means differ from means in other groups (see Section 8.2).

Salaries over turnover - The test statistics for the independent ANOVA and the Levene's test of equality of error variances for salaries over turnover are as follows (see Table 8.5).

Tests of Between-Subjects Effects

Dependent Variable: salaries over turnover

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	28462.867 ^a	2	14,231.433	48.775	0.000	0.342
Intercept	587,767.020	1	587,767.020	2,014.431	0.000	0.915
Service	28,462.867	2	14,231.433	48.775	0.000	0.342
Error	54,854.297	188	291.778			
Total	669,448.059	191				
Corrected Total	83,317.164	190				

a. R Squared = .342 (Adjusted R Squared = .335)

Levene's Test of Equality of Error Variances^a

Dependent variable: salaries over turnover

F	df1	df2	Sig.
10.684	2	188	0.000

a. Design: Intercept+Service

Table 8.5 Test of between-subjects effects with salaries over turnover as dependent variable

The results of the variances analysis show that the differences in salaries over turnover per service line are also significant $F(2,188) = 48.78$, $p < 0.001$. In addition, 34.2% of the variation in salaries over turnover is accounted for by the service line investigated (partial $\eta^2 = 0.342$).

Furthermore, the Levene's test of equality of error variances shows that the variances of the three service lines are significantly different from each other ($p < 0.001$). Therefore, we have not met the assumption of homogeneity of variance. Additional multiple comparison procedures to assess which group means differ from means in other groups are therefore unnecessary. Instead, we must consider performing a non-parametric alternative to the ANOVA on the three service lines (see Section 8.3).

Turnover growth - The test statistics for the independent ANOVA and the Levene's test of equality of error variances for turnover growth are provided in see Table 8.6.

Tests of Between-Subjects Effects

Dependent Variable: turnover growth

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	1658.842 ^a	2	829.421	3.032	0.050	0.029
Intercept	12,524.465	1	12,524.465	45.789	0.000	0.186
Service	1,658.842	2	829.421	3.032	0.050	0.029
Error	54,705.323	200	273.527			
Total	70,412.153	203				
Corrected Total	56,364.165	202				

a. R Squared = .029 (Adjusted R Squared = .020)

Levene's Test of Equality of Error Variances^a

Dependent variable: turnover growth

F	df1	df2	Sig.
1.097	2	200	0.336

a. Design: Intercept+Service

Table 8.6 Test of between-subjects effects with turnover growth as dependent variable

The results of the variances analysis show that the differences in turnover growth per service line are again non-significant $F(2,200) = 3.03$, $p = 0.050$. In addition, only 2.9% of the variation in turnover growth is accounted for by the service line investigated (partial $\eta^2 = 0.029$).

Furthermore, the Levene's test of equality of error variances shows that the variances of the three service lines are not significantly different from each other ($p = 0.336$), indicating that we have met the assumption of homogeneity of variance. Thus, it can be concluded that there are no significant differences in turnover growth for cleaning, catering and security services.

Employee growth - The test statistics for the independent ANOVA and the Levene's test of equality of error variances for employee growth are as follows (see Table 8.7).

Tests of Between-Subjects Effects

Dependent Variable: employee growth

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	36.280 ^a	2	18.140	0.063	0.939	0.001
Intercept	4,188.191	1	4,188.191	14.450	0.000	0.079
Service	36.280	2	18.140	0.063	0.939	0.001
Error	48,692.091	168	289.834			
Total	53,030.414	171				
Corrected Total	48,728.371	170				

a. R Squared = .001 (Adjusted R Squared = -.011)

Levene's Test of Equality of Error Variances^a

Dependent variable: employee growth

F	df1	df2	Sig.
0.482	2	168	0.619

a. Design: Intercept+Service

Table 8.7 Test of between-subjects effects with employee growth as dependent variable

The results of the variances analysis show that the differences in employee growth per service line are also non-significant $F(2,168) = 0.06$, $p = 0.939$. In addition, only 0.1% of the variation in employee growth is accounted for by the service line investigated (partial $\eta^2 = 0.001$).

Again, the Levene's test of equality of error variances shows that the variances of the three service lines are not significantly different from each other ($p = 0.919$), indicating that we have met the assumption of homogeneity of variance. Hence, it can be concluded that there are no significant differences in employee growth for the three service lines investigated.

Liquidity ratio - The test statistics for the independent ANOVA and the Levene's test of equality of error variances for liquidity ratio are highlighted in Table 8.8.

Tests of Between-Subjects Effects
Dependent Variable: liquidity ratio

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	1.280 ^a	2	0.640	1.510	0.223	0.013
Intercept	335.153	1	335.153	790.820	0.000	0.779
Service	1.280	2	0.640	1.510	0.223	0.013
Error	95.356	225	0.424			
Total	450.166	228				
Corrected Total	96.636	227				

a. R Squared = .013 (Adjusted R Squared = .004)

Levene's Test of Equality of Error Variances^a
Dependent variable: liquidity ratio

F	df1	df2	Sig.
0.892	2	225	0.411

a. Design: Intercept+Service

Table 8.8 Test of between-subjects effects with liquidity ratio as dependent variable

The results of the variances analysis show that the differences in liquidity ratio per service line are non-significant $F(2,225) = 1.51, p = 0.223$. In addition, only 1.3% of the variation in liquidity ratio is accounted for by the service line investigated ($\text{partial } \eta^2 = 0.013$).

Furthermore, the Levene's test of equality of error variances shows that the variances of the three service lines are not significantly different from each other ($p = 0.411$), indicating that we have met the assumption of homogeneity of variance. Thus, it can be concluded that there are no significant differences in liquidity ratio for cleaning, catering and security services.

Current ratio - The test statistics for the independent ANOVA and the Levene's test of equality of error variances for current ratio are as follows (see Table 8.2h).

Tests of Between-Subjects Effects

Dependent Variable: current ratio

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	0.106 ^a	2	0.053	0.093	0.911	0.001
Intercept	385.427	1	385.427	676.995	0.000	0.748
Service	0.106	2	0.053	0.093	0.911	0.001
Error	129.805	228	0.569			
Total	540.018	231				
Corrected Total	129.911	230				

a. R Squared = .001 (Adjusted R Squared = -.008)

Levene's Test of Equality of Error Variances^a

Dependent variable: current ratio

F	df1	df2	Sig.
1.591	2	228	0.206

a. Design: Intercept+Service

Table 8.9 Test of between-subjects effects with current ratio as dependent variable

The results of the variances analysis show that the differences in current ratio per service line are also non-significant $F(2,228) = 0.09$, $p = 0.911$. In addition, only 0.1% of the variation in current ratio is accounted for by the service line investigated (partial $\eta^2 = 0.001$).

Again, the Levene's test of equality of error variances shows that the variances of the three service lines are not significantly different from each other ($p = 0.206$), indicating that we have met the assumption of homogeneity of variance. Hence, it can be concluded that there are no significant differences in current ratio for the three service lines investigated.

Solvency ratio - The test statistics for the independent ANOVA and the Levene's test of equality of error variances for solvency ratio are provided in Table 8.10.

Tests of Between-Subjects Effects
 Dependent Variable: solvency ratio

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	1031.534 ^a	2	515.767	0.832	0.436	0.007
Intercept	161,284.971	1	161,284.971	260.253	0.000	0.534
Service	1,031.534	2	515.767	0.832	0.436	0.007
Error	140,677.269	227	619.724			
Total	309,243.830	230				
Corrected Total	141,708.802	229				

a. R Squared = .007 (Adjusted R Squared = -.001)

Levene's Test of Equality of Error Variances^a
 Dependent variable: solvency ratio

F	df1	df2	Sig.
0.223	2	227	0.800

a. Design: Intercept+Service

Table 8.10 Test of between-subjects effects with solvency ratio as dependent variable

The results of the variances analysis show that the differences in solvency ratio per service line are non-significant $F(2,69227 = 0.83, p = 0.436$. In addition, only 0.7% of the variation in solvency ratio is accounted for by the service line investigated ($\text{partial } \eta^2 = 0.007$).

Furthermore, the Levene's test of equality of error variances shows that the variances of the three service lines are not significantly different from each other ($p = 0.800$), indicating that we have met the assumption of homogeneity of variance. Thus, it can be concluded that there are no significant differences in solvency ratio for cleaning, catering and security services.

Gearing ratio - The test statistics for the independent ANOVA and the Levene's test of equality of error variances for gearing ratio are as follows (see Table 8.11).

Tests of Between-Subjects Effects

Dependent Variable: gearing ratio

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	6702.883 ^a	2	3,351.442	0.205	0.815	0.002
Intercept	1,933,653.295	1	1,933,653.295	118.512	0.000	0.415
Service	6,702.883	2	3,351.442	0.205	0.815	0.002
Error	2,724,791.432	167	16,316.116			
Total	4,752,461.313	170				
Corrected Total	2,731,494.316	169				

a. R Squared = .002 (Adjusted R Squared = -.009)

Levene's Test of Equality of Error Variances^a

Dependent variable: gearing ratio

F	df1	df2	Sig.
0.719	2	167	0.489

a. Design: Intercept+Service

Table 8.11 Test of between-subjects effects with gearing ratio as dependent variable

The results of the variances analysis show that the differences in gearing ratio per service line are also non-significant $F(2,167) = 0.21$, $p = 0.815$. In addition, only 0.2% of the variation in gearing ratio is accounted for by the service line investigated (partial $\eta^2 = 0.002$).

Again, the Levene's test of equality of error variances shows that the variances of the three service lines are not significantly different from each other ($p = 0.489$), indicating that we have met the assumption of homogeneity of variance. Hence, it can be concluded that there are no significant differences in gearing ratio for the three service lines investigated.

In short, there are no significant differences between the three service lines investigated for eight of the ten financial measures (i.e. profit margin, return on capital employed, turnover growth, employee growth, liquidity ratio, current ratio, solvency ratio and gearing ratio). As for both debtor collection period and salaries over turnover, however, there are significant differences. To further assess the exact differences concerning debtor collection period, an additional multiple comparison procedure is described in Section 8.2; to further assess the exact differences concerning salaries over turnover, a non-parametric alternative to the ANOVA is described in Section 8.3.

8.2 MULTIPLE COMPARISON ANALYSIS ON DEBTOR COLLECTION PERIOD

Following the fact that the variances analysis in the previous section indicated significant differences in debtor collection period per service line, but similar variances of the three service lines, a Tukey HSD (Honestly Significantly Different) test for equal variances assumed was used to assess which group means differ from the means in other groups. The statistics for this post-hoc test are provided in Table 8.12.

(I) service	(J) service	Difference (I-J)	Std. Error	Sig.	95% Confidence Interval for Mean	
					Lower Bound	Upper Bound
cleaning	catering	17.64*	3.13	0.000	10.24	25.04
	security	-3.53	3.43	0.559	-11.64	4.57
catering	cleaning	-17.64*	3.13	0.000	-25.04	-10.24
	security	-21.17*	3.54	0.000	-29.52	-12.82
security	cleaning	3.53	3.43	0.559	-4.57	11.64
	catering	21.17*	3.54	0.000	12.82	29.52

* The mean difference is significant at the .05 level.

	Service	N	Subset	
			1	2
Tukey HSD ^{a,b,c}	catering	70	38.48	
	cleaning	81		56.12
	security	51		59.65
	Sig.		1.000	0.548

a. Uses Harmonic Mean Sample Size = 64.880.

b. The group sizes are unequal. The harmonic mean of the group sizes is used.

c. Alpha = .05.

Table 8.12 Tukey's HSD test for debtor collection period with

The results of the Tukey HSD test show the mean differences of debtor collection period for each service line. Cleaning is significantly different from catering (mean difference = 17.64, $p < 0.001$) and catering is significantly different from security (mean difference = -21.17, $p < 0.001$). However, cleaning is not significantly different from security (mean difference = -3.53, $p = 0.559$). Therefore, it can be concluded that the debtor collection period for catering services is significantly lower when compared to both cleaning and security services.

8.3 NON-PARAMETRIC ANALYSES ON SALARIES OVER TURNOVER

Following the fact that the variances analysis in the previous section indicated significant differences in salaries over turnover per service line, and the fact that the Levene's tests indicated violations of the assumption of homogeneity of variance, we used Kruskal-Wallis ANOVA (the non-parametric alternative to ANOVA) to assess whether there are significant differences in salaries over turnover between the three service lines. The ranks and test statistics for the Kruskal-Wallis ANOVA for salaries over turnover are highlighted in Table 8.13.

Ranks

	Service	N	Mean Rank
Salaries over turn.	cleaning	74	114.95
	catering	73	55.95
	security	44	130.58
	Total	191	

Table 8.13 Kruskal-Wallis test for salaries over turnover

Test Statistics^{a,b}

Salaries over turnover	
Chi-Square	64.220
df	2
Asymp. Sig.	0.000

a. Kruskal Wallis Test

b. Grouping Variable: Service

Table 8.13 Kruskal-Wallis test for salaries over turnover (continued)

The first part of the Kruskal-Wallis ANOVA shows the mean ranks of salaries over turnover for each service line. Security providers had the highest level of salaries over turnover (mean rank = 130.58), closely followed by cleaning providers (mean rank = 114.95). Catering providers had the lowest level of salaries over turnover (mean rank = 55.95). The test statistics show that χ^2 is 64.22, with an associated probability value lower than 0.001. Thus, it can be concluded that there are significant differences in salaries over turnover for cleaning, catering and security services.

Following the fact that the Kruskal-Wallis ANOVA indicated significant differences in salaries over turnover per service line, a Dunnett T3 test was used to assess the exact differences between the three service lines. The statistics for this post-hoc test are as follows (see Table 8.14).

(I) service	(J) service	Difference (I-J)	Std. Error	Sig.	95% Confidence Interval for Mean	
					Lower Bound	Upper Bound
cleaning	catering	22.46*	2.54	0.000	16.33	28.58
	security	-5.97	3.85	0.327	-15.37	3.42
catering	cleaning	-22.46*	2.54	0.000	-28.58	-16.33
	security	-28.43*	3.64	0.000	-37.36	-19.50
security	cleaning	5.97	3.85	0.327	-3.42	15.37
	catering	28.43*	3.64	0.000	19.50	37.36

* The mean difference is significant at the .05 level.

Table 8.14 Dunnett T3 test for salaries over turnover

The results of the Dunnett T3 test show the mean differences of salaries over turnover for each service line. Cleaning is significantly different from catering (mean difference = 22.46, $p < 0.001$) and catering is significantly different from security (mean difference = -28.43, $p < 0.001$). However, cleaning is not significantly different from security (mean difference = -5.97, $p = 0.327$). Hence, it can be concluded that salaries over turnover for catering services is significantly lower when compared to both cleaning and security services.

8.4 RE-RUN OF CUSTOMER PERCEPTION VERSUS EFFICIENCY MEASURES

With both debtor collection period and salaries over turnover for catering services being significantly lower when compared to both cleaning and security services, we re-ran the analyses as performed in Section 7.3 whilst separating cleaning, catering and security services. In a first step, the associations between customer perceived performance of the nine service quality dimensions and the actual efficiency measures for supplier organisations were investigated using correlation analyses (see Tables 8.15 to 8.17).

	Reliability	Clout	Reputation	Awareness	Competitiveness	Collaboration	Accessibility	Competence	Assurance	Service quality	Customer satisfaction	Contract renewal
Debtor collection	0.06	0.02	-0.25	-0.33	0.02	-0.28	0.04	-0.07	0.04	-0.11	-0.21	-0.31
Salaries over turnover	-0.01	0.25	0.52*	0.37	0.20	0.31	-0.14	0.26	0.20	0.31	0.22	0.45

* Correlation is significant at the 0.05 level

** Correlation is significant at the 0.01 level

Table 8.15 Correlations between the quality dimensions and efficiency measures within cleaning

	Reliability	Clout	Reputation	Awareness	Competitiveness	Collaboration	Accessibility	Competence	Assurance	Service quality	Customer satisfaction	Contract renewal
Debtor collection	0.29	0.05	0.11	0.07	0.14	0.11	0.25	0.43	0.31	0.20	0.21	0.15
Salaries over turnover	0.03	0.27	-0.29	-0.23	-0.23	-0.07	-0.13	0.22	0.05	-0.05	-0.07	0.17

* Correlation is significant at the 0.05 level

** Correlation is significant at the 0.01 level

Table 8.16 Correlations between the quality dimensions and efficiency measures within catering

	Reliability	Clout	Reputation	Awareness	Competitiveness	Collaboration	Accessibility	Competence	Assurance	Service quality	Customer satisfaction	Contract renewal
Debtor collection	-0.34	-0.14	-0.31	-0.38	-0.38	-0.45	-0.41	-0.37	-0.24	-0.19	-0.22	-0.29
Salaries over turnover	0.33	0.12	0.34	0.41	0.46*	0.26	0.37	0.26	0.40	0.06	0.22	0.11

* Correlation is significant at the 0.05 level

** Correlation is significant at the 0.01 level

Table 8.17 Correlations between the quality dimensions and efficiency measures within security

The results of the correlation analysis indicate that only two significant relationships exist between customer perceived performance of the nine service quality dimensions and the two efficiency measures as extracted from the FAME database (see Tables 8.15 to 8.17). As for salaries over turnover, there are moderate yet significant correlations with both *reputation* as perceived by cleaning customers ($r = 0.52$, $p = 0.029$) and *competitiveness* as perceived by security customers ($r = 0.46$, $p = 0.049$). As for debtor collection period, however, there are no significant correlations to any of the nine service quality dimensions regardless of the service line investigated.

To further assess the exact relationships between the nine service quality dimensions and the two efficiency measures within each service line, two types of regression analysis were used. First, simple regression analyses were performed using each of the nine service quality dimensions per service line as independent variables, and the two efficiency measures, one at a time as dependent variables (a total of 54 simple regression analyses were run). Second, stepwise regression analyses were performed using all nine service quality dimensions per service line as potential independent variables.

Simple regression analyses - Tables 8.18 to 8.20 present results of the separate simple regression analyses of debtor collection period on each of the nine quality dimensions for each service line separately. Tables 8.21 to 8.23 present results of the separate simple regression analyses of salaries over turnover on each of the nine quality dimensions for each service line separately. In all cases, the coefficients of determination (R square value), the regression coefficients (Beta coefficient) and the p-values for the significance of each relationship are reported. The sign and statistical significance of each regression coefficient are of primary interest here rather than the magnitude, since our intent is to determine if a positive relationship exists, in contrast to using the models for prediction.

Dimension	R Square	Adjusted R Square	Beta Coefficient	p value
Reliability	0.003	-0.055	0.058	0.815
Clout	0.000	-0.058	0.022	0.929
Reputation	0.061	0.005	-0.246	0.310
Awareness	0.108	0.056	-0.329	0.169
Competitiveness	0.001	-0.058	0.023	0.925
Collaboration	0.079	0.025	-0.282	0.242
Accessibility	0.001	-0.057	0.038	0.876
Competence	0.005	-0.053	-0.072	0.771
Assurance	0.002	-0.057	0.044	0.857

Table 8.18 Impact of the service quality dimensions on debtor collection period in cleaning

Dimension	R Square	Adjusted R Square	Beta Coefficient	p value
Reliability	0.086	0.009	0.293	0.310
Clout	0.002	-0.081	0.047	0.872
Reputation	0.013	-0.070	0.112	0.703
Awareness	0.005	-0.078	0.068	0.816
Competitiveness	0.021	-0.061	0.144	0.624
Collaboration	0.012	-0.070	0.111	0.707
Accessibility	0.064	-0.014	0.254	0.382
Competence	0.184	0.116	0.429	0.126
Assurance	0.099	0.023	0.314	0.274

Table 8.19 Impact of the service quality dimensions on debtor collection period in catering

Dimension	R Square	Adjusted R Square	Beta Coefficient	p value
Reliability	0.114	0.062	-0.338	0.157
Clout	0.019	-0.039	-0.137	0.575
Reputation	0.094	0.041	-0.306	0.202
Awareness	0.147	0.097	-0.383	0.105
Competitiveness	0.148	0.097	-0.384	0.104
Collaboration	0.200	0.153	-0.447	0.055
Accessibility	0.169	0.120	-0.412	0.080
Competence	0.134	0.083	-0.366	0.124
Assurance	0.060	0.004	-0.244	0.314

Table 8.20 Impact of the service quality dimensions on debtor collection period in security

Dimension	R Square	Adjusted R Square	Beta Coefficient	p value
Reliability	0.000	-0.062	-0.011	0.965
Clout	0.061	0.002	0.246	0.324
Reputation	0.266	0.220	0.516	0.029
Awareness	0.137	0.083	0.371	0.130
Competitiveness	0.040	-0.020	0.201	0.424
Collaboration	0.098	0.042	0.313	0.206
Accessibility	0.021	-0.041	-0.144	0.569
Competence	0.066	0.008	0.257	0.304
Assurance	0.040	-0.020	0.199	0.428

Table 8.21 Impact of the service quality dimensions on salaries over turnover in cleaning

Dimension	R Square	Adjusted R Square	Beta Coefficient	p value
Reliability	0.001	-0.083	0.026	0.929
Clout	0.071	-0.007	0.266	0.358
Reputation	0.082	0.006	-0.287	0.319
Awareness	0.051	-0.028	-0.225	0.439
Competitiveness	0.055	-0.024	-0.235	0.419
Collaboration	0.004	-0.079	-0.066	0.822
Accessibility	0.018	-0.064	-0.133	0.651
Competence	0.048	-0.032	0.218	0.454
Assurance	0.002	-0.081	0.047	0.873

Table 8.22 Impact of the service quality dimensions on salaries over turnover in catering

Dimension	R Square	Adjusted R Square	Beta Coefficient	p value
Reliability	0.107	0.055	0.328	0.171
Clout	0.014	-0.044	0.119	0.629
Reputation	0.118	0.066	0.344	0.149
Awareness	0.171	0.122	0.413	0.079
Competitiveness	0.209	0.162	0.457	0.049
Collaboration	0.069	0.014	0.262	0.279
Accessibility	0.135	0.084	0.367	0.122
Competence	0.067	0.012	0.258	0.286
Assurance	0.161	0.112	0.401	0.089

Table 8.23 Impact of the service quality dimensions on salaries over turnover in security

As can be observed from Tables 8.18 to 8.23, none of the 54 regression coefficients (Beta coefficient) have negative signs. Thus, our first observation is that there are no inverse relationships between the nine service quality dimensions and both debtor collection period and salaries over turnover for any of the three service lines investigated. The second issue to be addressed is whether any of the nine service quality dimensions is positively and significantly related to one or more of the two efficiency measures.

The results of the simple regression analyses show that hardly any significant relationships exist between the nine service quality dimensions and the two efficiency measures (see Tables 8.18 to 8.23). However, *reputation* has a moderate yet significant relationship with salaries over turnover in cleaning ($R^2 = 0.27$, $p = 0.029$). In addition, *competitiveness* has a moderate yet significant relationship with salaries over turnover in security ($R^2 = 0.21$, $p = 0.049$).

Stepwise regression analyses - Tables 8.24 to 8.26 present the results of the stepwise regression analyses for each service line separately. For each of the ten financial measures as extracted from the FAME database, the final model p-value, the coefficients of determination (R square value), the independent variables entered in the model, their regression coefficients (Beta coefficient) and the p-values for the independent variables are reported. Six models were significant at $p < 0.010$ significance level and six models were significant at $p < 0.050$ significance level.

Dependent variable	Model p value	R Square	Dimension entered	Beta Coefficient	Entry p value
Salaries over turnover	0.029(a)	0.266	Reputation	0.516	0.029
Turnover growth	0.033(b)	0.241	Reputation	0.491	0.033
Employee growth	0.005(c)	0.396	Reputation	0.629	0.005
Liquidity ratio	0.017(d)	0.401	Collaboration Assurance	0.909 -0.632	0.005 0.037

a. Predictors: (Constant) COM 03

b. Predictors: (Constant) COM 03

c. Predictors: (Constant) COM 03

d. Predictors: (Constant) COM 06 and COM 09

Table 8.24 Stepwise regression analyses for cleaning with financial performance measures as dependent variables

Dependent variable	Model p value	R Square	Dimension entered	Beta Coefficient	Entry p value
Profit margin	0.017(a)	0.387	Reliability	-0.622	0.017
Turnover growth	0.001(b)	0.596	Clout	-0.772	0.001
Employee growth	0.002(c)	0.682	Clout Reputation	-0.569 0.453	0.009 0.027
Liquidity ratio	0.000(d)	0.704	Clout	0.839	0.000
Current ratio	0.003(e)	0.529	Clout	0.727	0.003
Solvency ratio	0.023(f)	0.361	Reputation	-0.601	0.023

a. Predictors: (Constant) COM 01

b. Predictors: (Constant) COM 02

c. Predictors: (Constant) COM 02 and COM 03

d. Predictors: (Constant) COM 02

e. Predictors: (Constant) COM 02

f. Predictors: (Constant) COM 03

Table 8.25 Stepwise regression analyses for catering with financial performance measures as dependent variables

Dependent variable	Model p value	R Square	Dimension entered	Beta Coefficient	Entry p value
Profit margin	0.001(a)	0.600	Assurance	-1.404	0.000
			Accessibility	1.087	0.002
Salaries over turnover	0.049(b)	0.209	Competitiveness	0.457	0.049

a. Predictors: (Constant) COM 09 and COM 07

b. Predictors: (Constant) COM 05

Table 8.26 Stepwise regression analyses for security with financial performance measures as dependent variables

Several things should be noted concerning the stepwise regression results in Tables 8.24 to 8.26. First, cleaning had *reputation* enter three models and catering had *clout* enter four models. In addition, security only had two models. *Awareness* and *competence* were not significantly related to any efficiency measure in any service line.

The stepwise results highlight the relative significance of *reputation*, *collaboration* and *assurance* for the actual financial performance by suppliers of cleaning services; the significance of *clout*, *reputation* and *reliability* for the actual financial performance by suppliers of catering services; and the relative significance of *assurance*, *accessibility* and *competitiveness* for the actual financial performance by suppliers of security services.

8.5 VERIFICATION OF CROSS-SUPPLIER COMPARISON

At the same seminar as described in Section 7.4, the results of the 'cross-supplier comparison' as described in the previous four sections were presented. Again, the panel discussion and the workshops during the seminar provided very useful feedback on the identified differences between suppliers of cleaning, catering and security services.

Differences in financial performance - Discussions around the cross-supplier comparison revealed the following. First, it was expected that cleaning would score highest on return and capital employed and that catering would score lowest. Main reasons for these expectations were that cleaning was seen as most labour intensive service line and that catering has a proportionally large product element to it. As for all other financial measures, no significant differences between the three service lines were expected, with salaries over turnover being the exception. Here, catering was expected to be lower when compared to both cleaning and security, again due to its proportionally large product element.

Against expectations, no significant differences were found for return on capital employed between the three service lines (see Section 8.1). Even though the averages for this profitability measure were highest for cleaning and lowest for catering, the non-significant differences between the three service lines were explained by relatively high salaries for catering staff in combination with relatively low profit margins on the food itself. Also against expectations, debtor collection period for catering services was found to be significantly lower when compared to both cleaning and security services (see Section 8.2). Further discussions revealed that most catering providers call for shorter debtor collection periods than do cleaning and security providers as the food itself is a relatively expensive component of the service delivery equation. In line with expectations, however, salaries over turnover for catering services was found to be significantly lower when compared to both cleaning and security services (see Section 8.3). As indicated, these differences could be explained by the fact that catering services have a proportionally large product element to them, namely the food itself.

To summarise Chapter 8, there are no significant differences in the financial performance for supplier organisations of cleaning, catering and security services concerning profit margin, return on capital employed, turnover growth, employee growth, liquidity ratio, current ratio, solvency ratio and gearing ratio. However, both debtor collection period and salaries over turnover are significantly lower for catering services when compared to both cleaning and catering services. The former findings again indicate that all three service lines investigated belong to one and the same group of business support services - that is facilities management services. The latter findings can be explained by the fact that catering services have a proportionally large and expensive product element to them, namely the food itself.

The next chapter will seek to uncover whether there are differences between the customer perceptions and the supplier perceptions concerning service quality, the nine service quality dimensions, and the underlying service quality attributes.

Box 8 Summary of cross-supplier comparison

9 CUSTOMER-SUPPLIER GAPS

As explained in our research methodology, this chapter focuses on exploring the differences between the customer perspective and the supplier perspective (see Section 4.6). First, we examine the differences between the two stakeholder groups with regards to service quality. Subsequently, we investigate whether differences exist concerning the service quality dimensions as well as their underlying service quality attributes. Next, we assess the differences regarding perceived importance of the service quality dimensions. Finally, all findings are verified and validated through focus group discussions at a dedicated seminar held in spring 2008. The raw data used in this chapter were in the form of perceived performance scores and taken directly from the customer surveys and the supplier surveys (see Annex B and Annex C).

9.1 DIFFERENCES IN PERCEIVED SERVICE QUALITY

In order to assess whether there are differences in overall perceived service quality between customers and suppliers, we first investigated the descriptive statistics for both stakeholder groups (see Table 9.1)

	N	Mean	Std. Dev.	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
customer	72	5.64	1.21	0.14	5.35	5.92	1.00	7.00
supplier	30	6.30	0.70	0.13	6.04	6.56	4.00	7.00
Total	102	5.83	1.13	0.11	5.61	6.05	1.00	7.00

Table 9.1 Descriptive statistics for service quality as perceived by customers and suppliers

Plotting the means on a graph, with the confidence intervals around the means, we get to Figure 9.1.

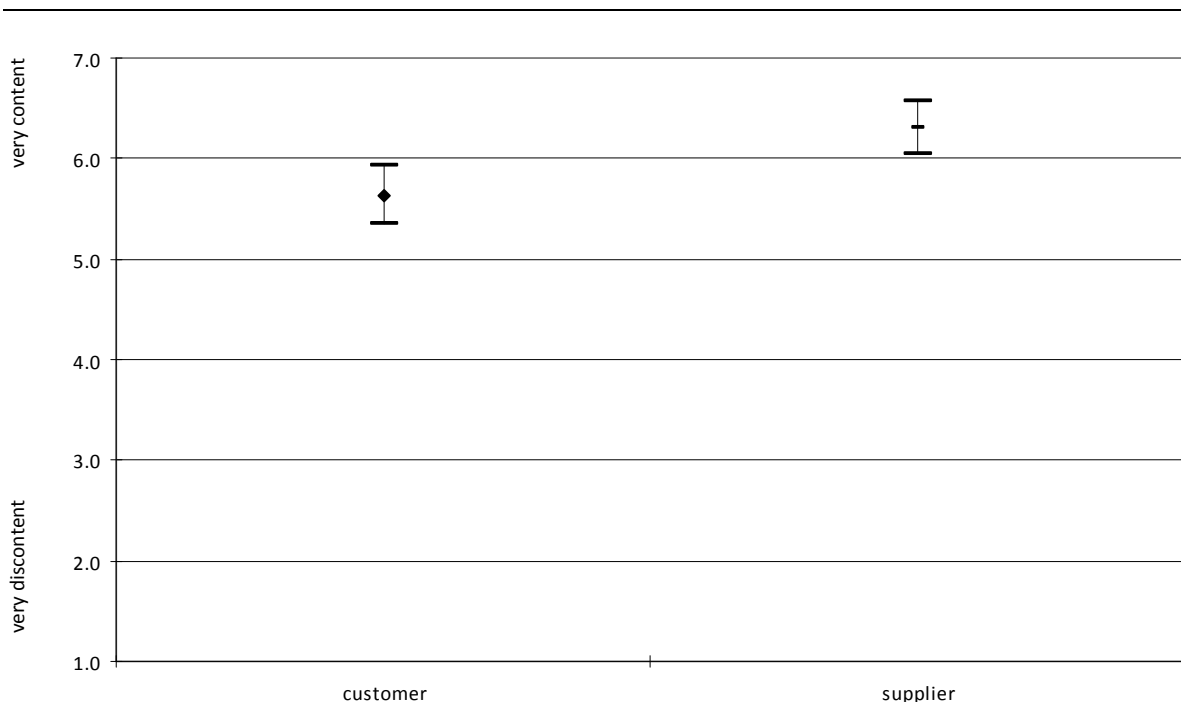


Figure 9.1 Confidence limits for service quality as perceived by customers and suppliers

In both cases the variances around the means for customers and suppliers appear similar. However, the mean for suppliers (6.30) is higher than the mean for customers (5.64) and the confidence intervals do not overlap. Thus, we suspect some effect between the two stakeholder groups.

Therefore, our hypothesis is that there will be significant differences between the overall service quality as perceived by the customer when compared to the overall service quality as perceived by the supplier, such that the supplier rating will be higher. Note that this is a one-tailed hypothesis, because specified the direction of the difference. This directional hypothesis is based on the fact that customers tend to rate supplier performance lower than suppliers do. With both conditions being negatively skewed, we used the Man-Whitney test (non-parametric alternative to the independent t-test) in order empirically assess whether the expected differences are significant (see Table 9.2).

Ranks

	Stakeholder	N	Mean Rank	Sum of Ranks
Service quality	Customer	72	46.22	3,327.50
	Supplier	30	64.18	1,925.50
	Total	102		

Test Statistics^a

	Service quality
Mann-Whitney U	699.500
Wilcoxon W	3,327.500
Z	-3.073
Asymp. Sig. (2-tailed)	0.002
Asymp. Sig. (1-tailed)	0.001

a. Grouping variable: Stakeholder

Table 9.2 Man-Whitney test for service quality as perceived by customers and suppliers

The Man-Whitney test shows that overall perceived service quality is indeed higher amongst suppliers than amongst customers ($z = -3.07$, $p = 0.001$). Therefore, it can be concluded that suppliers have higher perceptions of the service quality they provide than do customer organisations that receive cleaning, catering and security services, and that such a difference is highly unlikely to have arisen by sampling error.

9.2 DIFFERENCES ON SERVICE QUALITY DIMENSIONS

In order to assess whether there are differences in perceived performance on the nine service quality dimensions between customers and suppliers, we first investigated the descriptive statistics for both stakeholder groups (see Table 9.3).

	Stakeholder	N	Mean	Std. Dev.	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
						Lower B.	Upper B.		
Reliability	customer	72	5.51	1.12	0.13	5.25	5.77	1.40	7.00
	supplier	30	5.85	0.72	0.13	5.59	6.12	4.00	6.80
	Total	102	5.61	1.03	0.10	5.41	5.81	1.40	7.00
Clout	customer	72	5.33	1.29	0.15	5.03	5.63	1.00	7.00
	supplier	30	5.60	1.28	0.23	5.12	6.08	2.00	7.00
	Total	102	5.41	1.29	0.13	5.16	5.66	1.00	7.00

Table 9.3 Descriptive statistics for dimensions as perceived by customers and suppliers

	Stakeholder	N	Mean	Std. Dev.	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
						Lower B.	Upper B.		
Reputation	customer	72	5.64	1.12	0.13	5.37	5.90	2.00	7.00
	supplier	30	5.98	0.59	0.11	5.76	6.20	4.33	6.67
	Total	102	5.74	1.00	0.10	5.54	5.93	2.00	7.00
Awareness	customer	72	5.96	0.94	0.11	5.74	6.18	2.50	7.00
	supplier	30	6.23	0.53	0.10	6.04	6.43	4.25	7.00
	Total	102	6.04	0.84	0.08	5.87	6.21	2.50	7.00
Competitiven.	customer	72	5.41	1.13	0.13	5.15	5.68	1.80	7.00
	supplier	30	5.91	0.66	0.12	5.66	6.15	4.60	7.00
	Total	102	5.56	1.04	0.10	5.35	5.76	1.80	7.00
Collaboration	customer	72	5.16	1.15	0.14	4.89	5.43	1.50	7.00
	supplier	30	6.09	0.63	0.12	5.85	6.32	4.83	7.00
	Total	102	5.43	1.11	0.11	5.21	5.65	1.50	7.00
Accessibility	customer	72	5.87	0.90	0.11	5.66	6.08	2.50	7.00
	supplier	30	6.21	0.77	0.14	5.92	6.50	3.75	7.00
	Total	102	5.97	0.87	0.09	5.80	6.14	2.50	7.00
Competence	customer	72	5.76	0.96	0.11	5.53	5.98	1.33	7.00
	supplier	30	6.32	0.55	0.10	6.11	6.52	4.50	7.00
	Total	102	5.92	0.90	0.09	5.74	6.10	1.33	7.00
Assurance	customer	72	5.55	1.04	0.12	5.30	5.79	3.00	7.00
	supplier	30	5.93	0.56	0.10	5.72	6.13	4.75	7.00
	Total	102	5.66	0.94	0.09	5.47	5.84	3.00	7.00

Table 9.3 Descriptive statistics for dimensions as perceived by customers and suppliers (continued)

Plotting the means on a graph, with the confidence intervals around the means, we get to Figure 9.2.

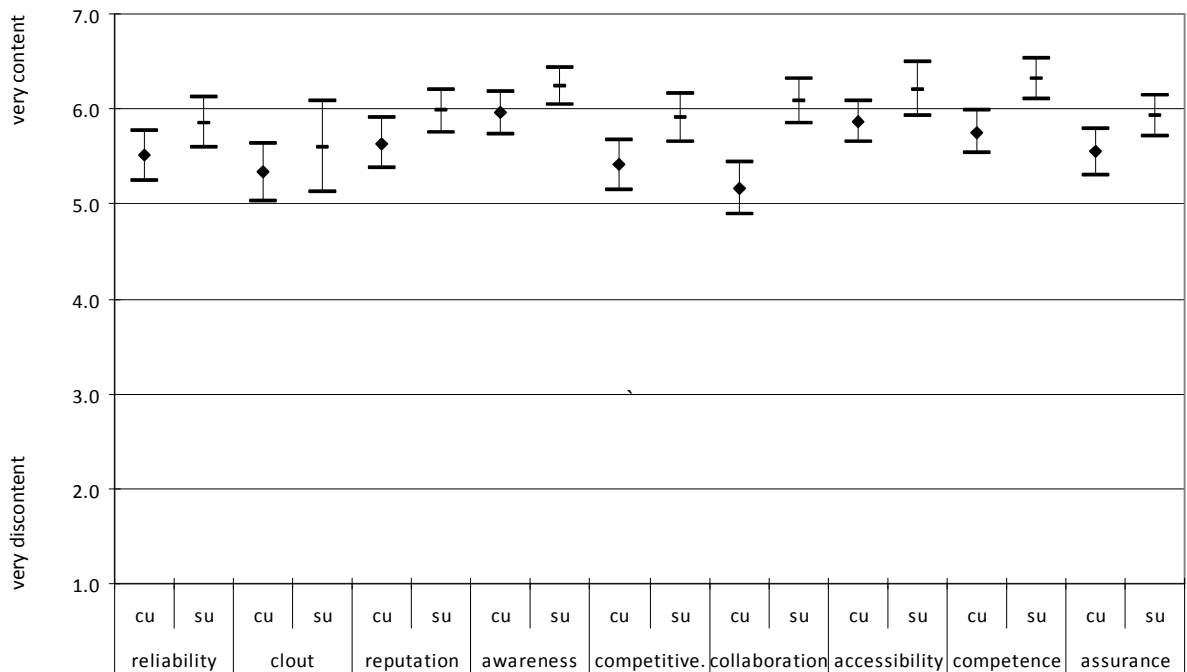


Figure 9.2 Confidence limits for performance on the nine service quality dimensions as perceived by customers and suppliers

Although the variances around the mean appear similar for most service quality dimensions, the mean for customers is lower than the mean for suppliers on all nine dimensions. With most confidence intervals clearly overlapping, however, we do not necessarily suspect a clear effect between the two stakeholder groups. As for *collaboration* and *competence*, however, we do suspect some effect between customers and suppliers as there is no overlap in the confidence intervals for the two stakeholder groups. Similarly, there might be some effect between customers and suppliers for *competitiveness* and *assurance*.

Based on the above, our hypothesis is that there will be significant differences between customer perceived performance and supplier perceived performance concerning some service quality dimensions, such that the ratings by suppliers will be higher. Again, note that this is a one-tailed hypothesis, because we have specified the direction of the difference. This directional hypothesis is based on the fact that customers tend to rate supplier performance lower than suppliers do. With all conditions being negatively skewed, we used Man-Whitney tests in order empirically assess whether the expected differences are significant (see Table 9.4).

Ranks

	Stakeholder	N	Mean Rank	Sum of Ranks
Reliability	Customer	72	49.19	3,542.00
	Supplier	30	57.03	1,711.00
	Total	102		
Clout	Customer	72	49.42	3,558.00
	Supplier	30	56.50	1,695.00
	Total	102		
Reputation	Customer	72	49.80	3,585.50
	Supplier	30	55.58	1,667.50
	Total	102		
Awareness	Customer	72	49.97	3,597.50
	Supplier	30	55.18	1,655.50
	Total	102		
Competitiveness	Customer	72	48.13	3,465.00
	Supplier	30	59.60	1,788.00
	Total	102		
Collaboration	Customer	72	43.51	3,132.50
	Supplier	30	70.68	2,120.50
	Total	102		
Accessibility	Customer	72	47.01	3,385.00
	Supplier	30	62.27	1,868.00
	Total	102		
Competence	Customer	72	45.15	3,250.50
	Supplier	30	66.75	2,002.50
	Total	102		
Assurance	Customer	72	49.05	3,531.50
	Supplier	30	57.38	1,721.50
	Total	102		

Table 9.4 Man-Whitney tests for dimensions as perceived by customers and suppliers

Test Statistics^a

	Reliability	Clout	Reputation
Mann-Whitney U	914.000	930.000	957.500
Wilcoxon W	3,542.000	3,558.000	3,585.500
Z	-1.227	-1.107	-0.903
Asymp. Sig. (2-tailed)	0.220	0.268	0.367
Asymp. Sig. (1-tailed)	0.110	0.134	0.183
	Awareness	Competitiveness	Collaboration
Mann-Whitney U	969.500	837.000	504.500
Wilcoxon W	3,597.500	3,465.000	3,132.500
Z	-0.820	-1.790	-4.236
Asymp. Sig. (2-tailed)	0.412	0.073	0.000
Asymp. Sig. (1-tailed)	0.206	0.037	0.000
	Accessibility	Competence	Assurance
Mann-Whitney U	757.000	622.500	903.500
Wilcoxon W	3,385.000	3,250.500	3,531.500
Z	-2.399	-3.373	-1.305
Asymp. Sig. (2-tailed)	0.016	0.001	0.192
Asymp. Sig. (1-tailed)	0.008	0.000	0.096

a. Grouping variable: Stakeholder

Table 9.4 Man-Whitney tests for dimensions as perceived by customers and suppliers (continued)

The Man-Whitney tests shows that perceived performance concerning *competitiveness* ($z = -1.79$, $p = 0.037$), *collaboration* ($z = -4.24$, $p < 0.001$) and *competence* ($z = -3.37$, $p < 0.001$) is indeed higher amongst suppliers than amongst customers. Furthermore, suppliers rate perceived performance concerning *accessibility* higher than do customers ($z = -2.40$, $p = 0.008$). As for *assurance*, however, there was no significant difference between perceived performance ($z = -1.31$, $p = 0.096$). Therefore, it can be concluded that suppliers rate their performance on four out of nine dimensions higher than do customers, and that such differences are highly unlikely to have arisen by sampling error.

9.3 ZOOMING IN ON EACH SERVICE QUALITY DIMENSION

In order to assess whether there are differences in perceived performance on all 44 service quality attributes between customers and suppliers, we used Man-Whitney tests for all underlying service quality attributes per service quality dimension.

Reliability - In order to assess whether there are differences in perceived performance on the underlying service quality attributes of the *reliability* dimension between customers and suppliers, we first investigated the descriptive statistics for both stakeholder groups (see Table 9.5).

	Stakeholder	N	Mean	Std. Dev.	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
						Lower B.	Upper B.		
VAR 01	customer	72	5.56	1.24	0.15	5.26	5.85	2.00	7.00
	supplier	30	5.90	0.55	0.10	5.70	6.10	5.00	7.00
	Total	102	5.66	1.09	0.11	5.44	5.87	2.00	7.00
VAR 14	customer	72	5.64	1.20	0.14	5.36	5.92	1.00	7.00
	supplier	30	6.07	0.98	0.18	5.70	6.43	3.00	7.00
	Total	102	5.76	1.15	0.11	5.54	5.99	1.00	7.00
VAR 08	customer	72	5.00	1.57	0.18	4.63	5.37	1.00	7.00
	supplier	30	5.43	1.17	0.21	5.00	5.87	3.00	7.00
	Total	102	5.13	1.47	0.15	4.84	5.42	1.00	7.00
VAR 07	customer	72	5.18	1.44	0.17	4.84	5.52	1.00	7.00
	supplier	30	5.43	1.41	0.26	4.91	5.96	2.00	7.00
	Total	102	5.25	1.43	0.14	4.97	5.53	1.00	7.00
VAR 26	customer	72	6.18	1.08	0.13	5.93	6.43	2.00	7.00
	supplier	30	6.43	0.94	0.17	6.08	6.78	4.00	7.00
	Total	102	6.25	1.04	0.10	6.05	6.46	2.00	7.00

Table 9.5 Descriptive statistics for reliability attributes as perceived by customers and suppliers

Plotting the means on a graph, with the confidence intervals around the means, we get to Figure 9.3.

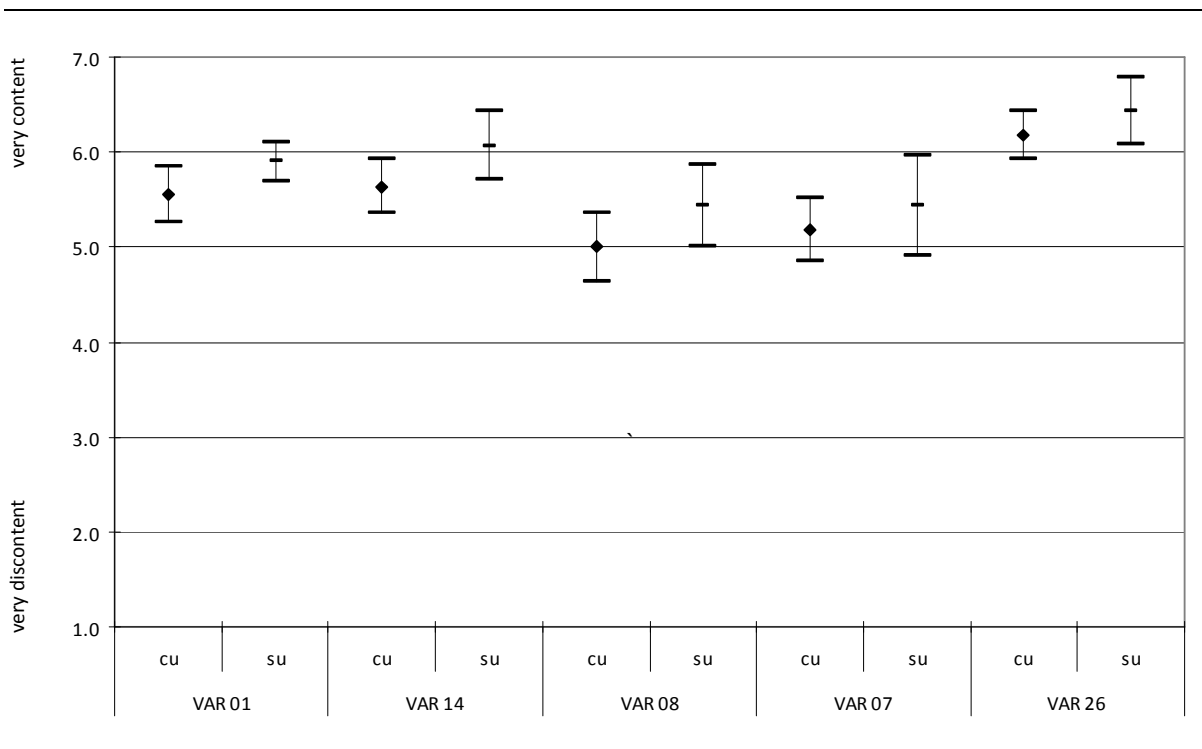


Figure 9.3 Confidence limits for the reliability attributes as perceived by customers and suppliers

Although the variances around the means appear similar for most service quality attributes, the means for customers is lower than the means for suppliers on all five attributes. With most confidence intervals clearly overlapping, however, we do not necessarily suspect clear effects between the two stakeholder groups.

Therefore, our hypothesis is that there will be no significant differences between customer perceived performance and supplier perceived performance concerning the five service quality attributes of the *reliability* dimension. With all conditions being negatively skewed, we used Man-Whitney tests in order empirically assess whether our hypothesis is true (see Table 9.6).

Ranks

	Stakeholder	N	Mean Rank	Sum of R.
VAR 01 - Consistent and correct service delivery	Customer	72	50.04	3,603.00
	Supplier	30	55.00	1,650.00
	Total	102		
VAR 14 - Meeting deadlines for projects and assignments	Customer	72	48.50	3,492.00
	Supplier	30	58.70	1,761.00
	Total	102		
VAR 08 - Proactive service personnel	Customer	72	49.64	3,574.00
	Supplier	30	55.97	1,679.00
	Total	102		
VAR 07 - Having customers' best interests at heart	Customer	72	49.87	3,590.50
	Supplier	30	55.42	1,662.50
	Total	102		
VAR 26 - Being believable and honest	Customer	72	49.04	3,531.00
	Supplier	30	57.40	1,722.00
	Total	102		

Test Statistics^a

	VAR 01	VAR 14	VAR 08	VAR 07	VAR 26
Mann-Whitney U	975.000	864.000	946.000	962.500	903.000
Wilcoxon W	3,603.000	3,492.000	3,574.000	3,590.500	3,531.000
Z	-0.839	-1.677	-1.041	-0.920	-1.435
A. Sig. (2-tailed)	0.402	0.093	0.298	0.357	0.151
A. Sig. (1-tailed)	0.201	0.047	0.149	0.179	0.076

a. Grouping variable: Stakeholder

Table 9.6 Man-Whitney tests for reliability attributes as perceived by customers and suppliers

Contrary to expectations, the Man-Whitney tests shows that 'meeting deadlines for projects and assignments' is higher rated amongst suppliers than amongst customers ($z = -1.68$, $p = 0.047$). Thus, with regards to *reliability*, it can be concluded that suppliers rate this attribute higher than do customers, and that such a difference is highly unlikely to have arisen by sampling error.

Clout - To assess whether there are differences in perceived performance on the underlying service quality attributes of the *clout* dimension between customers and suppliers, we first investigated the descriptive statistics for both stakeholder groups (see Table 9.7).

	Stakeholder	N	Mean	Std. Dev.	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
						Lower B.	Upper B.		
VAR 54	customer	72	5.56	1.68	0.20	5.16	5.95	1.00	7.00
	supplier	30	5.63	1.73	0.32	4.99	6.28	2.00	7.00
	Total	102	5.58	1.69	0.17	5.25	5.91	1.00	7.00
VAR 53	customer	72	5.76	1.29	0.15	5.46	6.07	1.00	7.00
	supplier	30	5.77	1.41	0.26	5.24	6.29	2.00	7.00
	Total	102	5.76	1.32	0.13	5.51	6.02	1.00	7.00
VAR 55	customer	72	5.03	1.61	0.19	4.65	5.41	1.00	7.00
	supplier	30	5.60	1.33	0.24	5.10	6.10	2.00	7.00
	Total	102	5.20	1.55	0.15	4.89	5.50	1.00	7.00
VAR 56	customer	72	4.97	1.48	0.17	4.62	5.32	1.00	7.00
	supplier	30	5.40	1.30	0.24	4.91	5.89	2.00	7.00
	Total	102	5.10	1.44	0.14	4.82	5.38	1.00	7.00

Table 9.7 Descriptive statistics for clout attributes as perceived by customers and suppliers

Plotting the means on a graph, with the confidence intervals around the means, we get to Figure 9.4.

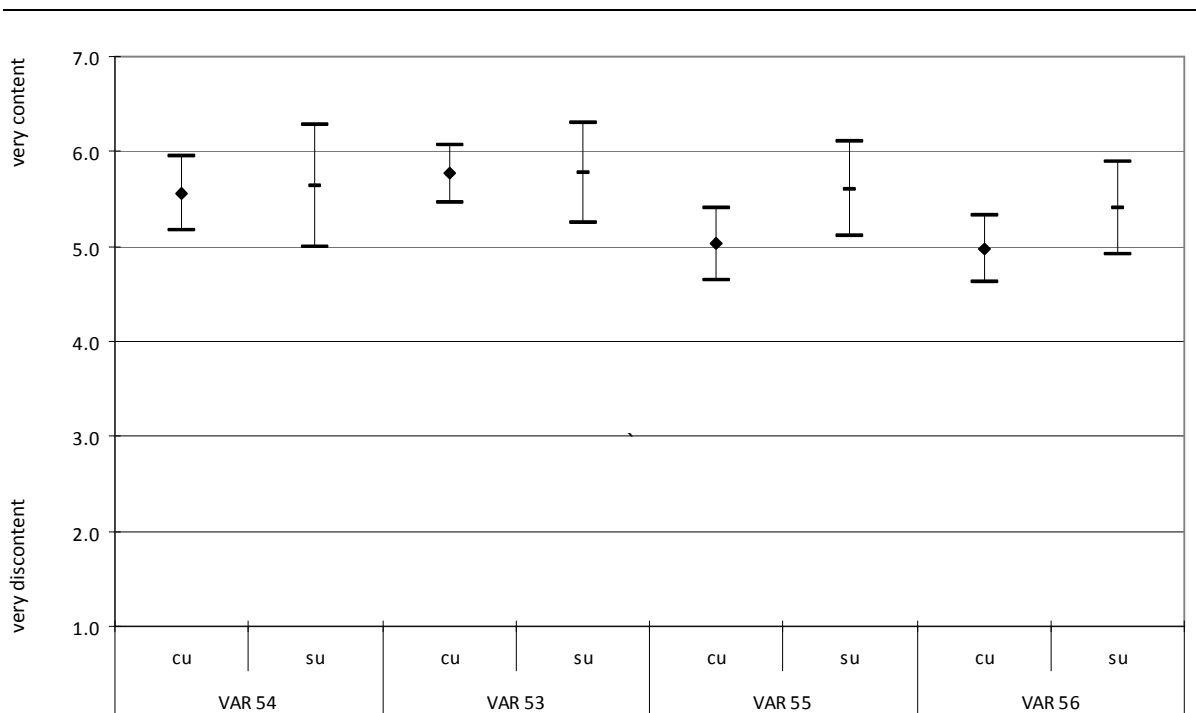


Figure 9.4 Confidence limits for the clout attributes as perceived by customers and suppliers

Both the means and the variances around the means appear similar for most service quality attributes. Again, with most confidence intervals clearly overlapping, we do not suspect clear effects between the two stakeholder groups.

Therefore, our hypothesis is that there will be no significant differences between customer perceived performance and supplier perceived performance concerning the four service quality attributes of the *clout* dimension. With all conditions being negatively skewed, we used Man-Whitney tests in order empirically assess whether our hypothesis is true (see Table 9.8).

Ranks

	Stakeholder	N	Mean Rank	Sum of R.
VAR 54 - Having a large presence in the market	Customer	72	50.79	3,657.00
	Supplier	30	53.20	1,596.00
	Total	102		
VAR 53 - Having sufficient leverage in the market	Customer	72	51.08	3,677.50
	Supplier	30	52.52	1,575.50
	Total	102		
VAR 55 - Ability to coordinate and consolidate resources with other suppliers	Customer	72	48.52	3,493.50
	Supplier	30	58.65	1,759.50
	Total	102		
VAR 56 - Ability to act as an advocate with other suppliers in the market	Customer	72	48.93	3,523.00
	Supplier	30	57.67	1,730.00
	Total	102		

Test Statistics^a

	VAR 54	VAR 53	VAR 55	VAR 56
Mann-Whitney U	1,029.000	1,049.500	865.500	895.000
Wilcoxon W	3,657.000	3,677.500	3,493.500	3,523.000
Z	-0.391	-0.236	-1.629	-1.397
A. Sig. (2-tailed)	0.696	0.814	0.103	0.163
A. Sig. (1-tailed)	0.348	0.407	0.052	0.081

a. Grouping variable: Stakeholder

Table 9.8 Man-Whitney tests for clout attributes as perceived by customers and suppliers

In line with expectations, the Man-Whitney tests confirms that there are no significant differences between the service quality attributes of the *clout* dimension as perceived by the customer when compared to the supplier ($p > 0.050$).

Reputation - In order to assess whether there are differences in perceived performance on the underlying service quality attributes of the *reputation* dimension between customers and suppliers, we first investigated the descriptive statistics for both stakeholder groups (see Table 9.9).

	Stakeholder	N	Mean	Std. Dev.	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
						Lower B.	Upper B.		
VAR 28	customer	72	6.15	1.17	0.14	5.88	6.43	1.00	7.00
	supplier	30	6.47	0.68	0.12	6.21	6.72	4.00	7.00
	Total	102	6.25	1.06	0.10	6.04	6.45	1.00	7.00
VAR 25	customer	72	6.03	1.20	0.14	5.75	6.31	2.00	7.00
	supplier	30	6.30	1.12	0.20	5.88	6.72	3.00	7.00
	Total	102	6.11	1.18	0.12	5.88	6.34	2.00	7.00
VAR 17	customer	72	5.67	1.39	0.16	5.34	5.99	1.00	7.00
	supplier	30	5.80	0.81	0.15	5.50	6.10	3.00	7.00
	Total	102	5.71	1.25	0.12	5.46	5.95	1.00	7.00
VAR 19	customer	72	5.33	1.42	0.17	5.00	5.67	1.00	7.00
	supplier	30	5.83	1.18	0.21	5.39	6.27	1.00	7.00
	Total	102	5.48	1.37	0.14	5.21	5.75	1.00	7.00
VAR 35	customer	72	5.36	1.49	0.18	5.01	5.71	1.00	7.00
	supplier	30	5.77	1.28	0.23	5.29	6.24	2.00	7.00
	Total	102	5.48	1.43	0.14	5.20	5.76	1.00	7.00
VAR 13	customer	72	5.28	1.45	0.17	4.94	5.62	2.00	7.00
	supplier	30	5.70	0.70	0.13	5.44	5.96	4.00	7.00
	Total	102	5.40	1.28	0.13	5.15	5.65	2.00	7.00

Table 9.9 Descriptive statistics for reputation attributes as perceived by customers and suppliers

Plotting the means on a graph, with the confidence intervals around the means, we get to Figure 9.5.

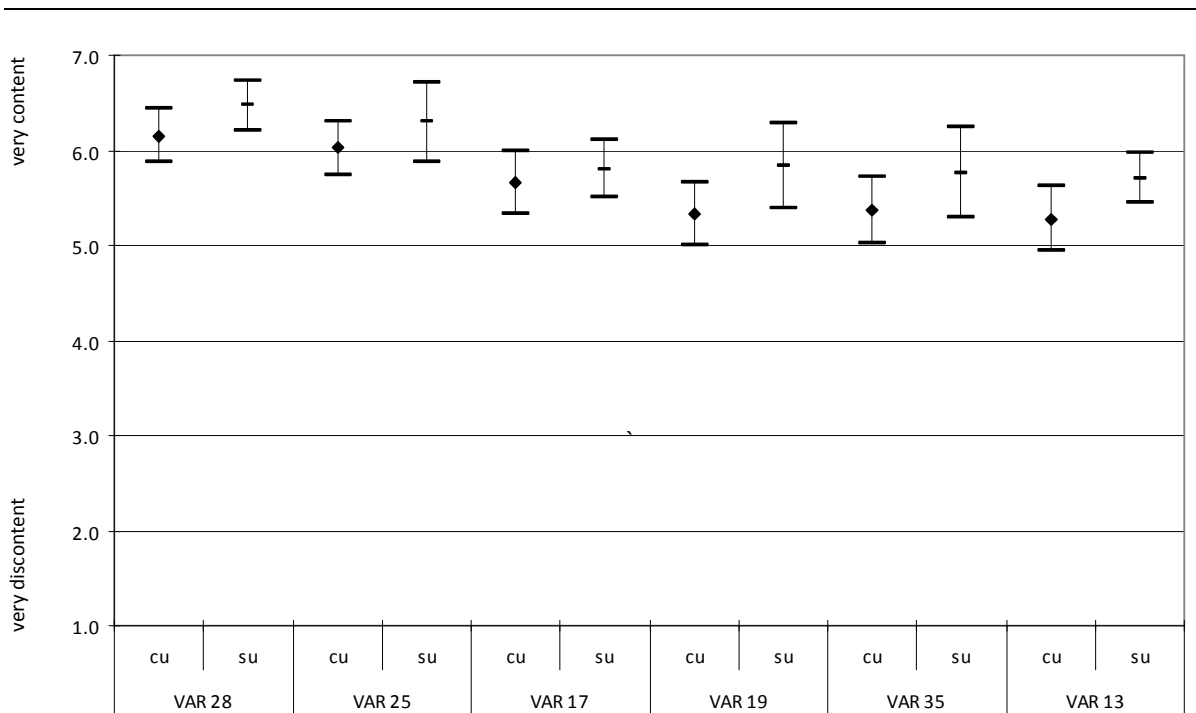


Figure 9.5 Confidence limits for the reputation attributes as perceived by customers and suppliers

Although the variances around the means appear similar for most service quality attributes, the means for customers is lower than the means for suppliers on all six attributes dimensions. Again, with most confidence intervals clearly overlapping, we do not necessarily suspect clear effects between the two stakeholder groups.

Therefore, our hypothesis is that there will be no significant differences between customer perceived performance and supplier perceived performance concerning the six service quality attributes of the *reputation* dimension. With all conditions being negatively skewed, we used Man-Whitney tests in order empirically assess whether our hypothesis is true (see Table 9.10).

Ranks

	Stakeholder	N	Mean Rank	Sum of R.
VAR 28 - Demonstration of ethical conduct	Customer	72	49.90	3,592.50
	Supplier	30	55.35	1,660.50
	Total	102		
VAR 25 - Having a good reputation in the market	Customer	72	48.93	3,523.00
	Supplier	30	57.67	1,730.00
	Total	102		
VAR 17 - Well dressed and neat-appearing service personnel	Customer	72	52.18	3,757.00
	Supplier	30	49.87	1,496.00
	Total	102		
VAR 19 - Accurate paperwork and record keeping by service personnel	Customer	72	48.13	3,465.00
	Supplier	30	59.60	1,788.00
	Total	102		
VAR 35 - Explanation of the trade-offs between service quality and cost	Customer	72	49.33	3,551.50
	Supplier	30	56.72	1,701.50
	Total	102		
VAR 13 - Understanding customers' specific needs	Customer	72	50.17	3,612.00
	Supplier	30	54.70	1,641.00
	Total	102		

Test Statistics^a

	VAR 28	VAR 25	VAR 17	VAR 19	VAR 35	VAR 13
Mann-Whitney U	964.500	895.000	1,031.000	837.000	923.500	984.000
Wilcoxon W	3,592.500	3,523.000	1,496.000	3,465.000	3,551.500	3,612.000
Z	-0.935	-1.474	-0.390	-1.865	-1.222	-0.747
A. Sig. (2-tailed)	0.350	0.141	0.697	0.062	0.222	0.455
A. Sig. (1-tailed)	0.175	0.070	0.348	0.031	0.111	0.228

a. Grouping variable: Stakeholder

Table 9.10 Man-Whitney tests for reputation attributes as perceived by customers and suppliers

Contrary to expectations, the Man-Whitney tests shows that 'accurate paperwork and record keeping by service personnel' is higher rated amongst suppliers than amongst customers ($z = -1.87$, $p = 0.031$). Thus, with regards to *reputation*, it can be concluded that suppliers rate this attribute higher than do customers, and that such a difference is highly unlikely to have arisen by sampling error.

Awareness - To assess whether there are differences in perceived performance on the underlying service quality attributes of the *awareness* dimension between customers and suppliers, we first investigated the descriptive statistics for both stakeholder groups (see Table 9.11).

	Stakeholder	N	Mean	Std. Dev.	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
						Lower B.	Upper B.		
VAR 37	customer	72	6.04	1.09	0.13	5.78	6.30	2.00	7.00
	supplier	30	6.17	1.21	0.22	5.72	6.62	1.00	7.00
	Total	102	6.08	1.12	0.11	5.86	6.30	1.00	7.00
VAR 38	customer	72	6.06	1.10	0.13	5.80	6.31	1.00	7.00
	supplier	30	6.53	0.57	0.10	6.32	6.75	5.00	7.00
	Total	102	6.20	1.00	0.10	6.00	6.39	1.00	7.00
VAR 27	customer	72	6.28	0.91	0.11	6.06	6.49	4.00	7.00
	supplier	30	6.70	0.53	0.10	6.50	6.90	5.00	7.00
	Total	102	6.40	0.84	0.08	6.24	6.57	4.00	7.00
VAR 20	customer	72	5.46	1.26	0.15	5.16	5.75	2.00	7.00
	supplier	30	5.53	1.07	0.20	5.13	5.93	2.00	7.00
	Total	102	5.48	1.20	0.12	5.24	5.72	2.00	7.00

Table 9.11 Descriptive statistics for awareness attributes as perceived by customers and suppliers

Plotting the means on a graph, with the confidence intervals around the means, we get to Figure 9.6.

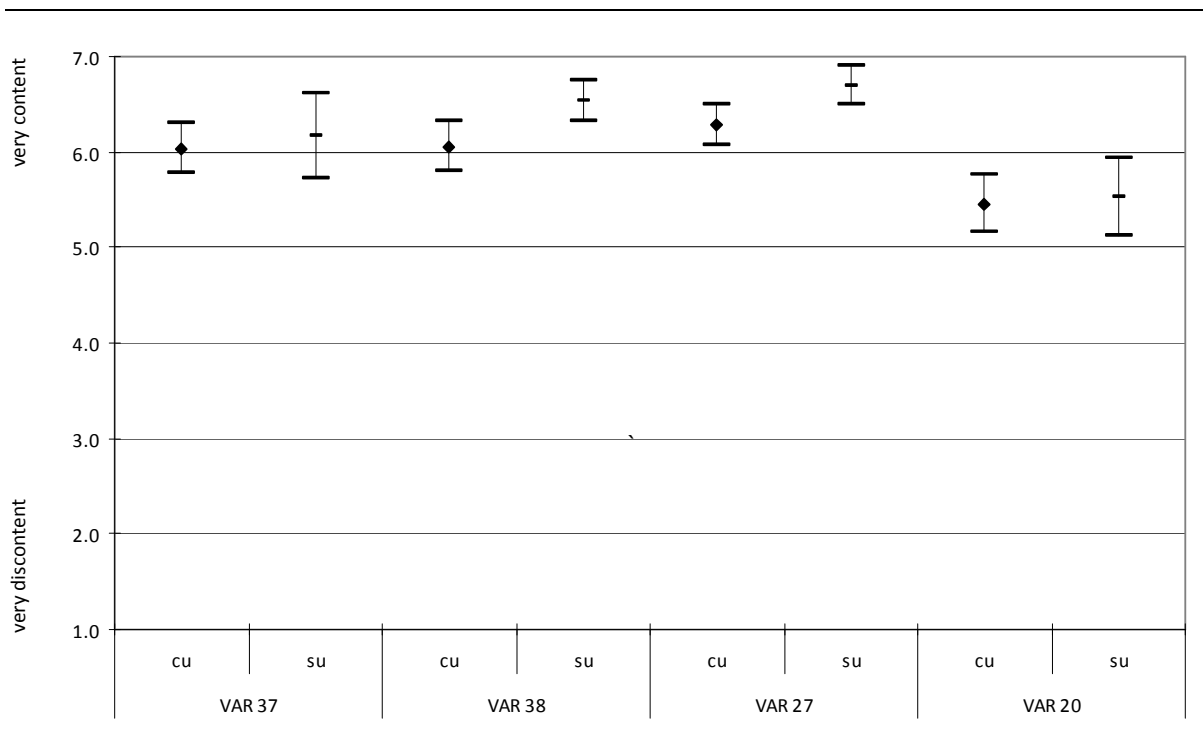


Figure 9.6 Confidence limits for the awareness attributes as perceived by customers and suppliers

Both the means and the variances around the means appear similar for the first and the last service quality attribute. However, the confidence intervals for variable 38 and variable 27 do not overlap substantially. Here, we therefore suspect some effects between the two stakeholder groups.

Based on the above, our hypothesis is that there will be significant differences between customer perceived performance and supplier perceived performance concerning variables 38 and 27, such that the supplier ratings will be higher. With all conditions being negatively skewed, we used Man-Whitney tests in order empirically assess whether our hypothesis is true (see Table 9.12).

Ranks

	Stakeholder	N	Mean Rank	Sum of R.
VAR 37 - Having a basic understanding of customers' businesses	Customer	72	50.17	3,612.00
	Supplier	30	54.70	1,641.00
	Total	102		
VAR 38 - Willingness to learn customers' specific requirements	Customer	72	47.86	3,446.00
	Supplier	30	60.23	1,807.00
	Total	102		
VAR 27 - Protection of confidential and proprietary information	Customer	72	47.75	3,438.00
	Supplier	30	60.50	1,815.00
	Total	102		
VAR 20 - Visually appealing materials associated with the services	Customer	72	51.07	3,677.00
	Supplier	30	52.53	1,576.00
	Total	102		

Test Statistics^a

	VAR 37	VAR 38	VAR 27	VAR 20
Mann-Whitney U	984.000	818.000	810.000	1,049.000
Wilcoxon W	3,612.000	3,446.000	3,438.000	3,677.000
Z	-0.759	-2.086	-2.245	-0.248
A. Sig. (2-tailed)	0.448	0.037	0.025	0.804
A. Sig. (1-tailed)	0.224	0.018	0.012	0.402

a. Grouping variable: Stakeholder

Table 9.12 Man-Whitney tests for awareness attributes as perceived by customers and suppliers

As expected, the Man-Whitney tests shows that 'willingness to learn customers' specific requirements' ($z = -2.09$, $p = 0.018$) and 'protection of confidential and proprietary information' ($z = -2.25$, $p = 0.012$) are indeed higher rated amongst suppliers than amongst customers. Hence, with regards to *awareness*, it can be concluded that suppliers rate attribute 38 and 27 higher than do customers, and that such differences are highly unlikely to have arisen by sampling error.

Competitiveness - In order to assess whether there are differences in perceived performance on the underlying service quality attributes of the *competitiveness* dimension between customers and suppliers, we first investigated the descriptive statistics for both stakeholder groups (see Table 9.13).

	Stakeholder	N	Mean	Std. Dev.	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
						Lower B.	Upper B.		
VAR 46	customer	72	5.51	1.27	0.15	5.22	5.81	2.00	7.00
	supplier	30	6.20	0.71	0.13	5.93	6.47	5.00	7.00
	Total	102	5.72	1.17	0.12	5.49	5.95	2.00	7.00
VAR 47	customer	72	5.10	1.37	0.16	4.78	5.42	1.00	7.00
	supplier	30	5.67	1.35	0.25	5.16	6.17	2.00	7.00
	Total	102	5.26	1.38	0.14	4.99	5.54	1.00	7.00
VAR 48	customer	72	5.39	1.66	0.20	5.00	5.78	1.00	7.00
	supplier	30	5.80	1.47	0.27	5.25	6.35	1.00	7.00
	Total	102	5.51	1.61	0.16	5.19	5.83	1.00	7.00
VAR 45	customer	72	5.49	1.50	0.18	5.13	5.84	1.00	7.00
	supplier	30	6.20	0.76	0.14	5.92	6.48	4.00	7.00
	Total	102	5.70	1.36	0.13	5.43	5.96	1.00	7.00
VAR 18	customer	72	5.57	1.30	0.15	5.26	5.87	2.00	7.00
	supplier	30	5.67	1.09	0.20	5.26	6.07	1.00	7.00
	Total	102	5.60	1.24	0.12	5.36	5.84	1.00	7.00

Table 9.13 Descriptive statistics for competitiveness attributes as perceived by customers and suppliers

Plotting the means on a graph, with the confidence intervals around the means, we get to Figure 9.7.

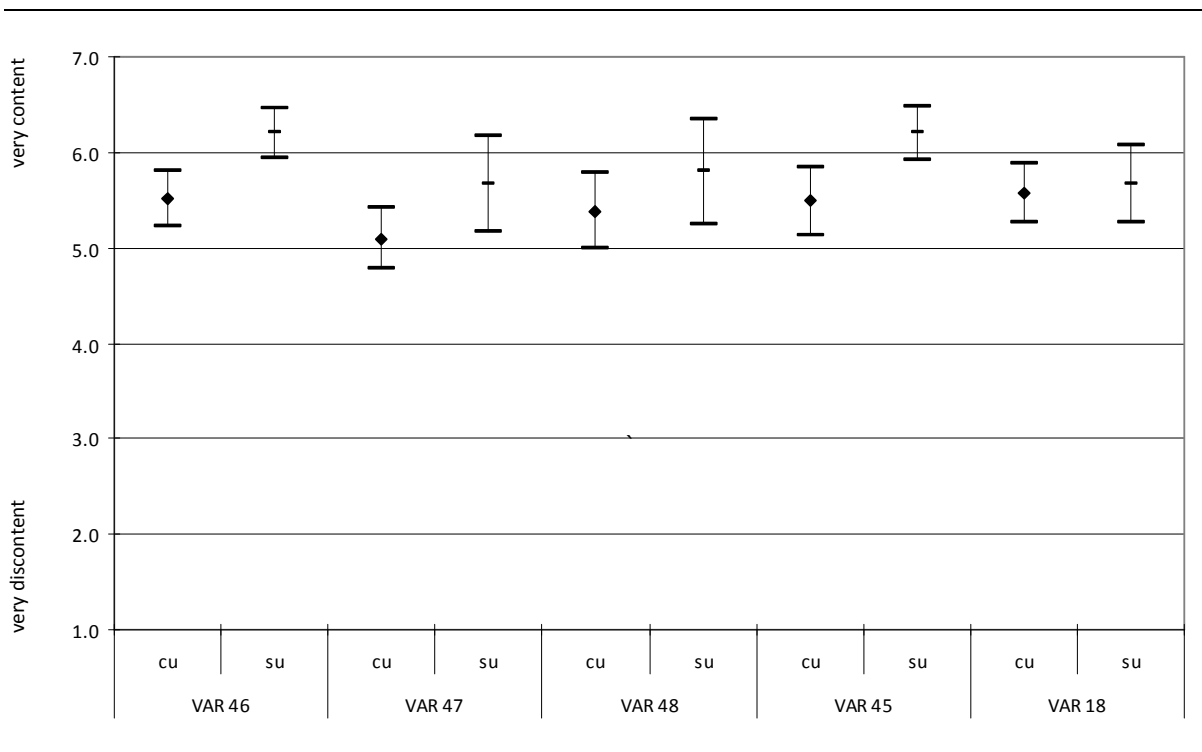


Figure 9.7 Confidence limits for the competitiveness attributes as perceived by customers and suppliers

Although the variances around the mean appear relatively similar for most service quality attributes, the mean for customers is lower than the mean for suppliers on all five attributes. However, the confidence intervals for variable 46 and variable 45 do not overlap. Therefore, we suspect significant effects between the two stakeholder groups for these two variables.

Based on the above, our hypothesis is that there will be significant differences between customer perceived performance and supplier perceived performance concerning variables 46 and 45, such that the ratings by suppliers will be higher. With all conditions being negatively skewed, we used Man-Whitney tests in order empirically assess whether our hypothesis is true (see Table 9.14).

Ranks

	Stakeholder	N	Mean Rank	Sum of R.
VAR 46 - Pricing that is competitive compared to other supplier	Customer	72	47.03	3,386.00
	Supplier	30	62.23	1,867.00
	Total	102		
VAR 47 - Provision of multiple competitive bids	Customer	72	47.59	3,426.50
	Supplier	30	60.88	1,826.50
	Total	102		
VAR 48 - Pricing that relates to the quality delivered	Customer	72	49.45	3,560.50
	Supplier	30	56.42	1,692.50
	Total	102		
VAR 45 - Pricing that meets customers' budget objectives	Customer	72	47.74	3,437.00
	Supplier	30	60.53	1,816.00
	Total	102		
VAR 18 - Up-to-date appearing service equipment	Customer	72	51.24	3,689.00
	Supplier	30	52.13	1,564.00
	Total	102		

Test Statistics^a

	VAR 46	VAR 47	VAR 48	VAR 45	VAR 18
Mann-Whitney U	758.000	798.500	932.500	809.000	1,061.000
Wilcoxon W	3,386.000	3,426.500	3,560.500	3,437.000	3,689.000
Z	-2.485	-2.130	-1.128	-2.110	-0.147
A. Sig. (2-tailed)	0.013	0.033	0.259	0.035	0.883
A. Sig. (1-tailed)	0.006	0.017	0.130	0.017	0.442

a. Grouping variable: Stakeholder

Table 9.14 Man-Whitney tests for competitiveness attributes as perceived by customers and suppliers

As expected, the Man-Whitney tests shows that 'pricing that is competitive compared to other suppliers' ($z = -2.49$, $p = 0.006$) and 'pricing that meets customers' budget objectives' ($z = -2.11$, $p = 0.017$) are indeed higher rated amongst suppliers than amongst customers. In addition, the Man-Whitney tests shows that 'provision of multiple competitive bids' is also higher rated amongst suppliers than amongst customers ($z = -2.13$, $p = 0.017$). Thus, with regards to *competitiveness*, it can be concluded that suppliers rate attributes 46, 47 and 45 higher than do customers, and that such differences are highly unlikely to have arisen by sampling error.

Collaboration - To assess whether there are differences in perceived performance on the underlying service quality attributes of the *collaboration* dimension between customers and suppliers, we first investigated the descriptive statistics for both stakeholder groups (see Table 9.15).

	Stakeholder	N	Mean	Std. Dev.	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
						Lower B.	Upper B.		
VAR 43	customer	72	4.38	1.46	0.17	4.03	4.72	1.00	7.00
	supplier	30	5.67	1.12	0.21	5.25	6.09	3.00	7.00
	Total	102	4.75	1.49	0.15	4.46	5.05	1.00	7.00
VAR 42	customer	72	4.94	1.40	0.17	4.61	5.27	1.00	7.00
	supplier	30	6.23	0.77	0.14	5.94	6.52	4.00	7.00
	Total	102	5.32	1.38	0.14	5.05	5.59	1.00	7.00
VAR 44	customer	72	4.93	1.24	0.15	4.64	5.22	1.00	7.00
	supplier	30	6.20	0.61	0.11	5.97	6.43	5.00	7.00
	Total	102	5.30	1.23	0.12	5.06	5.55	1.00	7.00
VAR 41	customer	72	5.53	1.34	0.16	5.21	5.84	1.00	7.00
	supplier	30	6.37	0.61	0.11	6.14	6.60	5.00	7.00
	Total	102	5.77	1.23	0.12	5.53	6.02	1.00	7.00
VAR 33	customer	72	5.54	1.32	0.16	5.23	5.85	2.00	7.00
	supplier	30	6.07	1.01	0.19	5.69	6.45	2.00	7.00
	Total	102	5.70	1.26	0.12	5.45	5.94	2.00	7.00
VAR 36	customer	72	5.63	1.54	0.18	5.26	5.99	1.00	7.00
	supplier	30	6.00	1.17	0.21	5.56	6.44	2.00	7.00
	Total	102	5.74	1.45	0.14	5.45	6.02	1.00	7.00

Table 9.15 Descriptive statistics for collaboration attributes as perceived by customers and suppliers

Plotting the means on a graph, with the confidence intervals around the means, we get to Figure 9.8.

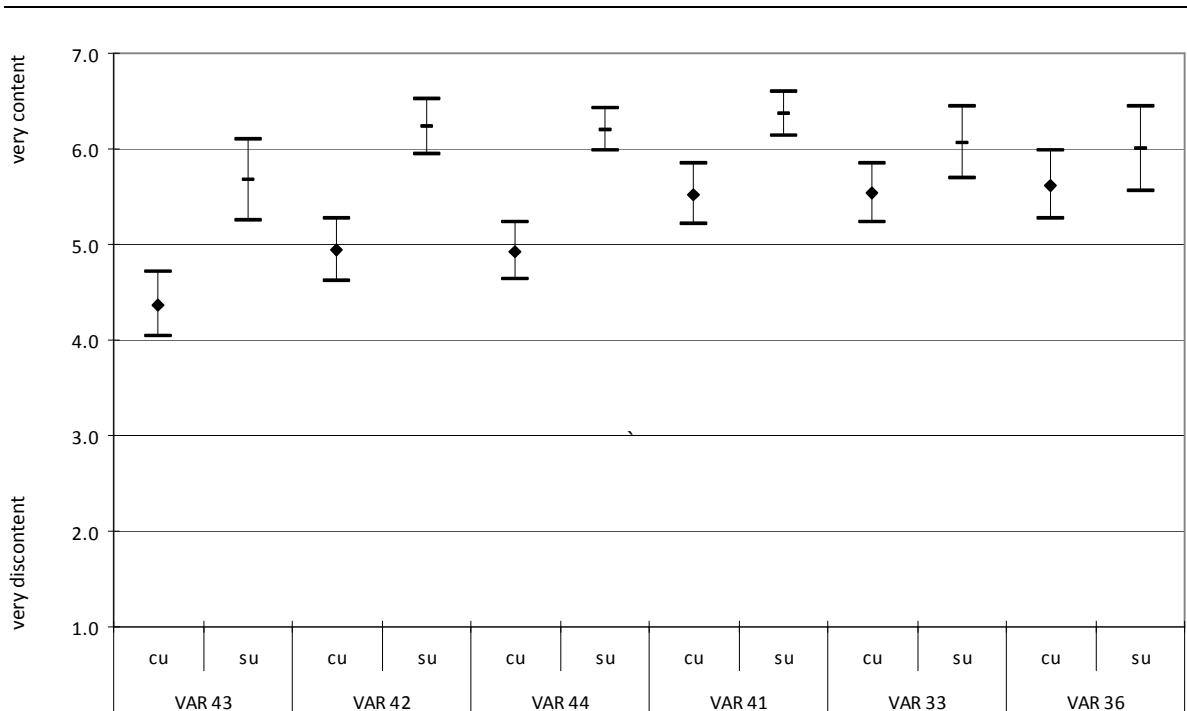


Figure 9.8 Confidence limits for the collaboration attributes as perceived by customers and suppliers

Although the variances around the means appear similar for most service quality attributes, the means for customers is lower than the means for suppliers on all six attributes dimensions. With the confidence intervals for variables 43, 42, 44 and 41 not overlapping, we again suspect significant effects between the two stakeholder groups for these four variables.

Therefore, our hypothesis is that there will be significant differences between customer perceived performance and supplier perceived performance concerning variables 43, 42, 44 and 41, such that the supplier ratings will be higher. With all conditions being negatively skewed, we used Man-Whitney tests in order empirically assess whether our hypothesis is true (see Table 9.16).

Ranks

	Stakeholder	N	Mean Rank	Sum of R.
VAR 43 - Willingness to incur risk for customers	Customer	72	43.94	3,164.00
	Supplier	30	69.63	2,089.00
	Total	102		
VAR 42 - Willingness to act as an advocate with senior customers' executives	Customer	72	43.10	3,103.50
	Supplier	30	71.65	2,149.50
	Total	102		
VAR 44 - Willingness to provide profit driven alternatives	Customer	72	41.92	3,018.00
	Supplier	30	74.50	2,235.00
	Total	102		
VAR 41 - Willingness to establish partnerships with joint goal setting	Customer	72	45.74	3,293.50
	Supplier	30	65.32	1,959.50
	Total	102		
VAR 33 - Promotion of an interactive environment with open communication	Customer	72	48.15	3,467.00
	Supplier	30	59.53	1,786.00
	Total	102		
VAR 36 - Assurance that a problem will be handled effectively and efficiently	Customer	72	49.92	3,594.50
	Supplier	30	55.28	1,658.50
	Total	102		

Test Statistics^a

	VAR 43	VAR 42	VAR 44	VAR 41	VAR 33	VAR 36
Mann-Whitney U	536.000	475.500	390.000	665.500	839.000	966.500
Wilcoxon W	3,164.000	3,103.500	3,018.000	3,293.500	3,467.000	3,594.500
Z	-4.094	-4.581	-5.310	-3.222	-1.909	-0.897
A. Sig. (2-tailed)	0.000	0.000	0.000	0.001	0.056	0.370
A. Sig. (1-tailed)	0.000	0.000	0.000	0.001	0.028	0.185

a. Grouping variable: Stakeholder

Table 9.16 Man-Whitney tests for collaboration attributes as perceived by customers and suppliers

As expected, the Man-Whitney tests shows that 'willingness to incur risk for customers' ($z = -4.09$, $p < 0.001$), 'willingness to act as an advocate with senior customers' executives' ($z = -4.58$, $p < 0.001$), 'willingness to provide profit driven alternatives' ($z = -5.31$, $p < 0.001$) and 'willingness to establish partnerships with joint planning and goal setting' ($z = -3.22$, $p = 0.001$) all are indeed higher rated amongst suppliers than amongst customers. In addition, the Man-Whitney tests shows that 'promotion of an interactive environment with open communication' is also higher rated amongst suppliers than amongst customers ($z = -1.91$, $p = 0.028$). Hence, with regards to *collaboration*, it can be concluded that suppliers rate attributes 43, 42, 44, 41 and 33 higher than do customers, and that such differences are highly unlikely to have arisen by sampling error.

Accessibility - In order to assess whether there are differences in perceived performance on the underlying service quality attributes of the *accessibility* dimension between customers and suppliers, we first investigated the descriptive statistics for both stakeholder groups (see Table 9.17).

	Stakeholder	N	Mean	Std. Dev.	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
						Lower B.	Upper B.		
VAR 30	customer	72	6.15	0.99	0.12	5.92	6.38	2.00	7.00
	supplier	30	6.50	0.68	0.12	6.25	6.75	5.00	7.00
	Total	102	6.25	0.92	0.09	6.07	6.44	2.00	7.00
VAR 29	customer	72	5.94	1.07	0.13	5.69	6.20	2.00	7.00
	supplier	30	6.27	1.01	0.19	5.89	6.65	3.00	7.00
	Total	102	6.04	1.06	0.11	5.83	6.25	2.00	7.00
VAR 31	customer	72	6.01	0.91	0.11	5.80	6.23	3.00	7.00
	supplier	30	6.40	0.62	0.11	6.17	6.63	5.00	7.00
	Total	102	6.13	0.85	0.08	5.96	6.29	3.00	7.00
VAR 32	customer	72	5.36	1.17	0.14	5.09	5.64	2.00	7.00
	supplier	30	5.67	1.21	0.22	5.21	6.12	2.00	7.00
	Total	102	5.45	1.18	0.12	5.22	5.68	2.00	7.00

Table 9.17 Descriptive statistics for accessibility attributes as perceived by customers and suppliers

Plotting the means on a graph, with the confidence intervals around the means, we get to Figure 9.9.

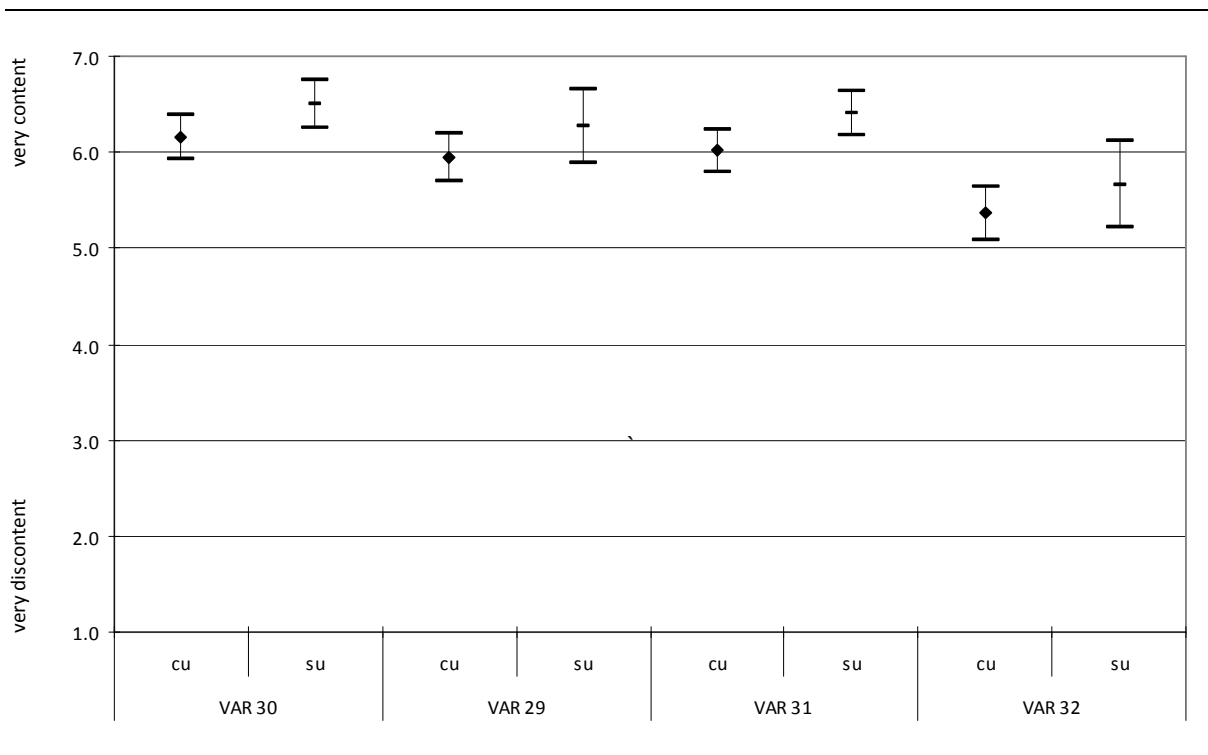


Figure 9.9 Confidence limits for the accessibility attributes as perceived by customers and suppliers

Although the variances around the means appear similar for most service quality attributes, the means for customers is lower than the mean for suppliers on all four attributes. Furthermore, the confidence intervals for variable 30 and variable 31 do not overlap substantially. Here, we therefore suspect some effect between the two stakeholder groups.

Based on the above, our hypothesis is that there will be significant differences between customer perceived performance and supplier perceived performance concerning variables 30 and 31, such that the ratings by suppliers will be higher. With all conditions being negatively skewed, we used Man-Whitney tests in order empirically assess whether our hypothesis is true (see Table 9.18).

Ranks

	Stakeholder	N	Mean Rank	Sum of R.
VAR 30 - Being easily contacted (face-to-face, phone or e-mail)	Customer	72	48.54	3,495.00
	Supplier	30	58.60	1,758.00
	Total	102		
VAR 29 - Being available at all times to assist customers	Customer	72	48.20	3,470.50
	Supplier	30	59.42	1,782.50
	Total	102		
VAR 31 - Having convenient operating hours	Customer	72	48.14	3,466.00
	Supplier	30	59.57	1,787.00
	Total	102		
VAR 32 - Having technical resources that ease the spread of information	Customer	72	48.82	3,515.00
	Supplier	30	57.93	1,738.00
	Total	102		

Test Statistics^a

	VAR 30	VAR 29	VAR 31	VAR 32
Mann-Whitney U	867.000	842.500	838.000	887.000
Wilcoxon W	3,495.000	3,470.500	3,466.000	3,515.000
Z	-1.708	-1.888	-1.942	-1.488
A. Sig. (2-tailed)	0.088	0.059	0.052	0.137
A. Sig. (1-tailed)	0.044	0.030	0.026	0.068

a. Grouping variable: Stakeholder

Table 9.18 Man-Whitney tests for accessibility attributes as perceived by customers and suppliers

As expected, the Man-Whitney tests shows that ‘being easily contacted (face-to-face, phone or e-mail)’ ($z = -1.71$, $p = 0.044$) and ‘having convenient operating hours’ ($z = -1.94$, $p = 0.026$) are indeed higher rated amongst suppliers than amongst customers. In addition, the Man-Whitney tests shows that ‘being available at all times to assist customers’ is also higher rated amongst suppliers than amongst customers ($z = -1.89$, $p = 0.030$). Thus, with regards to *accessibility*, it can be concluded that suppliers rate attributes 30, 29 and 31 higher than do customers, and that such differences are highly unlikely to have arisen by sampling error.

Competence - To assess whether there are differences in perceived performance on the underlying service quality attributes of the *competence* dimension between customers and suppliers, we first investigated the descriptive statistics for both stakeholder groups (see Table 9.19).

	Stakeholder	N	Mean	Std. Dev.	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
						Lower B.	Upper B.		
VAR 21	customer	72	6.17	1.02	0.12	5.93	6.41	1.00	7.00
	supplier	30	6.63	0.49	0.09	6.45	6.82	6.00	7.00
	Total	102	6.30	0.92	0.09	6.12	6.48	1.00	7.00
VAR 24	customer	72	5.29	1.32	0.16	4.98	5.60	1.00	7.00
	supplier	30	5.67	1.12	0.21	5.25	6.09	3.00	7.00
	Total	102	5.40	1.27	0.13	5.15	5.65	1.00	7.00
VAR 23	customer	72	5.92	1.03	0.12	5.67	6.16	2.00	7.00
	supplier	30	6.50	0.51	0.09	6.31	6.69	6.00	7.00
	Total	102	6.09	0.95	0.09	5.90	6.27	2.00	7.00
VAR 51	customer	72	5.82	1.29	0.15	5.52	6.12	1.00	7.00
	supplier	30	6.43	0.86	0.16	6.11	6.75	3.00	7.00
	Total	102	6.00	1.21	0.12	5.76	6.24	1.00	7.00
VAR 50	customer	72	5.81	1.24	0.15	5.51	6.10	1.00	7.00
	supplier	30	6.30	0.84	0.15	5.99	6.61	3.00	7.00
	Total	102	5.95	1.16	0.11	5.72	6.18	1.00	7.00
VAR 22	customer	72	5.54	1.02	0.12	5.30	5.78	2.00	7.00
	supplier	30	6.37	0.56	0.10	6.16	6.57	5.00	7.00
	Total	102	5.78	0.98	0.10	5.59	5.98	2.00	7.00

Table 9.19 Descriptive statistics for competence attributes as perceived by customers and suppliers

Plotting the means on a graph, with the confidence intervals around the means, we get to Figure 9.10.

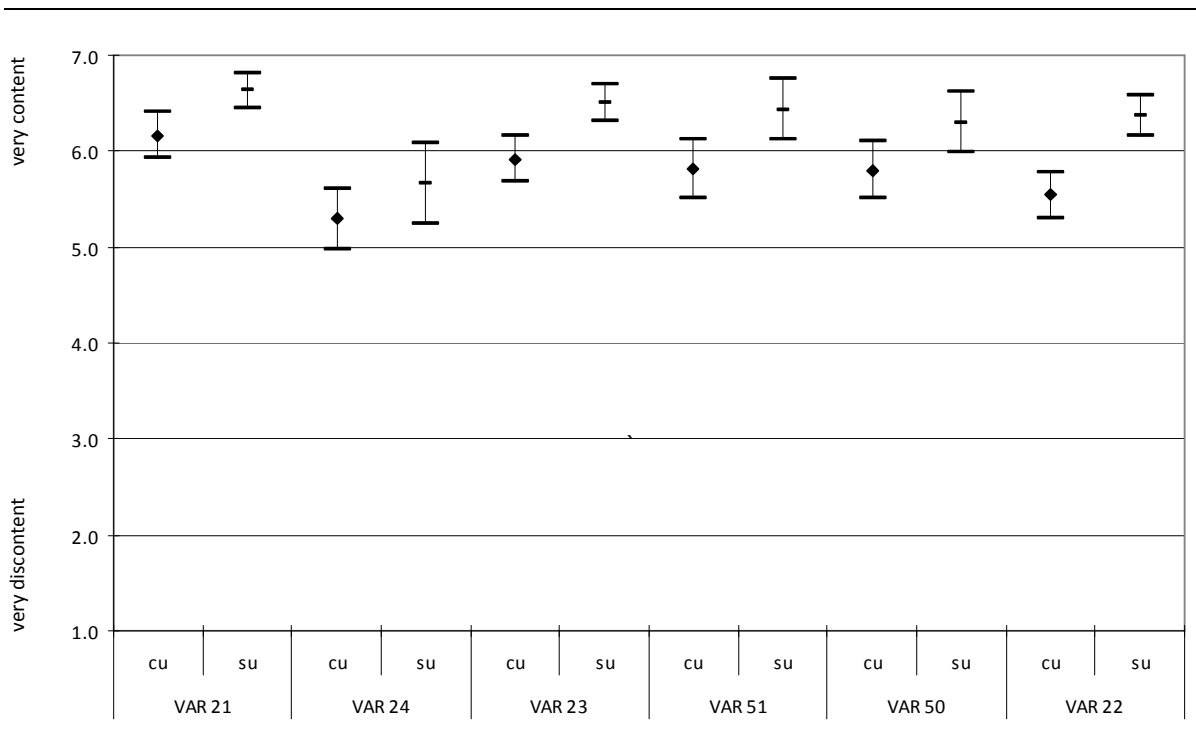


Figure 9.10 Confidence limits for the competence attributes as perceived by customers and suppliers

Although the variances around the means appear similar for most service quality attributes, the means for customers is lower than the means for suppliers on all six attributes. With the confidence intervals for variables 21, 23 and 22 not overlapping, we suspect significant effects between the two stakeholder groups for these three variables.

Therefore, our hypothesis is that there will be significant differences between customer perceived performance and supplier perceived performance concerning variables 21, 23 and 22, such that the supplier ratings will be higher. With all conditions being negatively skewed, we used Man-Whitney tests in order empirically assess whether our hypothesis is true (see Table 9.20).

Ranks

	Stakeholder	N	Mean Rank	Sum of R.
VAR 21 - Having sufficient expertise in the area of the services	Customer	72	47.09	3,390.50
	Supplier	30	62.08	1,862.50
	Total	102		
VAR 24 - Having sufficient research capability	Customer	72	49.26	3,547.00
	Supplier	30	56.87	1,706.00
	Total	102		
VAR 23 - Having the required knowledge and skills to manage the service	Customer	72	46.40	3,340.50
	Supplier	30	63.75	1,912.50
	Total	102		
VAR 51 - Ability to provide customised and unique services	Customer	72	46.45	3,344.50
	Supplier	30	63.62	1,908.50
	Total	102		
VAR 50 - Ability to offer an extended scope of the basic services provided	Customer	72	47.54	3,423.00
	Supplier	30	61.00	1,830.00
	Total	102		
VAR 22 - Having good problem-solving skills	Customer	72	44.15	3,178.50
	Supplier	30	69.15	2,074.50
	Total	102		

Test Statistics^a

	VAR 21	VAR 24	VAR 23	VAR 51	VAR 50	VAR 22
Mann-Whitney U	762.500	919.000	712.500	716.500	795.000	550.500
Wilcoxon W	3,390.500	3,547.000	3,340.500	3,344.500	3,423.000	3,178.500
Z	-2.611	-1.218	-2.977	-2.890	-2.316	-4.356
A. Sig. (2-tailed)	0.009	0.223	0.003	0.004	0.021	0.000
A. Sig. (1-tailed)	0.005	0.112	0.001	0.002	0.010	0.000

a. Grouping variable: Stakeholder

Table 9.20 Man-Whitney tests for competence attributes as perceived by customers and suppliers

As expected, the Man-Whitney tests shows that ‘having sufficient expertise in the area of the services’ ($z = -2.61$, $p = 0.005$), ‘having the required knowledge and skills to manage the service’ ($z = -2.98$, $p = 0.001$) and ‘having good problem-solving skills’ ($z = -4.36$, $p < 0.001$) all are indeed higher rated amongst suppliers than amongst customers. In addition, the Man-Whitney tests shows that ‘ability to provide customised and unique services’ ($z = -2.89$, $p = 0.002$) and ‘ability to offer an extended scope of the basic services provided’ ($z = -2.32$, $p = 0.010$) are also higher rated amongst suppliers than amongst customers. Hence, with regards to *competence*, it can be concluded that suppliers rate attributes 21, 23, 51, 50 and 22 higher than do customers, and that such differences are highly unlikely to have arisen by sampling error.

Assurance - In order to assess whether there are differences in perceived performance on the underlying service quality attributes of the *assurance* dimension between customers and suppliers, we first investigated the descriptive statistics for both stakeholder groups (see Table 9.21).

	Stakeholder	N	Mean	Std. Dev.	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
						Lower B.	Upper B.		
VAR 09	customer	72	5.75	1.08	0.13	5.50	6.00	2.00	7.00
	supplier	30	5.87	0.68	0.12	5.61	6.12	4.00	7.00
	Total	102	5.78	0.98	0.10	5.59	5.98	2.00	7.00
VAR 16	customer	72	5.58	1.24	0.15	5.29	5.88	3.00	7.00
	supplier	30	6.00	0.74	0.14	5.72	6.28	4.00	7.00
	Total	102	5.71	1.13	0.11	5.48	5.93	3.00	7.00
VAR 10	customer	72	5.24	1.35	0.16	4.92	5.55	1.00	7.00
	supplier	30	5.67	0.66	0.12	5.42	5.91	4.00	7.00
	Total	102	5.36	1.20	0.12	5.13	5.60	1.00	7.00
VAR 06	customer	72	5.61	1.25	0.15	5.32	5.91	2.00	7.00
	supplier	30	6.17	0.83	0.15	5.86	6.48	3.00	7.00
	Total	102	5.77	1.17	0.12	5.55	6.00	2.00	7.00

Table 9.21 Descriptive statistics for assurance attributes as perceived by customers and suppliers

Plotting the means on a graph, with the confidence intervals around the means, we get to Figure 9.11.

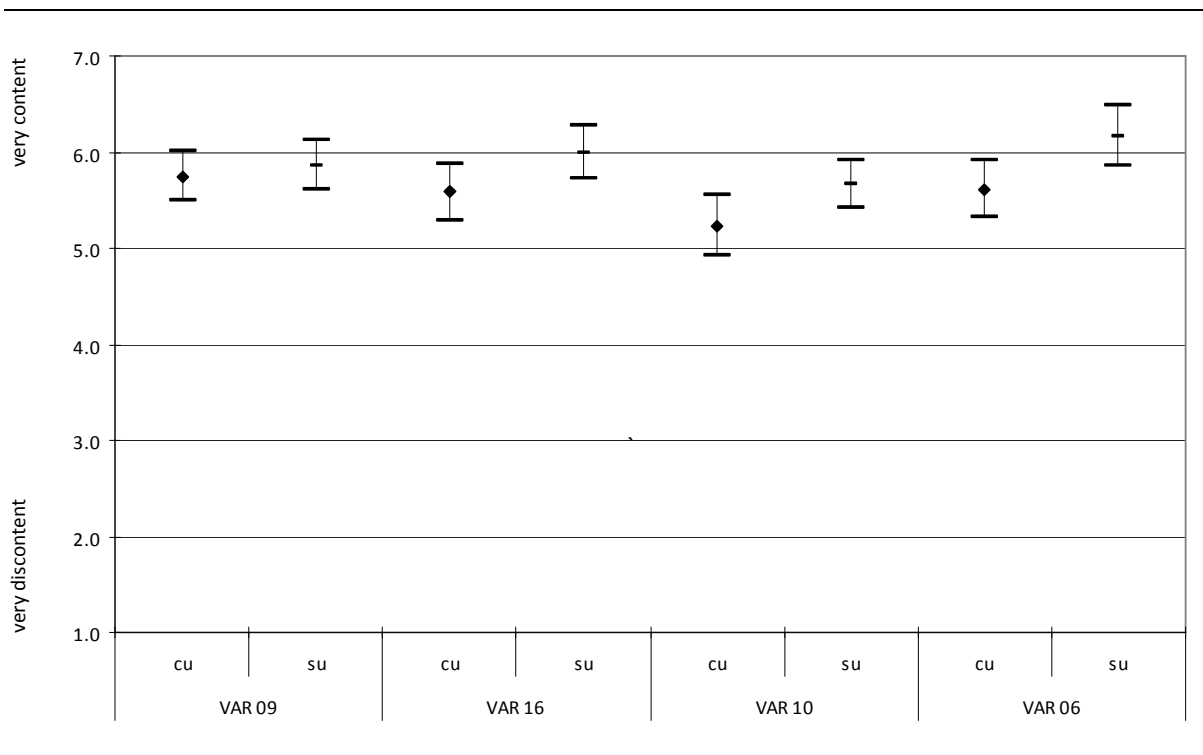


Figure 9.11 Confidence limits for the assurance attributes as perceived by customers and suppliers

Although the means and the variances around the means appear similar for most service quality attributes, the confidence intervals for variable 6 do not overlap substantially. Here, we therefore suspect some effects between the two stakeholder groups.

Based on the above, our hypothesis is that there will be significant differences between customer perceived performance and supplier perceived performance concerning variable 06, such that the rating by suppliers will be higher. With all conditions being negatively skewed, we used Man-Whitney tests in order empirically assess whether our hypothesis is true (see Table 9.22).

Ranks

	Stakeholder	N	Mean Rank	Sum of R.
VAR 09 - Consistently courteous service personnel	Customer	72	51.44	3,703.50
	Supplier	30	51.65	1,549.50
	Total	102		
VAR 16 - Showing signs of recognition towards customers	Customer	72	49.34	3,552.50
	Supplier	30	56.68	1,700.50
	Total	102		
VAR 10 - Confidence instilling behaviour by service personnel	Customer	72	49.41	3,557.50
	Supplier	30	56.52	1,695.50
	Total	102		
VAR 06 - Receiving prompt service if needed	Customer	72	47.62	3,428.50
	Supplier	30	60.82	1,824.50
	Total	102		

Test Statistics^a

	VAR 09	VAR 16	VAR 10	VAR 06
Mann-Whitney U	1,075.500	924.500	929.500	800.500
Wilcoxon W	3,703.500	3,552.500	3,557.500	3,428.500
Z	-0.036	-1.214	-1.186	-2.202
A. Sig. (2-tailed)	0.971	0.225	0.236	0.028
A. Sig. (1-tailed)	0.486	0.112	0.118	0.014

a. Grouping variable: Stakeholder

Table 9.22 Man-Whitney tests for assurance attributes as perceived by customers and suppliers

As expected, the Man-Whitney tests shows that 'receiving prompt service if needed' ($z = -2.20$, $p = 0.014$) is indeed higher rated amongst suppliers than amongst customers. Thus, with regards to *assurance*, it can be concluded that suppliers rate attribute 6 higher than do customers, and that such difference is highly unlikely to have arisen by sampling error.

In short, there are 21 service quality attributes spread over eight service quality dimensions where account managers from supplier organisations have significantly higher perceptions of service performance when compared to contract managers from customer organisations. The four dimensions for which the majority of the underlying service quality attributes were significantly different are *competitiveness*, *collaboration*, *accessibility* and *competence*. The one dimension for which no significant differences appeared for the underlying service quality attributes is *clout*.

9.4 DIFFERENCES IN PERCEIVED IMPORTANCE

In order to assess whether there are differences in perceived importance between customers and suppliers, we first investigated the descriptive statistics for both stakeholder groups (see Table 9.23).

	Stakeholder	N	Mean	Std. Dev.	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
						Lower B.	Upper B.		
Reliability	customer	72	6.59	0.40	0.05	6.49	6.68	5.20	7.00
	supplier	30	6.51	0.52	0.09	6.31	6.70	5.20	7.00
	Total	102	6.56	0.44	0.04	6.48	6.65	5.20	7.00
Clout	customer	72	5.18	1.19	0.14	4.90	5.46	1.00	7.00
	supplier	30	5.29	0.99	0.18	4.92	5.66	3.00	7.00
	Total	102	5.21	1.13	0.11	4.99	5.44	1.00	7.00
Reputation	customer	72	6.40	0.48	0.06	6.29	6.51	5.00	7.00
	supplier	30	6.46	0.47	0.09	6.28	6.64	5.33	7.00
	Total	102	6.42	0.47	0.05	6.32	6.51	5.00	7.00
Awareness	customer	72	6.41	0.47	0.06	6.30	6.52	5.25	7.00
	supplier	30	6.40	0.54	0.10	6.20	6.60	5.00	7.00
	Total	102	6.41	0.49	0.05	6.31	6.51	5.00	7.00
Competitiven.	customer	72	6.20	0.61	0.07	6.06	6.34	4.40	7.00
	supplier	30	6.15	0.49	0.09	5.97	6.34	5.00	7.00
	Total	102	6.19	0.58	0.06	6.07	6.30	4.40	7.00
Collaboration	customer	72	5.80	0.68	0.08	5.64	5.96	2.83	7.00
	supplier	30	6.13	0.51	0.09	5.94	6.32	4.83	7.00
	Total	102	5.89	0.65	0.06	5.77	6.02	2.83	7.00
Accessibility	customer	72	6.17	0.68	0.08	6.01	6.33	3.25	7.00
	supplier	30	6.39	0.56	0.10	6.18	6.60	4.75	7.00
	Total	102	6.24	0.65	0.06	6.11	6.36	3.25	7.00
Competence	customer	72	6.13	0.58	0.07	5.99	6.26	4.33	7.00
	supplier	30	6.29	0.51	0.09	6.10	6.48	5.33	7.00
	Total	102	6.18	0.56	0.06	6.07	6.29	4.33	7.00
Assurance	customer	72	6.25	0.52	0.06	6.13	6.37	5.00	7.00
	supplier	30	6.51	0.63	0.11	6.27	6.74	4.50	7.00
	Total	102	6.33	0.56	0.06	6.22	6.44	4.50	7.00

Table 9.23 Descriptive statistics for importance as perceived by customers and suppliers

Plotting the means on a graph, with the confidence intervals around the means, we get to Figure 9.12.

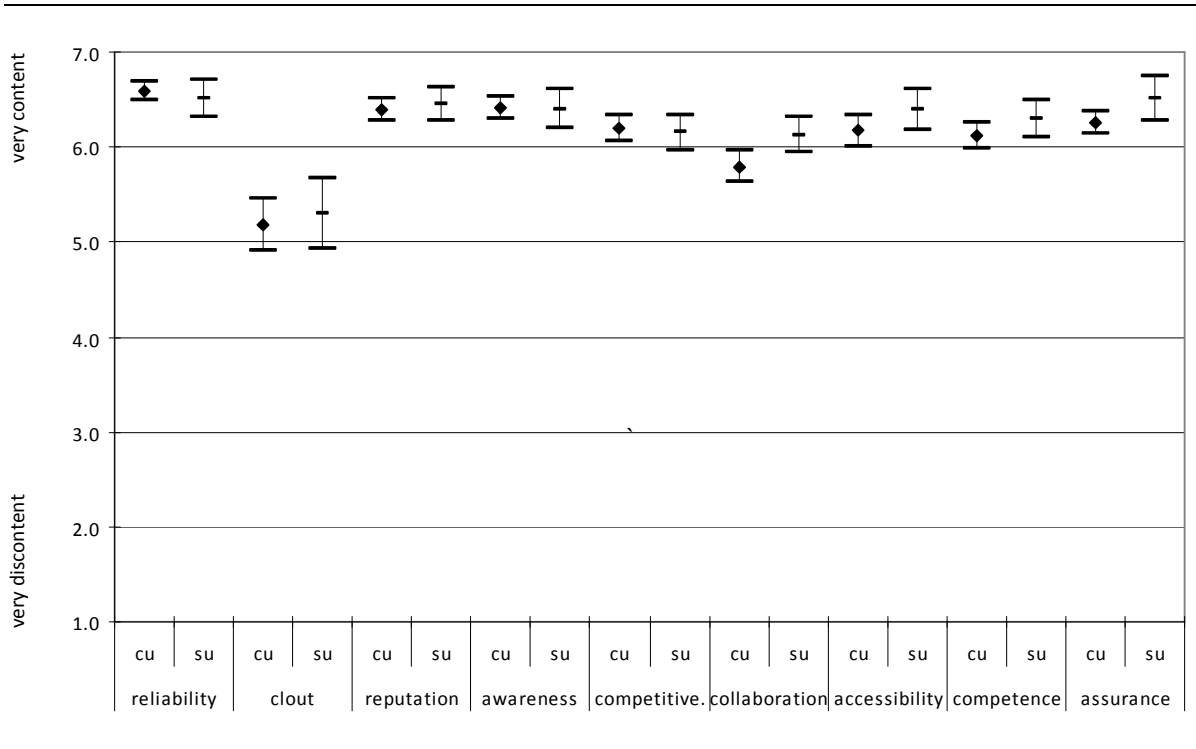


Figure 9.12 Confidence limits for importance of the nine service quality dimensions as perceived by customers and suppliers

First of all, *clout* is clearly regarded to be of lower importance by both customers and suppliers when compared to the other eight service quality dimensions. As highlighted in Section 5.6, however, this could be explained by the notion that *clout* has less influence on overall perceived service quality for small and medium-sized customer organisations.

Furthermore, both the means and the variances around the means appear relatively similar for all service quality dimensions. However, the confidence intervals for *collaboration* and *assurance* do not overlap substantially. Here, we therefore suspect some effects between the two stakeholder groups.

Therefore, our hypothesis is that there will be significant differences between customer perceived importance and supplier perceived importance concerning both the *collaboration* dimension and the *assurance* dimension, such that the supplier ratings will be higher. Note that this is a two-tailed hypothesis, because we have not specified the direction of the difference. This non-directional hypothesis is based on the fact that customers rate importance higher than suppliers do for three service quality dimensions (i.e. *reliability*, *awareness* and *competitiveness*). With both conditions being negatively skewed, we used Man-Whitney tests in order empirically assess whether the expected differences are significant (see Table 9.24).

Ranks

	Stakeholder	N	Mean Rank	Sum of Ranks
Reliability	Customer	72	52.31	3,766.50
	Supplier	30	49.55	1,486.50
	Total	102		
Clout	Customer	72	51.47	3,705.50
	Supplier	30	51.58	1,547.50
	Total	102		
Reputation	Customer	72	50.29	3,621.00
	Supplier	30	54.40	1,632.00
	Total	102		
Awareness	Customer	72	51.58	3,713.50
	Supplier	30	51.32	1,539.50
	Total	102		
Competitiveness	Customer	72	53.02	3,817.50
	Supplier	30	47.85	1,435.50
	Total	102		
Collaboration	Customer	72	47.11	3,392.00
	Supplier	30	62.03	1,861.00
	Total	102		
Accessibility	Customer	72	48.62	3,500.50
	Supplier	30	58.42	1,752.50
	Total	102		
Competence	Customer	72	49.29	3,549.00
	Supplier	30	56.80	1,704.00
	Total	102		
Assurance	Customer	72	46.54	3,351.00
	Supplier	30	63.40	1,902.00
	Total	102		

Test Statistics^a

	Reliability	Clout	Reputation
Mann-Whitney U	1,021.500	1,077.500	993.000
Wilcoxon W	1,486.500	3,705.500	3,621.000
Z	-0.437	-0.018	-0.643
Asymp. Sig. (2-tailed)	0.662	0.985	0.520
	Awareness	Competitiveness	Collaboration
Mann-Whitney U	1,074.500	970.500	764.000
Wilcoxon W	1,539.500	1,435.500	3,392.000
Z	-0.041	-0.811	-2.331
Asymp. Sig. (2-tailed)	0.967	0.417	0.020
	Accessibility	Competence	Assurance
Mann-Whitney U	872.500	921.000	723.000
Wilcoxon W	3,500.500	3,549.000	3,351.000
Z	-1.548	-1.174	-2.653
Asymp. Sig. (2-tailed)	0.122	0.240	0.008

a. Grouping variable: Stakeholder

Table 9.24 Man-Whitney tests for importance as perceived by customers and suppliers

As expected, the Man-Whitney tests shows that perceived importance concerning *collaboration* ($z = -2.33$, $p = 0.020$) and *assurance* ($z = -2.65$, $p = 0.008$) is higher amongst suppliers than amongst customers. Therefore it can be concluded that suppliers rate the importance on two out of nine dimensions higher than do customers, and that such differences are highly unlikely to have arisen by sampling error.

9.5 VERIFICATION OF CUSTOMER-SUPPLIER GAPS

At the same seminar as described in Section 7.4, the results of the 'customer-supplier gaps' as described in the previous four sections were presented. The subsequent panel discussion and workshops during the seminar provided valuable feedback on the identified perception differences between customers and suppliers of cleaning, catering and security services. Furthermore, practical recommendations were given on how to close the customer-supplier gaps in relation to the service quality dimensions and their underlying attributes (for more details see Section 11.3).

Differences in perceived service quality - Discussions around the differences in overall service quality as perceived by customers and suppliers revealed no surprises as it was expected by both customers and suppliers that suppliers would rate perceived service quality higher than customers would do. Further discussions, however, revealed that the size of the gap definitely needed to decrease in the future and that close monitoring of this gap was a good first step.

Differences in service quality dimensions - Discussions around the differences in the nine service quality dimensions as perceived by customers and suppliers revealed the following. First, based on service quality dimensions that explain additional variance in service quality as perceived by customers identified in Section 5.4 (*collaboration*, *competitiveness*, *competence* and *awareness*) and service quality dimensions that explain additional variance in financial performance of suppliers identified in Section 7.3 (*reputation*, *competitiveness* and *clout*), it was expected to find gaps between customer and supplier perceptions for *clout*, *reputation*, *awareness*, *collaboration* and *competence*. Second, with *competitiveness* explaining additional variance in both service quality as perceived by customers and financial performance as attained by suppliers, a gap between customer and supplier perceptions for this service quality dimension was not necessarily expected.

Against expectations, no performance gaps between customer and supplier perceptions were found for *clout*, *reputation* and *awareness*. As expected, however, gaps between customer and supplier perceptions were found for *collaboration* and *competence*. As highlighted in Section 9.2, and against expectations, additional gaps between customer and supplier perceptions were found for *competitiveness* and *accessibility*. As for *reliability* and *assurance* no gaps between customer and supplier perceptions were expected neither found. Although not all gaps could be easily explained, it was clear that, with significant gaps between customer perceptions and supplier perceptions on four out of nine service quality dimensions (*competitiveness*, *collaboration*, *accessibility* and *competence*), a great challenge lay ahead to bring the perspectives of the two stakeholder groups closer to each other.

Differences in service quality attributes - Discussions around the differences in service quality attributes as perceived by customers and suppliers revealed the following. First, it was found surprising that suppliers have higher perceptions of service quality when compared to customers for all 44 service quality attributes and that significant differences were found for 21 of these attributes. Second, and following the significant differences found in the service quality dimensions *competitiveness*, *collaboration*, *accessibility* and *competence*, it was less surprising that suppliers have significantly higher perceptions of service quality when compared to customers for the majority of the service quality attributes underlying these four dimensions (3 out of 5, 5 out of 6, 3 out of 4 and 5 out of 6 respectively). Last, and perhaps most important, the significant differences found

in the various service quality attributes were seen as useful indicators for supplier organisations to close the gaps for *competitiveness*, *collaboration*, *accessibility* and *competence*. For more details on how to close the customer-supplier gaps identified, please consult Section 11.3 - Closing the quality gaps.

Differences in perceived importance - Discussions around the differences in perceived importance of the nine service quality dimensions revealed the following. First, as *clout* has no significant relationship with customer perceived service quality (see Section 5.4), but was identified as having significant relationships with both the liquidity ratio and the current ratio of suppliers (see Section 7.3), the group expected that supplier organisations would rate *clout* as more important than customer organisations would do. Second, as *accessibility* and *competence* showed no significant relationships with any of the actual financial performance measures for supplier organisations (see Section 7.3), but both service quality dimensions being identified as having significant relationships with customer perceived service quality (see Section 5.4), the delegates expected that customer organisations would rate *accessibility* and *competence* as more important than supplier organisations would do.

Against expectations, no importance-gaps between customer and supplier perceptions were found for *clout*, *accessibility* and *competence*. However, also against expectations, gaps between customer and supplier perceptions were found for *collaboration* and *assurance* as in both cases perceived importance was significantly higher amongst suppliers than amongst customers. As both service quality dimensions have significant relationships with customer perceived service quality and at least two financial measures for suppliers, these gaps were difficult to explain.

To summarise Chapter 9, supplier organisations have significantly higher perceptions of the service quality they deliver than do customer organisations. Similarly, suppliers rate their performance on four out of nine service quality dimensions significantly higher than do customers. As for the underlying service quality attributes, suppliers have significantly higher perceptions for almost 50% of the attributes when compared to customers. All these findings provide useful information for service providers striving to optimally meet customer needs.

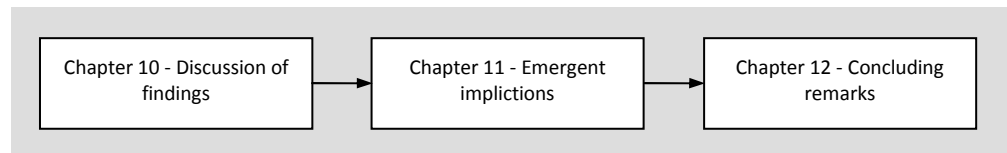
The last part of this thesis will consist of a thorough discussion of all relevant research findings, describe the most important implications for both practitioners and academics, and highlight the most relevant conclusions that can be drawn from the research performed.

Box 9 Summary of customer-supplier gaps

PART C - DISCUSSION, IMPLICATIONS AND CONCLUSIONS

As highlighted in Section 1.4, Part C of this thesis focuses on discussion, implications and conclusions. In Chapter 10, we highlight all relevant observations that can be drawn from the literature review in Part A and the empirical research in Part B of this thesis. Chapter 11 highlights all relevant implications that can be drawn from the empirical research in Part B of this thesis. In Chapter 12, we highlight the most important aspects of our research on service quality in relation to business support services.

PART C -
Discussion,
implications and
conclusions



10 DISCUSSION OF FINDINGS

In this chapter we highlight all relevant observations that can be drawn from the literature review in Part A and the empirical research in Part B of this thesis. In all instances, observations are verified and validated against feedback provided through panel discussions and workshops at dedicated seminars held over the last three years. First, we focus on the literature available on the importance of quality to organisational performance. Next, we focus on the literature related to the measurement of service quality. Third, we focus on the empirical findings related to the customer perspective on service quality. Subsequently, we focus on the empirical findings related to the supplier perspective on service quality. Finally, we focus on the discrepancies between the views of customers and suppliers.

10.1 PERFORMANCE AND QUALITY

The review of the literature on performance and quality in Chapter 2 provided three valuable observations. Each observation is briefly discussed before being verified and validated against the outcome of focus group discussions held in spring 2006.

The first important observation, from our literature review on 'organisational performance', is that the profitability of an organisation depends to a great extent on meeting the generic performance criteria: effectiveness, efficiency, productivity, flexibility and creativity (van Ree 2002) - and that quality plays a critical role in the productivity equation (e.g. Sink and Tuttle 1989, Vuorinen et al. 1998). This is arguably best conceptualised in the widely accepted value profit chain (Heskett et al. 1997 and 2003), in which quality plays a dominant role (see Section 2.1). These findings led to the decision to focus our research on service quality.

Additional focus group discussions confirmed that quality is regarded as essential to corporate success. Following the guiding principles of the value profit chain, both customers and suppliers of business support services recognised that input quality has a significant impact on employee satisfaction, employee loyalty and ultimately employee productivity, and that output value has a significant impact on customer satisfaction, customer loyalty and ultimately financial performance (for more details see Section 2.4).

A second and related observation, from a review of the literature concerning 'product quality', is that defining quality has proven to be a challenge (see Section 2.2). Over the last century definitions have ranged from 'elimination of variations to the standard' (Deming 1940s) and 'fitness for use' (Juran 1950s) to 'best for the customer use' (Feigenbaum 1960s) and 'conformance to requirements' (Crosby 1970s). More recently, and arguably due to a shift from focusing on products to focusing on services, definitions have ranged from 'the discrepancy between consumers' experiences and expectations' (Grönroos 1984) and 'the discrepancy between consumers' perceptions and expectations' (e.g. Parasuraman et al. 1988) to 'consumers' perceptions of performance only' (Cronin and Taylor 1992). These findings led to the decision to measure service quality based on perception only.

In an attempt to simplify the debate, it was decided to group all non-price attributes into one entity called 'quality' - defined as 'the totality of inherent characteristics of a product or service that bear on its ability to increase the demand for that product or service at a fixed price' (after ISO 9000 Series of Standards). In this definition a characteristic is a distinguishing feature that can be physical (e.g. mechanical or electrical), temporal (e.g. availability or punctuality), functional (e.g. capability or durability), ergonomic (e.g. physiological or safety-related), sensory (e.g. touch or sound), or behavioural (e.g. honesty or veracity).

Further focus group discussions revealed that there was general consensus amongst all facilities management executives concerning this definition of quality. In addition, it was argued that most products and services encompass multiple, if not all, of the features highlighted in this definition. Subsequently, it was seen

as important to optimally satisfy (clearly stated or generally implied) consumers' needs and requirements concerning all features of a specific product or service simultaneously (for further details see Section 2.4).

The third and last observation, from the literature review regarding 'service quality', is that service operations are distinctive in nature from product manufacturing. It has been argued that intangibility, perishability, heterogeneity and simultaneity - as the four most frequently cited characteristic differences between products and services - must be acknowledged for a full understanding of quality in relation to services (Zeithaml et al. 1985, Parasuraman et al. 1985). The latest view with respect to these characteristic differences, however, is that all economic offerings can be arranged along a products-to-services continuum and that there are very few pure products or pure services (Vargo and Lusch 2004, Lovelock and Gummesson 2004). At best it can be argued that tangible-dominant products are higher in search properties when compared to intangible-dominant services and that intangible-dominant services are higher in credence properties when compared to tangible-dominant products (see Section 2.3). These findings contributed to our decision to focus on cleaning, catering and security services as they can be arranged adjacent to each other on the intangible-dominant side of the products-to-services spectrum.

Additional focus group discussions revealed that cleaning, catering and security were not seen as pure services, but could be arranged on the intangible-dominant side of the products-to-services continuum. As security was perceived to be highest in credence properties it was regarded the most service-like offering of the three business support services and with catering being perceived as the highest in search properties it was regarded as the least service-like offering of the three business support services (for more details see Section 1.3).

10.2 MEASURING SERVICE QUALITY

Concerning our literature review on measuring service quality in Chapter 3 three relevant observations emerged. Again, each observation is briefly discussed before being verified and validated against the outcome of focus group discussions held in spring 2006.

The first important observation, from the literature review on 'measuring service quality', is that there are two schools of thought concerning the measurement of quality in relation to services: one group of researchers supporting the disconfirmation paradigm of perceptions-minus-expectations (e.g. Parasuraman et al. 1985), and one group supporting the performance-based paradigm of a perceptions only version of service quality (e.g. Cronin and Taylor 1992). Our literature review in Section 3.1, however, supports the use of performance-based measures of service quality over gap measures of perceptions-minus-expectations. These findings reiterated our decision to use of performance-based measures of service quality.

Further focus group discussions revealed that most facilities management executives agreed that service quality is a function of perceptions only. The main reason for this view was the belief that previous experiences in certain service encounters will influence expectations and therefore impact the gap between expectations and current experiences. Therefore, the performance-based paradigm was seen as a better method to evaluate service quality (for further details see Section 3.6).

A second and related observation, from a review of the literature concerning 'quality measurement models', is that, in line with the two schools of thought identified, two methods were developed to measure service quality. Based on the disconfirmation paradigm, Parasuraman et al. (1985) and Zeithaml et al. (1990) developed the SERVQUAL instrument featuring 22 expectation statements and 22 perception statements. Based on the performance-based paradigm, Cronin and Taylor (1992) developed the SERVPERF instrument featuring the 22 perception statements only. Following considerable support for the performance-based paradigm, SERVPERF seems the most appropriate method to measure service quality (see Section 3.3). These

findings led to the decision to use the SERVPERF methodology as a starting point for our service quality measurement instrument.

Additional focus group discussions revealed that most executives were only familiar with the SERVQUAL methodology, whereas only a few were familiar with the SERVPERF methodology. As the SERVPERF instrument is based on the performance-based paradigm, however, the delegates unanimously preferred the use of the SERVPERF method to investigate service quality in relation to cleaning, catering and security services (for more details see Section 3.6).

The third and last significant observation, from our literature review regarding 'business-to-business services', is that service quality determinants needed to be added to existing measurement instruments when service quality is to be evaluated in a business-to-business context. Although it is generally difficult for end-user consumers to assess service quality dimensions such as 'communication' and 'price', they are seen as critical dimensions at the business-to-business level (Section 3.5). These findings led to our decision to add additional service quality determinants and service quality items to the existing SERVPERF instrument.

Further focus group discussions recognised that determinants needed to be added to the existing SERVPERF instrument when service quality was to be evaluated in a business-to-business context. Building on existing research, it was decided that service quality of business support services was to be evaluated using 15 service quality determinants (reliability, responsiveness, assurance, empathy, tangibles, competence, credibility, accessibility, communication, understanding, consulting, price, offering, clout and geographics) each containing four service quality items (for further details see Section 3.6).

10.3 THE CUSTOMER PERSPECTIVE

The empirical results in Chapter 5 and 6 provided six noteworthy observations concerning customer perceived service quality in relation to cleaning, catering and security services. Each observation is briefly discussed before being contrasted against the available literature and being verified and validated against the outcome of focus group discussions held in spring 2007.

The first primary observation, from our empirical investigation into the 'dimensionality of service quality', is that customer perceived service quality in relation to cleaning, catering and security services consists of nine service quality dimensions containing 44 service quality attributes. Moreover, the total variance in overall perceived service quality explained by the nine service quality dimensions was 80% (see Section 5.1). However, two important issues should be noted. First, as the service quality dimensions identified explain 80% of the variance in customer perceived service quality, there may be other determinants and/or items important to service quality. Second, our nine-dimensional service quality construct was identified using non-orthogonal factor rotation analysis, indicating that the nine service quality dimensions are interrelated. These issues noticeably highlight the need for further research (see Section 11.4).

Although we investigated service quality in a business-to-business context, there are certain similarities to empirical findings by Parasuraman et al. (1988) and Zeithaml et al. (1990) who investigated service quality in a business-to-consumer environment. Where we tested 15 service quality determinants containing 60 service quality items in a business-to-business context and identified nine service quality dimensions containing 44 service quality attributes, Parasuraman et al. (1988) and Zeithaml et al. (1990) tested ten service quality determinants containing 36 service quality items in a business-to-consumer environment and identified five service quality dimensions containing 22 service quality attributes. Furthermore, four of our original 15 determinants remained distinct whilst ten of the remaining determinants collapsed into five distinct dimensions (it should be noted that geographics disappeared all together), whereas for Parasuraman and Zeithaml three of their original ten determinants remained distinct whilst the remaining seven determinants collapsed into two distinct dimensions (see Section 3.3).

Additional focus group discussions revealed that both customers and suppliers of business support services generally recognised all nine dimensions as clear indicators of service quality in a business-to-business context - especially upon closer examination of their underlying service quality attributes (for more details see Section 5.6).

The nine service quality dimensions and their 44 underlying service quality attributes identified for cleaning, catering and security services are as provided in Table 10.1.

Dimension	Underlying attributes	IP Gap	CS Gap
1. Reliability	Consistent and correct service delivery	✓	
	Meeting deadlines for projects and assignments	✓	✓
	Proactive service personnel	✓	
	Having customers' best interests at heart	✓	
	Being believable and honest	✓	
2. Clout	Having a large presence in the market		
	Having sufficient leverage in the market		
	Ability to coordinate and consolidate resources with other suppliers		
	Ability to act as an advocate with other suppliers in the market		
3. Reputation	Demonstration of ethical conduct	✓	
	Having a good reputation in the market	✓	
	Well dressed and neat-appearing service personnel	✓	
	Accurate paperwork and record keeping by service personnel	✓	✓
	Explanation of the trade-offs between service quality and cost	✓	
4. Awareness	Understanding customers' specific needs	✓	
	Having a basic understanding of customers' businesses	✓	
	Willingness to learn customers' specific requirements	✓	✓
	Protection of confidential and proprietary information	✓	✓
5. Competitiveness	Visually appealing materials associated with the services	✓	
	Pricing that is competitive compared to other suppliers	✓	✓
	Provision of multiple competitive bids	✓	✓
	Pricing that relates to the quality delivered	✓	
	Pricing that meets customers' budget objectives	✓	✓
6. Collaboration	Up-to-date appearing service equipment	✓	
	Willingness to incur risk for customers	✓	✓
	Willingness to act as an advocate with senior customers' executives	✓	✓
	Willingness to provide profit driven alternatives	✓	✓
	Willingness to establish partnerships with joint planning and goal setting	✓	✓
	Promotion of an interactive environment with open communication	✓	✓
7. Accessibility	Assurance that a problem will be handled effectively and efficiently	✓	
	Being easily contacted (face-to-face, phone or e-mail)	✓	✓
	Being available at all times to assist customers	✓	✓
	Having convenient operating hours		✓
8. Competence	Having technical resources that ease the spread of information	✓	
	Having sufficient expertise in the area of the services	✓	✓
	Having sufficient research capability		
	Having the required knowledge and skills to manage the service	✓	✓
	Ability to provide customised and unique services		✓
9. Assurance	Ability to offer an extended scope of the basic services provided		✓
	Having good problem-solving skills	✓	✓
	Consistently courteous service personnel	✓	
	Showing signs of recognition towards customers	✓	
	Confidence instilling behaviour by service personnel	✓	
	Receiving prompt service if needed	✓	✓

IP Gap: significant difference between customer perceived service quality and customer perceived importance
CS Gap: significant difference between customer perceived service quality and supplier perceived service quality

Table 10.1 Service quality dimensions and their underlying service quality attributes

A second and related observation, from further investigation into the 'reliability of our scale', is that our nine-dimensional service quality construct shows high reliability as well as good content validity and good construct validity (see Section 5.2). First, high reliability is evidenced by a high coefficient of reliability for all nine service quality dimensions (i.e. Cronbach's alpha > 0.85). Second, our original service quality determinants and service quality items were based on comparable exploratory research and additional focus group discussions, indicating good content validity. Third, good construct validity is evidenced by high average within-dimension correlations (indicating good convergent validity) and a lower average cross-dimension correlations (indicating good discriminant validity) for all 44 service quality attributes.

Again, there are similarities to findings by Parasuraman et al. (1988) who investigated service quality in a business-to-consumer context. Where we found high reliability as well as good content validity and good construct validity for our nine-dimensional construct, they found high reliability as well as good content validity and good convergent validity for their five-dimensional construct (see Section 3.3). In another study, Parasuraman et al. (1991) also found that their five-dimensional construct showed high reliability as well as good content validity and good construct validity (i.e. good convergent and discriminant validity).

As stated previously, further group discussions revealed that both customers and suppliers of business support services generally recognised all nine dimensions as clear indicators of service quality in a business-to-business context (for further details see Section 5.6).

The third significant observation, from our investigation into 'associations and relationships', is that our empirical results show that eight of the nine service quality dimensions are strongly or moderately yet highly significantly related to overall perceived service quality and customer satisfaction - *clout* being the exception with a weak and moderately significant relationships to both service quality and customer satisfaction. The same eight service quality dimensions are moderately yet highly significantly related to purchase intention (see Section 5.4). These findings reiterate that service quality is a multi-dimensional construct, but also indicate that certain service quality dimensions may have a stronger impact on customer perceived service quality and/or customer satisfaction than do others. Furthermore, these findings clearly indicate that service quality is not the only construct important in arriving at a purchase intention. For example, purchase intentions may also be influenced by the actual need for a certain level of service quality and/or the actual price of the service offering provided. Again, these issues highlight the need for further research (see Section 11.4).

These observations are comparable to empirical findings by Zeithaml et al. (1990) and Cronin and Taylor (1992) who investigated service quality in a business-to-consumer environment. Zeithaml et al. (1990) found that the five dimensions of their SERVQUAL scale were significantly related to overall perceived service quality, consumer satisfaction and purchase intention (see Section 3.4). In a subsequent study, Cronin and Taylor (1992) identified moderate yet significant correlations between their one-dimensional SERVPERF scale and overall perceived service quality, consumer satisfaction and purchase intention.

Additional focus group discussions revealed two important issues. First, some facilities management executives questioned whether *clout* actually belonged to the nine-dimensional service quality construct. This was especially the case for customer organisations operating from one building or few premises where service quality attributes such as market leverage and/or market presence of a supplier organisation were seen to have less influence on overall perceived service quality, customer satisfaction and purchase intention (see Section 5.6). Second, many management executives affirmed the moderate relationships between the nine service quality dimensions and purchase intention. There was general consensus that, next to the service quality and customer satisfaction, the actual price of a particular service offering plays an important role in arriving at a purchase intention (for more details see Section 5.6).

A fourth and related observation, from further investigation into 'causal directions', is that service quality seems to be an antecedent of customer satisfaction and that customer satisfaction seems to be an antecedent

of purchase intention (see Section 5.4). This observation is supported by the notion that the nine service quality dimensions have a marginally stronger correlation with overall perceived service quality (i.e. average $r = 0.58$) than they have with customer satisfaction (i.e. average $r = 0.57$) and the notion that customer satisfaction has a slightly stronger correlation with purchase intention (i.e. $r = 0.72$) than does overall perceived service quality (i.e. $r = 0.69$).

Again, these observations are in line with findings by Cronin and Taylor (1992 and 1994) and Parasuraman et al. (1993 and 1994) who investigated service quality in a business-to-consumer context (see Section 3.2). Cronin and Taylor (1992) found that service quality is an antecedent of consumer satisfaction and that consumer satisfaction exerts a stronger influence on purchase intention than does service quality. In a subsequent study, they argued that consumer satisfaction appears to be a better predictor for purchase intention when compared to service quality and that this was only logical as consumers hardly ever purchase the highest quality service available - not least due to cost constraints (Cronin and Taylor 1994). Although Parasuraman et al. (1988) initially argued that incidents of consumer satisfaction over time result in perceptions of service quality, they later agreed that service quality is an antecedent of consumer satisfaction (Parasuraman et al. 1994). In another study, they found that greater consumer perceptions of service quality lead to positive behavioural intentions such as purchase intention (Boulding et al. 1993).

Further focus group discussions revealed that some facilities management executives still found it difficult to distinguish between service quality and customer satisfaction, but also led to general consensus that service quality leads to customer satisfaction, which in turn drives purchase intentions. However, it was mentioned that, next to service quality, personal factors such as psychological state-of-mind may have an impact on customer satisfaction. Similarly, it was reiterated that, next to customer satisfaction, situational factors such as the actual cost of the service plays an important role in arriving at a purchase intention (for further details see Section 5.6).

The fifth valuable observation, from our empirical investigation into 'importance-performance gaps', is that perceived importance is significantly higher than perceived performance for eight of the nine service quality dimensions - *clout* again being the exception. Based on the magnitude of the discrepancy between customers' perception and importance and the strength of their respective relationships to overall perceived service quality, the dimensions can be ordered by need of improvement: 1) *reliability*, 2) *competitiveness*, 3) *collaboration*, 4) *assurance*, 5) *reputation*, 6) *awareness*, 7) *competence*, 8) *accessibility* and finally 9) *clout*. Furthermore, our results show that perceived importance is significantly higher than perceived performance for 33 of the 44 service quality attributes (see Section 5.5 and Table 10.1). These findings are arguably of great interest to both contract managers at customer organisations and account managers at supplier organisation responsible for the management of cleaning, catering and security services. Whereas the importance-performance gaps for the nine service quality dimensions provide a first indication concerning certain service quality shortfalls, the importance-performance gaps for the underlying service quality attributes provide detailed information on how to restore particular shortfalls. First suggestions to close the importance-performance gaps identified can be found in Section 11.3.

Although we investigated service quality in a business-to-business context, there are certain similarities to empirical findings by Forker et al. (1996) who investigated product quality in a business-to-business environment. Forker et al. (1996) found that executives in the furniture industry rate importance higher than performance for seven of the eight product quality dimensions investigated in their study.

Additional focus group discussion revealed that the significant differences found and especially the prioritisation based on the strength the relationship of each service quality dimension to overall perceived service quality were seen as valuable information for resource allocation decisions. Moreover, the importance-performance gaps for each underlying service quality attribute per dimension were seen as clear indicators for supplier organisations to improve customer perceived service quality (for more details see Section 5.6).

The 33 service quality attributes for which customer perceived performance is significantly lower than customer perceived importance are provided in Table 10.1.

The last important observation, from our 'cross-customer investigation' in relation to customer perceived service quality, is that there are no significant differences between cleaning, catering and security services concerning overall perceived service quality, customer satisfaction and purchase intention (see Section 6.2). Furthermore, there are no significant differences between the three service lines concerning the nine service quality dimensions (see Section 6.4). These findings not only indicate that all three service lines investigated belong to one and the same class of services, but also suggest that our nine-dimensional service quality construct may have certain general applicability across a wider range of business support services. Although promising, there is a definite need for further empirical testing of our methodology in service areas not classified as facilities management (see Section 11.4).

This observation is comparable to findings by Parasuraman et al. (1988) and Cronin and Taylor (1992) who investigated service quality in a business-to-consumer context. Parasuraman et al. (1988) found no differences in consumer perceived service quality between retail banking, credit card, product repair and maintenance, and long-distance phoning. Similarly, Cronin and Taylor (1992) found no differences in service quality between retail banking, pest control, dry cleaning, and fast food.

Further focus group discussions revealed that customer perceived service quality and customer satisfaction were expected to be lowest for cleaning and highest for security. Main reasons for these expectations were slightly higher salaries for security staff when compared with cleaning and catering staff and less face-to-face contact between end-user consumers and cleaning operatives when compared to catering and security staff. As for the nine service quality dimensions, it was again expected that cleaning would score lowest on many dimensions and security highest - not least because security was regarded as the most mature sector of the three service lines (for further details see Section 6.5).

10.4 THE SUPPLIER PERSPECTIVE

Concerning our empirical investigation into supplier perceived service quality in relation to cleaning, catering and security services, as articulated in Chapter 7 and 8, three relevant observations emerged. Again, each observation is briefly discussed before being contrasted against the available literature and being verified and validated against the outcome of focus group discussions held in spring 2008.

The first and most concerning observation, from our empirical investigation into 'supplier perceptions', is that there are only a few significant correlations and hardly any significant relationships between the perceived importance of the nine service quality dimensions and the perceived performance on the five financial measures; profitability, efficiency, growth, liquidity and solvency. However, *competitiveness* is significantly related to both efficiency and growth, six of the nine quality dimensions are significantly related to liquidity, and both *reputation* and *accessibility* are significantly related to solvency (see Section 7.1). Moreover, there are no significant correlations between supplier perceived financial performance and their actual financial performance (see Section 7.2). These findings indicate that service quality is not the only construct important to the financial performance of supplier organisations. For example, financial performance may also be influenced by the price of a particular service offering and/or by various transactional factors such as shareholders and competitors or various contextual factors such as demographics and politics. Furthermore, these findings suggest that account managers at supplier organisations do not have a clear picture of the financial performance of the companies they work for. To further investigate these issues, additional research is required (see Section 11.4).

Although no comparable research emerged from our literature research, further focus group discussions revealed various interesting issues. Based on the first part of our observation, there was general agreement

that that service quality is only one determinant of financial performance such that there are other, arguably more important determinants that have an impact on financial performance. Especially large (re)tenders and economic developments were seen to considerably impact the financial performance of supplier organisations. Based on the second part of our observation, most management executives affirmed that many account managers at supplier organisations do not always have a clear picture of the financial performance of the companies they work for (for more details see Section 7.4).

A second and more promising observation, from further investigation into ‘associations and relationships’, is that there are various significant correlations and significant relationships between the nine service quality dimensions as perceived by customers and the ten financial performance measures as extracted from the FAME (Financial Analysis Made Easy) database; profit margin and return on capital employed, debtor collection period and salaries over turnover, turnover growth and employee growth, liquidity ratio and current ratio as well as solvency ratio and gearing ratio (see Section 7.3). Concerning the positive and significant relationships identified, *clout* is significantly related to both liquidity ratio and current ratio, *reputation* is significantly related to turnover growth and employee growth, *awareness* is significantly related to employee growth, *competitiveness* is significantly related to salaries over turnover and employee growth, *collaboration* is significantly related to liquidity ratio and current ratio, and *assurance* is significantly related to salaries over turnover. For *reliability*, *accessibility* and *competence*, however, no positive and significant relationships with any of the ten financial measures were found (see Section 7.3). These findings are arguably of great interest to account managers at supplier organisation responsible for the management of cleaning, catering and security services. Whereas there were only a few significant correlations and hardly any significant relationships between their own perceptions of the strategic importance of the nine service quality dimensions and their perceptions of financial performance, there are strong indications that customer perceived service quality does exert an influence on their financial performance. Although promising, there is a clear need for additional research to investigate how exactly the nine service quality dimensions impact the financial performance of supplier organisations (see Section 11.4).

These observations are comparable to findings by Forker et al. (1996) who investigated product quality in a business-to-business environment. Forker et al. (1996) found various significant relationships between the eight product quality dimensions and the eight financial performance measures of suppliers in the furniture industry investigated in their study.

Additional focus group discussions revealed that it was found encouraging that there were various significant relationships between the nine service quality dimensions as perceived by customers and the actual financial performance of suppliers. Recognising that customer perceived service quality has a diminishing impact on successively customer satisfaction, purchase intentions and ultimately the financial performance of supplier organisations, the lack of abundant highly significant relationships was not found surprising (for further details see Section 7.4).

The third and last important observation, from our ‘cross-supplier investigation’ in relation to supplier financial performance, is that our empirical results show that there are no significant differences between cleaning, catering and security companies concerning profit margin, return on capital employed, turnover growth, employee growth, liquidity ratio, current ratio, solvency ratio and gearing ratio for supplier organisations (see Section 8.1). However, both debtor collection period and salaries over turnover are significantly lower for catering providers when compared to both cleaning and security providers (see Section 8.2 and Section 8.3 respectively). Again, these findings indicate that all three service lines investigated belong to one and the same class of services. Also, they suggest that our nine-dimensional service quality construct may have certain general applicability. As stated previously, there is a clear need for further empirical testing of our methodology in other service environments (see Section 11.4).

Although no comparable research emerged from our literature research, further focus group discussions revealed that hardly any of the executives expected that the debtor collection period for catering services would be significantly lower when compared to cleaning and security services. The fact that salaries over turnover for catering services was found to be significantly lower when compared to both cleaning and security services was not surprising as this could be explained by the fact that catering services have a proportionally large product element to them, namely the food itself. This proportionally larger product component in catering services was also the reason that, contrary to our findings, catering was expected by the focus group to score lowest on both profitability measures; profit margin and return on capital employed (for more details see Section 8.5).

10.5 CUSTOMER-SUPPLIER GAPS

The empirical findings as expressed in Chapter 9 resulted in one valuable observation concerning the differences between the customer perspective and the supplier perspective. Our observation is briefly discussed before being contrasted against the available literature and being verified and validated against the outcome of focus group discussions held in spring 2008.

The primary observation from our empirical investigation into 'customer-supplier gaps' is that customer organisations have significantly lower perceptions of the service quality they receive than do supplier organisations that provide cleaning, catering and security services (see Section 9.1). Similarly, customers rate supplier performance significantly lower than do suppliers on four service quality dimensions; *competitiveness*, *collaboration*, *accessibility* and *competence* (see Section 9.2). As for the underlying service quality attributes, customers have significantly lower perceptions for 21 of the 44 service quality attributes when compared to suppliers (see Section 9.3 and Table 10.1). Again, these findings are arguably of great interest to both contract managers at customer organisations and account managers at supplier organisation responsible for the management of cleaning, catering and security services. Whereas the customer-supplier gaps for the nine service quality dimensions provide a first indication concerning certain service quality shortfalls, the customer-supplier gaps for the underlying service quality attributes provide detailed information on how to restore particular shortfalls. First suggestions to close the customer-supplier gaps identified can be found in Section 11.3.

Although no comparable research emerged from our literature research, additional focus group discussions revealed that the difference in service quality as perceived by customers and suppliers was expected by both customer contract managers and supplier account managers. For the nine service quality dimensions, however, differences were expected concerning *clout*, *reputation*, *awareness*, *collaboration* and *competence*. Although not all findings were in line with initial expectations, there was again general consensus that the gaps identified were seen as useful information for resource allocation decisions. Moreover, the customer-supplier gaps for each underlying service quality attribute per dimension were seen as useful directions for supplier organisations pertaining to improve customer perceived service quality (for further details see Section 9.5).

The 21 service quality attributes for which customer organisations have significantly lower perceptions of the service quality they receive than do supplier organisations that provide cleaning, catering and security services are provided in Table 10.1.

To summarise Chapter 10, quality plays an important role in organisational performance and is seen as essential to corporate success. Quality can be defined as ‘the totality of inherent characteristics of a product or service that bear on its ability to increase the demand for that product or service at a fixed price’. However, service operations are distinctive in nature from product manufacturing, indicating a need for different approaches to quality measurement.

Whereas product quality can be measured against specifications, service quality is best measured by capturing perceptions. Following the performance-based paradigm of a perceptions only version of service quality, SERVPERF seems the most appropriate method to measure service quality. However, dimensions needed to be added to the existing SERVPERF instrument when service quality is to be evaluated in a business-to-business context.

Empirical testing of our adapted and supplemented service quality instrument led to the identification of a clear nine-dimensional construct for service quality in relation to cleaning, catering and security services. Of the nine service quality dimensions identified, eight dimensions are significantly related to overall perceived service quality, customer satisfaction and purchase intention. Furthermore, there are various significant relationships between the nine service quality dimensions as perceived by customers and the financial performance of suppliers.

However, in the eye of the customer, perceived performance is significantly lower than perceived importance for eight of the nine service quality dimensions. Similarly, customer organisations have significantly lower perceptions of the service quality they receive than do supplier organisations that provide cleaning, catering and security services. In both cases, significant differences identified for the underlying service quality attribute per dimension provide clear indications for both customers and suppliers pertaining to improve customer perceived service quality.

The next chapter will describe the most important implications for both customers and suppliers of cleaning, catering and security services, provide useful direction to close the quality gaps identified in this thesis and highlight various directions for future research.

Box 10 Summary of discussion of findings

11 EMERGENT IMPLICATIONS

This chapter highlights all relevant implications that can be drawn from the empirical research in Part B of this thesis. First, we focus on noteworthy implications for customer organisations. Subsequently, we focus on implications relevant to supplier organisations. Third, we highlight directions to close the service quality gaps identified. Finally, we suggest various directions for future research. Again, all implications are verified and validated against feedback provided through panel discussions and workshops at dedicated seminars held in spring 2007 or spring 2008.

11.1 CUSTOMER IMPLICATIONS

The empirical findings and subsequent discussion as described in Section 10.3 resulted in two noteworthy implications for customer contract managers responsible for cleaning, catering and security services. Each implication is briefly discussed based on the outcome of focus group discussions held in spring 2007.

First and foremost, our service quality scale can be used to assess customer perception of service quality as the nine-dimensional construct allows assessment of levels of overall perceived service quality as well as levels of service quality along each dimension (cf. Parasuraman et al. 1988). By periodic assessment of perceived service quality, customers can start to monitor and track service quality trends over time and subsequently compare and benchmark their perceptions against other customer organisations. Both customers and suppliers of cleaning, catering and security services would not only learn a great deal about the service quality delivered, but also about what needs to be done to improve service quality.

Furthermore, customer organisations should consider developing a framework of Service Quality Indicators, which can be used in addition to existing Key Performance Indicators and Service Level Agreements. Based on such a framework, customer organisations can benchmark the service quality delivered from a range of supplier organisations prior to or during the procurement process. In addition, such a framework can be used for monitoring purposes throughout the life of a service contract. Again, both customers and suppliers would learn a great deal about what needs to be done to improve the quality of the service delivered.

11.2 SUPPLIER IMPLICATIONS

With reference to supplier account managers responsible for cleaning, catering and security services, our empirical findings and subsequent discussion as articulated in Section 10.4 resulted in two relevant implications. Again, each implication is briefly discussed based on the outcome of focus group discussions held in spring 2008.

First, it is important to note that our nine-dimensional construct of service quality is interrelated and that all nine service quality dimensions have significant relationships with both overall perceived service quality and customer satisfaction. These findings suggest that customer organisations view service quality in relation to business support services as a whole. Subsequently, suppliers that offer cleaning, catering and/or security services should focus on offering all of the salient service quality dimensions concurrently with the hopes of achieving perceptions of offering unparalleled service quality (cf. Westbrook and Peterson 1998). In order to achieve this, supplier policy makers should start with creating awareness of these customer views and subsequently implement training programmes to instil these customer values into their operational staff.

Furthermore, supplier organisations can use our nine-dimensional service quality scale to assess their performance as perceived by customer organisations. Outcomes of such assessments can then be used for a variety of useful applications (cf. Parasuraman et al. 1988 and 1991).

- First, such a service quality scale can serve as a diagnostic tool to uncover areas of service quality shortfalls for individual customer organisations. Further investigation of the service quality gaps identified may subsequently direct resource-allocation decisions pertaining to improve service quality. In addition, supplier policy makers may opt to group customer organisations into several clusters, each with their own service quality perceptions. These clusters can subsequently be contrasted on transactional variables (e.g. shareholder or employee characteristics) and contextual variables (e.g. demographic or economic characteristics) as to develop cluster specific policies.
- Second, such a scale can help supplier organisations to track the level of service quality provided by various service delivery teams. Subsequent evaluation of team characteristics may reveal certain areas for improvements. Alternatively, supplier policy makers may opt to group teams into several clusters, each with their own service quality image. Again, these clusters can then be contrasted on transactional and contextual variables in order to develop cluster specific policies.
- Last but not least, such a service quality scale can assist supplier organisations to assess their performance relative to competitors - not least to look for differentiation opportunities. In a competitive market where many supplier organisations provide almost identical services, superior service delivery against one or more of the nine service quality dimension may be an intelligent means to enhance their competitive position.

11.3 CLOSING THE QUALITY GAPS

Combining the findings in Section 5.5 with the findings in Section 9.2, the areas in definite need of improvement in performance are: *competitiveness*, *collaboration*, *accessibility* and *competence*, as customer perceived importance of these service quality dimensions is significantly higher than customer perceived performance and customer perceived performance is significantly lower than supplier perceived performance. Based on focus group discussions held in spring 2008, closing the gaps for these four service quality dimensions is considered in further detail as follows.

Competitiveness - Looking at the underlying service quality attributes that exhibit both significant importance-performance gaps and significant customer-supplier gaps (see Table 10.1), the way to improve in the area of *competitiveness* is focussing on: 'pricing that is competitive compared to other suppliers', 'provision of multiple competitive bids' and 'pricing that meets customers' budget objectives'. Considering the importance-performance gaps as perceived by customers alone, other areas to improve on are: 'pricing that relates to the quality delivered' and 'up-to-date appearing service equipment'.

For *competitiveness*, it was generally recognised that competitive pricing and meeting customers' budget objectives is important, but also that pricing should be in line with the quality delivered. Transparency and trust on both the supplier side and the customer side were seen as fundamental ingredients in getting this balance right. Additional routes to ensure value for money may be through benchmarking, peer comparisons and/or independent audits.

Collaboration - Looking at the underlying service quality attributes that exhibit both significant importance-performance gaps and significant customer-supplier gaps (see Table 10.1), the way to improve in the area of *collaboration* is focussing on: 'willingness to incur risk for customers', 'willingness to provide profit driven alternatives', 'willingness to establish partnerships with joint planning and goal setting' and 'promotion of an interactive environment with open communication'. Considering the importance-performance gaps as

perceived by customers alone, another area to focus on is 'assurance that a problem will be handled effectively and efficiently'.

For *collaboration*, an interactive environment with open communication was seen as crucial - not least to ensure informed clients. In order to achieve this, suppliers and customers have to talk the same language and apply an open book approach. Suppliers should take the lead by better educating customers and proactively managing their expectations. In turn, customers should be more proactive in explaining to end-user consumers what level of service quality to expect. To close the circle, operational staff should be given an identity and included in the communication process as well.

Accessibility - Looking at the underlying service quality attributes that exhibit both significant importance-performance gaps and significant customer-supplier gaps (see Table 10.1), the way to improve in the area of *accessibility* is focussing on: 'being easily contacted (face-to-face, phone or e-mail)' and 'being available at all times to assist customers'. Considering the importance-performance gaps as perceived by customers alone, another area to focus on is 'having technical resources that ease the spread of information'.

For *accessibility*, it was generally recognised that ease of contact and availability at all times are important ingredients to enhance service delivery. Furthermore, technical resources that ease the spread of information were seen as useful tools in this context. However, customers cannot possibly expect suppliers to be contactable and/or available at all times. Nevertheless, suppliers can be more proactive in explaining when they can be reached and customers can be more proactive in scheduling periodic meetings with suppliers.

Competence - Looking at the underlying service quality attributes that exhibit both significant importance-performance gaps and significant customer-supplier gaps (see Table 10.1), the way to improve in the area of *competence* is focussing on: 'having sufficient expertise in the area of the services', 'having the required knowledge and skills to manage the service' and 'having good problem-solving skills'.

For *competence*, having sufficient expertise as well as adequate knowledge and skills were seen as fundamental in delivering any service. In order to guarantee this, both account managers and operational staff should be educated and/or trained on a continuous basis. To subsequently also retain trained and educated employees, higher staff salaries, longer continuous shifts and day-time working were mentioned as potential triggers.

Other areas in need of improvement include: *reliability*, *reputation*, *awareness* and *assurance* as customer perceived importance of these dimensions is significantly higher than customer perceived performance (see Section 5.5). Closing the gaps for these four service quality dimensions is considered in further detail as follows.

Reliability - Looking at the underlying service quality attributes that exhibit significant importance-performance gaps (see Table 10.1), the way to improve in the area of *reliability* is focussing on: 'meeting deadlines for projects and assignments' as well as 'consistent and correct service delivery', 'proactive service personnel', 'having customers' best interests at heart' and 'being believable and honest'.

For *reliability*, on-time service delivery was recognised as the single most fundamental ingredient to improve service delivery. With turnover and absenteeism of operational staff being seen as the main reasons for underperformance in relation to on-time service delivery, higher staff salaries, longer continuous shifts and day-time working were again mentioned as potential solutions. In order to enhance both consistency in service delivery and proactiveness of service personnel, operational staff should be made aware of both customer expectations and end-user expectations. In turn, end-user consumers should communicate certain issues more adequately.

Reputation - Looking at the underlying service quality attributes that exhibit significant importance-performance gaps (see Table 10.1), the way to improve in the area of *reputation* is focussing on: 'accurate paperwork and record keeping by service personnel' as well as 'demonstration of ethical conduct', 'well dressed and neat-appearing service personnel', 'explanation of the trade-offs between service quality and cost' and 'understanding customers' specific needs'.

For *reputation*, both accurate administration by service personnel and neat-appearing service personnel were seen as relatively tangible aspects of *reputation*, whereas for example demonstration of ethical conduct was seen as more important. Improving in the first two areas is again seen as a matter of training operational staff, whereas ethics were seen as much more difficult to embed in people. A simple first step in enhancing *reputation* might be to screen operatives for ethical conduct during the recruitment and selection process.

Awareness - Looking at the underlying service quality attributes that exhibit significant importance-performance gaps (see Table 10.1), the way to improve in the area of *awareness* is focussing on: 'willingness to learn customers' specific requirements' and 'protection of confidential and proprietary information' as well as 'having a basic understanding of customers' businesses' and 'visually appealing materials associated with the services'.

For *awareness*, having a basic understanding of customers' businesses and subsequent willingness to learn customers' specific requirements were seen as key ingredients. Again, continuous training of account managers was seen as essential in order to improve in this area. Also, customers should be more proactive in expressing their specific needs and requirements.

Assurance - Looking at the underlying service quality attributes that exhibit significant importance-performance gaps (see Table 10.1), the way to improve in the area of *assurance* is focussing on: providing prompt service if needed as well as 'consistently courteous service personnel' and 'confidence instilling behaviour by service personnel'.

For *assurance*, courteous service personnel and confidence instilling behaviour were seen as important. A combination of careful screening during the recruitment and selection process and continuous training of operational staff were regarded as key ingredients to enhance *assurance*. Furthermore, *assurance* was seen as mutual endeavour between service operatives and end-user consumers. In other words, the consumer has to exhibit a certain level of courtesy as well.

The one area which is not in need of improvement is *clout* as there are no significant importance-performance gaps (see Section 5.5) and no significant customer-supplier gaps (see Section 9.2). However, the *clout* dimension is definitely an interesting area for future research (for more details see Section 11.4).

11.4 FUTURE RESEARCH DIRECTIONS

Combining the observations that emerged from our discussion in Chapter 10 with all management implications as described in the previous three sections, there are multiple interesting directions for future research. Five research directions identified are briefly described as follows.

Research methodology - Concerning the methodology developed and tested in this thesis, three relevant areas for future research emerged from our discussion.

First, our initial 15 service quality determinants and their 60 underlying service quality items were based on interpretation of qualitative data generated through a number of focus groups discussions (see Section 4.3). Moreover, our final nine service quality dimensions and their 44 underlying service quality attributes explain 80% of the variance in customer perceived service quality (see Section 5.1). These observations indicate that there may be other dimensions and/or attributes important to service quality. Therefore, it is highly recommended to conduct further focus groups discussions and/or in-depth executive interviews to potentially reveal additional variables important to service quality (cf. Zeithaml et al. 1985, Westbrook and Peterson 1998) - especially when testing our methodology in business-to-business service environments not classified as facilities management.

Second, our surveys used self-stated perception ratings that rely upon the subjective assessment of single respondents from customer and supplier organisations (see Section 4.3). This introduces the potential for reliability and validity errors. Subsequently, it is recommended to ask respondents to complete our survey in consultation with one or more of their colleagues (cf. Babakus et al. 1995, Westbrook and Peterson 1998) - not least to provide a more balanced assessment from customer and supplier organisations.

Third, our surveys included single-item measures to capture customer perceived service quality, customer satisfaction and purchase intention as well as service quality and financial performance as perceived by suppliers (see Section 4.3). This adds to the potential for reliability errors. Consequently, it is recommended to develop multi-item measures to capture these constructs (cf. Cronin and Taylor 1994, Babakus et al. 1995) - again to provide a more balanced assessment from customers and suppliers.

Dimensionality and relationships - Concerning the multi-dimensional service quality construct and the relationships between service quality, customer satisfaction and purchase intention identified in this thesis, three areas for future research emerged from our discussion.

First, the need for oblique (non-orthogonal) factor rotation analysis to arrive at our nine-dimensional service quality scale accentuates that the emergent service quality dimensions are interrelated (see Section 5.1). To better understand this phenomenon of interrelations, it is highly recommended to start exploring the nature and causes of these interrelationships (cf. Parasuraman et al. 1991). An intriguing method to further investigate the interrelations of service quality dimensions may be found in path analysis as it can be used to describe the directed dependencies among the nine dimensions, whilst allowing variables in the model to function as independent and dependent variables at the same time (Olobatuyi 2006).

Next, factor rotation analysis was used as the sole method in our study to verify both the dimensionality of service quality and the content per service quality dimension (see Section 5.1). To further investigate the dimensionality and content of our service quality construct, it is recommended to apply or develop other methods (cf. Parasuraman et al. 1994). One alternative method may be found in providing facilities management executives with clear and concise definitions of the nine service quality dimensions identified and simply asking them to sort the 44 service quality attributes identified into the various dimensions on the basis of their content. The proportion of attributes sorted into the 'correct' dimensions would reflect the degree to which the dimensions are distinct (Parasuraman et al. 1991).

Finally, our results only suggest that service quality is an antecedent of customer satisfaction and that customer satisfaction is an antecedent of purchase intentions (see Section 5.4). Moreover, there is no clear consensus in the service quality literature and the consumer satisfaction literature about the about the causal link between the three constructs. Specifically, many service quality researchers argue that customer satisfaction is an antecedent of service quality, whereas many consumer satisfaction researchers argue that the opposite is true (see Section 3.2). To resolve the confusion and reconcile the contradicting views, it is highly recommended to intensify empirical research into the causal directions between service quality, customer satisfaction and purchase intention (cf. Parasuraman et al. 1994). Again, path analysis might prove useful in further investigation into the causal direction between quality and satisfaction.

Clout dimension - One concern emerging from Section 5.4 is the observation that the *clout* dimension has only moderately significant relationships with overall perceived service quality and customer satisfaction and a non-significant relationship with purchase intention (see Table 5.7). Furthermore, the *clout* dimension has highly significant correlations to *reputation* and *competence*, significant correlations to *reliability*, *competitiveness*, *collaboration* and *accessibility*, moderately significant correlations to *assurance*, and no significant correlations to *awareness*, whereas all other service quality dimensions have highly significant to each other (see Table 5.6). Although these observations raise questions as to whether the *clout* dimension actually belongs to the service quality construct, additional focus group discussions revealed that larger customer organisations operating throughout the country definitely regard *clout* as part of service quality, whereas this is not necessarily the case for smaller customer organisations operating from one single office or few premises in one region (see Section 5.6). Moreover, the results in Section 7.3 indicate that the *clout* dimension does exhibit strong relationships with the liquidity ratio and the current ratio of supplier organisations. Following these findings, it is highly recommended to further investigate the role of *clout* in relation to both service quality and customer satisfaction as well as supplier financial performance. A fruitful starting point may be found in differentiating between service quality perceptions of smaller customer organisations and perceptions of larger customer organisations.

Supplier perspective - Another concern, emerging from Section 7.2, is the fact that there are no significant correlations between supplier perceived financial performance and actual financial performance (see Table 7.4). This finding not only indicates that account managers within supplier organisations not always have a clear picture of the financial performance of the organisations they work for, but also brings into question the validity of the relationships between strategic importance and financial performance as perceived by suppliers (see Section 7.1). As these findings are based on only 30 surveys received from various supplier organisations, it is recommended to pursue further routes to collect supplier data. However, it is to be noted that such data appears very difficult to obtain (see Section 4.3).

Other service environments - Although the cross-customer comparison (see Chapter 6) indicates that there are no significant differences between service quality perceptions concerning cleaning, catering and security services, the nine-dimensional service quality construct identified in our study may very well be specific to cleaning, catering and security services. Therefore, it is highly recommended to test our service quality measurement instrument in different business-to-business service environments (e.g. outsourced corporate finance and human resources activities). Furthermore, our instrument is most probably culture specific. With sole application in the United Kingdom to date, it is also recommended to test our instrument in different geographical regions (e.g. Mainland Europe, Asia and America). When applying our methodology in different environments and/or regions, however, it is recommended to test whether our original surveys encompass all determinant and items perceived to be important to service quality in the environment and/or region

investigated. When necessary, the instrument should be adapted to fit the needs of a particular service environment or geographical region.

To summarise Chapter 11, the service quality scale identified in this thesis can be used to assess and benchmark customer perceptions of service quality in relation to cleaning, catering and security services, subsequently help both customers and suppliers to identify service quality shortfalls, and finally provide both stakeholders with clear indications about what needs to be done to improve service quality.

The areas in definite need of improvement in performance are: *competitiveness, collaboration, accessibility* and *competence*, as customer perceived importance of these service quality dimensions is significantly higher than customer perceived performance and customer perceived performance is significantly lower than supplier perceived performance. Looking at the underlying service quality attributes that exhibit both significant importance-performance gaps and significant customer-supplier gaps, first steps to improve customer perceived service quality evolve around building transparency and trust and proactive management of expectations as well as continuous development of competences and improved labour conditions for service operatives.

To enhance our understanding of service quality in relation to business support services, however, further research is needed concerning the research methodology developed and applied, the interrelationships of nine-dimensional construct identified, and the exact role of the *clout* dimension. Furthermore, it is highly recommended to continue accumulating data - both in a variety of service environments and in various geographical regions.

The last chapter will highlight the most relevant conclusions that can be drawn from this thesis and summarise our contribution to knowledge.

Box 11 Summary of emergent implications

12 CONCLUDING REMARKS

In this last chapter we highlight the most important aspects of our research on service quality in relation to business support services. First, we focus on the most relevant conclusions that can be derived from this thesis by referring to our research proposition. Furthermore, we highlight our contribution to knowledge - which should be of interest to both academics and practitioners. Finally, we provide a brief closing note.

12.1 MOST RELEVANT CONCLUSIONS

In a final attempt to condense our findings whilst referring to our main proposition and subsequent hypotheses (see Section 4.1), six relevant conclusions can be drawn from our research. As can be seen in Table 12.1 substantial evidence has been presented throughout this thesis to support our proposition and the majority of its five related hypotheses.

	Proposition or hypothesis	Empirical support
Proposition	Service quality in the context of business support services is a multi-dimensional construct (i.e. service quality in cleaning, catering and security consists of various dimensions).	Fully supported as nine clear service quality dimensions were identified
Hypothesis 1	As for customer organisations, all service quality dimensions identified positively influence overall perceived service quality, customer satisfaction and purchase intention.	Supported for eight of the nine service quality dimensions
Hypothesis 2	From the customer perspective, there are no significant differences between cleaning, catering and security services concerning all service quality dimensions as well as overall perceived service quality, customer satisfaction and purchase intention.	Fully supported for all nine service quality dimensions and all three output measures
Hypothesis 3	As for supplier organisations, all service quality dimensions identified positively influence supplier financial performance.	Supported for six of the nine service quality dimensions
Hypothesis 4	From the supplier perspective, there are no significant differences between cleaning, catering and security services concerning all service quality dimensions as well as supplier financial performance.	Supported for eight of the ten financial measures, but not supported for the service quality dimensions
Hypothesis 5	Customers and suppliers of business support services have different perceptions of overall perceived service quality, all service quality dimensions and their underlying service quality attributes.	Supported for overall service quality, four of the nine dimensions and 21 of the 44 attributes

Table 12.1 Summary of empirical support for proposition and hypotheses

A major conclusion from our empirical research, fully supporting our main proposition, is that customer perceived service quality in relation to the business support services considered (i.e. cleaning, catering and security) consists of nine clear service quality dimensions containing 44 service quality attributes (see Table 10.1). Moreover, the nine-dimensional service quality construct identified shows high reliability as well as good validity. The nine service quality dimensions are: *reliability*, *clout*, *reputation*, *awareness*, *competitiveness*, *collaboration*, *accessibility*, *competence* and *assurance*. The fact that the nine service quality dimensions are interrelated indicates that all dimensions should be fulfilled concurrently in order to assure good service quality.

A second conclusion from our research, related to our first hypothesis, is that eight of the nine service quality dimensions are strongly or moderately yet highly significantly related to customer perceived service quality and customer satisfaction - *clout* being the exception with a weak and moderately significant relationships to both service quality and customer satisfaction. The same eight service quality dimensions are moderately yet highly significantly related to purchase intention. The first finding reiterates that service quality is a multi-dimensional

construct, whereas the latter finding suggests that may be other constructs important in arriving at a purchase decision - for example the costs of service delivery.

Furthermore, our empirical results suggest that service quality is an antecedent of customer satisfaction (as the nine service quality dimensions exert a marginally stronger influence on overall perceived service quality than they do on customer satisfaction) and that customer satisfaction is an antecedent of purchase intention (as customer satisfaction exerts a slightly stronger influence on purchase intention than does overall perceived service quality). These findings add to the ongoing debate concerning the causality between these three constructs.

Another major conclusion from our cross-customer comparison, fully supporting our second hypothesis, is that there are no significant differences between cleaning, catering and security services concerning customer perceived service quality, customer satisfaction and purchase intention. Furthermore, there are no significant differences between the three service lines concerning the nine service quality dimensions. These findings indicate that all three service lines investigated belong to one and the same group of business support services - that is facilities management services.

A fourth conclusion from our empirical research, related to our third hypothesis, is that there are no significant correlations between supplier perceived financial performance and their actual financial performance. However, there are various significant relationships between the nine service quality dimensions as perceived by customers and the actual financial performance of suppliers. Although these findings indicate that account managers at supplier organisations providing cleaning, catering and security services do not always have a clear picture of the financial performance of the companies they work for, they also indicate that customer perceived service quality does have an impact on the financial performance of supplier organisations.

A fifth conclusion from our cross-supplier comparison, related to our fourth hypothesis, is that there are no significant differences between cleaning, catering and security companies concerning profit margin, return on capital employed, turnover growth, employee growth, liquidity ratio, current ratio, solvency ratio and gearing ratio for supplier organisations. However, both debtor collection period and salaries over turnover are significantly lower for catering providers when compared to both cleaning and security providers. These findings reiterate that all three service lines investigated belong to one and the same group of business support services - that is facilities management services.

A last major conclusion from our customer-supplier comparison, related to our fifth hypothesis, is that customer organisations have significantly lower perceptions of the service quality they receive than do supplier organisations that provide cleaning, catering and security services. Similarly, customers rate supplier performance significantly lower than do suppliers on: *competitiveness*, *collaboration*, *accessibility* and *competence*. As for the underlying service quality attributes, customers have significantly lower perceptions for 21 of the 44 attributes when compared to suppliers.

Moreover, customer perceived performance is significantly lower than customer perceived importance for eight of the nine service quality dimensions - *clout* being the exception. Ordered by need of improvement the dimensions are: 1) *reliability*, 2) *competitiveness*, 3) *collaboration*, 4) *assurance*, 5) *reputation*, 6) *awareness*, 7) *competence* and 8) *accessibility*. As for the underlying service quality attributes, perceived performance is significantly lower than perceived importance for 33 of the 44 attributes. These findings provide useful directions and clear indications where suppliers should focus their efforts in order to improve customer perceived service quality, customer satisfaction and ultimately purchase intentions of customer organisations.

12.2 CONTRIBUTION TO KNOWLEDGE

This thesis provided three noteworthy contributions to knowledge. First, we developed a new conceptual quality model applicable to both products and services. Second, we extended the existing SERVPERF instrument to measure service quality in a business-to-business context. Third, we successfully tested our service quality questionnaire which led to valuable empirical findings.

New conceptual quality model - We have developed a new conceptual quality model that is applicable to both products and services in both a business-to-consumer context and a business-to-business environment. The model is based on existing quality models and new insights from emergent literature and has been validated through focus group discussions (see Section 3.4).

Extended measurement instrument - We have successfully adapted, supplemented and tested the existing SERVPERF instrument in order to be able to measure service quality in a business-to-business context - a rather new area for service quality research (see Chapter 4).

- First, based on emergent literature and focus group discussions, the existing five service quality determinants containing 22 service quality items developed for the measurement of service quality in a business-to-consumer context has been adapted and supplemented to 15 service quality determinants containing 60 service quality items for the measurement of service quality in a business-to-business environment.
- Furthermore, based on the emergent literature, the existing SERVPERF instrument has been supplemented with 60 statements to measure perceived importance of each service quality item - not least to enhance the diagnostic value of the existing SERVPERF methodology.
- Finally, our final service quality questionnaire - featuring a background section to capture relevant contextual information, 60 perception statements and 60 importance statements on a 7-point Likert scale, as well as a closing section to capture either customer satisfaction and purchase intention or supplier perceived financial performance - was validated for comprehension and completeness through executives interviews and completed by 72 contract managers at customer organisations and 30 account managers at supplier organisations.

Empirical and verified findings - We have identified nine clear service quality dimensions for cleaning, catering and security services, of which eight dimensions show highly significant relationships with both customer perceived service quality, customer satisfaction and purchase intention. Furthermore, we exposed various significant relationships between the nine service quality dimensions as perceived by customers and the actual financial performance of suppliers. Finally, we revealed that customer organisations have significantly lower perceptions of the service quality they receive than do supplier organisations that provide cleaning, catering and security services (see Part B of this thesis).

12.3 CLOSING NOTE

The main aim of this thesis was to identify service quality indicators that are beneficial to both customers and suppliers of cleaning, catering and security services. Our exploratory research resulted in important findings and relevant conclusions for both academics and practitioners interested in service quality as well as various valuable implications for customer organisations and especially supplier organisations pertaining to improve customer perceived service quality. However, our research has only begun to address the many issues that are important in the management of service quality in relation to business support services. Our findings undoubtedly raise more questions than they answer, but the questions we addressed - what quality

dimensions are important for customer satisfaction and what quality dimensions are important for supplier performance - are arguably among the most important in business-to-business service quality management.

Successful development and subsequent testing of a quality measurement instrument for business-to-business service environments, led to the identification of a nine-dimensional construct that customers use in forming quality perceptions concerning cleaning, catering and security services: *reliability, clout, reputation, awareness, competitiveness, collaboration, accessibility, competence* and *assurance*. Furthermore, eight of these service quality dimensions have significant relationships with customer satisfaction and purchase intention. Similarly, six of the service quality dimensions as perceived by customers have significant relationships with the financial performance of supplier organisations. However, customer organisations have significantly lower perceptions of the service quality they receive than do supplier organisations for four service quality dimensions. Moreover, customer perceived performance is significantly lower than customer perceived importance for eight of the nine service quality dimensions. Although concerning, the differences identified reveal valuable information for organisations pertaining to improve customer perceived service quality - ultimately leading to improved customer satisfaction as well as enhanced supplier performance.

To close, continued effort is needed to further define, measure and understand the complexity of service quality in a business-to-business context. Fruitful areas for future research identified include: enhancing the research methodology developed and employed, uncovering the nature of the interrelationships among the service quality dimensions identified as well as the role of *clout* in our nine-dimensional service quality construct, and continuing to accumulate empirical evidence on the viability of our findings - not least in service environments not classified as facilities management. Research directed at these and other areas will further contribute to our understanding of service quality indicators for business support services.

To summarise Chapter 12, there is substantial evidence to support the majority of our hypotheses. Service quality in the context of business support services consists of nine service quality dimensions of which eight dimensions show highly significant relationships with both customer perceived service quality and customer satisfaction. Furthermore, various significant relationships between the nine service quality dimensions as perceived by customers and the actual financial performance of suppliers were exposed. Finally, it was revealed that customer organisations have significantly lower perceptions of the service quality they receive than do supplier organisations that provide cleaning, catering and security services.

Concerning the contribution to knowledge, we developed a new conceptual quality model, adapted and supplemented the existing SERVPERF instrument, and successfully tested our extended instrument - leading to a wide variety of valuable empirical findings. However, continued effort is needed to further define, measure and understand the complexity of service quality in a business-to-business context.

Box 12 Summary of concluding remarks

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ANNEX A NATURE AND PARADIGM

This annex provides an overview of the nature and paradigm underlying this thesis. It should be noted that the content of this annex is extensively based on the works by Habermas (1972) and Burrell and Morgan (1979) as well as more recent publications by Gioia and Pitre (1990) and Murray and Ozanne (1991).

Research nature - According to Habermas (1972) all knowledge falls into three categories, each driven by a different kind of interest, and each of which could be legitimately described as resulting in knowledge:

- 1 Objective science: driven by the interest to predict and control phenomena, whether natural or human (this category is also known as objectivism or empirical-analytical science).
- 2 Subjective science: driven by the interest to explain and understand phenomena, and communicate this effectively (this category is also known as subjectivism or historical-hermeneutic science).
- 3 Critical theory: driven by the interest of individuals to exercise and develop their own freedom.

The first is concerned with developing know-how and technology to predict events and to regulate how and when they occur. The second is intended to explain and facilitate communication and understanding between individuals. The third is rooted in the potential of knowledge to empower individuals and involves an understanding of what underlies people's actions, concepts and beliefs (Griseir 2002).

By exploring the various assumptions about the nature of social sciences we can distinguish the three 'research natures' from each other. The first set of assumptions is ontological: is reality given or a product of the mind? The second set of assumptions is axiological: is the goal to explain or understand phenomena? The third set of assumptions is epistemological: can knowledge be acquired or must it be experienced? According to Burrell and Morgan (1979) these assumptions have important methodological implications. Whereas objectivists examine relationships and regularities between elements, subjectivists focus on how individuals create, modify and interpret the world.

	Objective science	Subjective science	Critical theory
Ontology	realism	nominalism	conceptualism
Nature of reality	- objective and tangible - fragmentable - divisible	- socially constructed - holistic - contextual	- force-field between the two - dynamic - historical totality
Nature of being	- deterministic - reactive	- voluntaristic - proactive	- suspended judgement - emphasise human potential
Axiology	explanation	understanding	emancipation
Nature of the goal	- via subsumption	- via interpretation	- via social organisation
Epistemology	positivism	anti-positivism	post-positivism
Nature of knowledge	- nomothetic - time-free - context-independent - value-free	- idiographic - time-bound - context-dependent - value-laden	- forward-looking - imaginative - critical and unmasking - practical
Nature of research	- dualism and separation	- interactive and cooperative	- continuing dialogue

Table A1 Three categories of knowledge (Burrell and Morgan 1979, Murray and Ozanne 1991)

Based on the description of the three categories of knowledge, our research falls into the category of empirical-analytical or 'objective' science. Concerning our methodology, however, one could argue that from a philosophical perspective our surveys are both nomothetic and idiographic. From a sociological and psychological perspective our methodology is more nomothetic.

Research paradigm - By exploring the various assumptions about the nature of society, Burrell and Morgan (1979) made a further distinction between objectivism and subjectivism. Besides the use of an objectivist-subjectivist continuum, they proposed the use of a radical-regulation continuum to analyse the key assumptions about the nature of social sciences and the nature of society. Burrell and Morgan (1979) provided a description of the extremes of each end of the continuum for illustration, while recognising that research may be positioned at any point along the continuum. Objectivist researchers are portrayed as viewing the social world as "if it were a hard, external, objective reality" and as searching for universal laws to explain this reality. Subjectivist researchers are portrayed as concerned "with an understanding of the way in which the individual creates, modifies and interprets the world" and at the extremes as interested in individual explanations of their unique experiences. Researchers of the radical tradition are primarily concerned with "explanations for the radical change, deep-seated structural conflict, modes of domination and structural contradiction which they see as characterising modern society". Researchers with a regulatory perspective "are primarily concerned to provide explanations of society in terms which emphasise its underlying unity and cohesiveness" and the mechanisms by which this is maintained.

These dimensions were presented as a framework to create four paradigms: functionalist, interpretivist, radical humanist and radical structuralist (see Figure A1). **Functionalists** are portrayed as taking an objective view of reality and are concerned with explaining how organisations and society maintain order. **Interpretivists** are portrayed as taking a subjective view of reality and are being concerned with explaining how organisations and society maintain order. **Radical humanists** are portrayed as taking a subjective view of reality and are concerned with explaining radical change in organisations and society. **Radical structuralists** are portrayed as taking an objective view of reality and are concerned with explaining radical change in organisations and society.

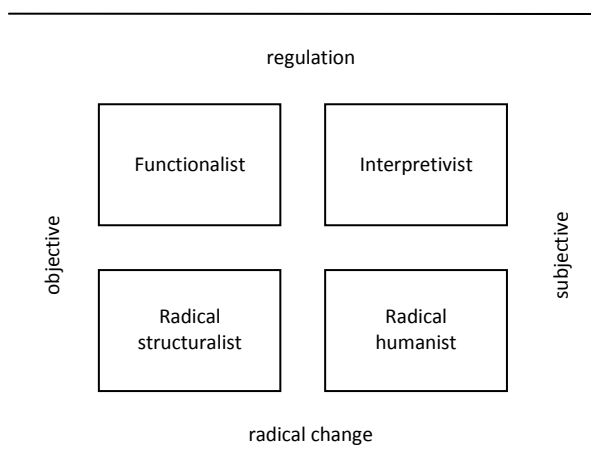


Figure A1 Burrell and Morgan's four paradigms (1979)

In discussing assumptions about the nature of social sciences, Burrell and Morgan (1979) identified a series of key concerns that allowed them to distinguish the objective and subjective dimensions of the framework. Functionalists and radical structuralists take an objective perspective and tend to have a realist ontology, a predictive axiology, and a positivist epistemology. Interpretivists and radical humanists take a subjective

perspective and tend to have a nominalist ontology, a interpretative axiology, and an anti-positivist epistemology.

In addition, Burrell and Morgan (1979) identified a series of key concerns that allowed them to distinguish the radical and regulatory dimensions of the framework. Functionalists and interpretivists focus on explanations of how society is regulated and are concerned with status quo, social order, consensus, social cohesion, solidarity, need satisfaction and actuality. In contrast, radical structuralists and radical humanists focus on explanations of revolutionary change and are concerned with structural conflict, modes of domination, contradictions, emancipation, deprivation and potentiality.

The **functionalist paradigm** has provided the dominant framework for the conduct of academic sociology and the study of organisations. It represents a perspective which is firmly rooted in the sociology of regulation and approaches its subjective matter from an objectivist point of view (Burrell and Morgan 1979). The functionalist paradigm generates regulative sociology in its most fully developed form. In its overall approach it seeks to provide essentially rational explanations of social affairs. It is a perspective which is highly pragmatic in orientation, concerned to understand society in a way which generates knowledge which can be put to use. It is often problem-orientated in approach, concerned to provide practical solutions to practical problems. It is usually firmly committed to a philosophy of social engineering as a basis for social change and emphasises the importance of understanding order, equilibrium and stability in society and the way in which these can be maintained. It is concerned with the effective 'regulation' and control of social affairs.

Theorists located in the context of the **interpretive paradigm** adopt an approach in agreement with the tenets of what we can be described as the sociology of regulation, though its subjectivist approach to the analysis of the social world makes its link with this sociology often implicit rather than explicit. It sees the social world as an emergent social process which is created by the individuals' concerned (Burrell and Morgan 1979). Social reality is regarded as being little more than a network of assumptions and intersubjectively share meanings. The ontological status of the social world is viewed as extremely questionable and problematic as far as theorists located within the interpretive paradigm are concerned. Everyday life is accorded the status of a miraculous achievement. Interpretive philosophers and sociologists seek to understand the very basis and source of social reality. They often delve into the depths of human consciousness and subjectivity in their quest for the fundamental meanings which underlie social life.

The **radical humanist paradigm** is defined by its concern to develop a sociology of radical change from a subjectivist standpoint. Its approach to social science has much in common with that of the interpretive paradigm, in that it views the social world from a perspective which tends to be nominalist, anti-positivist, voluntarist and idiographic. However, its frame of reference is committed to a view of society which emphasises the importance of overthrowing or transcending the limitations of existing social arrangements (Burrell and Morgan 1979). In keeping with its subjectivist approach to social science, the radical humanist perspective places central emphasis upon human consciousness. Radical humanists seek to change the social world through a change in modes of cognition and consciousness.

Theorists located within the **radical structuralist paradigm** advocate a sociology of radical change from an objectivist standpoint. Whilst sharing an approach to science which has many similarities with that of functionalist theory, it is directed at fundamentally different ends. Radical structuralism is committed to radical change, emancipation and potentiality, in an analysis which emphasises structural conflict, modes of domination, contradiction and deprivation. It approaches these general concerns from a standpoint which tends to be realist, positivist, determinist and nomothetic (Burrell and Morgan 1979). Whereas the radical

humanist forge their perspective by focusing upon ‘consciousness’ as the basis for a radical critique of society, the radical structuralists concentrate upon structural relationships within a realist social world. They emphasize the fact that radical change is built into the very nature and structure of contemporary society, and they seek to provide explanations of the basic interrelationships within the context of total social formations.

Functionalist paradigm	Interpretivist paradigm	Radical humanist paradigm	Radical structuralist paradigm
Goals To <i>search</i> for regularities and <i>test</i> in order to <i>predict</i> and <i>control</i>	Goals To <i>define</i> and <i>explain</i> in order to <i>diagnose</i> and <i>understand</i>	Goals To <i>describe</i> and <i>critique</i> in order to <i>change</i>	Goals To <i>identify</i> sources of domination in order to <i>guide</i> revolutionary practices
Theoretical concerns - relationships - causation - generalisation	Theoretical concerns - social construction of reality - reification process - interpretation	Theoretical concerns - social construction of reality - distortion - interests served	Theoretical concerns - domination - alienation - emancipation
Theory-building approaches <i>Refinement</i> through <i>causal analysis</i>	Theory-building approaches <i>Discovery</i> through <i>code analysis</i>	Theory-building approaches <i>Disclosure</i> through <i>critical analysis</i>	Theory-building approaches <i>Liberation</i> through <i>structural analysis</i>

Table A2 Paradigm differences affecting theory building (Gioia and Pitre 1990)

Based on the description of the four paradigms, our research falls into the functionalist paradigm. Since our surveys are both nomothetic and idiographic, however, one could argue that our research has an interpretative edge.

Theory building - Building on the paradigm differences as described above, Gioia and Pitre (1990) set out four approaches to theory building that are consistent with the basic assumptions of each paradigm. Following the blurred nature of the transition zones between paradigms, they also recognised that it is possible to construct bridges that link apparently disparate paradigms together.

The **functionalist paradigm** seeks to examine regularities and relationships that lead to generalisations and universal principles (Gioia and Pitre 1990). Theory building typically takes place in a deductive manner, starting with reviewing the literature and operating out of existing theories. Hypotheses are derived by selecting specific variables as likely causes of some designated effect. Such hypotheses are tentative statements of relationships that extend prior theory in a new direction, propose an explanation for a perceived gap in existing knowledge, or set up a test of competing possible explanations for structural relationships. Data are collected with instruments designed according to the hypotheses formulated and analysis is predominantly quantitative. Variables, categories and hypotheses all tend to remain constant over the course of the theory elaboration processes. The result of these processes is either the verification or falsification of hypotheses, with theory building occurring through the incremental revision or extension of the original theory.

Within the **interpretive paradigm**, the basic stance towards theory building is one of becoming part of the evolving events studied (Gioia and Pitre 1990). The interpretive researcher collects data that are relevant to the informants and attempts to preserve their unique representations. Analysis begins during data collection and typically uses coding procedures to discern patterns in the (usually) quantitative data so that descriptive codes, categories, or interpretive schemes that are adequate at the level of meaning of the informants can be established. Thereafter, analysis, theory generation and further data collection go hand in hand. Thus, the theory generation process is typically iterative, cyclical, and nonlinear. Through this process, tentative speculations are confirmed or disconfirmed by further consultation with informants. Subsequently, revisions and modifications are likely to occur before a grounded, substantive, mid-range theory is proposed.

Theory building in the **radical humanist paradigm** is similar to that of interpretivism, but there is the important distinction of having a more critical or evaluative stance (Gioia and Pitre 1990). In this paradigm, theory building is best viewed as having a political agenda, because the purposes of theory are to examine the legitimacy of the social consensus on meaning, to uncover communicative distortions, and to educate individuals about the way in which distortions occur. The critical perspective implies different kinds of research questions and, thus, different theory-building approaches. Within this paradigm hypothesis testing is rare and even literature reviews are not a central characteristic of theory-building efforts. Although theory generation is often grounded in specific instances and situations, it also is based on an article of faith that new theory should be geared mainly to the goal of radical change and liberation.

In the **radical structuralist paradigm**, theory-building is related to that of radical humanism by virtue of the shared ideology for change - although a macro focus is of prime concern (Gioia and Pitre 1990). Historical, dialectical, and critical modes of inquiry are used in theory generation with the goal to understand, explain and act on existing structural mechanisms, with the ultimate goal of transforming them through radical change. The process by which this theoretical intent is accomplished is initially grounded in observations about the oppressive nature of the world, but more frequently it is defined by a cyclical consideration of argument and evidence. Theory building involves the rethinking of data in light of refinements and viewpoints; it also involves attempting to recast contextually bound situations into some broader context. Theory-building efforts are mainly persuasive constructions about structural features and their implications for the purpose of fomenting transformative change.

Functionalist paradigm	Interpretivist paradigm	Radical humanist paradigm	Radical structuralist paradigm
<p>Opening work</p> <p>Selecting a topic: - what are the issues? - what are the questions?</p> <p>Reviewing literature: - what do we know? - what is missing?</p> <p>Developing a framework: - what are relevant theories? - what are the variables?</p> <p>Formulating hypotheses</p> <p>Designing research: - what are the data? - where to find the data? - how to measure data?</p>	<p>Opening work</p> <p>Selecting a topic: - what are the issues? - what are the questions?</p> <p>Designing research: - what are the data? - where to find the data? - how to record data?</p>	<p>Opening work</p> <p>Selecting a topic: - what are the issues? - what are the questions?</p> <p>Designing research: - what are the data? - where to find the data? - how to measure data?</p>	<p>Opening work</p> <p>Selecting a topic: - what are the issues? - what are the questions?</p> <p>Articulating the theory: - how is the topic a 'potential' special case of grand theory?</p>
<p>Data collection</p> <p>Probing representative samples of subjects - according to hypotheses formulated</p>	<p>Data collection</p> <p>Identifying specific cases and questioning informants - according to what is relevant to them in context</p>	<p>Data collection</p> <p>Identifying specific cases and questioning informants - according to what is relevant to them; contextual information pertaining to deep structure</p>	<p>Data collection</p> <p>Probing historical evidence - according to grand theory</p>

Table A3 Paradigm comparison of steps toward theory building (Gioia and Pitre 1990)

Functionalist paradigm	Interpretivist paradigm	Radical humanist paradigm	Radical structuralist paradigm
Analysis Testing hypotheses: evaluate the significance of the data according to initial problems and hypotheses	Analysis Coding: provide a description at the first and sometimes a second level of abstraction Formulating conjectures: identify the relations between concepts at first level or across levels of abstraction Evaluating conjectures: validate with informants through new data collection Formulating theory: identify the emerging concepts and relationships (and contrast against literature)	Analysis Coding: provide information at the first level of abstraction Formulating description deep analysis: reflect on what makes people construct their world the way they do Criticising: unveil how deep forces influence the first level of abstraction and identify whose interests are served	Analysis Arguing: use specific instances to further validate the theory Structural analysis: identify the sources of domination and the potential points of leverage
Theory building Writing up results: show how the theory is refined, supported or disconfirmed and show what it tells the scientific community and practitioners	Theory building Writing up a substantive theory: show how it all fits together	Theory building Writing up a dialectical analysis: show how the level of consciousness should change	Theory building Writing up a rhetorical analysis: showing how the praxis should change

Table A3 Paradigm comparison of steps toward theory building (continued)

Based on the four approaches to theory building, and our research falling into the functionalist paradigm, we adopted the 'functionalist' approach towards theory as highlighted in the first column above.

ANNEX B CUSTOMER SURVEY

This annex provides an overview of the survey developed to gain a better understanding of quality as perceived by client contract managers. For more details on measure development and survey development, please consult Section 4.2 and Section 4.3 respectively. The example given focuses on cleaning services, but similar surveys for catering services and security services were developed.

INTRODUCTION

In order to improve FM service delivery in the United Kingdom, IPD Occupiers has asked University College London to conduct surveys on cleaning, catering and security services. This particular survey is to obtain the opinion of cleaning contract managers on current cleaning services. The survey focuses more on the attitudes of cleaning personnel and company representatives than on the characteristics of the service delivered.

In all questions we ask you about your personal opinion - there are no right or wrong answers and most often first impressions are best. Unless stated otherwise you only have to tick a box or circle a number.

All information provided will be treated in confidence and processed anonymously. The completed surveys will only be assessed by researchers of University College London. The results will be communicated at our next Turning Point Seminar scheduled for the fourth quarter of 2007 in central London.

Please return the completed survey to Hermen van Ree (IPD Occupiers, 1 St John's Lane, London EC1M 4BL). For questions and/or comments please email to hermen.van.ree@ipd.com or phone 078 7577 6719.

We count on your collaboration. With kind regards,

Hermen van Ree
Research & Development
Investment Property Databank

Peter McLennan
Senior Research Fellow
University College London

COMPANY INFORMATION

Company name:

Company size:

- < 100
 100 - 1,000
 1,000 - 10,000
 10,000 - 100,000
 > 100,000

Company classification:

- Manufacturing
 Electricity, gas and water
 Construction
 Wholesale and retail trade
 Transport and communication
 Financial intermediation
 Real estate and business
 Public administration
 Education
 Health and social work

Name of current cleaning provider (optional):

How many years are you a customer of this provider:

Annual spent on cleaning services per employee (in £):

PERFORMANCE

The following set of statements relate to **your feelings about cleaning staff at your company**. For each statement, please show the extent to which you believe cleaning at your company has the feature described by the statement. Circling a 7 means you strongly agree that cleaning at your company has that feature, circling a 1 means you strongly disagree. You may use any number in the middle as well to show how strong your feelings are. There are no right or wrong answers - all we are interested in is a number that best shows your perception about cleaning at your company. Please note that some of the statements are negatively worded.

		strongly disagree	disagree	mildly disagree	neutral	mildly agree	agree	strongly agree
Reliability - ability to perform cleaning services dependably and accurately								
Cleaning personnel consistently perform their services correctly	1	2	3	4	5	6	7	
Cleaning personnel provide the services at the time they promise to do so	1	2	3	4	5	6	7	
Cleaning personnel show sincere interest in solving problems as they occur	1	2	3	4	5	6	7	
Cleaning personnel consistently respond within promised timeframes	1	2	3	4	5	6	7	
Responsiveness - willingness to help and provide prompt service								
Cleaning personnel are not always willing to help you	1	2	3	4	5	6	7	
Cleaning personnel do not give you prompt service if needed	1	2	3	4	5	6	7	
Cleaning personnel do not always meet deadlines for projects and assignments	1	2	3	4	5	6	7	
Cleaning personnel are not proactive in responding to unperceived problems	1	2	3	4	5	6	7	
Assurance - cleaning personnel's knowledge and courtesy								
Cleaning personnel are consistently courteous with you	1	2	3	4	5	6	7	
Cleaning personnel's behaviour instils confidence in you	1	2	3	4	5	6	7	
Cleaning personnel have the required skills to perform their service	1	2	3	4	5	6	7	
Cleaning personnel have the required knowledge to answer your questions	1	2	3	4	5	6	7	
Empathy - caring and individualised attention by cleaning personnel								
Cleaning personnel do not understand your specific needs	1	2	3	4	5	6	7	
Cleaning personnel do not have your best interests at heart	1	2	3	4	5	6	7	
Cleaning personnel do not give you personal attention	1	2	3	4	5	6	7	
Cleaning personnel do not show signs of recognition towards you	1	2	3	4	5	6	7	
Tangibles - physical appearance of cleaning personnel and their equipment								
Cleaning personnel are well dressed and neat-appearing	1	2	3	4	5	6	7	
Cleaning personnel have up-to-date appearing equipment (e.g. trolleys and vacuum cleaners)	1	2	3	4	5	6	7	
Cleaning personnel keep paperwork and records accurately	1	2	3	4	5	6	7	
Materials associated with cleaning services are visually appealing (e.g. safety floor signs)	1	2	3	4	5	6	7	

The following set of statements relate to **your feelings about the cleaning company and their representatives in general**. Again, note that some of the statements are negatively worded.

	strongly disagree	disagree	mildly disagree	neutral	mildly agree	agree	strongly agree
Competence - possession of the required skills and knowledge							
The cleaning company has sufficient expertise in the area of cleaning services	1	2	3	4	5	6	7
The cleaning company possesses good problem-solving skills	1	2	3	4	5	6	7
The cleaning company possesses the required knowledge and skills to manage the service	1	2	3	4	5	6	7
The cleaning company has sufficient research capability	1	2	3	4	5	6	7
Credibility - involves trustworthiness and believability							
The cleaning company does not have a good reputation in the market	1	2	3	4	5	6	7
The cleaning company is not believable and honest	1	2	3	4	5	6	7
The cleaning company does not protect confidential and proprietary information	1	2	3	4	5	6	7
The cleaning company does not demonstrate ethical conduct	1	2	3	4	5	6	7
Accessibility - approachability and ease of contact							
The cleaning company is available at all times to assist you	1	2	3	4	5	6	7
The cleaning company can be easily contacted (face-to-face, phone or e-mail)	1	2	3	4	5	6	7
The cleaning company has convenient operating hours	1	2	3	4	5	6	7
The cleaning company has technical resources that ease the spread of information	1	2	3	4	5	6	7
Communication - being informed in language you can understand							
The cleaning company does not promote an interactive environment with open communication	1	2	3	4	5	6	7
The cleaning company does not explain the service itself including associated costs	1	2	3	4	5	6	7
The cleaning company does not explain the trade-offs between service quality and cost	1	2	3	4	5	6	7
The cleaning company does not assure that a problem will be handled effectively and efficiently	1	2	3	4	5	6	7
Understanding - efforts to understand your company's needs							
The cleaning company has a basic understanding of your company's business	1	2	3	4	5	6	7
The cleaning company is willing to learn your company's specific requirements	1	2	3	4	5	6	7
The cleaning company provides you with individualised attention	1	2	3	4	5	6	7
The cleaning company is willing to include programmes to train and educate your colleagues	1	2	3	4	5	6	7

	strongly disagree	disagree	mildly disagree	neutral	mildly agree	agree	strongly agree
Consulting - ability to align with your company's operations							
The cleaning company is willing to establish partnerships with joint planning and goal setting	1	2	3	4	5	6	7
The cleaning company is willing to act as an advocate with senior company executives	1	2	3	4	5	6	7
The cleaning company is willing to incur risk for your company	1	2	3	4	5	6	7
The cleaning company is willing to provide profit driven alternatives	1	2	3	4	5	6	7
Price - monetary allocation in return for the cleaning service							
The cleaning company's price does not meet your company's budget objectives	1	2	3	4	5	6	7
The cleaning company's price is not competitive compared to other suppliers	1	2	3	4	5	6	7
The cleaning company does not secure multiple competitive bids	1	2	3	4	5	6	7
The cleaning company's price does not relate to the quality delivered	1	2	3	4	5	6	7
Offering - scope of services made available to your company							
The cleaning company provides multiple options and programmes to choose from	1	2	3	4	5	6	7
The cleaning company can offer an extended scope of the basic services provided	1	2	3	4	5	6	7
The cleaning company can provide customised and unique services	1	2	3	4	5	6	7
The cleaning company offers other support services (e.g. catering and/or security)	1	2	3	4	5	6	7
Clout - ability to secure the best service offerings at the lowest price							
The cleaning company does not have sufficient leverage in the market	1	2	3	4	5	6	7
The cleaning company does not have a large presence in the market	1	2	3	4	5	6	7
The cleaning company is not able to coordinate and consolidate resources with other suppliers	1	2	3	4	5	6	7
The cleaning company is not able to act as an advocate with other suppliers in the market	1	2	3	4	5	6	7
Geographics - ability to offer services in different locations							
The cleaning company is able to offer standardised services in other cities nationally	1	2	3	4	5	6	7
The cleaning company is able to coordinate standardised services in other countries	1	2	3	4	5	6	7
The cleaning company is able to offer customised services other cities nationally	1	2	3	4	5	6	7
The cleaning company is able to coordinate customised services in other countries	1	2	3	4	5	6	7
Overall performance - combining all 15 service quality areas							
The cleaning company is offering good quality service	1	2	3	4	5	6	7

IMPORTANCE

The following set of statements relate to **your feelings about the importance of each feature of the cleaning staff at your company**. A 7 means you consider the feature very important, a 1 means it is very unimportant. You may circle any of the numbers to indicate the importance of each factor to you. Once again, there are no right or wrong answers - all we are interested in is your perception of how important each feature is to you.

		very unimportant	unimportant	mildly unimportant	neutral	mildly important	important	very important
Reliability - ability to perform cleaning services dependably and accurately								
Consistent and correct service delivery		1	2	3	4	5	6	7
Service provision at promised timeslots		1	2	3	4	5	6	7
Sincere interest in solving problems as they occur		1	2	3	4	5	6	7
Consistent response within promised timeframes		1	2	3	4	5	6	7
Responsiveness - willingness to help and provide prompt service								
Helpful cleaning personnel		1	2	3	4	5	6	7
Receiving prompt service if needed		1	2	3	4	5	6	7
Meeting deadlines for projects and assignments		1	2	3	4	5	6	7
Proactive cleaning personnel		1	2	3	4	5	6	7
Assurance - cleaning personnel's knowledge and courtesy								
Consistently courteous cleaning personnel		1	2	3	4	5	6	7
Confidence instilling behaviour by cleaning personnel		1	2	3	4	5	6	7
Skilful cleaning personnel		1	2	3	4	5	6	7
Knowledgeable cleaning personnel		1	2	3	4	5	6	7
Empathy - caring and individualised attention by cleaning personnel								
Understanding your specific needs		1	2	3	4	5	6	7
Having your best interests at heart		1	2	3	4	5	6	7
Provision of personal attention by cleaning personnel		1	2	3	4	5	6	7
Showing signs of recognition towards you		1	2	3	4	5	6	7
Tangibles - physical appearance of cleaning personnel and their equipment								
Well dressed and neat-appearing cleaning personnel		1	2	3	4	5	6	7
Up-to-date appearing cleaning equipment (e.g. trolleys and vacuum cleaners)		1	2	3	4	5	6	7
Accurate paperwork and record keeping by cleaning personnel		1	2	3	4	5	6	7
Visually appealing materials associated with cleaning services (e.g. safety floor signs)		1	2	3	4	5	6	7

The following set of statements relate to **your feelings about the importance of each feature of the cleaning company and their representatives in general.**

	very unimportant	unimportant	mildly unimportant	neutral	mildly important	important	very important
Competence - possession of the required skills and knowledge							
Having sufficient expertise in the area of cleaning services	1	2	3	4	5	6	7
Having good problem-solving skills	1	2	3	4	5	6	7
Having the required knowledge and skills to manage the service	1	2	3	4	5	6	7
Having sufficient research capability	1	2	3	4	5	6	7
Credibility - involves trustworthiness and believability							
Having a good reputation in the market	1	2	3	4	5	6	7
Being believable and honest	1	2	3	4	5	6	7
Protection of confidential and proprietary information	1	2	3	4	5	6	7
Demonstration of ethical conduct	1	2	3	4	5	6	7
Accessibility - approachability and ease of contact							
Being available at all times to assist you	1	2	3	4	5	6	7
Being easily contacted (face-to-face, phone or e-mail)	1	2	3	4	5	6	7
Having convenient operating hours	1	2	3	4	5	6	7
Having technical resources that ease the spread of information	1	2	3	4	5	6	7
Communication - being informed in language you can understand							
Promotion of an interactive environment with open communication	1	2	3	4	5	6	7
Explanation of the service itself including associated costs	1	2	3	4	5	6	7
Explanation of the trade-offs between service quality and cost	1	2	3	4	5	6	7
Assurance that a problem will be handled effectively and efficiently	1	2	3	4	5	6	7
Understanding - efforts to understand your company's needs							
Having a basic understanding of your company's business	1	2	3	4	5	6	7
Willingness to learn your company's specific requirements	1	2	3	4	5	6	7
Provision of individualised attention by cleaning company	1	2	3	4	5	6	7
Willingness to include programmes to train and educate your company's staff	1	2	3	4	5	6	7

	very unimportant	unimportant	mildly unimportant	neutral	mildly important	important	very important
Consulting - ability to align with your company's operations							
Willingness to establish partnerships with joint planning and goal setting	1	2	3	4	5	6	7
Willingness to act as an advocate with your senior executives	1	2	3	4	5	6	7
Willingness to incur risk for your company	1	2	3	4	5	6	7
Willingness to provide profit driven alternatives	1	2	3	4	5	6	7
Price - monetary allocation in return for the cleaning service							
Pricing that meets your company's budget objectives	1	2	3	4	5	6	7
Pricing that is competitive compared to other suppliers	1	2	3	4	5	6	7
Provision of multiple competitive bids	1	2	3	4	5	6	7
Pricing that relates to the quality delivered	1	2	3	4	5	6	7
Offering - scope of services made available to your company							
Having multiple options and programmes to choose from	1	2	3	4	5	6	7
Ability to offer an extended scope of the basic services provided	1	2	3	4	5	6	7
Ability to provide customised and unique services	1	2	3	4	5	6	7
Ability to offer other support services (e.g. catering and/or security)	1	2	3	4	5	6	7
Clout - ability to secure the best service offerings at the lowest price							
Having sufficient leverage in the market	1	2	3	4	5	6	7
Having a large presence in the market	1	2	3	4	5	6	7
Ability to coordinate and consolidate resources with other suppliers	1	2	3	4	5	6	7
Ability to act as an advocate with other suppliers in the market	1	2	3	4	5	6	7
Geographics - ability to offer services in different locations							
Ability to offer standardised services in other cities nationally	1	2	3	4	5	6	7
Ability to coordinate standardised services in other countries	1	2	3	4	5	6	7
Ability to offer customised services other cities nationally	1	2	3	4	5	6	7
Ability to coordinate customised services in other countries	1	2	3	4	5	6	7

SATISFACTION

Finally, please indicate how satisfied you are with the current cleaning services and whether you would renew the contract with the current cleaning provider.

	very dissatisfied	dissatisfied	mildly dissatisfied	neutral	mildly satisfied	satisfied	very satisfied
Overall, how satisfied are you with the current cleaning services?	1	2	3	4	5	6	7
Would you renew the contract with the current cleaning provider?	yes	/	no	/	no idea		

Thank you for your collaboration!

ANNEX C SUPPLIER SURVEY

This annex provides an overview of the survey developed to gain a better understanding of quality as perceived by supplier account managers. For more details on measure development and survey development, please consult Section 4.2 and Section 4.3 respectively. The example given focuses on cleaning services, but similar surveys for catering services and security services were developed.

INTRODUCTION

In order to improve FM service delivery in the United Kingdom, IPD Occupiers has asked University College London to conduct surveys on cleaning, catering and security services. This particular survey is to obtain the opinion of cleaning account managers on current **cleaning services for office buildings**. The survey focuses more on the attitudes of cleaning personnel and yourself as a company representative than on the characteristics of the service delivered.

In all questions we ask you about your personal opinion - there are no right or wrong answers and most often first impressions are best. Unless stated otherwise you only have to complete a box or circle a number.

All information provided will be treated in confidence and processed anonymously. The completed surveys will only be assessed by researchers of University College London. The results will be communicated at our next Turning Point Seminar scheduled for the second quarter of 2008 in central London.

Please return the completed survey to Hermen van Ree (IPD Occupiers, 1 St John's Lane, London EC1M 4BL). For questions and/or comments please email to hermen.van.ree@ipd.com or phone 078 7577 6719.

We count on your collaboration. With kind regards,

Hermen van Ree
Research & Development
Investment Property Databank

Peter McLennan
Senior Research Fellow
University College London

COMPANY INFORMATION

Company name:

Contract name:

optional (in order to relate customer and supplier perceptions directly)

Company size (number of
cleaning employees only):

Operational cleaning staff
(% of all cleaning employees):

Management staff
(% of all cleaning employees):

actual number or rough estimate

actual number or rough estimate

actual number or rough estimate

PERCEIVED PERFORMANCE

The following set of statements relate to **your feelings about operational cleaning staff at your company**. For each statement, please show the extent to which you believe your cleaning personnel has the feature described by the statement. Circling a 7 means you strongly agree that cleaning personnel at your company has that feature, circling a 1 means you strongly disagree. You may use any number in the middle as well to show how strong your feelings are. There are no right or wrong answers - all we are interested in is a number that best shows your perception about your cleaning personnel. **Please note that some of the statements are negatively worded.**

	strongly disagree	disagree	mildly disagree	neutral	mildly agree	agree	strongly agree
Reliability - ability to perform cleaning services dependably and accurately							
Our cleaning personnel consistently perform their services correctly	1	2	3	4	5	6	7
Our cleaning personnel provide the services at the time they promise to do so	1	2	3	4	5	6	7
Our cleaning personnel show sincere interest in solving problems as they occur	1	2	3	4	5	6	7
Our cleaning personnel consistently respond within promised timeframes	1	2	3	4	5	6	7
Responsiveness - willingness to help and provide prompt service							
Our cleaning personnel are not always willing to help customers	1	2	3	4	5	6	7
Our cleaning personnel do not give customers prompt service if needed	1	2	3	4	5	6	7
Our cleaning personnel do not always meet deadlines for projects and assignments	1	2	3	4	5	6	7
Our cleaning personnel are not proactive in responding to unperceived problems	1	2	3	4	5	6	7
Assurance - cleaning personnel's knowledge and courtesy							
Our cleaning personnel are consistently courteous with customers	1	2	3	4	5	6	7
Our cleaning personnel's behaviour instils confidence in customers	1	2	3	4	5	6	7
Our cleaning personnel have the required skills to perform their service	1	2	3	4	5	6	7
Our cleaning personnel have the required knowledge to answer customer questions	1	2	3	4	5	6	7
Empathy - caring and individualised attention by cleaning personnel							
Our cleaning personnel do not understand customer specific needs	1	2	3	4	5	6	7
Our cleaning personnel do not have customers best interests at heart	1	2	3	4	5	6	7
Our cleaning personnel do not give customers personal attention	1	2	3	4	5	6	7
Our cleaning personnel do not show signs of recognition towards customers	1	2	3	4	5	6	7
Tangibles - physical appearance of cleaning personnel and their equipment							
Our cleaning personnel are well dressed and neat-appearing	1	2	3	4	5	6	7
Our cleaning personnel have up-to-date appearing equipment (e.g. trolleys and vacuum cleaners)	1	2	3	4	5	6	7
Our cleaning personnel keep paperwork and records accurately	1	2	3	4	5	6	7
Materials associated with our cleaning services are visually appealing (e.g. safety floor signs)	1	2	3	4	5	6	7

The following set of statements relate to **your feelings about the management (account managers for cleaning services) at your company**. Again, note that some of the statements are negatively worded.

	strongly disagree	disagree	mildly disagree	neutral	mildly agree	agree	strongly agree
Competence - possession of the required skills and knowledge							
Our company has sufficient expertise in the area of cleaning services	1	2	3	4	5	6	7
Our company possesses good problem-solving skills	1	2	3	4	5	6	7
Our company possesses the required knowledge and skills to manage the service	1	2	3	4	5	6	7
Our company has sufficient research capability	1	2	3	4	5	6	7
Credibility - involves trustworthiness and believability							
Our company does not have a good reputation in the market	1	2	3	4	5	6	7
Our company is not believable and honest	1	2	3	4	5	6	7
Our company does not protect confidential and proprietary information	1	2	3	4	5	6	7
Our company does not demonstrate ethical conduct	1	2	3	4	5	6	7
Accessibility - approachability and ease of contact							
Our company is available at all times to assist clients	1	2	3	4	5	6	7
Our company can be easily contacted (face-to-face, phone or e-mail)	1	2	3	4	5	6	7
Our company has convenient operating hours	1	2	3	4	5	6	7
Our company has technical resources that ease the spread of information	1	2	3	4	5	6	7
Communication - informing clients in language they can understand							
Our company does not promote an interactive environment with open communication	1	2	3	4	5	6	7
Our company does not explain the service itself including associated costs	1	2	3	4	5	6	7
Our company does not explain the trade-offs between service quality and cost	1	2	3	4	5	6	7
Our company does not assure that a problem will be handled effectively and efficiently	1	2	3	4	5	6	7
Understanding - efforts to understand clients' needs							
Our company has a basic understanding of our clients' business	1	2	3	4	5	6	7
Our company is willing to learn client specific requirements	1	2	3	4	5	6	7
Our company provides individualised attention to clients	1	2	3	4	5	6	7
Our company is willing to include programmes to train and educate clients	1	2	3	4	5	6	7

	strongly disagree	disagree	mildly disagree	neutral	mildly agree	agree	strongly agree
Consulting - ability to align with the clients' operations							
Our company is willing to establish partnerships with joint planning and goal setting	1	2	3	4	5	6	7
Our company is willing to act as an advocate with senior client executives	1	2	3	4	5	6	7
Our company is willing to incur risk for clients	1	2	3	4	5	6	7
Our company is willing to provide profit driven alternatives to clients	1	2	3	4	5	6	7
Price - monetary allocation in return for the cleaning service							
Our company's price does not meet clients' budget objectives	1	2	3	4	5	6	7
Our company's price is not competitive compared to peers	1	2	3	4	5	6	7
Our company does not secure multiple competitive bids	1	2	3	4	5	6	7
Our company's price does not relate to the quality delivered	1	2	3	4	5	6	7
Offering - scope of services made available by our company							
Our company provides multiple options and programmes to choose from	1	2	3	4	5	6	7
Our company can offer an extended scope of the basic services provided	1	2	3	4	5	6	7
Our company can provide customised and unique services	1	2	3	4	5	6	7
Our company offers other support services (e.g. catering and/or security)	1	2	3	4	5	6	7
Clout - ability to secure the best service offerings at the lowest price							
Our company does not have sufficient leverage in the market	1	2	3	4	5	6	7
Our company does not have a large presence in the market	1	2	3	4	5	6	7
Our company is not able to coordinate and consolidate resources with other suppliers	1	2	3	4	5	6	7
Our company is not able to act as an advocate with other suppliers in the market	1	2	3	4	5	6	7
Geographics - ability to offer services in different locations							
Our company is able to offer standardised services in other cities nationally	1	2	3	4	5	6	7
Our company is able to coordinate standardised services in other countries	1	2	3	4	5	6	7
Our company is able to offer customised services in other cities nationally	1	2	3	4	5	6	7
Our company is able to coordinate customised services in other countries	1	2	3	4	5	6	7
Overall performance - combining all 15 service quality areas							
Our company is offering good quality cleaning services for office buildings	1	2	3	4	5	6	7

STRATEGIC IMPORTANCE

The following set of statements relate to **your feelings about the strategic importance of each feature of operational cleaning staff at your company**. A 7 means you consider the feature very important, a 1 means it is very unimportant. You may circle any of the numbers to indicate the strategic importance of each factor to your company. Once again, there are no right or wrong answers - all we are interested in is your perception of how important each feature is for the overall performance of your company.

		very unimportant	unimportant	mildly unimportant	neutral	mildly important	important	very important
Reliability - ability to perform cleaning services dependably and accurately								
Consistent and correct service delivery	1	2	3	4	5	6	7	
Service provision at promised timeslots	1	2	3	4	5	6	7	
Sincere interest in solving problems as they occur	1	2	3	4	5	6	7	
Consistent response within promised timeframes	1	2	3	4	5	6	7	
Responsiveness - willingness to help and provide prompt service								
Helpful cleaning personnel	1	2	3	4	5	6	7	
Providing prompt service if needed	1	2	3	4	5	6	7	
Meeting deadlines for projects and assignments	1	2	3	4	5	6	7	
Proactive cleaning personnel	1	2	3	4	5	6	7	
Assurance - cleaning personnel's knowledge and courtesy								
Consistently courteous cleaning personnel	1	2	3	4	5	6	7	
Confidence instilling behaviour by cleaning personnel	1	2	3	4	5	6	7	
Skilful cleaning personnel	1	2	3	4	5	6	7	
Knowledgeable cleaning personnel	1	2	3	4	5	6	7	
Empathy - caring and individualised attention by cleaning personnel								
Understanding customer specific needs	1	2	3	4	5	6	7	
Having customers best interests at heart	1	2	3	4	5	6	7	
Provision of personal attention by cleaning personnel	1	2	3	4	5	6	7	
Showing signs of recognition towards customers	1	2	3	4	5	6	7	
Tangibles - physical appearance of cleaning personnel and their equipment								
Well dressed and neat-appearing cleaning personnel	1	2	3	4	5	6	7	
Up-to-date appearing cleaning equipment (e.g. trolleys and vacuum cleaners)	1	2	3	4	5	6	7	
Accurate paperwork and record keeping by cleaning personnel	1	2	3	4	5	6	7	
Visually appealing materials associated with cleaning services (e.g. safety floor signs)	1	2	3	4	5	6	7	

The following set of statements relate to **your feelings about the strategic importance of each feature of management (account managers for cleaning services) at your company.**

	very unimportant	unimportant	mildly unimportant	neutral	mildly important	important	very important
Competence - possession of the required skills and knowledge							
Having sufficient expertise in the area of cleaning services	1	2	3	4	5	6	7
Having good problem-solving skills	1	2	3	4	5	6	7
Having the required knowledge and skills to manage the service	1	2	3	4	5	6	7
Having sufficient research capability	1	2	3	4	5	6	7
Credibility - involves trustworthiness and believability							
Having a good reputation in the market	1	2	3	4	5	6	7
Being believable and honest	1	2	3	4	5	6	7
Protection of confidential and proprietary information	1	2	3	4	5	6	7
Demonstration of ethical conduct	1	2	3	4	5	6	7
Accessibility - approachability and ease of contact							
Being available at all times to assist clients	1	2	3	4	5	6	7
Being easily contacted (face-to-face, phone or e-mail)	1	2	3	4	5	6	7
Having convenient operating hours	1	2	3	4	5	6	7
Having technical resources that ease the spread of information	1	2	3	4	5	6	7
Communication - informing clients in language they can understand							
Promotion of an interactive environment with open communication	1	2	3	4	5	6	7
Explanation of the service itself including associated costs	1	2	3	4	5	6	7
Explanation of the trade-offs between service quality and cost	1	2	3	4	5	6	7
Assurance that a problem will be handled effectively and efficiently	1	2	3	4	5	6	7
Understanding - efforts to understand clients' needs							
Having a basic understanding of the clients' business	1	2	3	4	5	6	7
Willingness to learn client specific requirements	1	2	3	4	5	6	7
Provision of individualised attention by our company	1	2	3	4	5	6	7
Willingness to include programmes to train and educate clients	1	2	3	4	5	6	7

	very unimportant	unimportant	mildly unimportant	neutral	mildly important	important	very important
Consulting - ability to align with the clients' operations							
Willingness to establish partnerships with joint planning and goal setting	1	2	3	4	5	6	7
Willingness to act as an advocate with senior client executives	1	2	3	4	5	6	7
Willingness to incur risk for clients	1	2	3	4	5	6	7
Willingness to provide profit driven alternatives to clients	1	2	3	4	5	6	7
Price - monetary allocation in return for the cleaning service							
Pricing that meets clients' budget objectives	1	2	3	4	5	6	7
Pricing that is competitive compared to peers	1	2	3	4	5	6	7
Provision of multiple competitive bids	1	2	3	4	5	6	7
Pricing that relates to the quality delivered	1	2	3	4	5	6	7
Offering - scope of services made available by our company							
Having multiple options and programmes to choose from	1	2	3	4	5	6	7
Ability to offer an extended scope of the basic services provided	1	2	3	4	5	6	7
Ability to provide customised and unique services	1	2	3	4	5	6	7
Ability to offer other support services (e.g. catering and/or security)	1	2	3	4	5	6	7
Clout - ability to secure the best service offerings at the lowest price							
Having sufficient leverage in the market	1	2	3	4	5	6	7
Having a large presence in the market	1	2	3	4	5	6	7
Ability to coordinate and consolidate resources with other suppliers	1	2	3	4	5	6	7
Ability to act as an advocate with other suppliers in the market	1	2	3	4	5	6	7
Geographics - ability to offer services in different locations							
Ability to offer standardised services in other cities nationally	1	2	3	4	5	6	7
Ability to coordinate standardised services in other countries	1	2	3	4	5	6	7
Ability to offer customised services in other cities nationally	1	2	3	4	5	6	7
Ability to coordinate customised services in other countries	1	2	3	4	5	6	7

FINANCIAL PERFORMANCE

The following set of indicators relate to **the financial performance of your company**. For each ratio please indicate how your company performs relative to your major competitors. Circling a -3 means your company is worst in industry, circling a +3 means your company performs best in industry. You may use any of the numbers to indicate the relative financial performance of your company. In case you don't feel comfortable completing this section; please return the survey without this page.

	worst in industry	very poor	poor	average	good	very good	best in industry
Profitability - our company's ability to make a positive return on investment made	-3	-2	-1	0	1	2	3
Efficiency - our company's ability to positively impact revenue via operating margin	-3	-2	-1	0	1	2	3
Growth - our company's relative growth in profitability	-3	-2	-1	0	1	2	3
Liquidity - our company's ability to meet its obligation in the event they fall due	-3	-2	-1	0	1	2	3
Solvency - our company's ability to pay its debts with available cash	-3	-2	-1	0	1	2	3

Thank you for your collaboration!

ANNEX D STATISTICAL CONCEPTS

This annex provides an overview of the statistical concepts applied in this thesis. Depending on the number of variables investigated and the type of analyses to be performed, a variety of statistical tests is available (see Table D1). It should be noted that content of this annex is extensively based on publications by Dancey and Reidy (2004) and Hinton (2004), but does not provide a complete overview of all statistical concepts available.

number of variables	type of analyses	statistical tests
two variables	correlation analyses	Pearson's correlation coefficient (or Spearman's rank correlation for non-parametric analysis)
	relationship (or regression) analyses	linear (or simple) regression
	differences analyses	independent t-test (or Man-Whitney for non-parametric analysis) for between-participants designs related t-test (or Wilcoxon for non-parametric analysis) for within-participants designs
more than two	correlation analyses	Principle Factoring Analysis (or Principle Component Analysis for non-orthogonal analysis)
	relationship (or regression) analyses	multiple (or stepwise) regression
	variances analyses	ANOVA (or Kruskal-Wallis ANOVA for non-parametric analysis) for one dependent variable MANOVA (or Kruskal-Wallis MANOVA for non-parametric analysis) for more than one independent variable

Table D Flow diagram of statistical concepts used in this thesis

Because of their greater power, parametric tests are preferred over non-parametric tests. Parametric tests, however, can only be performed when we meet the following underlying assumptions:

- The population from which the samples are drawn should be normally distributed
- The variances of the population should be approximately equal
- The samples should not contain extreme scores

Whenever any of these assumptions have been grossly violated, we have to consider non-parametric alternatives to the original tests. An additional underlying assumption for ANOVA and MANOVA is homogeneity of variance and homogeneity of variance-covariance matrices respectively. In short, this means that the variances should be similar for the different groups investigated.

The most commonly reported output for many statistical tests is the p-value. The p-value is the probability of obtaining a result at least as extreme as the one that was actually observed, assuming that the null hypothesis is true. For instance, a p-value of 0.05 indicates that findings are statistically significant at the 5% level and means that there is only a 5% chance of the result arising from sampling error. Three significance levels commonly used are: 0.10, 0.05, and 0.01. These are often referred to as moderately significant, significant, and highly significant respectively.

Correlation analyses

Correlation analyses provide a measure of the relationship or association between variables. Pearson's correlation coefficient (r) can be used for normally distributed variables, whereas Spearman's rank correlation (ρ) is predominantly used for non-normally distributed data and/or ordinal data. A correlation coefficient can be squared (R^2) to give a measure of the variance explained.

Pearson's correlation coefficient (r) is a measure of the strength and direction of a linear relationship between two variables. A major assumption is the normal distribution of variables.

Spearman's rank correlation (ρ) is the non-parametric alternative to Pearson's correlation coefficient (R) and transforms the original scores into ranks before performing further calculations. It is used when data is not normally distributed and for ordinal data.

A commonly reported output includes:

The correlation coefficient (r or ρ) provides a measure of association between two variables. The correlation coefficient can range from -1 (a perfect negative relationship) to +1 (a perfect positive relationship). A value of 0 indicates no linear relationship (there may still be a strong non-linear relationship). Three levels of correlation commonly used are $r < 0.30$ indicating a weak correlation, $0.30 < r < 0.70$ indicating a moderate correlation, and $r > 0.70$ indicating a strong correlation.

Factor rotation analysis is a statistical approach used to analyze interrelationships among a large number of variables and to explain these variables in terms of their common underlying dimensions (or factors). This approach involves finding a way of condensing the information contained in a number of original variables into a smaller set of dimensions (factors) with a minimum loss of information (Hair et al. 2005).

Principal Factoring Analysis is a method of orthogonal factor rotation analysis using a priori communality estimates. Successive factors (combinations of variables) are extracted which explain the most variation in a set of variables. The first factor accounts for the most variance in the variables. Then the second factor accounts for the most variance in the variables residualised for the first factor, and so on. The factors are uncorrelated.

For orthogonal rotations, the most widely used algorithm is **Varimax** (Kaiser 1958), which rotates the factors so that the variances of the squared factor loadings on each factor are maximised. In other words, Varimax simplifies each factor by forcing the variables to show either strong loadings or near-zero loadings on a given factor.

Principal Component Analysis is a method of oblique (non-orthogonal) factor rotation analysis, factoring a correlation matrix directly, without estimating communalities. Successive components (combinations of variables) are extracted which explain the most variation in a set of variables. The first component accounts for the most variance in the variables. Then the second component accounts for the most variance in the variables residualised for the first component, and so on. The factors are correlated, allowing for interrelations.

For oblique (nonorthogonal) rotations, the most widely used algorithm is **Direct Oblimin** (Jennrich and Sampson 1966), which proceeds by finding a rotation that will minimise the cross products of the factor loadings; this generates a simple-structured solution because those cross products are small when many of the loadings are close to zero.

Commonly reported outputs include:

Eigenvalues give the variance of a linear function of the variables. They measure the amount of the variation explained by each principal component and will be largest for the first component and smaller for the subsequent components. An eigenvalue greater than 1 indicates that principal components account for more variance than accounted for by one of the original variables in standardised data. This is commonly used as a cut-off point for which principal components are retained.

Cronbach's alpha (Cronbach 1951) is a coefficient of reliability and is commonly used as a measure of the internal consistency of a psychometric instrument. It measures how well a set of variables (or items) measures a single, unidimensional latent construct. An alpha value higher than 0.80, indicates a high degree of internal consistency.

Relationship (or regression) analyses

Regression analyses are an extension of correlation analyses and provide a measure of the effect of one or more variables on another variable. While correlation analyses allow us to conclude how strongly two variables relate to each other (both magnitude and direction), regression analyses explain how much a dependent variable will change when an independent variable changes by a certain amount.

Simple regression analyses assess the effect of one *independent* variable (x) on another *dependent* variable (y).

Stepwise regression analyses assess the effect of several *independent* variables (x_1 , x_2 , and so on) on another *dependent* variable (y). *Please note that this method seeks a model that balances a relatively small number of variables with a good fit to the data by seeking a model with a high R square value.*

Commonly reported outputs include:

The R squared value (R^2), often called the coefficient of determination, provides a measure of how well one variable is at predicting another (i.e. how well future outcomes are likely to be predicted by the regression model). For instance, a R^2 value of 0.75 indicates that 75% of the variation in one variable is explained by the variation in the other (conversely 25% is 'unexplained'). In line with correlation analyses, three levels of regression commonly used are $R^2 < 0.09$ indicating a weak correlation, $0.09 < R^2 < 0.49$ indicating a moderate correlation, and $R^2 > 0.49$ indicating a strong correlation.

The Beta coefficient, or regression coefficient, expresses the 'effect' of one variable on another without regard to how differently the variables are scaled. A Beta coefficient of 0.5 means that every time the independent variable changes by one standard deviation, the estimated outcome variable changes by half a standard deviation, on average.

Differences analyses

Differences analyses provide a measure of the differences between scores in two conditions. Differences can be analysed between samples (between-participants or independent design) or within samples (within-participants or related design). The independent t-test can be used for independent designs, whereas the related t-test can be used for related designs.

T-tests assess whether there is a statistically significant difference between the means of two conditions. A major assumption is the normal distribution of variables.

Independent t-test is used when participants perform in only one of two conditions.

Related t-test (or paired t-test) is used when participants perform in both conditions.

Commonly reported outputs include:

The confidence interval (CI) give the confidence limits for the differences between the means. It assesses how confident one can be that the population mean difference is within a certain interval.

The standard deviation (SD) is a measure of how much the scores in a sample vary around the mean and provides an indication of what is happening between the two extremes.

Mann-Whitney U tests and Wilcoxon signed-rank tests assess whether there is a statistical significant difference between the means ranks of two conditions. They are used when data is not normally distributed and for ordinal data.

Mann-Whitney U test is the non-parametric alternative to of the independent t-test and transforms the original scores into ranks before performing further calculations.

Wilcoxon signed-rank test is the non-parametric alternative to of the paired t-test and transforms the original scores into ranks before performing further calculations.

A commonly reported output includes:

The z-score is a measure of effect size and quantifies the distance (measured in standard deviations) a data point is from the mean of the entire data set. When the data point is below the population mean the z-score is negative, when above the z-score is positive. Thus, a z-score of 1 means that it falls one standard deviation above the mean.

Variations analyses

Variations analyses provide a measure of the variances between scores in more than two conditions. Variations can be analysed between samples (between-participants or independent design) or within samples (within-participants or related design). ANOVA is used for situations with one or more independent variables and one dependent variable; MANOVA is used for situations with one or more independent variables and more than one dependent variable.

ANOVA (analysis of variance) - also known as univariate analysis - is the parametric equivalent of the t-test, for more than two groups. ANOVAs assess whether there are statistical significant differences between multiple means (i.e. the means of two or more conditions) by comparing variances. Major assumptions are the normal distribution of variables and homogeneity of variance.

Independent ANOVA is used when participants perform in only one of several conditions.

Related ANOVA is used when participants perform in all conditions.

Commonly reported outputs include:

The F-value is the test statistic used to decide whether the sample means are within sampling variability of each other. A large F-value (much greater than 1) suggests that there probably is a group effect; a small F-value (quite close to 0) suggests that the differences found are likely due to chance (or some violation of assumptions).

The Partial Eta squared (partial η^2) provides a measure of how well future outcomes are likely to be predicted by the model. A value of 0.75 indicates that 75% of the variance in the dependent variable can be accounted for by the independent variable (conversely 25% is 'unexplained').

Levene's test is an inferential statistic used to assess the equality of variance in different samples. It tests the null hypothesis that the population variances are equal. If the test is significant ($p < 0.050$), there are violations of the assumption of homogeneity of variance, in which case Kruskal-Wallis ANOVA (a non-parametric alternative to ANOVA) is recommended.

Tukey's HSD (Honestly Significantly Different) is a *post-hoc* test used to determine which means are significantly different from one another (generally used in conjunction with an ANOVA). The test compares the mean of each group to the means of every other group, and identifies where the difference between two means is greater than the standard error would be expected to allow.

A commonly reported output includes:

The mean difference (MD) is the difference between the mean of two groups. The higher the mean difference, the more likely that two means are statistically significant different.

Kruskal-Wallis ANOVA is the non-parametric alternative to ANOVA and transforms the original scores into ranks before performing further calculations. It is used when data is not normally distributed and for ordinal data, but also when the Levene's test indicates violations of the assumption of homogeneity of variance.

A commonly reported output includes:

The Chi-square test (χ^2) is a measure of association and assesses goodness-of-fit (one variable only), independence (two variables with two levels each), or homogeneity (two variables, one with two levels, the other with more than two levels) of data. First, the chi-square test can be used to determine whether a sample of data comes from a normally distributed population by comparing its frequency distribution with that of the normal distribution. Second, it can be used to determine whether two variables are independent by comparing their observed joint occurrence with their expected joint occurrence. Finally, it can be used to determine whether categories of a single variable are represented in the same proportions in two or more populations.

Dunnnett's T3 test is a *post-hoc* test used to determine which means are significantly different from one another (generally used in conjunction with a Kruskal-Wallis ANOVA). The test compares the mean ranks of each group to the mean ranks of every other group, and identifies where the difference between two mean ranks is greater than the standard error would be expected to allow.

A commonly reported output includes:

The mean difference (MD) is the difference between the mean of two groups. The higher the mean difference, the more likely that two means are statistically significant different.

MANOVA (multivariate analysis of variance) - also known as multivariate analysis - is the multivariate equivalent of the ANOVA, for situations with **more than one dependent variable** as well as one or more independent variables. Major assumptions are the normal distribution of variables and homogeneity of variance-covariance matrices.

Independent MANOVA is used when participants perform in only one of several conditions.

Related MANOVA is used when participants perform in all conditions.

Commonly reported outputs include:

The F-value is the test statistic used to decide whether the sample means are within sampling variability of each other. A large F-value (much greater than 1) suggests that there probably is a group effect; a small F-value (quite close to 0) suggests that the differences found are likely due to chance. The most commonly reported F-value is normally taken from the Wilks' lambda test.

The Partial Eta squared (partial η^2) provides a measure of how well future outcomes are likely to be predicted by the model. A value of 0.75 indicates that 75% of the variance in the dependent variable can be accounted for by the independent variable (conversely 25% is 'unexplained').

Box's M test is an inferential statistic used to assess the homogeneity of variance in different samples. It tests the null hypothesis that the population variances are homogenous. If the test is significant ($p < 0.050$), there are violations of the assumption of homogeneity of variance-covariance matrices, in which case Kruskal-Wallis MANOVA (a non-parametric alternative to MANOVA) is recommended.

Kruskal-Wallis MANOVA is the non-parametric alternative to MANOVA and transforms the original scores into ranks before performing further calculations. It is used when data is not normally distributed and for ordinal data, but also when the Box's M test indicates violations of the assumption of homogeneity of variance-covariance matrices.

A commonly reported output includes:

The Chi-square test (χ^2) provides a measure of association and assesses goodness-of-fit (one variable only), independence (two variables with two levels each), or homogeneity (two variables, one with two levels, the other with more than two levels) of data. First, the chi-square test can be used to determine whether a sample of data comes from a normally distributed population by comparing its frequency distribution with that of the normal distribution. Second, it can be used to determine whether two variables are independent by comparing their observed joint occurrence with their expected joint occurrence. Finally, it can be used to determine whether categories of a single variable are represented in the same proportions in two or more populations.