

**An Investigation into
Consulting Engineering Service Quality Perceptions and
Expectations**

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degree of Master of Science in Engineering

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This 30th day of September 1998.

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ABSTRACT

This thesis focuses on the 'Quality of Service' provided by Consulting Civil/Structural engineers. The study assesses whether or not there are shortfalls in the quality of engineering services provided by consulting engineers. It identifies service dimensions that are problematic and also identifies 'real' variables which consulting engineers should manage in order to improve their services. A survey research method was used (pilot and main study) to collect information from management in the consulting industry; and from clients of the consulting engineering profession.

The pilot study aimed to determine whether engineers were meeting client expectations; and to what extent formal quality control usage and management support of this, contributed to the delivery of quality services. Furthermore the study aimed to determine whether engineers ever assessed client satisfaction to gather information about providing more accurate services to clients; to determine any costs associated with poor services; and to determine any general service improvements suggested by engineers and clients.

The main study aimed to measure the relative size of the gap that existed between the expected and perceived services from clients; as well as the gap across the boundary between clients' expected service and engineers' perceptions of clients' expectations.

It was found that on the whole clients were dissatisfied with services received from engineers. This provision of 'poor services' was found to have bigger financial implications to engineers than it did to clients! Three areas of service, were identified which engineers should manage to improve their services i.e. the provision of the optimum solution to the client's exact need, doing this in the allotted time, and tailoring this service to within the client's budget. This was regarded as being superior service provision, and would give engineers the required competitive edge to remain profitable in the market.

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1 INTRODUCTION

The purpose of any business is to be profitable. To be profitable, a business needs to be competitive. To be competitive, a business needs a competitive advantage. **EXCELLENT SERVICE** is a competitive advantage (Heather³). Manning⁴ supports this statement and stresses that any service industry needs to understand that **EXCELLENT SERVICE** is competitive advantage.

A systems model is developed figure 1 - showing the interactions of the transformation processes within a typical consulting engineering firm. This model helps put forward the question, "**What do we need to do, to produce an output from this transformation process, which will leave us with satisfied internal and external clients?**" From the literature available it is evident that the delivery of a better quality service needs investigation.

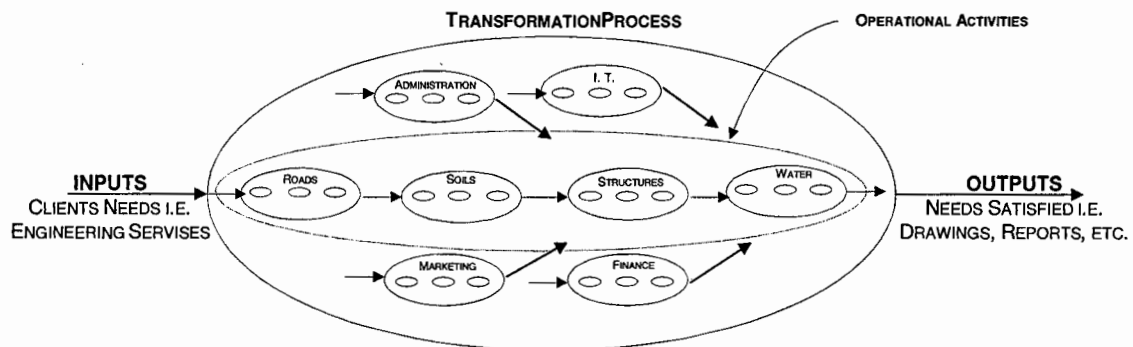


Figure 1: A Systems Model showing the interactions of transformation processes within a consulting engineering company

Similarities between the quality of concrete and the quality of service provided to the industry can be seen in table 1. Both strongly affect the level of satisfaction of a client. Good quality concrete must conform to performance and durability criteria. Performance would be meeting the specific strengths set. This is easy to attain and even easier to measure i.e. cube tests are used as a very reliable indication/measure of entire structures strengths attained. Durability specifications on the other hand are easy to specify, difficult to attain and even more difficult to measure by the consulting engineer. The durability specification would relate to the type of cement used, the type of aggregate used, water/cement ratio, the cover allowed, curing etc. for a particular

environment. The measurement of this is difficult and is however only measurable with time. Failure to meet these specs would result in corrosion of steel, surface cracking, spalling of concrete, and in severe environments with no preventative maintenance - structural failure of the element. So too 'Service Quality' needs to meet the expectations and perceptions/experiences of clients as can be seen in the table.

	PRODUCT	MEASURES/ CRITERIA	SPECIFICATION	TESTS
SATISFIED CLIENT	Quality Concrete	• Performance	Strength e.g. 30Mpa	Cube Strength Tests
		• Durability	Cement type Aggregate type w/c Ratio Cover Curing	No real short term measure. Time will tell i.e. cracking, steel corrosion, spalling of concrete, structural failure of element.
SATISFIED CLIENT	Quality Service	• Expectations	Actual Service Experience	Satisfied/Dissatisfied Client
		• Perceptions/ Experience	Prompt professional service Word-of-mouth Interpersonal contact e.g. friendliness, tact, verbal skills Physical environment of service	Repeat client

Table 1: Quality of Concrete vs Quality of Service

The actual level of service delivered to the client is measurable, by him being either satisfied or dissatisfied. His experience/perception can be influenced by prompt service, word-of-mouth, etc. as seen in the table, but it is the measurement of how well this 'specification' has been achieved which is difficult. It becomes a challenge of the consulting engineering industry to meet this demand by continuously improving the level of service, and in doing so, a large part of meeting this challenge is learning how today's more discerning clients feel about their experiences with our services. This thesis attempts to show that client's **expectations and experiences** define a **Quality Service**.

2 LITERATURE REVIEW

2.1 The importance of general services in our economy

Dierdonck¹ states that today more than 70% or more of the active population in western industrialized economies work in the service sector. Its share of the gross national product in these countries is about as high and is still growing. The Harvard Business School has shown that even on the stock exchange, service companies have beaten industrial ones. To emphasize the importance of services, Dierdonck¹ shows that the sector which is most strongly dominated by the Japanese is not cars or electronics, but banking. He goes on to state that the service sectors economic importance cannot be overestimated, but yet services are given second rate treatment in business schools by management theorists. Most managerial theories are developed for industrial companies and are not really relevant to the service industry. He goes on to say that even government authorities are inclined to neglect the service sector.

2.2 What is a service

In services Dierdonck¹ distinguishes a so called core or substantive element that corresponds with a substantive customer need (e.g. to eat – in a restaurant for instance) as well as a whole series of peripheral needs. He explains that the peripheral needs also have to be satisfied by the service in question: interpersonal contact, security, atmosphere, completeness, environment, timing and other needs. It often turns out that one of these peripheral needs is considered to be more important than the substantive/core one. This is supported by Manning⁴, who counselled that whatever you're selling, "Sell the sizzle, not the steak!"

In the industrial sector the focus is on the end product intended for the customer. The service sector, Manning⁴ explains, does not always have an end product and can better be explained as a process, a product being produced. As soon as the product is delivered, it disappears. Dierdonck¹ believes that the service/product all depends upon whether one looks at the product from the eyes of the producer's or the consumer's point of view.

2.3 Basic characteristics of a service

Dierdonck¹ states that the two basic characteristics of services are **intangibility** and **simultaneity**. Intangibility because services can be immaterial i.e. acts deeds which we cannot take away, and which sometimes we cannot even see. Simultaneity, because production and consumption of a service takes place more or less at the same time. He also claims that a service is a **heterogeneous** product because it is impossible to create standard services as clients approach service providers with his bundle of needs - every one being different from the other. He goes on to state that the complexity is such that process parameters cannot be control measures to produce the same output over and over again. The difficulty lies in the variability and unsteadiness caused by the product's heterogeneity. Another disruptive factor is the customer/client - it is difficult to manage his behavior and to adapt it to the conditions of the working environment. The result as Dierdonck¹ explains is that for the achievement of the product, 'standard operating procedures' alone won't do - one is much more dependant on personnel who have to be able to react in an impromptu way.

Another characteristic, as Dierdonck¹ explains, is the interaction of the 'production process' and the customer, and the way this interaction effects the customer's perception of the product. Bowers² who calls it **inseparability** supports this characteristic. He explains that the inseparability of a service is the product and that the consumption of the product goes together with the person producing it. Furthermore , he explains, the process of evaluation of both the product and the producer is done simultaneously by the customer.

2.4 The importance of consulting engineering services in our industry

The mission statement of the South African Institute of Consulting Engineers states: "To promote integrity and excellence in the practice of civil engineering and to improve prosperity and the quality of life by enhancing the professional development and well being of our members".

Today's marketplace has evolved into an intensely price-competitive arena, cutting deeply into most professions...price cutting, marketing and hustling for business being common. It is obvious that greater emphasis should be placed on the service delivered to the customer (Mucha⁶).

2.5 Customers/clients of consulting engineering services

Melnyk⁵ describes in an operations management context that clients are individuals or groups of people (e.g. companies) interested in the output of an operations management system. They are differentiated as being internal or external to the firm - an **internal customer** being anyone who uses the output of another area or department within the producing firm; an **external customer** as being anyone outside the corporate boundaries of the firm who uses the output. He goes on to state that linking internal customers to intermediate, and then finally external customers, gives a chain of customers. Thus as one of operations management's key objectives, it must identify and satisfy the needs and expectations of the customers in the chain.

Similarly in the provision of consulting engineering services, there are internal and external customers/clients. Most people tend to associate the term client with those who buy the services from consulting engineers. However in the context of Engineering, there are more than the **Traditional Clients** i.e. Government, municipal and commercial. **Architects** make use of the services, as well as **Contractors** who rely on accurate technical information for the progression of an engineering project construct.

In support of the above Manning⁴ explains that customers exist both inside and outside of organisation walls. The **External** customer is the one to focus on, the one who ultimately accounts for company's results. But each person in the organization also has **Internal** customers who depend on him or her. For example the draughting staff relying on technical information from engineers to detail from. These internal customers make results happen. And as the saying goes, "You have to show that *you* care, if you expect them to show that *they* care". However he says the starting point to success is to look outside your organization at the customer who finally buys, uses, or consumes the service. Then, to do everything necessary to meet or exceed that person's expectations.

Long-term competitive advantage is possible only when you treat customers as partners in profit - when you develop a win-win relationship that benefits you both (Manning⁴).

2.6 Customers perceptions of a service

Manning⁴ states that apart from the core element of the service, 7 other factors influence the way in which the client perceives the service:

1. The general image of the service or sector. He states that service professions tend to enjoy a predetermined reputation that does not depend on the products economic value. They seem to be related to a positive or negative value from a purely sociological point of view. In support of this argument he uses the public transport and used car trade as an example which has a negative reputation with most consumers, whereas health care and software are contradictory and enjoys a positive image. Where then does the consulting engineering industry lie?
2. The general image of the contact personnel, which he states is totally independent of whether or not they do a good job or not. This is supported by Dierdonck¹ who says that the attitude, dress and appearance will influence the way in which the service is appreciated, irrespective of its intrinsic quality.
3. The marketing function in the service provider plays an important role, as their task is to the service and all contacts between the organisation and customers. He states that it is the previously mentioned intangibility and simultaneity that create a need for this interaction between the 'process' and marketing. Melnyk⁵ in support of Dierdonck¹, states that marketing must monitor interactions with the customer to identify and flag any changes in the needs and expectations. Marketing thus represents the customer internally within the firm and it presents the firm to the customer externally.
4. The customer/client group toward which the service industry is targeted will also influence the image, meaning that the current group of customers will play an important role in determining the future ones.
5. The influence of the physical environment of the location in which the service is delivered: the appearance of the buildings, its neatness, lay-out, etc.
6. Manning⁴ believes that various factors can contribute to an atmosphere of calm, hard work, efficiency co-operation, trust, etc.
7. The operating and other personnel with whom the customer get into contact - i.e. by their attitude, behavior, professionalism and competence, the personnel may have a considerable influence on the client. Dierdonck¹ does however stress that the importance of procedures, technical adequacy of the service in the case of engineering, material i.e. written documents etc. should not be underestimated.

Melnyk⁵ says that though a customer may be influenced by advertising, the customer's perception of the service industry/firm is shaped by actual experiences with the service

at the moment of interacting with the service. This interaction is the moment of truth. The customer's experience determines much about whether he or she develops a favorable or poor view of the company. From the customers' first interaction with the profession, he begins to compare his expectations with the actual service. If the actual experience meets or exceeds his expectations, he develops a favorable view of the company/industry. When the experience falls short of the expectation, not only are you less likely to return, but you are more likely to tell your friends about your bad experiences - a form of negative advertising.

Manning⁴ states that customers get a very superficial view of most firms. They're routed by receptionists, a credit clerk phones for payment. But those brief encounters shape customers' perceptions. The behaviour of the individuals they deal with makes an indelible impression. In the eyes of a customer, your front line representative is your company. Your company's total image is shaped by the way that person looks, acts and speaks.

Manning⁴ also states that Service "products" are different from manufactured products in several ways:

- 1 They're intangible - you can't see them, hold them or stockpile them.
- 2 They don't exist until they're consumed.
- 3 The user is often a partner in their production.
- 4 The person providing the service is part of its perceived value.
- 5 They can't be fixed or replaced.

"Customer care" or "customer service" forms part of the 'product' in a customer's mind i.e. his/her perception. So whatever service industry you're in, you need to carefully examine both the product you sell and the service you wrap it in. Both shape the customer's perception of value. Melnyk⁵ supports this view and explains that customers do not think of services and 'goods' separately, but rather are part of one package that the firm delivers to the customer. The customers moment of interacting with the total 'product' experience determines his perception of the firm/industry and the quality that it offers.

2.7 Value Service

Manning⁴ states that "Value" to the customer means tangible things such as function, appearance, feel, fit, finish, reliability, serviceability, guarantees. It also means intangibles: image, empathy, courtesy, and respect.

In return, you get not just money, but equally important, such vital "invisible assets" as information, ideas, skills, vision, confidence, trust, a brand reputation, and a positive attitude within your organization.

Melnyk⁵ defines VALUE as the customer's subjective evaluation, adjusted for cost, of how well a service meets or exceeds expectations - to create and keep customers, a firm cannot simply provide a service; it must offer those customers something that they value i.e. the right combination of product quality, fair price and good service. To deliver a value service, he defines three critical questions which need to be answered:

1. Exactly which customers determine value?
2. Which target market are they serving?
3. How can the industry cope with changes in its customer base and its overall market?

Value and the value equation

Melnyk⁵ states that the value equation offers a convenient way of measuring the perceived value of the firm's service. Proctor and Gamble⁷ describe the relationship between the various attributes of value as follows:

$$\text{VALUE} = \text{PERFORMANCE}/\text{COST}$$

The above equation expresses value as a comparison of what a product can do against what it costs. **Performance** describes what the service does for the customer. And is described in terms of three traits: Firstly **Quality** represents how well the service meets or exceeds the expectations of the customer at the moment of interaction with the service. Secondly **Speed** describes the time needed to deliver the service to the customer or the time that the firm needs to produce the service. Lastly **Flexibility** reflects how easily the product can be changed to match the needs of the customer. However, performance presupposes the notion of the function of the service. The service must satisfy a real need, it must perform as promised, and it must offer the

features the customer wants. This condition underlies all expressions of value. The three components of performance do not always carry equal weights. Rather performance is a weighted sum of these variables based on subjective weights that reflect the customer's priorities:

Performance = 'a' x Quality x 'b' x Speed x 'c' x Flexibility

COST the denominator in the value equation are all the costs which the customer incurs to acquire, use, and dispose of the service. Thus the four traits that determine value are speed, quality, flexibility and cost. Every action taken within the service provision can be evaluated in terms of its effect on each of these traits (Melnyk⁵).

2.8 Quality Service

Melnyk⁵ states that quality is the defining component of value in the views of customers. It is not the same as product features i.e. adding more features does not necessary increase quality. Quality depends on whether each service feature performs as the firm led the customer to believe it should.

1. Attributes of quality

Melnyk⁵ identifies seven different attributes that contribute to quality:

Functionality - gives a yes/no answer to the question of whether a service performs as expected at the moment of truth.

Reliability - an attribute of quality that measures how long a product/service performs before it fails.

Durability - measures performance under adverse conditions

Safety - measures the likelihood of harm from a service

Serviceability - measures service related traits as speed, competence, and ease of repair.

Aesthetics - measures the product's appearance, feel, sound taste or smell.

Perceived quality - is an assessment of quality based on the reputation of the firm gained from adds, media reports, reputations and past experiences to indicate perceived quality.

2. Types of quality

Melnyk⁵ breaks down quality into four categories:

Indifferent quality - quality that the customer does not notice or appreciate i.e. it generates no value for the customer e.g. garnish on a dinner plate

Expected quality - is the quality that the customer expects and demands

One-dimensional quality - resembles expected quality i.e. quality that the customer expects but does not create an order loser when lacking e.g. slow restaurant service in a restaurant will not cause customers to leave, but unsanitary conditions will.

Exiting quality - is what causes the customer to notice the firm. It is quality that exceeds customer expectations or pleasantly surprises customers.

Returning to the value equation above, many customers regard quality as an important source of value. Of the three components of the numerator in the value equation, quality was recognized first for its significant impact on the development and maintenance of a sustainable competitive advantage.

This leads to the concept of Total Quality Management (TQM). Melnyk⁵ states that TQM makes quality part of the corporate fabric, an integral element of the firms corporate fabric, and an integral element of the firms competitive presence in the marketplace and its strategy for winning customers. Quality is not seen as a problem to solve, but rather as part of the solution.

Four principles of TQM

1. Commitment to Quality at four different levels:

commitment to producing quality products

organisation members must make a commitment to customers

commitment by top managers

commitment from the firm as whole

2. Extensive use of scientific tools (measurement and control), technologies, and methods

3. Total involvement in the quality undertaking

4. Continuous improvement

2.9 Measurement of Service Quality using SERVQUAL

Most of the literature available for measuring service quality was found to be devoted to tangible goods quality, defined in terms of conformance to manufacturers' specifications.

Among the most popular assessment tools for service quality was SERVQUAL, an instrument designed by the marketing research team of Berry, Parasuraman and Zeithaml et al⁹. Through numerous qualitative studies, they evolved a set of five dimensions that have been consistently ranked by customers to be most important for service quality, regardless of the service industry. These dimensions were defined as follows:

Tangibles	appearance of physical facilities, equipment, personnel, and communication materials
Reliability	ability to perform the promised service dependably and accurately
Responsiveness	willingness to help customers and provide prompt service
Assurance	knowledge and courtesy of employees and their ability to convey trust and confidence
Empathy	the caring individualised attention the firm provides its customers

Based on the five SERVQUAL dimensions above, the researchers also developed a survey instrument to measure the gap between customers' expectation for excellence and their perception of actual service delivered. This was in the form of a battery of questions for each of the five dimensions. A modified SERVQUAL instrument can be seen in Appendix B and C. The SERVQUAL instrument helped service providers understand both customer expectations and perceptions of specific services, as well as quality improvements. It also helped target specific service elements requiring improvement. They also developed a conceptual model of service quality to guide the inquiry into service quality improvement. A modified version of the model can be seen in figure 3 on page 23. This model showed potential gaps in service delivery that needed investigation. The researchers argued that until all five of the embedded gaps in the model were closed, customers perceived service quality shortfalls.

2.10 Customer Dissatisfaction

Manning⁴ states that customer dissatisfaction is a major business cost.

1. It costs about five times as much to get a new customer as it does to keep an existing one. Far better to keep the customers you've got - they're your most precious "invisible asset".
2. Almost five times as many customers switch because of poor service than because of poor product quality or price.
3. Satisfied customers tell between three and five people about their experience; unhappy ones tell 11 to 15.

2.11 Conclusions from the Literature Study

The organogram below shows the findings of the literature study that led to the investigations discussed in the following chapters.

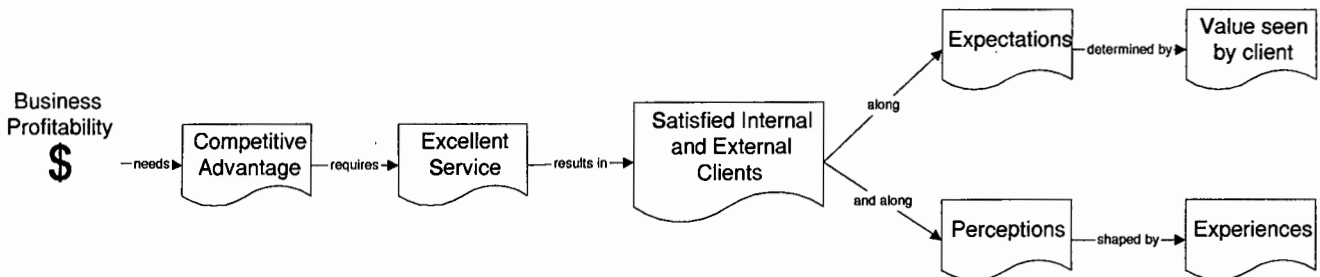


Figure 2: Organogram showing findings from literature study

For service organisations to be profitable they need a competitive advantage. To have a competitive advantage they must provide excellent services that will result in satisfied internal and external clients. This satisfaction occurs when the expected service is perceived as been met. The value of the service seen by clients determines how well the service meets or exceeds the expectations i.e. how well the service functions and fits, and how reliable it is. Client experiences shape their perceptions of the service. It was evident from the literature review, that client expectations and perceptions of services, are factors that affect the level of satisfaction of clients.

The following chapters describe the investigation into the expectations and perceptions of services from consulting engineers.

3 RESEARCH METHODOLOGY

3.1 Research Framework explained

A conceptual model was used as a framework to guide the research inquiry into the expectations and perceptions of services from consulting engineers. This model can be seen in figure 3 on the following page. It is a slightly modified version of that developed by Zeithaml et al⁹. The conceptual model application aimed at identifying any of the five GAPS imbedded in the model. The model showed that GAP 5 (between the client's perception and their expected service) needed to be reduced. GAPS 1 - 4 also needed to be reduced in order to reduce GAP 5.

Determining and/or measuring the gaps 1 through to 5 in the framework helped the understanding, measurement and improvement of the levels of quality service in the consulting engineering industry. The principle of the model was that should one or more of the gaps exist, customers perceived service quality shortfalls.

Section 3.2 of this chapter explains the GAPS embedded in the model while section 3.3 describes how the GAPS were identified and measured in consulting engineering, using a two stage research approach i.e. a Pilot and Main Study. Chapter 4 presents the Pilot Study approach, and chapter 5 the findings and discussion thereof. Chapter 6 presents the Main Study that provided a measure for some of the embedded GAPS, while chapter 7 presents the findings and discussion of the main study. The findings of both the pilot and main study are summarised in chapter 8 with the conclusions and recommendations in chapters 9 and 10 respectively.

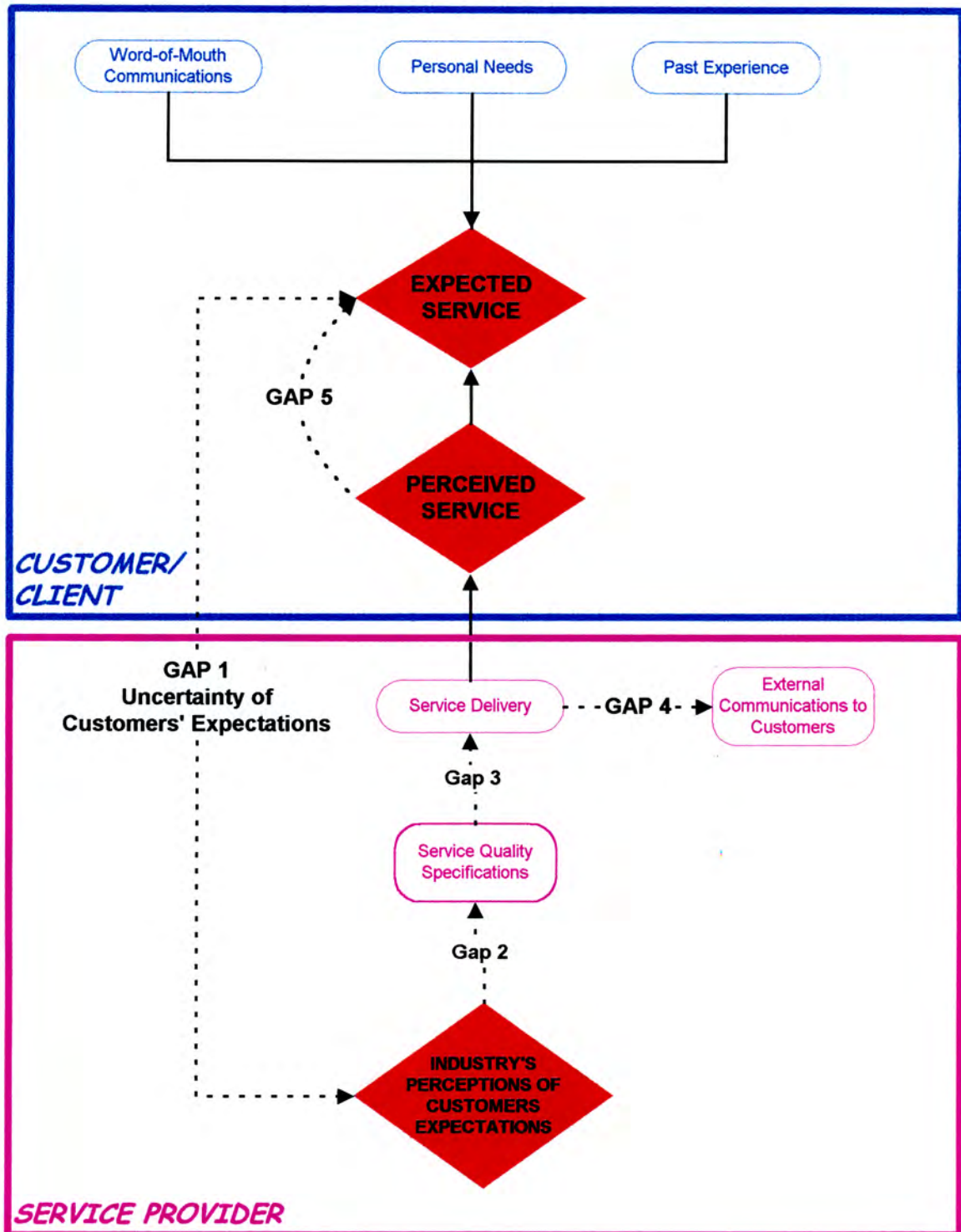


Figure 3: Conceptual Model used to guide research inquiry

3.2 The five GAPS explained

Gap 5: Client Expectations/Perceptions Gap

The service quality shortfall perceived by clients is represented by GAP 5 shown in figure 4 below. The figure clearly shows that the closing of GAP 5 will result in a satisfied client. Apart from identifying contributing factors to the existence of GAP 5, the closure of GAPS 1-4 will also reduce GAP 5. GAPS 1 through to 4 are the shortfalls within the service providers organization i.e. the consulting engineering industry. It is also necessary to show what key factors influence the expected service. These have, from previous research, been proven to be word-of-mouth communications, personal needs, past experience and external communications from the service provider (Zeithaml et al⁹).

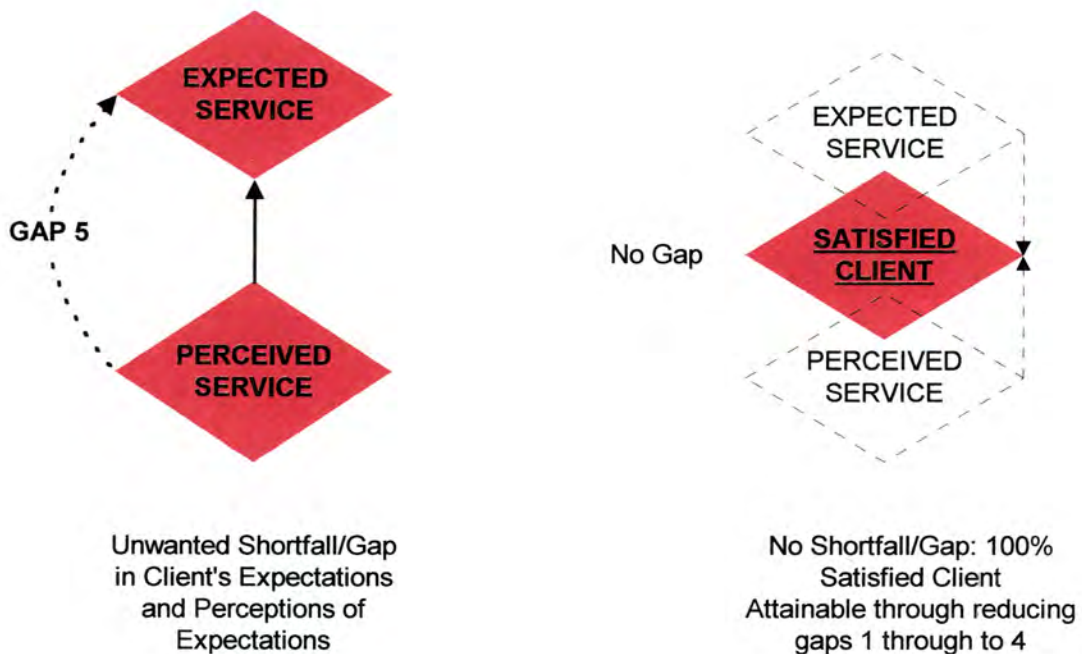


Figure 4: The GAP 5 between expected and perceived service by clients

Gap1: Clients Expectations – Industry's Perceptions Gap

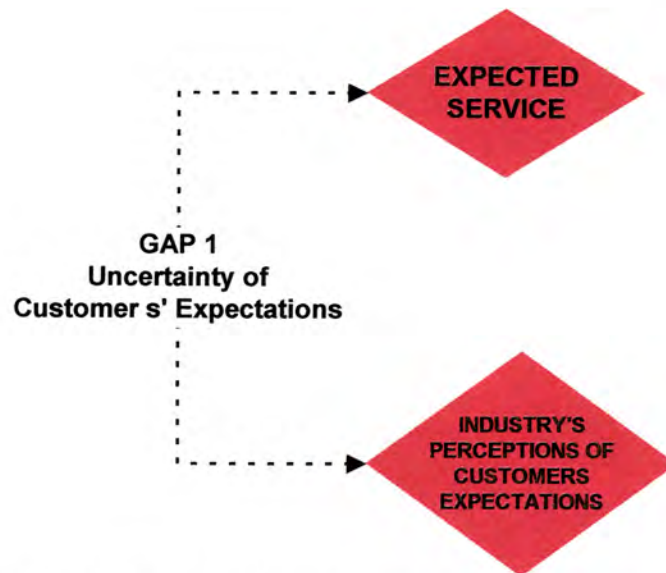


Figure 5: The GAP 1 between client expectations and industries perceptions of client expectations

The necessary first step in improving Quality of service (i.e. narrowing GAP 5) is for managers to acquire accurate information about customers' expectations (Zeithaml et al⁹). This will allow managers an understanding of what their clients expect from superior quality service. It helps highlight service features critical to meeting clients' desires, and what levels of performance are desired for these features. The understanding gained will help prevent bad, uninformed, decisions resulting in perceptions of poor quality service by clients.

Gap 2: Industry's Perceptions - Service Quality Specifications

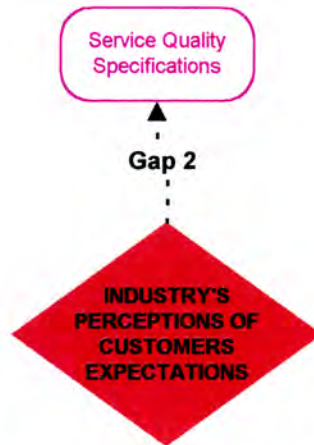


Figure 6: The GAP 2 between engineers perceptions of client expectations and service quality specifications set to achieve this

Another prerequisite for providing high quality service is the presence of performance standards within consulting practices to enforce management's perceptions of clients' expectations (Zeithaml et al⁹). Standards and procedures are important to signal to personnel what the priorities are. When procedures are absent or when standards do not reflect clients' expectations, quality of service as perceived by clients is likely to suffer. In contrast when there are standards reflecting what clients expect, the quality of service they perceive is more likely to be enhanced. Thus, ensuring performance standards (i.e. procedures and techniques), that accurately reflect clients' expectations, will favorably impact on clients' service quality perceptions.

Gap 3: Service Quality Specifications - Service Delivery Gap

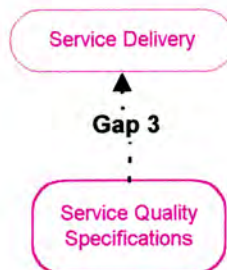


Figure 7: The GAP3 between client service perceptions and actual service experiences

This above gap shown in figure 7 measures the ability of the industry to meet the service performance standards set. Inquiry is needed to find out what the reasons are for the discrepancy between service-performance standards and actual service delivery as shown in the figure. When the level of service delivery falls short of the standards, it falls short of what clients expect as well. This direct association between gaps 3 and 5 suggests that narrowing gap 3 by ensuring that all resources needed to achieve the standards are in place, should also reduce gap 5 (Zeithaml et al⁹).

Gap 4: Service Delivery - External Communications Gap



Figure 8: The GAP 4 between actual service delivery and the communication to clients

Promises made by the engineer through any communication whatsoever, raise expectations that serve as standards against which the client assesses service quality. A discrepancy between the actual service and the promised service (gap 4 in figure) therefore has an adverse effect on clients' perceptions of service quality. By knowing what is really important to the client, but neglecting to inform the client of what is being done, engineers will lose out on the opportunity to favourably influence clients service perceptions. The effective co-ordination of actual service delivery with external communications therefore narrows GAP 4 and hence favourable affects GAP 5 as well (Zeithaml et al⁹).

The five gaps now explained, the conceptual model was accepted for the purposes of this research, as a logical process of inquiry to help measure and improve quality of service.

3.3 Identification and measurement of the gaps in consulting engineering

The research approach was to identify and measure in the consulting engineering profession, the above 5 gaps proposed by the conceptual model and was done in two stages.

Stage one was the compilation of a pilot questionnaire (Appendix A) that was used to probe into the industry and determine whether there were any shortfalls (GAPS) in the delivery of consulting engineering services to the industry.

Stage two used a questionnaire (Appendix B) to perform a numerate/empirical study to measure the relative sizes of the gap between industry's perceptions of customer expectations, and customer expectations (GAP 1 – figure 2); and the gap between customer expectations and customer perceptions (GAP 5 – figure 2).

The findings of the pilot and main questionnaires are presented and discussed in chapters 5 and 7 respectively.

The investigation using the pilot and main questionnaires was aimed at providing a good understanding of the level of service quality in the industry as well as its determinants. It is necessary to close whatever gaps or shortfalls become evident from the investigation, by addressing the concerns expressed by the respondents; because if one or more of these exist, clients perceive service quality shortfalls. The two-stage research approach is shown in figure 9 below.

Two Stage Research approach

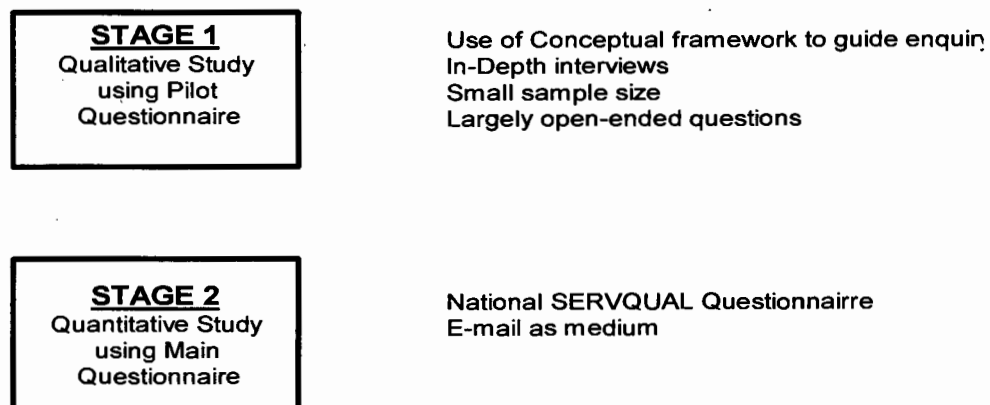


Figure 9: The research approach adopted

4 The Pilot Survey into Service Quality Perceptions and Expectations

The research began firstly with the Pilot Survey questionnaire. This was used to determine whether there was evidence supporting the thesis that a GAP between client expectations and perceptions existed (GAP 5, seen in key insert below), to search for evidence of peripheral GAPS 1 - 4, as well as suggesting possible recommendations for narrowing these Gaps.



This formed part of what was known as the qualitative stage of the research inquiry where a relatively small sample size of respondents (clients and engineers) was used to 'represent the universe' of consulting engineers. The pilot questionnaire used (Appendix A) was designed using largely open-ended questions, rather than closed questions, which would have resulted in forcing agreement with pre-empted ideas. The questions were formulated on the basis of what had been learned from the literature review re service expectations and perceptions of expectations of services.

The pilot questionnaire objectives were:

1. To determine whether engineers provided services that met client expectations (GAP 1).
2. To determine the extent of quality control usage, and the management support of these control measures (GAP 2).
3. To determine how effective current quality controls were and whether current control measures contributed to the delivery of quality services (GAP 3).
4. To determine whether engineers ever assessed client satisfaction to gather information about providing more accurate services to clients; to determine any costs associated with poor services; and to determine any general improvements suggested by engineers and clients (GAP 4).

5. To show that the gaps between what clients expect and what they experience, actually exist (GAP 5).

The clients were identified as being architects, contractors, traditional and commercial (government/municipal and private), as was learned from the literature review. The literature review also introduced internal clients e.g. draught-persons dependant on detailed information from engineers, but this will not form part of this research for, as Manning⁴ explains, "the external client is the one to focus on, the one who ultimately accounts for the company's results".

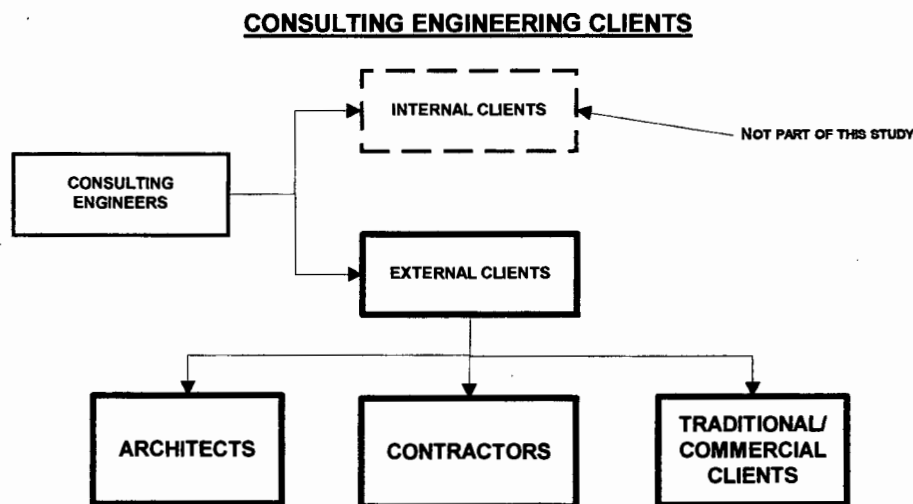


Figure 10: Clients to consulting engineers

Respondents for the pilot study were chosen randomly from the Professions and Projects Register⁸ published in South Africa, only those residing in the Western Cape, allowing the scope of the research to fall within time and budget constraints. The questionnaire was presented to 10 architects, 10 contractors, 10 commercial clients and 10 engineers.

5 FINDINGS AND DISCUSSION OF PILOT SURVEY

The in-depth face to face interviews from the pilot study provided much information concerning potential causes of service quality shortfalls. The findings for the five Gaps of the conceptual model were presented as follows: GAP 1 (section 5.1), GAP 2 (section 5.2), GAP 3 (section 5.3), GAP 4 (section 5.4) and GAP 5 (section 5.5). A summary of the pilot study findings is presented together with those from the main study in chapter 8, on page 74.

5.1 Gap 1 Shortfall - Uncertainty of Customer Expectations

It was found that GAP 1 did exist and was evident from the pilot questionnaire results displayed graphically throughout this section. Figure 11 summarised the key contributing factors to there being a GAP 1. These factors summarised the details that follow in the rest of this section up and until page 47.

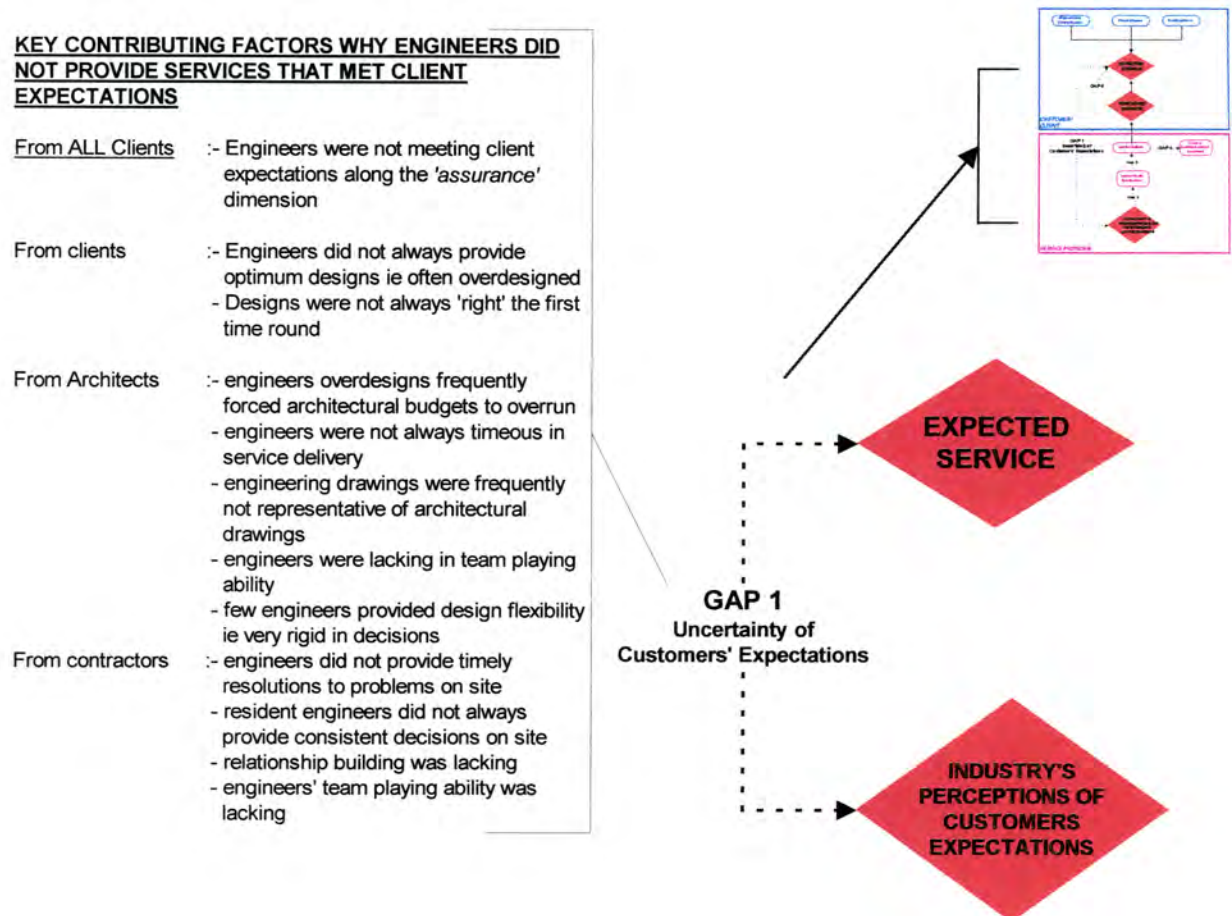


Figure 11: The key contributing factors to GAP 1

Figure 11 above was a summary of the GAP 1 findings. The following pages, are detailed displays of the findings of GAP 1 with the GAP 2-5 findings commencing on page 48. GAP 1's findings were presented for each of the defined client groups (see figure 12 below) i.e. all clients combined (in section 5.1.1), traditional/commercial clients (in section 5.1.2), architects (in section 5.1.3) and contractors (in section 5.1.4). Client expectations and perceptions were recorded, grouped and tallied. The results were presented along the five dimensions of service quality (tangibles, reliability, responsiveness, assurance and empathy). Brief statements describing each dimension are presented in Appendix D. The Service indicator scores on the graphs that follow were calculated as the difference between the number of client and engineer references to the statements defining each dimension. This data can be seen in Appendix E.

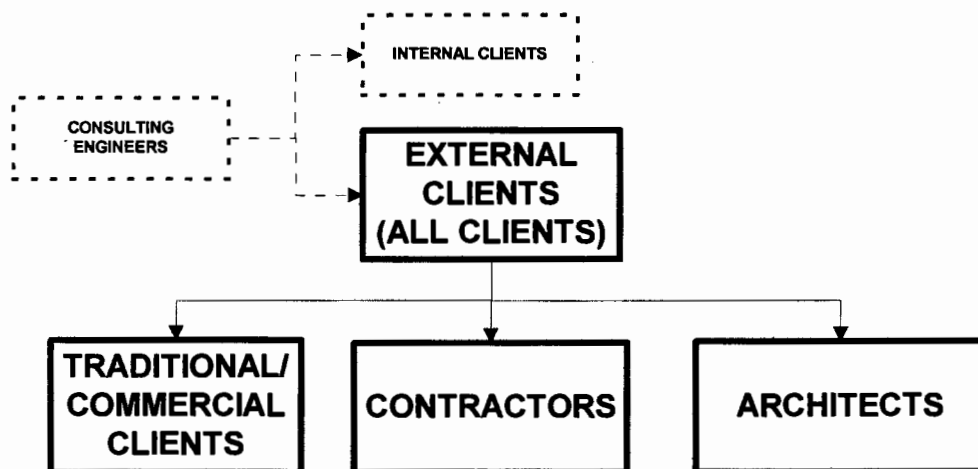


Figure 12: Breakdown of clients surveyed



5.1.1 Perceptions/Expectations of ALL Clients

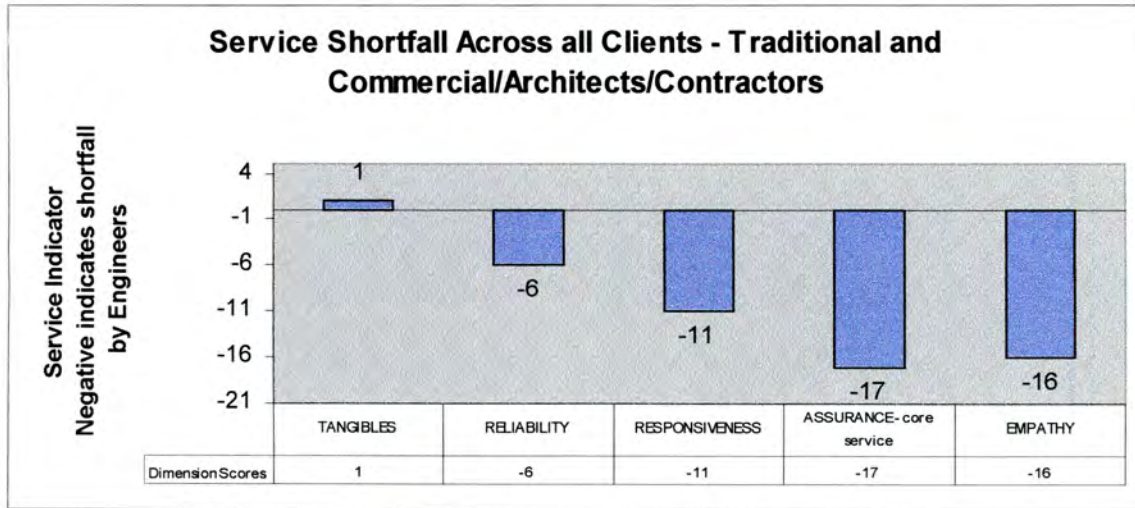
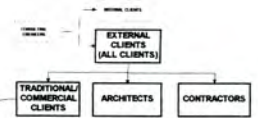


Figure 13: Service indicator scores for ALL clients

The indicator score for the total client sample i.e. 10 clients, 10 architects and 10 contractors, is displayed in figure 13. The fact that most of the bars 'scored' negative values, or were below the zero line, indicated that there was a shortfall in the provision of services along the defined dimensions. It was found that the only area of service where engineers provided more than the clients expected was along the dimension 'tangibles'. Appendix D has brief statements describing the five dimensions. The most serious shortfall in service provision relative to the other dimensions, was along the 'assurance' and 'empathy' dimension.

The following section describes the findings from the traditional clients.



5.1.2 Perceptions/Expectations of Traditional and Commercial Clients

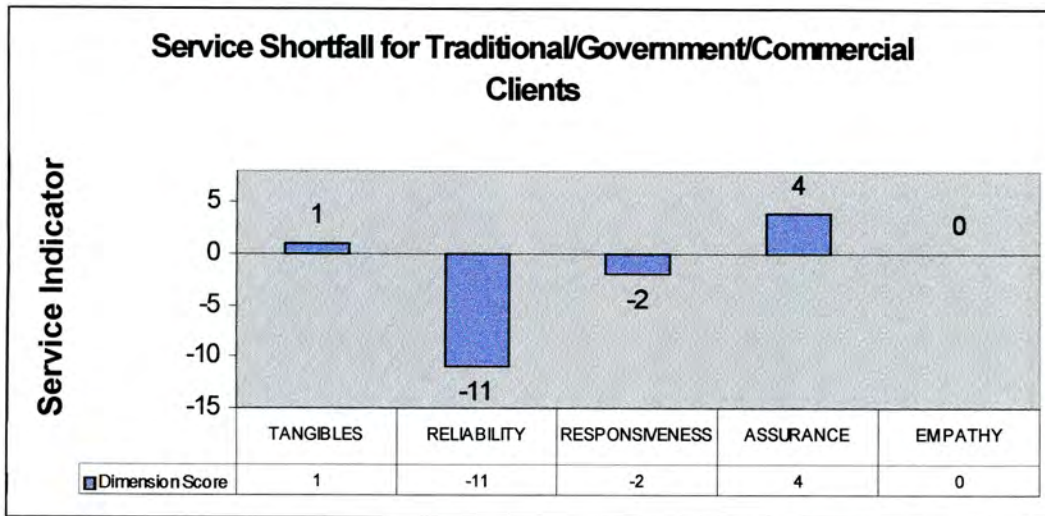
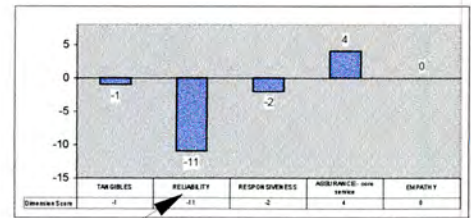


Figure 14: Service indicator scores for traditional clients

It was found from traditional clients, that the dimension '*reliability*' was the most serious service-quality shortfall from engineers (relative to the other dimensions). This was shown in figure 14 as having an indicator score of minus eleven. Engineers however exceeded client expectations along the '*assurance*' dimension, as was shown with an indicator score of plus four. The statements briefly describing the '*assurance*' dimension are in Appendix D.

The following three figures describe the dimensions '*reliability*', '*responsiveness*', and '*assurance*' in further detail along their defining characteristics. The '*empathy*' dimension was found to be satisfactory to government and private clients, with a score of zero.



Traditional Clients - Reliability Measure

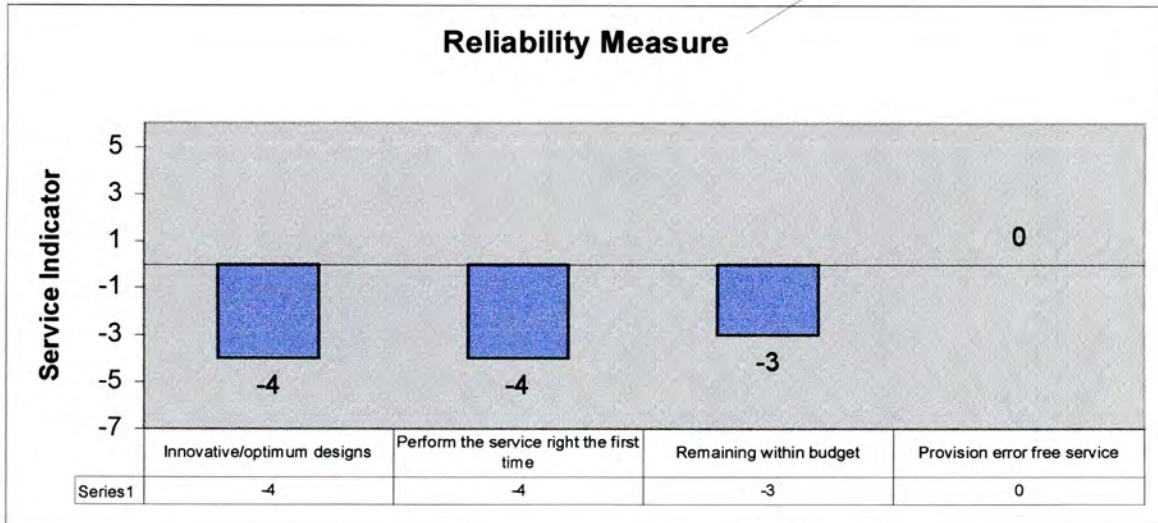
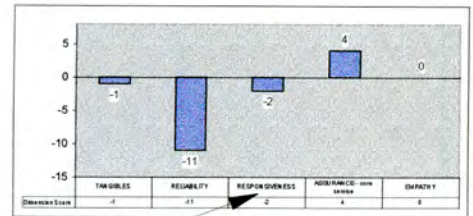


Figure 15: Service indicator scores for the reliability measure for clients

The shortfalls in the characteristics defining the 'reliability' measure were found to be numerically similar. The clients stressed the need for more innovation and optimisation in the designs received and it was found that this characteristic had an indicator score of minus four (see figure 15). Equally stressed was the need for the service to be performed right the first time. The two characteristics go hand in hand as the traditional clients in today's political climate stated that lean budgets did not allow for overdesigns to be redesigned.

Another shortfall in the eyes of clients was budget overruns. Clients frequently expressed their concern with the disregard that engineers had for set departmental budget allocations to projects. Although this scored lower on the service indicator graph, respondents referred to budget concerns in a serious manner.

The 'provision of error free services' had an indicator score of zero as nobody made referral to this characteristic. This can be seen in Appendix E - statement 8.



Traditional Clients - Responsiveness Measure

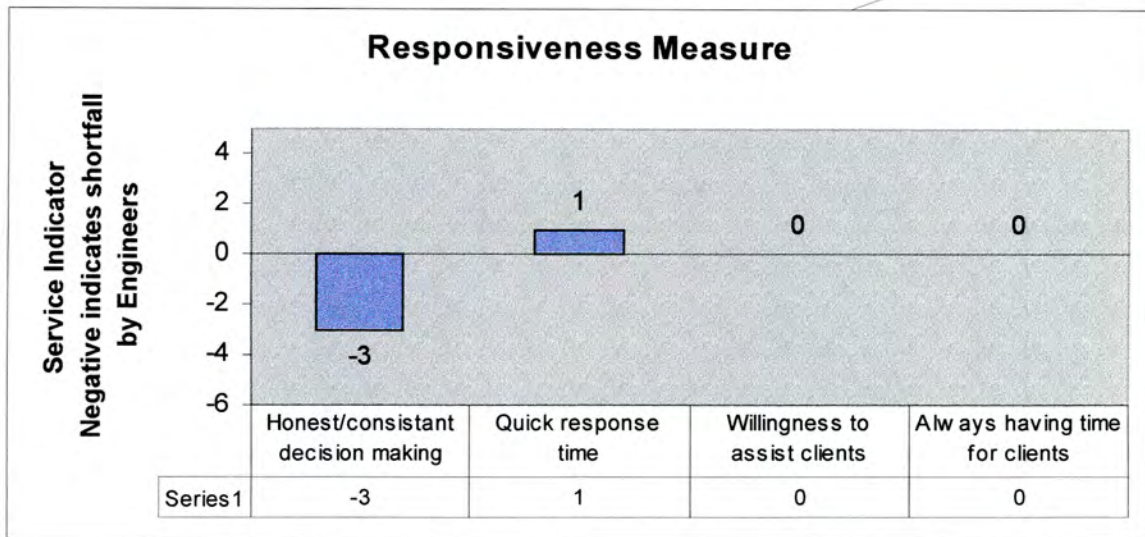
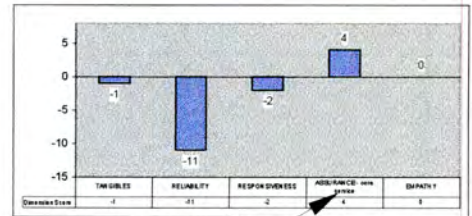


Figure 16: Service indicator scores for the responsiveness measure for clients

The 'responsiveness' dimension was found to be the second smallest service-quality shortfall to clients as seen on the key graph. A breakdown of this dimension in figure 16 shows that the area where engineers fall short the most, was in the making of 'consistent decisions' at site level.

It was found, and is evident from the graph, that the speed with which clients receive services, exceeded their expectations. There was no dissatisfaction from clients regarding the engineer's willingness to assist with client inquiries, and also in the provision of more than the service asked for.



Traditional Clients - Assurance Measure (Core Service Measure)

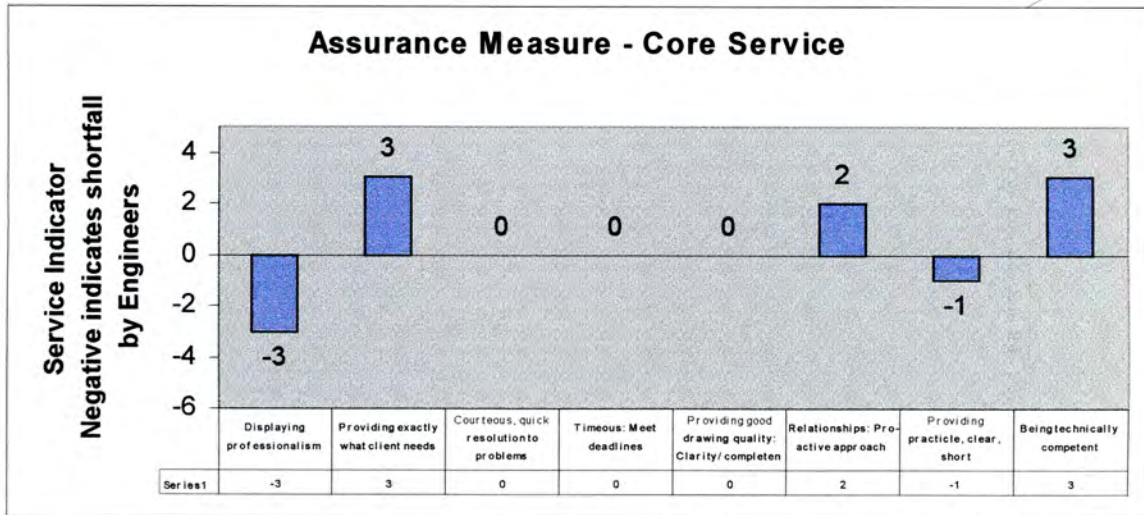
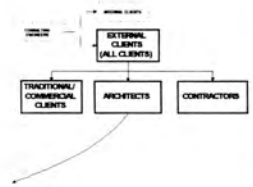


Figure 17: Service indicator scores for the assurance measure for clients

Clients surveyed did not experience any shortfall along the 'assurance' dimension. This was evident from the key insert where it had an indicator score of plus four. The 'assurance' dimension was characterised by the graph shown in figure 17. Two areas of this dimension were found to be unsatisfactory to clients i.e. the displaying of professionalism and to a lesser extent the presentation of documentation. With regard to documentation, it was found that the major concern was the 'cut and paste' attitude which engineers were reportedly doing. Clients expressed a need to have documentation specifications that were more specific to the project, rather than be modified from previous projects. The modification was said to often have a 'flavor' from another job.

The 'empathy' dimension, mentioned at the start of this section and seen in the key insert, was satisfactory to clients i.e. a score of zero. Brief statements defining this dimension can be seen in Appendix D.



5.1.3 Perceptions/Expectations of Architects

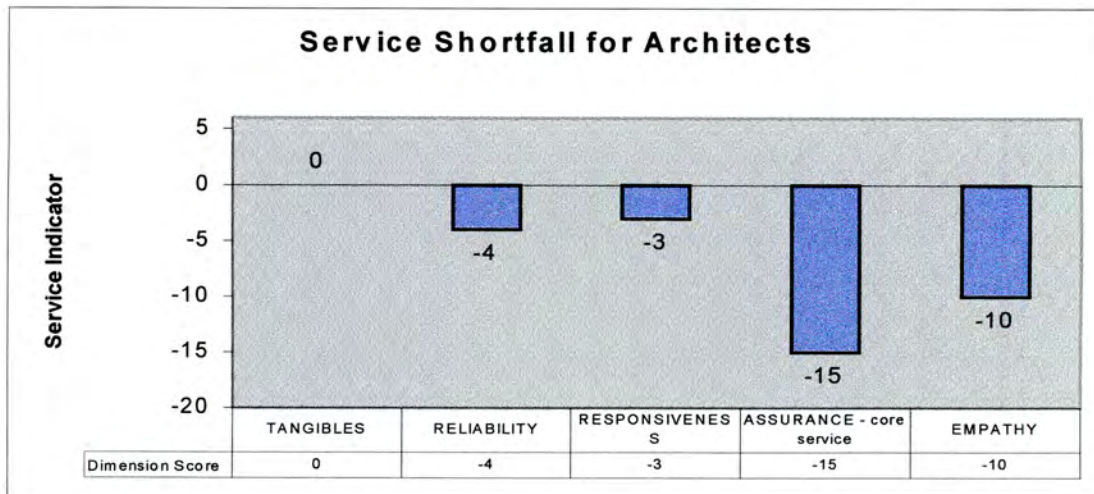


Figure 18: Service indicator scores for architects

It was found that the dimension 'assurance' was the most serious service-quality shortfall from engineers as shown in figure 18. This had an index score of fifteen below the line, which displays the severity of the shortfall, relative to the other dimensions. From the respondents surveyed there was no evidence showing that architects received more than they expected along any of the five dimensions. In the graphs that follow it was also evident that there was only one statement where the expectations of architects were exceeded.

The following four figures described the dimensions 'reliability', 'responsiveness', 'assurance' and 'empathy' in further detail along their defining characteristics. Architects, were satisfied with the 'tangibles' dimension as described in Appendix D, and is not discussed overleaf.

Architects - Reliability Measure

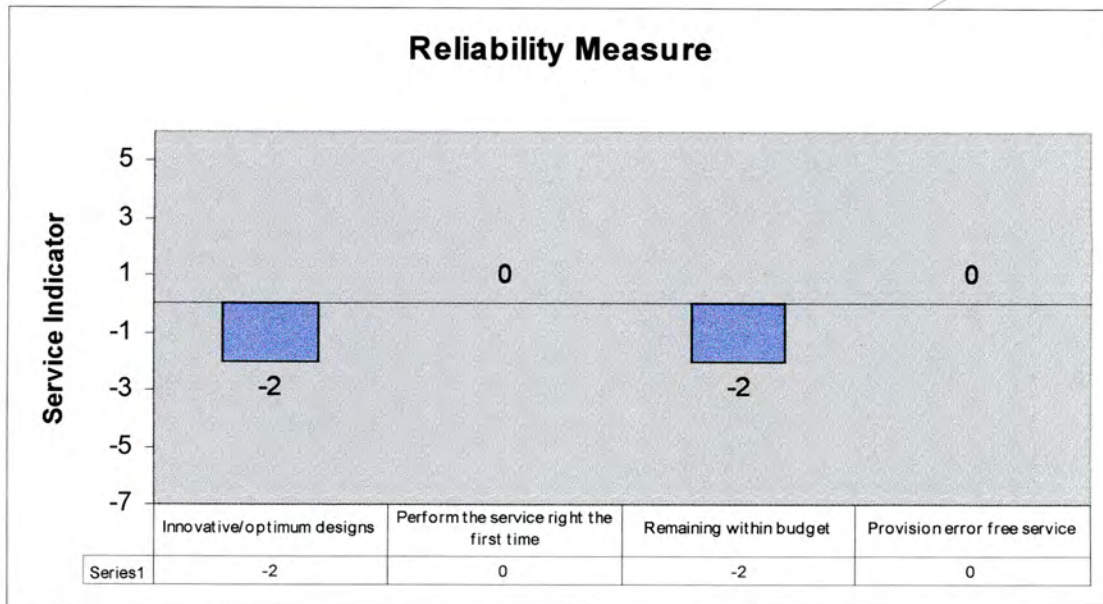
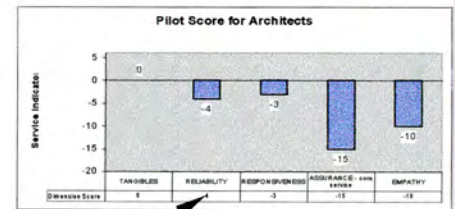


Figure 19: Service indicator scores for the reliability measure for architects

The two main shortfalls were found to be relating to the provision of 'innovative optimum designs' and 'remaining within budgets'. Architects frequently experienced budget overruns that they could directly attribute to engineering fees. This was most evident in the very small architectural practices surveyed. More architect respondents made mention of this inability, than did engineers, which is evident in figure 19 with indicator scores of minus two. This can also be seen in the table in Appendix E - statement 7.

Architects - Responsiveness Measure

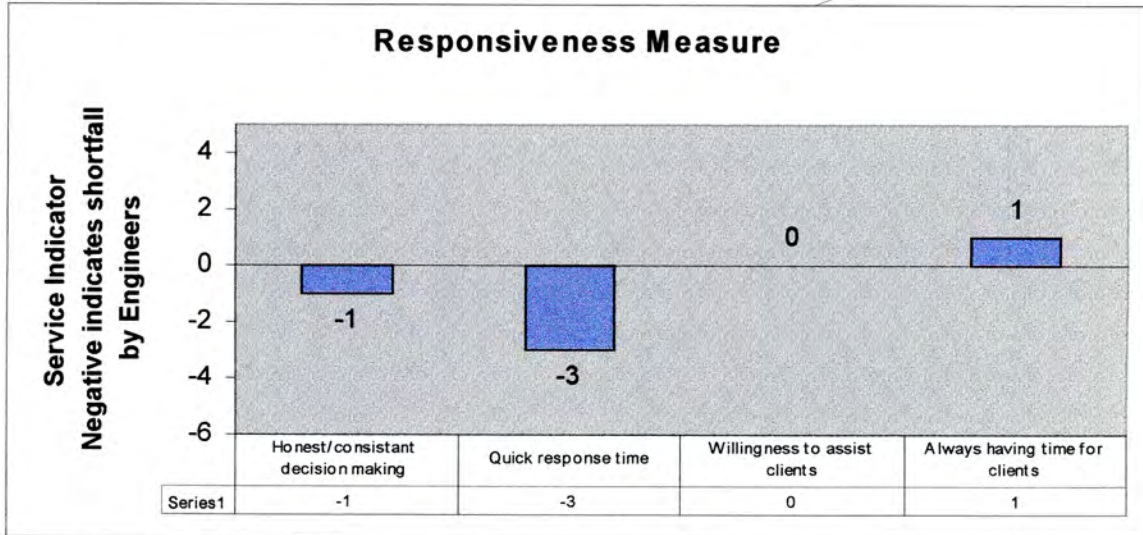
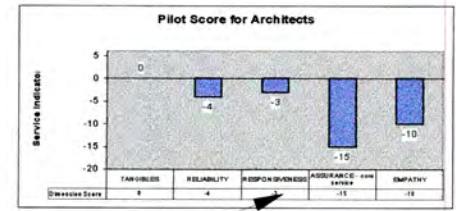
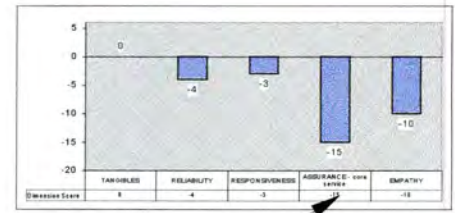


Figure 20: Service indicator scores for the responsiveness measure for architects

As can be seen from the key graph this was the area of least concern with regards to service shortfalls. The area where architects experienced the most dissatisfaction was in the 'response time' to their requests. Architects responses were "often I have had to call to chase the job" and "we generally wait long periods for structural drawings". The characteristic 'honest/consistent decision making' was found to be also negative, and was evident from responses like "today we need 230mm thick slabs on all levels, tomorrow we can get away with 190mm! Imagine the impact that has on tenant leases".

Engineers appeared to provide more than what was required from their project brief. This was suggested by the findings around the characteristic 'always having time for clients'. Reference made by respondents left this characteristic with a plus one on the indicator graph in figure 20. The table in Appendix E (statement 12) shows 5 architects as opposed to 4 engineers made reference to this characteristic.



Architects - Assurance Measure (Core Service Measure)

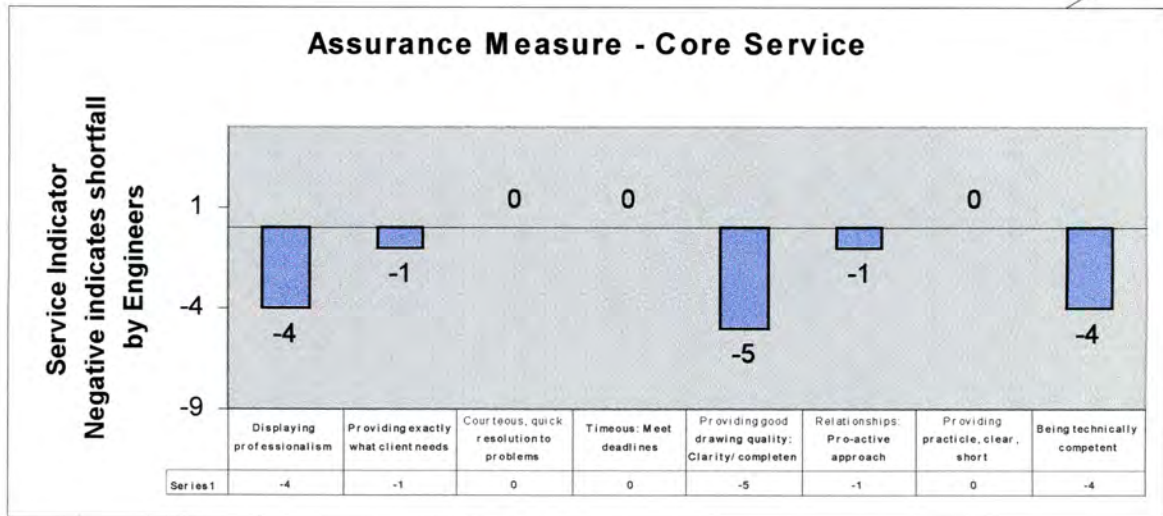


Figure 21: Service indicator scores for the assurance measure for architects

The 'assurance' dimension was found to be by far the biggest shortfall as can be seen in the key insert. The characteristics describing this dimension are shown above in figure 21. There was no evidence from the survey to suggest in any way that engineers were providing any engineering service exceeding the expectations of the architects surveyed. There are however, three characteristics i.e. 'Courteous, quick resolution to problems', 'Timeousness: Meeting deadlines' and 'Documentation', which were found to have zero indicator scores. This was from engineers and architects all having equal reference to the characteristics. This suggests that there are no shortfalls or over-provisions experienced from either party regarding these three statements.

Three other characteristics i.e. 'Displaying professionalism', 'Drawing quality' and 'Technical competency' were all found to have similarly valued indicator scores, with 'Drawing quality' being the most important shortfall. The provision of drawings was found to be what was ultimately perceived by the architect as the service deliverable, and were often said to be lacking in completeness. This completeness was described as being the inability of the engineer to produce drawings that would accurately compliment the architect drawings. Response from engineers, but not nearly as strongly, was the fact that architect alterations were the main reason for this perceived shortfall.

Architects - Empathy Measure

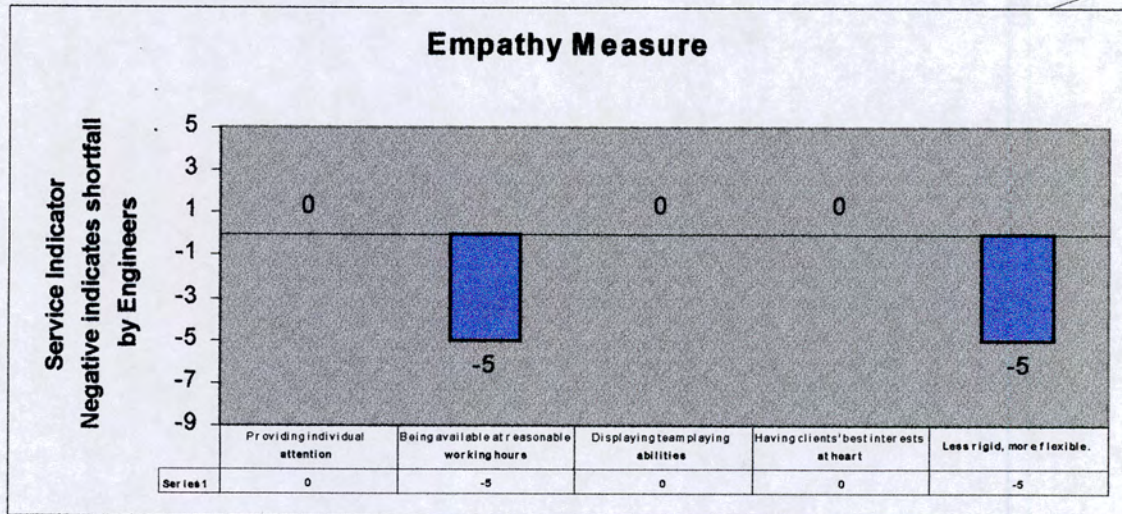
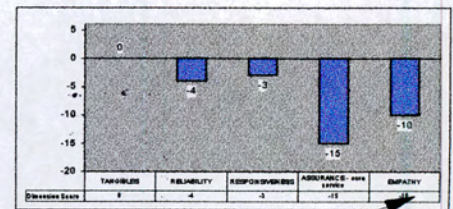
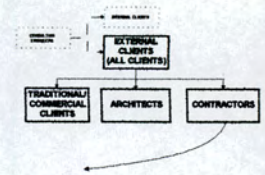


Figure 22: Service indicator scores for the empathy measure for architects

This dimension was found to rank second most important in the shortfalls experienced by architects, as can be seen in the key insert. The two characteristics '*displaying team playing abilities*' and '*Less rigid, more flexible approach*' both scored indicators of minus five in figure 22. Architects experienced more problems in these areas than engineers, judging from responses to these characteristics. From the architects surveyed it was found that there was a perceived lack in the '*team playing ability*' of engineers – based on their experience with engineers. It was found from the engineers surveyed, that they did not think architects expected this characteristic to be of as great importance. Neither did they think that from their experience with architects that their service approach was as rigid as the graph results indicate.



5.1.4 Perceptions/Expectations of Contractors

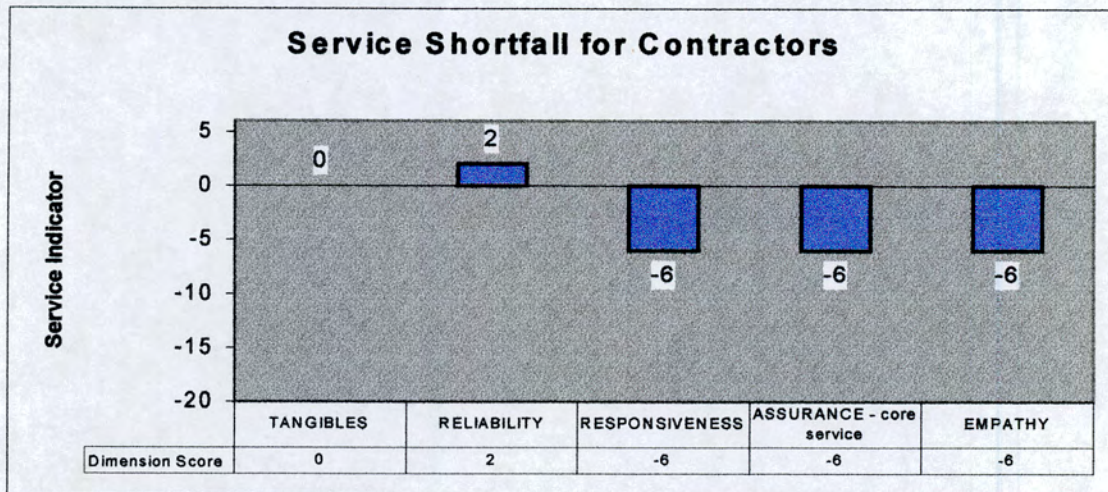


Figure 23: Service indicator scores for contractors

It was found that a shortfall in expectations was experienced along three of the defining quality dimensions. These had equally negative indicator scores of minus six and were 'Responsiveness', 'Assurance' and 'Empathy'. This is shown in figure 23.

It was however evident from the above graph that engineers exceeded contractors expectations for the dimension 'Reliability'.

The four that follow describe the dimensions 'reliability', 'responsiveness', 'assurance' and 'empathy' in further detail along their defining characteristics. Again the 'tangibles' dimension (having modern equipment, neat employees, etc. - appendix D) was found to be satisfactory to contractors.

Contractors - Reliability Measure

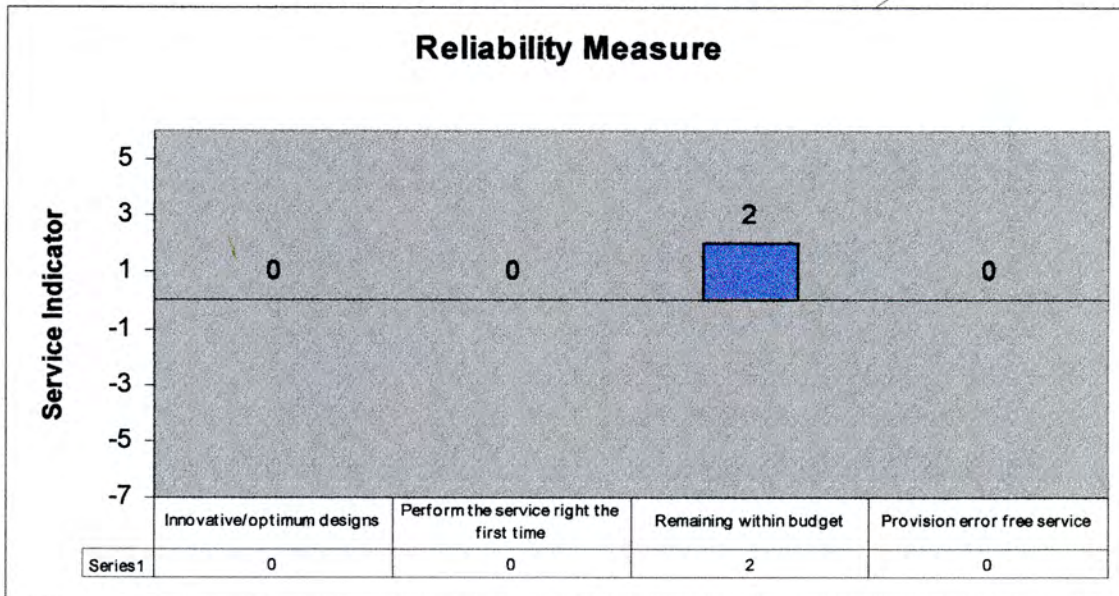
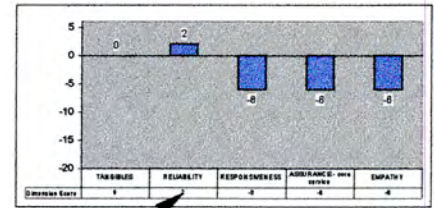
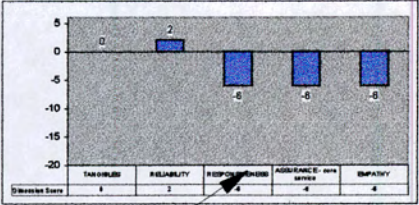


Figure 24: Service indicator scores for the reliability measure for contractors

The characteristics defining this dimension can be read from the statements in the above graph in figure 24. From the respondents surveyed it was found that matters relating to budgetary requirements were found to exceed the expectations of contractors. This indicator score of plus two was as a result of two engineers making reference to budgetary concerns i.e. engineers thought contractors expect their decisions to be such that they do not adversely affect the contract price i.e. in additional work. This can be seen from the table in Appendix E - statement 7 - where two engineers referenced this characteristic, and no contractors did. This showed that contractors were not dissatisfied with matters relating to budgets.



Contractors - Responsiveness Measure

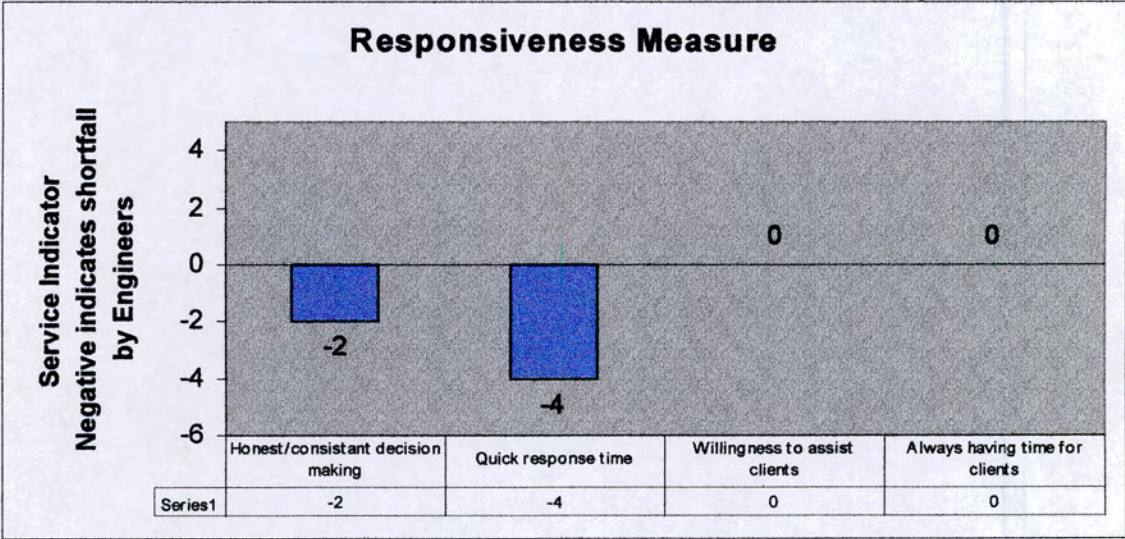
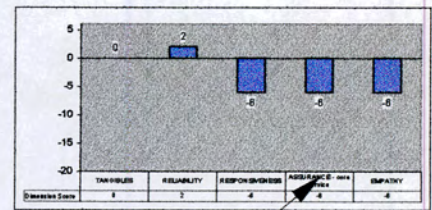


Figure 25: Service indicator scores for the responsiveness measure for contractors

The 'responsiveness' dimension was negative in two of the defining characteristics i.e. 'Honest/consistent decision making' and 'Quick response time'. The latter was referred to more by contractors than by engineers as being important. Most of the contractors interviewed clearly stressed the importance of timely resolution to problems arising during construction. To a lesser degree engineers were found to be not consistent in the decisions made on sites from time to time. Typically the major concern on civil works reported was the inspection of works before the next activity could progress. Respondents reported that decisions were often not objective but were sometimes affected by relations with the resident engineer.



Contractors - Assurance Measure (Core Service Measure)

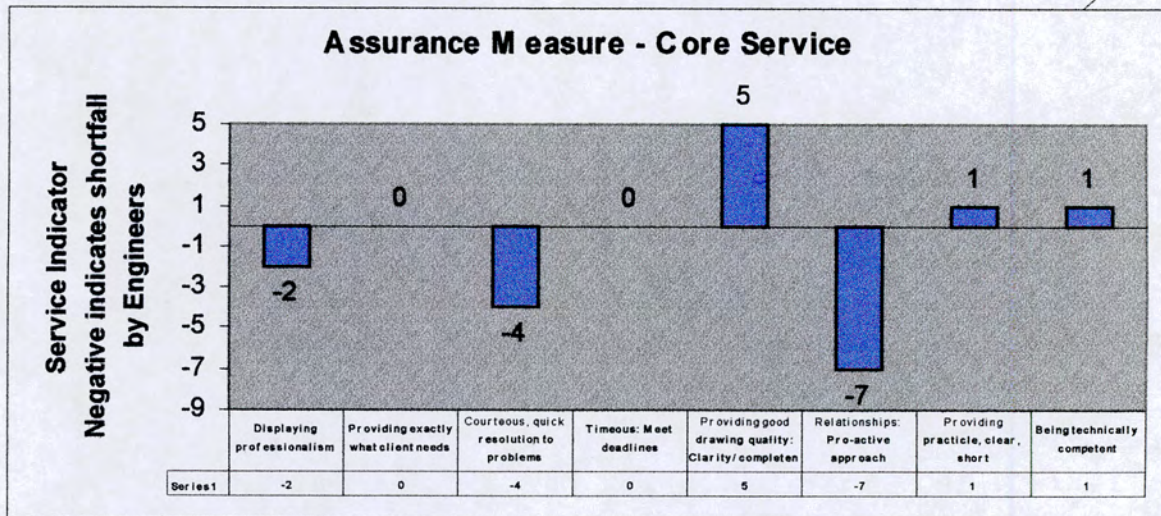


Figure 26: Service indicator scores for the assurance measure for contractors

The Indicator score of the 'assurance' dimension showed that the characteristic 'relationship building' of the engineers surveyed, was not as important as it was to contractors. This, relative to the other characteristics, scored an indicator score of minus seven in figure 26. This means that seven more contractors than engineers during the pilot survey mentioned the characteristic of 'site/contractual relations' as being an expectation of quality service.

In addition it was found that the characteristics 'display professionalism' and 'courteous, quick resolution to problems' from engineers had negative indicator scores. Unlike architects, the contractors were satisfied with the quality of drawings they had received in the past. This was found to be most satisfactory with an indicator score of plus five above the line. The service characteristics 'documentation: practical, clear and short specs' and 'technical competence', were also found to be satisfactory by both the contractors and engineers. In fact the findings indicate that the contractors expectations re these two characteristics were exceeded.

Contractors - Empathy Measure

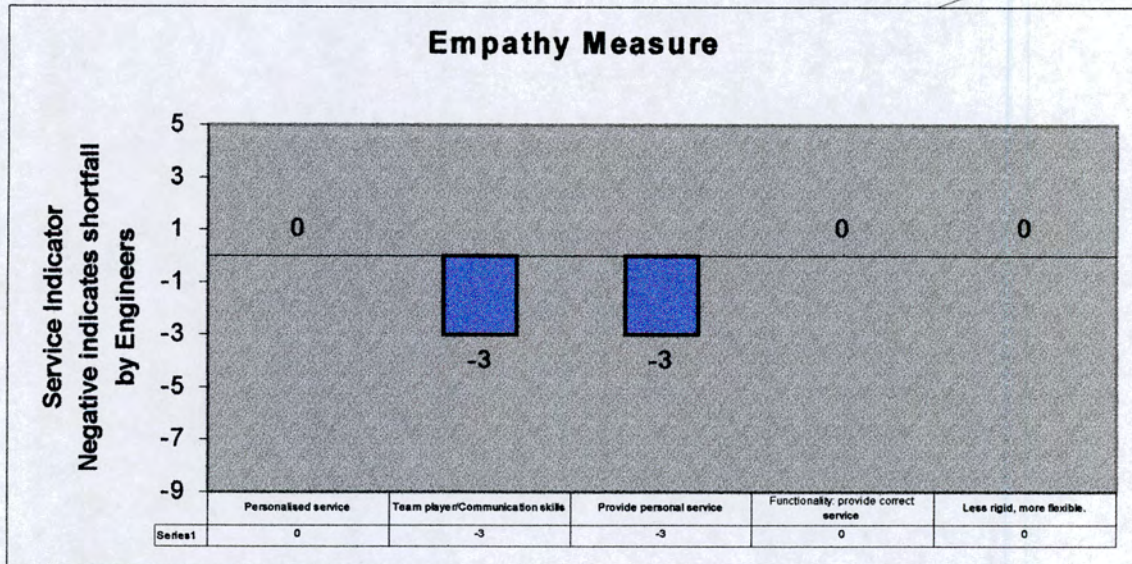
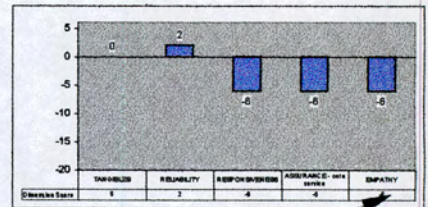


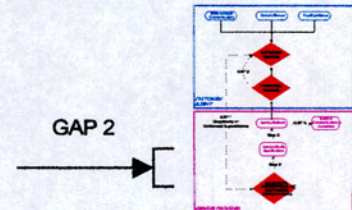
Figure 27: Service indicator scores for the empathy measure for contractors

The findings showed that with regard to the 'empathy' dimension, two defining characteristics did not receive enough attention from engineers. Engineers were not always available to attend to problems arising on site. The other was that their 'team playing abilities' were also lacking. One respondent's greatest concern was the imaginary glass dividing wall between the professional team and the contractor. It was stated that this division hampered the building of a team to tackle projects.

Having dealt with GAP 1 shortfalls (the uncertainty of client expectations), GAP 2 shortfalls are now examined.

5.2 Gap 2 Shortfall - Absence of Procedures or Standards Reflecting Client Expectations

The pilot survey enquired as to the existence of GAP 2 (see key insert below) using the questioning approach below. The italics below are a recap of the definition of GAP 2.



Another prerequisite for providing high quality service is the presence of performance standards in place within consulting practices to enforce management's perceptions of clients' expectations (Zeithaml et al⁹). Standards and procedures are important to signal to personnel what the management/industries priorities are. When procedures are absent or when standards in place do not reflect clients' expectations, quality of service as perceived by clients is likely to suffer. In contrast when there are standards reflecting what clients expect, the quality of service they perceive is likely to be enhanced. Thus ensuring performance standards (i.e. procedures and techniques), that accurately reflect clients' expectations will favorably impact on clients' service quality perceptions.

The following were the typical questions asked:

Are there documented quality management procedures in place in engineering companies?

Do clients believe that quality management procedures in engineering companies are important in the delivery of a better quality service?

Would senior management resist experimentation/implementation of quality management procedures/techniques?

Is there a lack of and/or need for management commitment to quality improvement?

KEY CONTRIBUTING FACTORS TO GAP 2

- Formal Quality Control was used widely, but not supported by all engineering respondents
- Standards and procedures were bulky and were often seen as obstacles in engineering companies
- Standards were often seen as more administration by engineers
- All Clients firmly believed quality control should be in place in engineering firms
- 30% Engineering managers would resist implementation of formal quality controls.
- 20% Engineering managers did not believe their behaviour should benchmark the commitment that their company had towards quality improvement efforts.

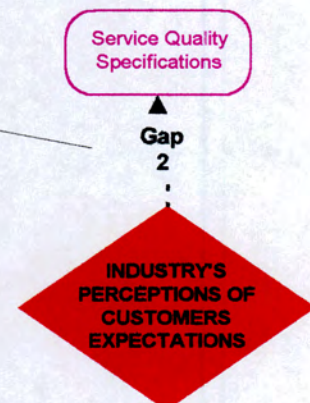


Figure 28: Key Contributing Factors to GAP 2

Figure 28 on the previous page was a summary of the GAP 2 findings. The following pages, are detailed displays of the findings relating to GAP 2.

Are there documented quality management procedures in place in engineering companies?

It was found that seven out of the ten engineers surveyed, had some form of quality management procedures and/or techniques in place. This constituted 70% of the respondents. They believed that these procedures contributed to ensuring that they deliver a service, which they think their clients expected. The fact that 30% (i.e. the other three respondents) felt there was no need for quality management procedures to reflect their clients expectations, was evidence of GAP 2's existence. GAP 2 is **"When procedures are absent or when standards in place do not reflect clients' expectations, quality of service as perceived by clients is likely to suffer"**

The following are examples of the types of procedures and techniques in place in the industry, which were evident from the seven respondents:

- three of the consulting firms had been ISO 9000 accredited and had a formal manual with guidelines while another respondent confirmed his firm made use of the SABS version
- one respondent said they used the ACE (association of consulting engineers) Quality Control Guidelines
- employee encouragement towards thoroughness was stated by one respondent as being the backbone of their quality control efforts
- another respondent encouraged their clients to enforce standards and penalties as a passive quality management technique
- having drawings checked independently and checklists for designs and drawings issued
- issuing a 'work and office procedures manual' for young engineers upon employment with pro-forma letters for clients, etc.
- having biannual employee performance assessments as well as peer reviews
- producing monthly reports on each job
- having a personnel officer responsible for training
- doing in-house training on a weekly basis even if for a short while

- undertaking 'damage control' procedures
- undertaking brainstorming sessions which were imperative to prevent the most fundamental mistakes
- one respondent said they relied on the calibre of engineer employed to be responsible for his/her own quality

All 7 respondents who had formal documented procedures in place, agreed that constraints were present preventing the turning of client expectations into concrete performance standards. One large constraint agreed upon by all 7 respondents was the 'Paper War', of standards implementation. This was an obstacle that reportedly made engineers lose sight of the intended purpose of the quality procedures. For those wishing to embark on the formalisation of the quality control effort, this had the problem that "nobody likes change - they all imagine more administration". It was for this reason that manuals were said to be used in moderation only. Employees were made aware that the systems were in place for control, and should not end up being controlled.

Do clients believe that quality management procedures in engineers companies are important in the delivery of a better quality service?

When this question was posed to the 30 'clients', it was found that all 30 respondents agreed outright that there ought to be some form of formal Quality Assurance effort within consulting engineering firms. One respondent enlarged on this. He believed that the local authorities would like to see in the industry a system of 'checks and balances' which would serve as a quality control/checks for authorities. He stated that this would have to be initiated from the traditional clients themselves, which is the first main obstacle in getting the ball rolling. He emphasised that this should be a results orientated effort. A respondent representing a contractor suggested that, built into these techniques, should be the principle that the contractor and the engineer get together and sort out problems prior to the commencement of contracts. Another client representing a local authority talked of these procedures/techniques as 'tools of the trade' and believed they were vital in feeding the feedback loop to service improvement. These tools he said must be tailored by each consulting engineer and designed to continually improve the service.

Would senior engineering management resist experimentation/implementation of quality management procedures/techniques?

It can be seen from table 2 below that 60% of the engineers disagreed that senior management would resist quality improvement procedures and techniques, whereas 10% agreed. This finding supported the earlier finding that 7 out of 10 respondents had some form of quality procedure or technique in place. It also provided evidence that GAP 2 definitely existed, as only 100% disagreement would mean that no gap existed.

	STRONGLY AGREE	AGREE	NEUTRAL	DISAGREE	STRONGLY DISAGREE
Senior engineering management will resist experimentation with quality improvement procedures and techniques in your organization	0	10%	20%	60%	10%

Table 2: Percentage resistance from senior management to formal quality improvement procedures

Is there a lack of and/or need for management commitment to quality improvement?

10% of the engineers were neutral when questioned whether Quality Management procedures increased project successes. This can be seen below in table 3.

	STRONGLY AGREE	AGREE	NEUTRAL	DISAGREE	STRONGLY DISAGREE
Commitment to quality is demonstrated by senior management's behavior	60%	20%	10%	0	10%

Table 3: Commitment to quality by senior management

This showed support for the 3 out of 10 respondents who did not use or have any quality assurance techniques in place in their workplace, as was found earlier (i.e. seven out of

the ten engineers surveyed, had some form of quality management procedures and/or techniques in place - three did not). The lack of Quality Assurance by 30% of the engineers was attributed to the fact that senior management resisted the efforts or did not initiate them. The above table 3 supported this statement that where 20% agreed and 10% were neutral. This could be attributed to the fact that the table showed disagreement about the fact that management should epitomise the quality improvement effort. The last statement statement in table 4 below showed that only half of the respondents (50%) believed that management training was not related to Quality Assurance.

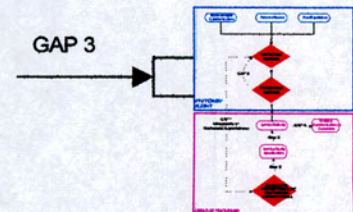
	STRONGLY AGREE	AGREE	NEUTRAL	DISAGREE	STRONGLY DISAGREE
Having Quality Management procedures in place increases project successes	20%	70%	10%	0	0
Training of top management in the basics of quality management is not essential to achieve a good quality service	20%	10%	10%	10%	50%

Table 4: The effect of Quality Management Procedures, and Training, on Project Successes and Service Quality respectively

Having dealt with GAP 2 shortfalls, GAP 3 shortfalls will now be examined overleaf.

5.3 Gap 3 Shortfall - Engineers not delivering services to their own procedures and standards set

The italics below are a recap of the definition of GAP 3 (shown in key insert). The questioning approach that follows was used to determine GAP 3.



This gap measures the ability of the industry to meet the service performance standards set. Inquiry is needed to find out what the reasons are for the discrepancy between service-performance standards and actual service delivery. When the level of service delivery falls short of the standards, it falls short of what clients expect as well. This direct association between gaps 3 and 5 suggests that narrowing gap 3 by ensuring that all resources needed to achieve the standards are in place - should also reduce gap 5 (Zeithaml et al⁸).

The following typical questions were asked:

Is there a need for service improvement?

Does training play a role in quality services?

Does poor service quality have financial implications and to what extent?

What factors if any hamper service delivery?

KEY CONTRIBUTING FACTORS WHY EXISTING QUALITY CONTROLS DID NOT ENSURE ACCURATE DELIVERY OF SERVICES

- Fast track syndrome gripping the industry
 - Communication and co-ordination of activities
 - Lack of in-house expertise
 - Fee constraints
 - Being understaffed
 - Work overload from smaller projects
 - Computerisation/Filing/Administration
 - Lack of information for designs
-
- 84% of clients felt there was a need for service improvement from engineers.
 - Training was considered important by engineers and clients as contributing to superior service quality
 - Poor quality cost clients between 0-5% of annual turnover
 - Poor quality cost engineers between 5-10% of annual turnover

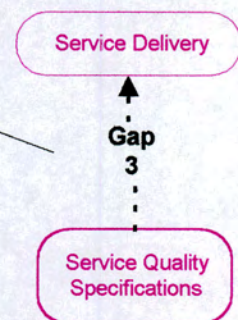


Figure 29: Contributing factors why quality controls did not ensure accurate delivery of services

Figure 29 on the previous page was a summary of the GAP 3 findings. The following pages, are a detailed display of the findings of GAP 3 along the questioning approach used.

Is there a need for service improvement?

It was found in section 5.2 that the use of "Service Quality Specifications" was evident. How well the engineers met these standards set was evident from their clients who believed there was a need for service improvement. The graph in figure 30 shows that 84% of the 30 'clients' surveyed (government, architects and contractors), believed there was a need for improvement in the current levels of service received. This finding indicates a shortfall, which is GAP 3.

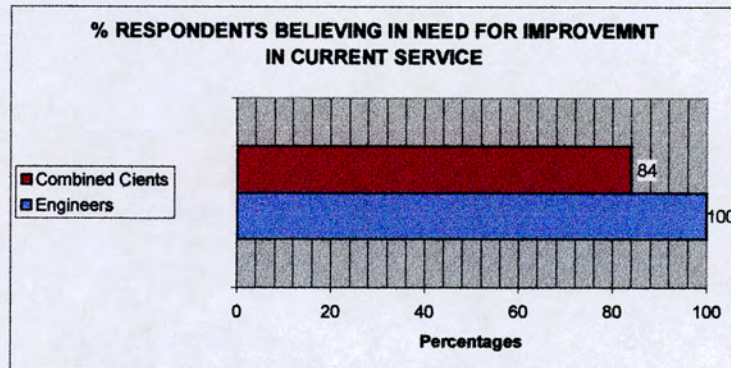


Figure 30: % Respondents believing in need for improvements in current service levels

The 84% above in figure 30 represented ALL 'clients' i.e. government, architects and contractors. Figure 31 is a comparison of the latter three showing, relative to each other, the strengths of their beliefs for improvements in current service levels from engineers. From this figure architects were found to be least dissatisfied with current levels of service, whereas all of the traditional clients surveyed believed that current service levels needed improvement.

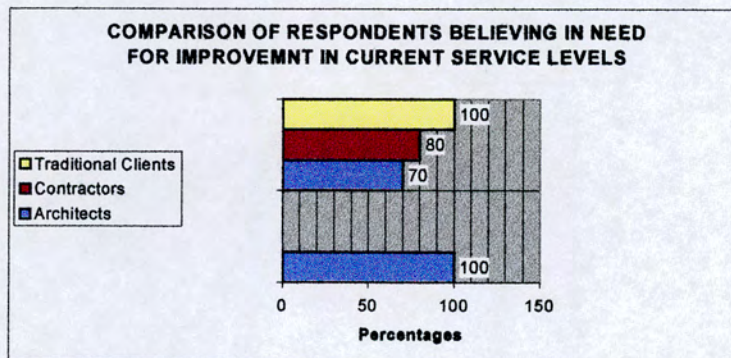


Figure 31: Breakdown of client respondents believing in service improvement

It was also found, and was evident from both of the two graphs that 100% of the engineers surveyed believed that there was a need for improvement in their current levels of service. All 10 of the engineers responded with statements relating to “there must always be room for improvement” in the provision of their services. Despite this finding of willingness on the part of engineers to improve, GAP 3 was nevertheless evident in the dissatisfaction expressed by the clients.

Does training play a role in quality services?

Training of employees was suggested to the consulting engineering respondents, as a possible reason for there being a GAP 3. 70% of these had a dedicated training budget allocation. One respondent stated that the South African Association of Consulting Engineers (SAICE) should provide more industry-related training. He compared the British institution and SAICE, where the British had a mandatory minimum number of hours to be spent on training each year, whereas SAICE had none. One respondent raised the issue of in-house training as being important in ultimately accurately delivering a quality service.

Does poor service quality have financial implications and to what extent?

Identifying GAP 3 and possible reasons why it exists, led the research inquiry to probe whether this shortfall in service, had financial implications to either 'clients' (government, architects and contractors) or engineers. This was posed to both engineers and 'clients'.

Engineers were questioned about what percentage of their annual turnover was wasted as a result of providing a poor quality service. And the clients were questioned about what percentages of their project budgets were wasted as a result of receiving a poor quality service from engineers. Figure 32 below showed the responses in categories of 5%. An estimated 60% of the respondents representing the engineers estimated that wastage was roughly between 5 and 10% of their annual turnover, with 30% of the respondents between 0 and 5%. Only 1 respondent estimated that his wastage could be as great as 15%. The findings from the client-base surveyed (30 respondents) showed that two categories were of concern to clients. 41% Claimed budget wastage was 0 to 5%, whereas 23% claim somewhere in the region of 15 to 20%. 8% Of the respondents claimed they experienced wastage of an amount greater than 25%. This wastage was interpreted as additional work due to unforeseen problems encountered.

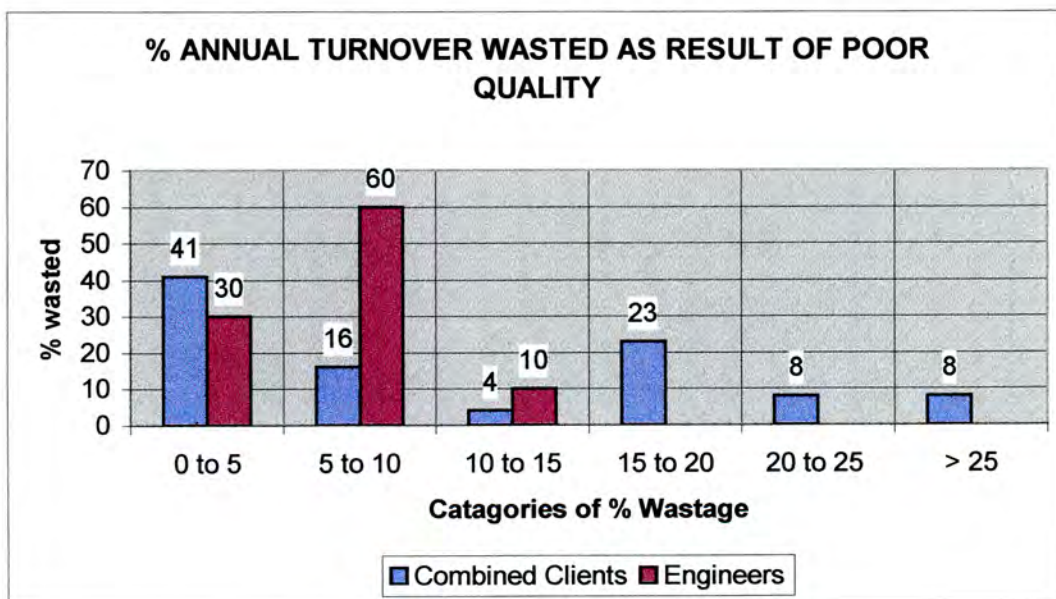


Figure 32: % Annual Turnover wasted as a result of poor service quality

What factors, if any, hamper service delivery?

Table 5 below showed 2 categories, which were found to be jointly the two most important factors hampering the delivery of a quality service to clients. These were found

to be the 'Fast Track Syndrome' and 'Communication and Coordination of activities'. It was found that from the ten respondents, 8 stated that with today's technology on the one end, and the tight fisted commercial client on the other, contracts were becoming only marginally profitable to all project members. This negatively affected any creativity from the consulting engineer. An equally important contributing factor was the lack of 'communication' from a coordinator/project manager facilitating the phases on a project.

SCORE RANKED	AREAS HAMPERING SERVICE DELIVERY FROM CONSULTING ENGINEERS	FREQUENCY
1	'Fast Track Syndrome' gripping the industry	8
1	Communication and Coordination of activities	8
2	Lack of in-house expertise	7
3	Fee Constraints	5
4	Understaffed	3
5	Work overload with small jobs	2
6	Computerisation/Filing/Administration	1
6	Lack of information for designs, etc.	1

Table 5: Areas hampering service delivery from engineers

It was found from one engineer that clients did not show unparalleled support for proposals from engineers to also act as project managers, or to have an external one appointed. This was reportedly often seen as an expense and not a value-adding part of the service.

The lack of experienced in-house expertise in specialised engineering areas was of concern to 7 out of the 10 respondents. This did not mean there was a lack of specialisation in the industry, but rather the lack of enough projects to allow the development of these areas. It was found that most consulting engineering practices, especially the smaller ones, found that employing the services of a "discipline specialist" on a contract basis for the duration of the project, alleviated this problem.

Thirdly it was found that only 50% of the respondents when working on government projects were informed who and at what seniority level e.g. director, manager, etc., may attend meetings and how many. It was reported that often there was a need to have

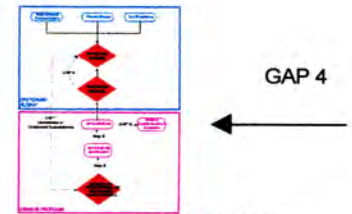
adequate representation from the consultant at meetings (i.e. the designers from the technical team). This representation first had to be agreed by the client, who often did not, or did not agree to pay for their representation when invoiced. Another two areas ranking fourth and fifth respectively in table 5 were consulting engineers being '*understaffed*' and '*overloaded*' with small projects. The understaffing was reportedly because of the current lack of projects big enough to warrant the staff numbers. This, however, was considered 'self inflicted' or an excuse from engineers, as the resources required for projects should be costed for prior to taking on the new projects. These two areas were ranked on the table, but will not be considered as areas hampering service delivery for this research.

Only one respondent mentioned that '*computerisation/administration*', etc. was considered to hamper the service that they had to offer. It was the shortage of the correct hardware and software that allowed his competitors to deliver a faster and more efficient service.

Having dealt with GAP 3 shortfalls, GAP 4 shortfalls will now be examined overleaf.

5.4 Gap 4 Shortfall - Discrepancy between actual and promised service

The italics below are a recap of the definition of GAP 4 while the questions that follow were used to determine GAP 4.



Promises made by the engineer through any communication whatsoever, raise expectations that serve as standards against which clients assess service quality. A discrepancy between the actual service and the promised service (gap 4 in figure) therefore has an adverse effect on clients' perceptions of service quality. By knowing what is really important to the client, but neglecting to inform the client of what is being done, engineers will lose out on the opportunity to favorably influence clients service perceptions. The effective co-ordination of actual service delivery with external communications therefore narrows GAP 4 and hence favorable affects GAP 5 as well (Zeithaml et al⁹).

Does communication influence service quality?

If and how often is client satisfaction assessed?

What costs are associated with poor service quality?

What areas of service are important and lesser important?

What improvements in service quality are required?

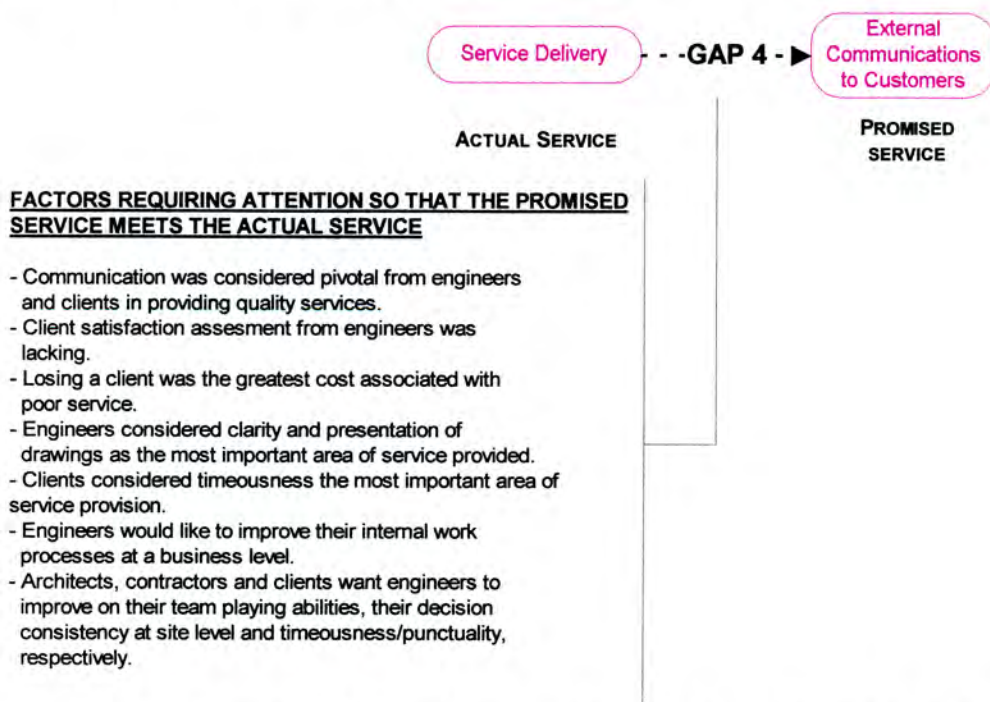


Figure 33: Factors which affected whether the promised service meets the actual service

Figure 33 above is a summary of the GAP 4 findings. The following pages, are a detailed description of the findings of GAP 4 along the questioning approach used.

Does communication influence service quality?

When questioned whether communication was important in the provision of a quality service, both engineers and clients all emphatically agreed that it was. This led to the enquiry as to how often satisfaction levels were being assessed by engineers.

If and how often is client satisfaction assessed?

This was important to reflect or ascertain what happened in actual service encounters, and to gauge the expectations of clients that service delivery would be modified accordingly. The findings from the engineers and clients were found to be contradictory. Table 6 showed how, and how often, engineers assessed client satisfaction. It showed a general lack of satisfaction assessment from engineers. When engineers were questioned how often they assessed client satisfaction, 50% reported 'often'. The methods employed were: 'sometimes' by receiving correspondence, 'rarely' compiling questionnaires and interviews, 'sometimes' using external marketing firms and 'often' making oral enquiries.

	ALWAYS	OFTEN	SOMETIMES	RARELY	NEVER
Satisfaction assessed at project completion	20%	50%	30%	0%	0%
Assess internal clients by questionnaires and interviews	10%	20%	0%	50%	20%
Review client correspondence	20%	10%	40%	20%	10%
Distribute surveys where clients ranking service quality	0%	10%	40%	10%	40%
Informal oral inquires	10%	50%	40%	0%	0%

Table 6: Frequency of client satisfaction assessment by engineers

Table 7 below shows that clients virtually never had their service satisfaction levels, assessed.

	ALWAYS	OFTEN	SOMETIMES	RARELY	NEVER
Satisfaction assessed at project completion	2%	2%	16%	42%	38%
By means of questionnaires and interviews	0	0	0	16%	84%
Marketing companies distributing surveys	0	10%	8%	18%	64%
Informal oral inquiries	10%	16%	22%	12%	40%

Table 7: Frequency of client experiences with satisfaction assessment from engineers

Neglecting to enquire about clients' satisfaction levels could result in a number of costs. The survey questioned engineers as to what they found were the costs of not delivering a quality service to clients. Table 8 shows two major costs that were mentioned by all respondents.

What costs are associated with poor service quality?

SCORE	COSTS ASSOCIATED WITH NOT DELIVERING A QUALITY SERVICE	FREQUENCY
1	Losing a Client – winning back clients confidence	9
2	Abortive Work – Redoing Work	8

Table 8: Costs associated with not delivering a quality service

90% Of the respondents attributed the **loss of a client**, as the largest cost resulting from the delivery of a poor quality service. This cost was escalated by the efforts to win back the clients confidence again. This relates to the statement in the literature study that 'not only are you as client less likely to return, but you are more likely to tell your friends about your bad experiences'. The fact that the findings showed this as being the foremost cost, was supportive of the literature review where Manning⁴ stated that it costs about five times as much to get a new customer as it does to keep the existing one, and,

satisfied clients will tell between 3 to 5 people about their experience - unhappy ones tell 11 to 15.

The second largest cost was having to redo work. This cost was explained as having ripple effects, in that the firms had to redo work, arrange overtime, suffer low productivity, abortive work and additional printing costs.

What areas of service are important and lesser important?

The pilot study determined what areas of service were really important to clients. By knowing this, engineers could favourably influence clients' service perceptions and thus make the GAP 4 smaller. Table 9 was a comparison of areas found to be important by engineers and clients.

ENGINEERS RANKING	COMPARISON OF AREAS OF SERVICE THOUGHT TO BE IMPORTANT BY ENGINEERS AND CLIENTS	CLIENTS RANKING
1	Clarity/Presentation/Less complexity of drawings	4
2	Timeousness	1
3	Presentation/External appearance of Engineers and Firm	5
4	Feedback/Communication	2
4	Socialising	6
5	Efficiency	4
5	Less Rigid/Design Compromise	3
5	Robustness	5

Table 9: Comparison of areas found to be important by engineers and clients

Table 10 was a comparison of areas of service thought to be of lesser importance by engineers and clients. The areas were ranked in order of importance to engineers.

ENGINEERS RANKING OF WHAT THEY THOUGHT WAS LEAST IMPORTANT TO CLIENTS	COMPARISON OF AREAS OF SERVICE THOUGHT TO BE OF LESSER IMPORTANCE BY ENGINEERS AND CLIENTS	CLIENTS RANKING OF WHAT WAS LEAST IMPORTANT TO THEM
1	Very Good Presentation/External appearance of Engineers and Firm	1

2	Supervision of construction by design engineer/resident engineer	3
3	Technical Details - the working drawings etc.	4
3	Entertainment of clients	2
4	'Overkill' Drawings i.e. more than basic structural drawings	4
4	Innovative designs which are more expensive or with high risks	4

Table 10: Comparison of areas thought to be of lesser importance by engineers and clients

This question was not well responded to by consulting engineers as one client commented, "clients are only really interested in the end product". Engineers thus did not experience many areas which clients expressed their dislikes. When prompted, however, the engineers felt that the '*external appearance of their staff and buildings*' was not that important to their clients. This was ranked first i.e. indicating engineers thought this was of least importance to clients. It was argued that the conditions of the profession were such that site visits dictated the less formal appearance of their staff, and that some consultants were based permanently on sites.

Less than '*external appearance of their staff and buildings*', '*supervision*' was an area which engineers felt was the next least importance to clients. Clients saw this as an excessive amount additional to the design fee and felt that it was not warranted. It was however mentioned that this was more the case with the commercial clients as opposed to the traditional government clients.

Ranking together in third place in table 10 was '*technical details*' and '*entertainment*'. One engineer mentioned that clients of lower status enjoyed being entertained, whilst clients of higher calibre became suspicious when entertained.

Ranking together in fourth place was the '*provision of busy drawings and innovative designs*'. It was found that engineers felt clients had little regard for drawings, whether they were simple or cluttered. This was found to be true for architects, traditional clients and contractors. What came across was the functionality of the drawing i.e. the drawing must fulfill its intended purpose/function as opposed to looking good. Ranking together with this was '*innovative designs*'. This was thought of as being of lesser important by engineers, from clients.

What improvements in service quality are required?

The respondents mentioned improvements in the delivery of their own services. These were quantified and grouped in categories which best reflect their suggestions. The ten engineering respondents, each made mention of numerous improvements - by far the most frequent mentioned was the improvement of their own internal processes as can be seen in the pie chart in figure 34.

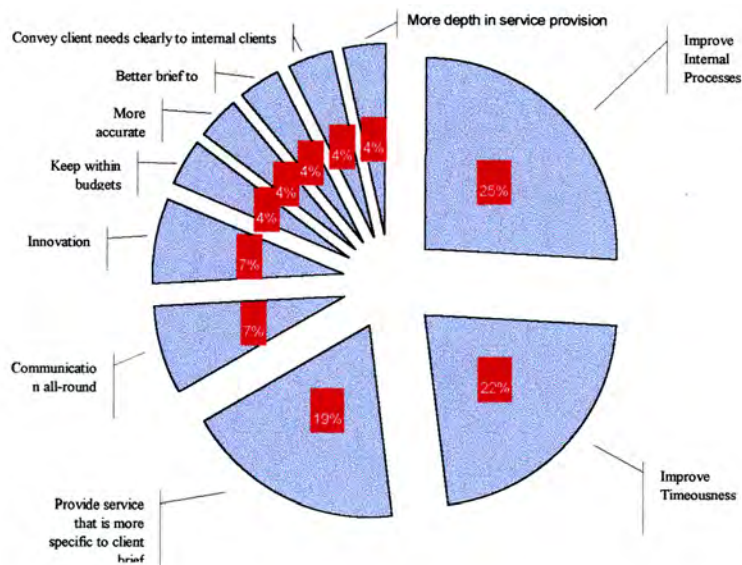


Figure 34: Improvements suggested by engineers in the delivery of their own services

Architects suggested engineers improve their:

- team playing ability
- ability to satisfy the specific needs of the architect
- site supervision
- drawing quality to be read with the architects drawings.
- communication and relationship skills with the professional team

Contractors suggested engineers:

- come down from that mystic level and 'get their boots dirty'
- be more consistent with decisions on projects

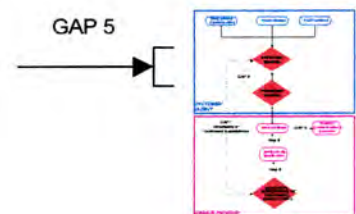
- employ firm, knowledgeable resident engineers
- improve communication i.e. adopt a listening approach
- build good relationships with contractors
- coordinate and communicate more during construction

Clients suggested engineers improve their:

- timeousness/punctuality
- initial cost estimates
- project management skills
- innovation in designs

5.5 Gap 5 - Client Expectations/Perceptions Gap

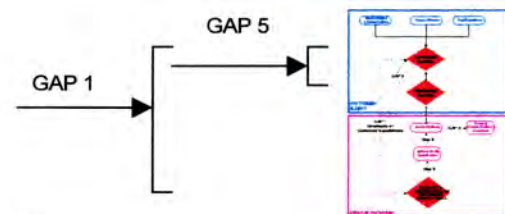
The conceptual model's theory stated that should any of the gaps 1 - 4 be found, then gap 5 would exist. From the above sections it is clear that gaps 1 - 4 existed, hence GAP 5 does too i.e. there is a gap between the expected and perceived service by clients (seen in the insert diagram below).



A summary of the key findings of the pilot study (in line with the key objectives for this study) is presented in chapter 8. The main study is presented overleaf.

6 The Main Survey into Service Quality Perceptions and Expectations

This stage of the research was the quantitative stage 2 (figure 9, page 28). A tool called SERVQUAL (introduced in the literature review, page 20) in the form of a questionnaire was used to measure, on an empirical basis, the relative size of the gaps that existed within the consulting engineers' provision of services. The measurement was specifically of GAP 5 and GAP 1 shown on the conceptual model insert below (GAP 2, 3, 4 are not measurable using SERVQUAL). The pilot survey showed they exist, while the main survey measured the relative size of the GAPS.



The main survey questionnaire had two main objectives:

1. To provide a numerate/empirical measure for the GAP 5 which might exist between the service expected, and perceived to be received by the clients. The measure was presented along the five service quality dimensions.
2. To provide a numerate/empirical measure for the GAP 1 that might exist across the boundary between clients' expected service, and engineers' perceptions of clients' expectations. The measure was presented along the five service quality dimensions explained earlier i.e. tangibles, reliability, responsiveness, assurance and empathy.

6.1 Explaining The SERVQUAL Instrument used

SERVQUAL was an instrument developed by Zeithaml et al⁹ to better understand the service expectations and perceptions of clients. It used a multiple item scale with good reliability and validity, designed to be applicable across a broad spectrum of service industries. The instrument had an expectations/perceptions format encompassing statements of five quality dimensions i.e. Tangibles, Reliability, Responsiveness, Assurance and Empathy. These five dimensions were identified as representing the evaluative criteria clients use to assess service quality. For the purposes of this research, the five dimensions were used as a starting point in assessing the criteria that clients employed in evaluating service quality. The acceptance of the dimensions for this

research was by virtue of them being derived by Zeithaml et al⁹, from their analysis of client's ratings from hundreds of interviews, in several service sectors. The dimensions below have brief definitions adjacent to them. They have also been modified to be specific to engineering.

Tangibles	related to the appearance of the physical facilities, equipment, personnel, and communication materials of the engineer
Reliability	related to the ability of the engineer to perform the promised service dependably and accurately
Responsiveness	related to the willingness of the engineer to help the client and the promptness of his service
Assurance	related to the provision of the core engineering service
Empathy	was the caring individualised attention that engineers provided to their clients

For the purposes of this research the definition of the dimension "*Assurance*" was altered and defined as being the provision of the core engineering service. Statements in Appendix D briefly describe the *assurance* dimension. Each dimension had defining characteristics in the form of statements that were adapted and supplemented for the research needs of engineering. These statements can be seen in Appendix B. The appendix shows the SERVQUAL instrument in the form of the main questionnaire. It had an expectations section and a perceptions section, each with 25 statements. The questions were modified to be specific to the provision of consulting engineering services. A section to ascertain clients' assessment of the relative importance of the five dimensions was also included.

6.2 Calculating the SERVQUAL GAP scores

The SERVQUAL statements were grouped into the five dimensions in the following way:

Dimension	Statements relating to the Dimension
Tangibles	Statements 1-4
Reliability	Statements 5-8
Responsiveness	Statements 9-12
Assurance	Statements 13-20
Empathy	Statements 21-25

A seven-point Likert scale ranging from 7 (strongly agree) to 1 (strongly disagree) accompanied each statement. A major advantage of this scale is the ability to obtain a summated value from the simplicity of the format. The difference between the ratings clients assigned to the paired expectation/perception statements, was the way in which quality of service was assessed using SERVQUAL. The SERVQUAL (or GAP 5) score for each statement pair, for each client, was calculated as follows:

$$\text{SERVQUAL Score} = \text{Perception Score} - \text{Expectation Score}$$

The consulting engineer's quality of service along each of the five dimensions was assessed across all clients by averaging their SERVQUAL scores on statements making up the dimension. Zeithaml et al⁹ explained that if N clients responded to a SERVQUAL survey, the average SERVQUAL along each dimension was obtained through the following two steps:

1. For each client, the SERVQUAL scores were added on the statements pertaining to the dimension and the sum was divided by the number of statements making up the dimension.
2. The above quantity was added across all N clients and the total was divided by N.

The SERVQUAL score for the five dimensions obtained above was averaged (i.e. summed and divided by five) to obtain an overall measure of service quality. This was however an *unweighted* SERVQUAL score as it did not take into account the relative importance that clients attach to the various dimensions. An overall *weighted* SERVQUAL score that took into account the relative importance of the dimensions was obtained through the following steps:

1. For each client the SERVQUAL score for each dimension obtained earlier was multiplied by the importance weight assigned by the client to that dimension (the importance weight was the points the clients allocated to the dimension divided by 100).
2. For each client the weighted SERVQUAL scores were added across all five dimensions to obtain a combined weighted SERVQUAL score.
3. The above scores were added across all clients and the total divided by N.

The GAP 1 scores crossed the boundary between clients and engineers as seen in the key insert at the start of chapter 6. Its measurement was a comparison of responses of

the engineers and clients. The difference between the average expectation scores along the dimensions produced the GAP 1 scores.

6.3 The interpretation of the results

The SERVQUAL instrument was used to calculate the service quality gap scores at different levels of detail: for each statement pairs, for each dimension, or combined across all dimensions as explained above. Appendix F shows the data captured to calculate the SERVQUAL scores. Only the first and last data table from each client is shown. Examination of the various gap scores, allowed service provision by engineers to be assessed, as perceived by clients. It also identified characteristics within those dimensions on which engineers should focus their improvement efforts. **The more negative the SERVQUAL score, the more serious the service quality shortfall was, as perceived from clients. A positive score indicated that the engineers who participated in the survey exceeded their clients' expectations.**

E-mail was the medium of questionnaire presentation. The questionnaire was mailed to engineers and clients. A total of 124 were mailed to consulting engineers; 69 to architects; 140 to contractors; and 85 to commercial and government clients. Table 11 below, shows the response to the questionnaires.

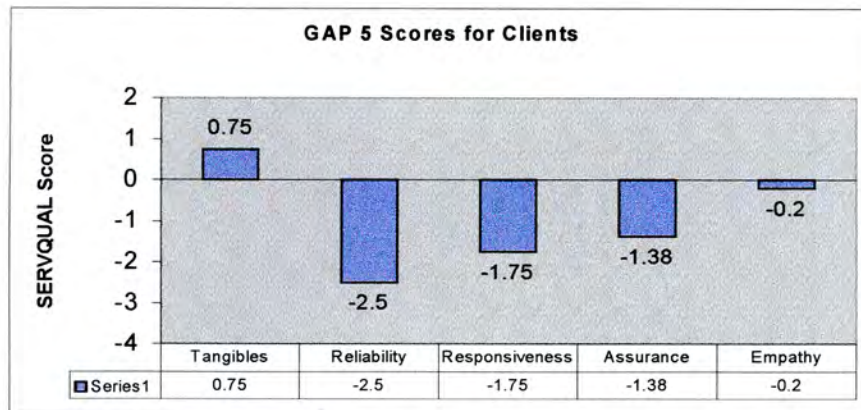
		Sample	Respondents	Percentage	Engineer/Client Percentage Comparison	Total Response Percentage
ENGINEERS	Engineers	124	45	36%	36%	27.7%
CLIENTS	Architects	69	16	23%	24%	
	Contractors	140	39	27.8%		
	Government/ Municipal	85	16	18.8%		
TOTAL		418	116	27.7%		

Table 11: Response to questionnaires

The response was good as dispatches, returns and reminders were instant with the use of the e-mail technology.

7 FINDINGS AND DISCUSSION OF MAIN QUESTIONNAIRE

7.1 GAP 5 Score For Government Clients

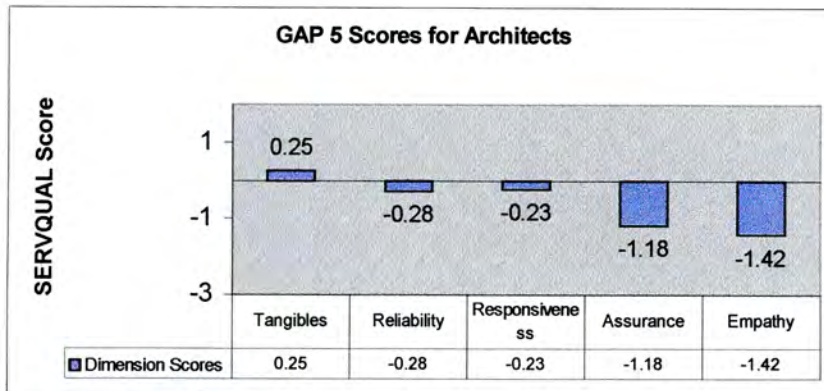


Average servqual score along each dimension	0.75	-2.5	-1.75	-1.38	-0.2
Overall measure of service quality (unweighted servqual)	-1.02				
Overall measure of service quality (weighted servqual)	-0.3				

Figure 35: GAP 5 score for ALL clients

Figure 35 shows that the dimension '*reliability*' was the most serious service quality shortfall (relative to the other dimensions) from engineers, with a SERVQUAL score of -2.5. Appendix F shows part of the data collected. It is interesting to note that the pilot study result also found the '*reliability*' dimension to be the most serious service quality shortfall. The only dimension where engineers exceeded client expectations was the '*tangibles*' dimension. Definitions can be seen in Appendix D. The overall weighted measure of service quality was -0.3, as shown in the above table. This indicates only slight dissatisfaction from clients.

7.2 GAP 5 Score For Architects

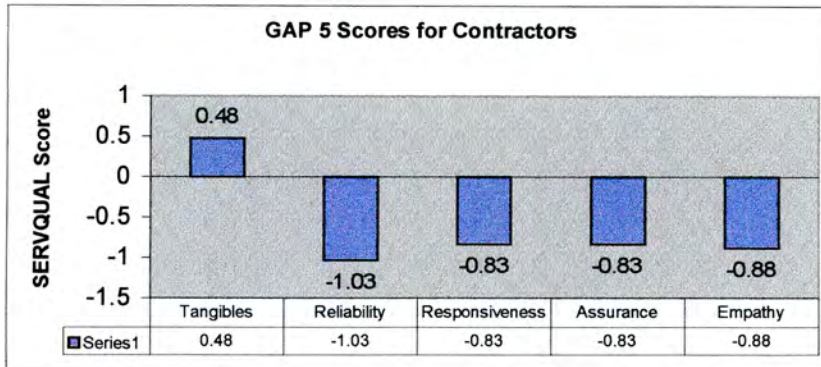


Average servqual score along each dimension	0.25	-0.28	-0.23	-1.18	-1.42
Overall measure of service quality (unweighted servqual)	-0.57				
Overall measure of service quality (weighted servqual)	-0.13				

Figure 36: GAP 5 score for architects

Figure 36 shows that the dimension '*empathy*' was the most serious service quality shortfall (relative to the other dimensions) from engineers, with a SERVQUAL score of -1.42. The pilot study result found the '*assurance*' dimension to be the most serious service quality shortfall. The only dimension where engineers exceeded client expectations was the '*tangibles*' dimension with a SERVQUAL score of +0.25. Definitions can be seen in Appendix D. The overall weighted measure of service quality was -0.13, as shown in the above table. This indicates only slight dissatisfaction from architects.

7.3 GAP 5 Score For Contractors

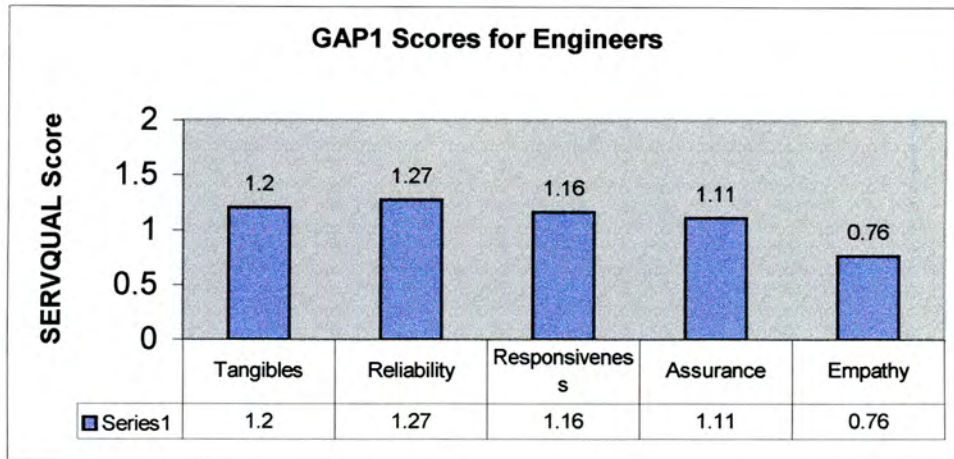


Average servqual score along each dimension	0.48	-1.03	-0.83	-0.83	-0.88
Overall measure of service quality (unweighted servqual)	-0.62				
Overall measure of service quality (weighted servqual)	-0.15				

Figure 37: GAP 5 score for contractors

Figure 37 shows that the dimension '*reliability*' was the most serious service quality shortfall (relative to the other dimensions) from engineers, with a SERVQUAL score of -1.03. The pilot study result found the dimension '*responsiveness*' and '*empathy*' dimension were the most serious service quality shortfalls. The only dimension where engineers exceeded client expectations was the '*tangibles*' dimension with a SERVQUAL score of +0.48. Definitions can be seen in Appendix D. The overall weighted measure of service quality was -0.15, as shown in the above table. This indicates only slight dissatisfaction from contractors.

7.4 GAP 1 Score Across the Boundary between Clients and Engineers



Average servqual score along each dimension	1.2	1.27	1.16	1.11	0.76
Overall measure of service quality (unweighted servqual)	1.1				
Overall measure of service quality (weighted servqual)	0.23				

Figure 38:GAP 1 score for engineers :

Figure 38 shows that engineers were generally aware of their client expectations across all the five dimensions - especially the reliability dimension with a SERVQUAL score of + 1.27.

8 Summary of Findings from Pilot and Main study

Pilot Study

The following summarises the findings from the pilot study along the original five objectives on page 29.

GAP 1:

The gap between what clients expected and what engineers thought clients expected, existed. Engineers were not meeting client expectations along the:

'assurance' dimension for all clients combined

'reliability' dimension for government and commercial clients

- engineers didn't always provide optimum designs
- designs were not always 'correct' the first time around
- overdesigns increased project costs and client budget overruns

'assurance' dimension for architects

- engineers overdesigns frequently forced architectural budgets to overrun
- engineers were dragging their feet in timeous service delivery
- engineering drawings were frequently not representative of architectural drawings
- engineers were lacking in team playing abilities
- few engineers provided design flexibility - their decisions were very rigid

'responsiveness', 'assurance' and 'empathy' dimensions for contractors

- engineers did not provide timely resolutions to problems on site
- resident engineers did not always provide consistent decisions on site relating to inspection of works
- relationship building was lacking between contractors and the professional team
- contactability and team playing ability was lacking

GAP 2:

Formal Quality Control was used widely, but not supported by all engineering respondents (p. 49) - evidence of GAP 2.

- Standards and procedures were bulky and were often seen as obstacles by engineers (p. 50).
- Standards were often seen as more administration (p. 50).
- All Clients firmly believed quality control should be in place in engineering firms.
- 30% of Engineering managers would resist implementation of formal quality controls (p. 51).
- 20% of Engineering managers did not believe their behaviour was a measure of their commitment to quality improvement.

GAP 3:

84% of clients felt there was a need for service improvement from engineers.

Training was considered important by both engineers and clients, as contributing to superior service quality.

Poor quality cost clients between 0-5% of annual turnover

Poor quality cost engineers between 5-10% of annual turnover

The following were found to be reasons why existing quality controls did not ensure satisfactory delivery of services:

- Fast track syndrome gripping the industry
- Lack of Communication and co-ordination of activities
- Lack of in-house expertise
- Fee constraints resulting in inadequate representation of engineers at technical meetings with government clients
- Being understaffed resulted in existing staff having too much responsibilities
- Work overload from too many smaller projects, all requiring the same input as on the larger projects
- Outdated computerised technology/Lack of well thought out office filing systems to facilitate paperwork
- Lack of information for designs from poor client briefings

GAP 4:

Communication was considered pivotal by engineers and clients in providing quality services.

Client satisfaction assessment by engineers was lacking.

Losing a client was the greatest cost associated with poor service.

Engineers considered clarity and presentation of drawings as the most important area of service provided.

Clients considered timeousness the most important area of service provision.

Engineers would like to improve their internal work processes at a business level.

Architects, contractors and clients wanted engineers to improve on their team playing abilities, their decision consistency at site level and timeousness/punctuality, respectively.

GAP 5:

There was a "gap/shortfall" between what clients expect and what they experience. This is evident from the above findings.

Main Study

The following summarises the findings from the main study along the original objectives on page 66. The empiracle measures for each of the five service quality dimensions is presented in table 12 below for GAP 5 and GAP 1, and include the weighted findings from each dimension as well as the overall result.

GAP 5:

Engineers were not meeting client expectations, especially along the dimensions below, (taken from table 12 that follows):

the '*reliability*' dimension for government and commercial clients "-2.5"

the '*empathy*' dimension for architects scoring "-1.42"

the '*reliability*' dimension for contractors scoring "-1.03"

The weighted measures were all negative indicating dissatisfaction from clients.

	GAP 5			GAP 1
	GOVERNMENT	ARCHITECTS	CONTRACTORS	ENGINEERS
Tangibles	0.75	0.25	0.48	1.2
Reliability	-2.5	-0.28	-1.03	1.27
Responsiveness	-1.75	-0.23	-0.83	1.16
Assurance	-1.38	-1.18	-0.83	1.11
Empathy	-0.2	-1.42	-0.88	0.76
Overall unweighted measure	-1.02	-0.57	-0.62	1.1
Overall weighted measure	-0.3	-0.13	-0.15	0.23

Negative indicates slight dissatisfaction from clients i.e. engineers were not meeting client expectations, especially along the three dimensions circled above

Positive indicates engineers were aware of client expectations

Table 12: Empiracle measures for each of the five service quality dimensions

GAP 1:

Engineers perceptions of what their clients expected, exceeded their clients' expectations. This was evident from the GAP 1 scores that were all positive in the above table 12. The weighted measure was also positive which indicates that engineers were well aware of client expectations.

9 CONCLUSIONS

Pilot Study

The following were concluded as being the main reasons for the shortfalls in each of the five GAPS from the pilot study, as laid out in the summary of findings in the preceding chapter.

GAP 1

It was concluded that in the quest for the provision of superior service quality, the representative sample of managers/engineers interviewed did not have a satisfactory enough understanding of what their clients expected. This was evident from the provision of over-designs (p. 35, 39), with the result that the service was often considered as being 'incorrect', the first time around. These incorrect designs led to increased project costs and clients' budgets being used up (page 35), without client needs being satisfied.

It was also found that engineers clearly showed ignorance of architectural needs by providing drawings that were not representative of architectural drawings. It was thus concluded that engineers were uncertain of their clients' expectations as well as the levels of performance that were desired by their clients.

Gap 2

Although quality control in its widest sense was being used, some engineers were not in favour of formalising the quality control systems. This contributed to more than 80% of clients being dissatisfied with services from engineers - the poor quality services ironically costing engineers more than it did their clients (5-10% vs. 0-5% of annual turnover). It was thus concluded that there were not enough formal performance standards in place – whether they were in the form of regular audits, etc., to help realise the objectives of the engineering firms. It was also concluded that there was clearly not enough consideration given, to stressing the importance of procedures and performance standards, for the provision of engineering services.

Gap 3

It was concluded that engineers were rather looking for excuses i.e. fee constraints, being understaffed, etc., rather than finding ways to ensure that controls were in place to ensure accurate delivery of services.

Gap 4

It was concluded that there was a lack of client satisfaction-assessment, resulting in engineers being unable to identify and accurately focus on areas of service which were regarded as important by clients. Thus there was a perceived service quality shortfall, between what clients expected and what they experienced. Contradictory to this, the findings indicated that engineers were very aware of their client expectations i.e. engineers perceptions of clients expectations exceeded their clients expectations. This showed that for engineers to improve their services they needed to inform themselves as to the levels of satisfaction of their clients and to be aware of factors which may hamper service delivery.

Gap 5

From the study it was concluded that the closure of this GAP was dependant on the closure of the GAPS 1-4. And to do this it was concluded that it was important not to raise the expectations of clients beyond the engineers' levels of service delivery – and likewise it was concluded that the actual service encounters, shaped the perceptions of the engineers' services in the eyes of clients.

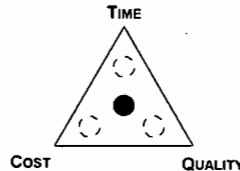
In summary the following from the pilot study were concluded as being areas of concern to all clients: Over-designs (not providing optimum solutions to the exact needs of clients), time and budgetary shortfalls, and poor communication skills.

Main Study

The conclusion drawn from the main study was that the numeric results confirmed that GAP 5 and GAP 1 did exist. It was however also concluded that the overall weighted measure of GAP 5 showed that clients were only slightly dissatisfied with services received. A positive conclusion was that the positive score for GAP 1 was a good indication that engineers were aware of client expectations - had this score been negative, this would have been reason for concern within the industry.

10 RECOMMENDATIONS

It is recommended that in the provision of consulting engineering services, engineers balance the 'ball' in the triangle below so as to maintain a balance between all matters relating to being timeous, being budget conscious and providing quality services to clients.



Time

It is recommended that engineers provide services at the time they promised to do so and be prompt in responding to queries. Delivery on time requires of engineers to fulfill more than just their technical function; they must project manage their projects using flowcharts and activity diagrams to better plan and control activities.

Cost

It is recommended that engineers produce all designs/reports/proposals within a 'budget conscious' frame of mind i.e. consider the cost implications they might have to the client's budget. The service must be tailored to remain within the clients available budget.

Quality

It is recommended that engineers develop a culture within their practices that insists on strict quality control measures and quality assurance, as the material costs of poor quality were found to be ultimately born by the engineer. Recommendations are that engineers must:

- use quality check teams to reduce errors on drawings (i.e. improving accuracy), increase productivity (i.e. less hours per drawing) and increase efficiency (i.e. less redoing of drawings)
- strive toward eventual ISO 9000 accreditation of the company, as this is likely to instill confidence in the clients from the project outset
- develop project related procedure manuals for new/young engineers, to ensure they are aware of what standards of work they should be delivering

- provide training e.g. for new software and computer aided design (CAD) releases. This will decrease wasted time inherent with CAD version updates and will allow the users to be productive sooner. Technical training in the form of continuous learning must be provided e.g. courses provided by institutions for the different engineering disciplines. Management training must also be provided to ensure the decision makers are 'talking the same language' when making decisions.

More specific to the GAPS discussed in the findings and conclusions, the following was recommended:

GAP 1

It is recommended that engineers gather enough information at project briefs to satisfy the exact needs of their clients, and in so doing not over-designing and/or providing services not needed. Engineers must be able to explain the theoretical justification for his/her designs. It is also recommended that the delivery of structural drawings to architects, accurately represent the architectural drawings i.e. it is recommended engineers make certain of exactly what the client wants/needs.

GAP 2

For the closure of this GAP, it is recommended that engineers implement formal procedures to ensure strict adherence to quality standards and requirements. This is recommended as being a non-negotiable requirement in the delivery of services. Management of engineering companies are urged to show support of this.

GAP 3

It is recommended that engineers improve the effects that their internal work processes have on each other, so that the output will better satisfy the needs of their clients. It is also recommended that engineers:

- improve internal project team communications (e.g. between different engineering disciplines/departments from the same engineering company)
- improve team member communications (e.g. between draughts-person and engineer; engineer and project engineer; and project engineer and client).

- focus on work process improvement e.g. the design and detail processes, as well as focusing on support functions like information technology, administration, filing systems and the marketing function. All staff must be involved in process improvement.

GAP 4

For the closure of this GAP, it is recommended that engineers determine client levels of satisfaction at project completion, as service improvement needs critical internal reflection. Engineers must pursue client views and suggestions, because knowing exactly what the clients need is important in the delivery of a better service. It is recommended engineers:

- perform client-feedback surveys to gather information for improving their services; to gather ideas for expanding their services; and to help maintain client contact and rapport
- perform staff feedback surveys as staff are sometimes the ones closest to architects/contractors/clients, and thus will have valuable contributions to make to service improvement
- have brainstorming sessions to identify all possible causes, symptoms or aspects of poor performance on recent projects completed, with no responses being rejected or criticised

GAP 5

It is recommended that engineers pursue any communication with clients (architects/contractors/government) in a professional contributing manner, as this is the medium through which engineers can satisfy their clients – and is also a powerful way of affecting client expectations. The following is strongly recommended:

- Communication must be honest between the engineer and the contractor; between the engineer and the architect; and between the engineer and the client (government/municipal/commercial)
- Clients must be regularly updated on project progress and kept informed of any potential problem situations
- Problem situations, whether site based/contractual/personal must be dealt with quickly so that there is no hostility between project members

Consulting engineers must realise that customer dissatisfaction is a major business cost. This was proven with engineers attributing the largest cost of poor services being that of *losing a client*. The provision of Excellent Service Quality along the above specific guidelines is thus recommended as increasing the company's competitive advantage and ultimately business profitability.

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APPENDIX A PILOT QUESTIONNAIRE FOR ENGINEERS

1. Need for Quality Service?

1.1 Describe what you believe to be understood by the term "Quality of Service" to clients.

.....

1.2 Do you as service provider feel there is a need to improve your Quality of Service to your clients? If your answer is 'No' proceed to question 1.4.

YES	UNSURE	NO

Please motivate your answer.

.....

1.3 What percentage of your annual turnover do you estimate is wasted as a result of poor quality?

PERCENT	
0-5	
5-10	
10-15	
15-20	
20-25	
> 25	

1.4 Has your organization ever used Quality Management procedures and techniques?

YES	NO

Please state which?

.....

APPENDIX A- (pilot questionnaire for engineers continued)

1.5 Does your organization have documented Quality Management procedures?

YES	NO

If yes, state i.e. ISO 9000, SABS, Statistical Quality controls, etc.

.....

.....

.....

.....

1.6 Quality management procedures involve amongst others, the management of processes. What problems are associated with QM procedures? E.g. end up managing procedures, not the process, becomes costly, high administration, etc.

.....

.....

.....

.....

1.7 Please circle a number from the scale to show how much you agree or disagree with each statement.

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
----------------	-------	---------	----------	-------------------

- | | | | | | | |
|-------|---|---|---|---|---|---|
| 1.7.1 | Having quality management procedures in place increases project successes (success relating to all aspects of a project)..... | 1 | 2 | 3 | 4 | 5 |
| 1.7.2 | Senior management in your organization will resist experimentation with quality improvement procedures and techniques in your organization..... | 1 | 2 | 3 | 4 | 5 |
| 1.7.3 | Commitment to quality is demonstrated by senior managements behaviour..... | 1 | 2 | 3 | 4 | 5 |
| 1.7.4 | Training of the top management team in the basics of Quality Management is not essential to achieve a good quality service..... | 1 | 2 | 3 | 4 | 5 |

APPENDIX A- (pilot questionnaire for engineers continued)

2 Client Demands and Delivery of Service

2.1 List in order of preference what wants, needs and quality characteristics you, as service providers perceive your client require/use in evaluating your quality of service. Or what do you think your clients use as measures of your quality of service?

TRADITIONAL	ARCHITECTS	CONTRACTORS	INTERNAL
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			

Other?

.....

2.2 Do you believe that communication and feedback plays an essential role in Quality Improvement efforts.

YES	UNSURE	NO

APPENDIX A- (pilot questionnaire for engineers continued)

2.3 Please circle a number from the scale to show how often you do each of the things listed below.

Always	Often	Sometimes	Rarely	Never
--------	-------	-----------	--------	-------

- | | | | | | | |
|-------|---|---|---|---|---|---|
| 2.3.1 | Assess client satisfaction at project completion..... | 1 | 2 | 3 | 4 | 5 |
| 2.3.2 | Assess internal clients by means of questionnaires and interviews..... | 1 | 2 | 3 | 4 | 5 |
| 2.3.3 | Review client correspondence on projects..... | 1 | 2 | 3 | 4 | 5 |
| 2.3.4 | Distribute surveys where customers rank quality of service in different categories..... | 1 | 2 | 3 | 4 | 5 |
| 2.3.5 | Informal oral enquiries..... | 1 | 2 | 3 | 4 | 5 |

2.4 Training? - discuss. To achieve involvement of all employees requires their commitment. Commitment requires their understanding. Understanding requires training. Training requires management commitment, planning and time.

.....

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.....

.....

2.5 List in order of importance the sources of costs which you believe are associated with not achieving quality e.g. redoing work, missing deadlines, overtime, etc.

- 1.....
- 2.....
- 3.....
- 4.....
- 5.....
- 6.....
- 7.....
- 8.....
- 9.....
- 10.....

2.6 What methods of 'service delivery' do you use i.e. personal delivery, mail, etc.

.....

.....

.....

.....

APPENDIX A- (pilot questionnaire for engineers continued)

2.7 What areas of the service you provide to clients, architects or contractors, do you think they regard as important?

To Clients

.....
.....
.....

To Architects

.....
.....
.....

To Contractors

.....
.....
.....

2.8 What areas of the service you provide to clients, architects or contractors, do you believe they regard as being of lesser importance?

To Clients

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.....
.....

To Architects

.....
.....
.....

To Contractors

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.....

APPENDIX A- (pilot questionnaire for engineers continued)

2.9 What improvements can you suggest in the services that you provide (or provided by engineers in general)?

To Clients

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.....
.....
.....

To Architects

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.....
.....
.....

To Contractors

.....
.....
.....
.....

2.10 Please identify common problems within your everyday work, which might hamper the delivery of a quality service to the client e.g. software/hardware problems, storage, filing, etc.

.....
.....
.....
.....

2.11 Ownership of management processes by employees results in successful quality management efforts - discuss.

.....
.....
.....
.....

APPENDIX A - (continued)

PILOT QUESTIONNAIRE FOR ARCHITECTS

1 Need for Quality Service?

1.1 Describe what you believe to be understood by the term "Quality of Service" from consulting engineers.

.....
.....
.....
.....

1.2 Do you as service receiver feel there is a need for improvement in the level of Quality Service currently received from consulting engineers?

YES	UNSURE	NO

Please motivate your answer.

.....
.....
.....
.....

1.3 What percentage of your annual turnover do you estimate is wasted as a result of receiving a poor quality service?

PERCENT	
0-5	
5-10	
10-15	
15-20	
20-25	
> 25	

1.4 Do you believe that Quality Management Procedures and Techniques are important in the delivery of a better service?

.....
.....
.....
.....

APPENDIX A- (pilot questionnaire for architects continued)

2 Client Demands and Delivery of Service

2.1 List in order of preference what wants, needs and quality characteristics you, as service receivers expect from the consulting engineering service.

- 1.....
- 2.....
- 3.....
- 4.....
- 5.....
- 6.....
- 7.....
- 8.....
- 9.....
- 10.....

Other?

.....

.....

2.2 Do you believe that communication and feedback plays an essential role in receiving a better quality service from consulting engineers.

YES	UNSURE	NO

2.2.1 How do you ensure that engineers are aware of your needs? Eg specs, meetings, drawings, verbally?

.....

.....

.....

.....

2.2.2 Do you believe that, given your level of satisfaction with our services, that your communication of your needs is sufficiently clear to warrant a quality service?

.....

.....

.....

2.3 Please circle a number from the scale to show how often you encounter the following.

Always	Often	Sometimes	Rarely	Never
--------	-------	-----------	--------	-------

APPENDIX A- (pilot questionnaire for architects continued)

- 2.3.1 Consulting engineers assess your level of satisfaction at project completion 1 2 3 4 5
- 2.3.2 Consulting Engineers assess your level of satisfaction by means of questionnaires and interviews..... 1 2 3 4 5
- 2.3.3 Distribute surveys where you as client rank quality of their service in different categories..... 1 2 3 4 5
- 2.3.4 Informal oral enquiries..... 1 2 3 4 5

2.4 Do you believe that there is a lack of after sales service from the service provider?

2.5 List in order of importance the sources of costs which you believe are associated with your needs not being satisfied e.g. redoing work, missing deadlines, etc.

- 1.....
- 2.....
- 3.....
- 4.....
- 5.....
- 6.....
- 7.....
- 8.....
- 9.....
- 10.....

2.6 What methods of 'service delivery' do you receive from consulting engineers i.e. personal delivery, mail, etc.

2.7 What areas of the service you receive from consulting engineers do you regard as important?

APPENDIX A- (pilot questionnaire for architects continued)

2.8 What areas of the service you receive from consulting engineers do you regard as being of lesser importance?

.....
.....
.....
.....

2.9 What general improvements can you suggest in the services that you receive from consulting engineers?

.....
.....
.....
.....

2.10 On a scale of 1 to 5, please indicate your level of satisfaction with the service as a whole that consulting engineers provide you with.

- Extremely satisfied 1
- Satisfied 2
- Adequate 3
- Dissatisfied 4
- Very dissatisfied 5

APPENDIX A - (continued)

PILOT QUESTIONNAIRE FOR CONTRACTORS

1 Need for Quality Service?

1.1 Describe what you believe to be understood by the term "Quality of Service" from consulting engineers.

.....
.....
.....
.....

1.2 Do you as contractor feel there is a need for improvement in the level of Quality Service currently received from consulting engineers?

YES	UNSURE	NO

Please motivate your answer.

.....
.....
.....
.....

1.3 What percentage of your annual turnover do you estimate is wasted as a result of receiving a poor quality service?

PERCENT	
0-5	
5-10	
10-15	
15-20	
20-25	
> 25	

1.4 Do you believe that Quality Management Procedures and Techniques in consulting engineering companies are important in the delivery of a better service?

.....
.....
.....
.....

APPENDIX A- (pilot questionnaire for contractors continued)

2 Client Demands and Delivery of Service

2.1 List in order of preference what wants, needs and quality characteristics you, as contractor expect from the consulting engineering service.

- 1.....
- 2.....
- 3.....
- 4.....
- 5.....
- 6.....
- 7.....
- 8.....
- 9.....
- 10.....

Other?

.....

.....

.....

.....

2.2 Do you believe that communication and feedback plays an essential role in receiving a better quality service from consulting engineers.

YES	UNSURE	NO

2.3 Do you ever inform consulting engineers to improve their services or have you ever felt it necessary to inform them?

.....

.....

.....

.....

2.4 Please circle a number from the scale to show how often you encounter the following.

Always	Often	Sometimes	Rarely	Never
--------	-------	-----------	--------	-------

APPENDIX A- (pilot questionnaire for contractors continued)

- 2.4.1 Consulting engineers assess your level of satisfaction at project completion 1 2 3 4 5
- 2.4.2 Consulting Engineers assess your level of satisfaction on a more formal basis by means of questionnaires and interviews..... 1 2 3 4 5
- 2.4.3 Distribute surveys where you as client rank quality of their service in different categories..... 1 2 3 4 5
- 2.4.4 Informal oral enquiries..... 1 2 3 4 5

2.5 Do you believe that there is a lack of good resident engineering services, maybe because of experience, or of the 75/25 fee split?

2.6 List in order of importance the costs which you believe are associated with receiving a poor quality service from consulting engineers?
 1.....
 2.....
 3.....
 4.....
 5.....
 6.....
 7.....
 8.....
 9.....
 10.....

2.7 What methods of 'service delivery' do you receive from consulting engineers i.e. personal delivery, mail, etc.

2.8 What areas of the service you receive from consulting engineers do you regard as important?

APPENDIX A- (pilot questionnaire for contractors continued)

2.9 What areas of the service you receive from consulting engineers do you regard as being of lesser importance?

.....
.....
.....
.....

2.10 What general improvements can you suggest in the services that you receive from consulting engineers?

.....
.....
.....
.....

2.11 On a scale of 1 to 5, please indicate your level of satisfaction with the service as a whole that consulting engineers provide you with.

- Extremely satisfied 1
- Satisfied 2
- Adequate 3
- Dissatisfied 4
- Very dissatisfied 5

Email:

APPENDIX A - (continued)

PILOT QUESTIONNAIRE FOR CLIENTS

1 Need for Quality Service?

1.1 Describe what you believe to be understood by the term "Quality of Service" from consulting engineers.

.....
.....
.....
.....

1.2 Do you as service receiver feel there is a need for improvement in the level of Quality Service currently received from consulting engineers?

YES	UNSURE	NO

Please motivate your answer.

.....
.....
.....
.....

1.3 What percentage of your projects overrun and by how much? Could this be attributed to receiving a poor quality service?

PERCENT	
0-5	
5-10	
10-15	
15-20	
20-25	
> 25	

1.4 Do you believe that Quality Management Procedures and Techniques in consulting engineering companies are important in the delivery of a better service?

.....
.....
.....
.....

APPENDIX A- (pilot questionnaire for clients continued)

2 Client Demands and Delivery of Service

2.1 List in order of preference what wants, needs and quality characteristics you, as service receivers expect from the consulting engineering service.

- 1.....
- 2.....
- 3.....
- 4.....
- 5.....
- 6.....
- 7.....
- 8.....
- 9.....
- 10.....

Other?

.....

2.2 Do you believe that communication and feedback plays an essential role in receiving a better quality service from consulting engineers.

YES	UNSURE	NO

2.2.1 Do you ever inform consulting engineers to improve their services or have you ever felt it necessary to inform them?

.....

2.2.2 Do you believe that, given your level of satisfaction with our services, that your communication of your needs is sufficiently clear to warrant a quality service?

.....

2.3 Please circle a number from the scale to show how often you encounter the following.

Always	Often	Sometimes	Rarely	Never
--------	-------	-----------	--------	-------

APPENDIX A- (pilot questionnaire for clients continued)

- 2.3.1 Consulting engineers assess your level of satisfaction at project completion 1 2 3 4 5
- 2.3.2 Consulting Engineers assess your level of satisfaction, in a more formal manner, by means of questionnaires and interviews..... 1 2 3 4 5
- 2.3.3 Distribute surveys where you as client rank quality of their service in different categories..... 1 2 3 4 5
- 2.3.4 Informal oral enquiries..... 1 2 3 4 5

2.4 Do you believe that there is a lack of good resident engineering services, maybe because of experience, or of the 75/25 fee split? - after sales service.

.....

2.5 List in order of importance the costs which you believe are associated with receiving a poor quality service from consulting engineers?

- 1.....
- 2.....
- 3.....
- 4.....
- 5.....
- 6.....
- 7.....
- 8.....
- 9.....
- 10.....

2.6 What methods of 'service delivery' do you receive from consulting engineers i.e. personal delivery, mail, etc. Is delivery rather the process?

.....

2.7 What areas of the service you receive from consulting engineers do you regard as important?

.....

APPENDIX A- (pilot questionnaire for clients continued)

2.8 What areas of the service you receive from consulting engineers do you regard as being of lesser importance?

.....
.....
.....
.....

2.9 What general improvements can you suggest in the services that you receive from consulting engineers?

.....
.....
.....
.....

2.10 On a scale of 1 to 5, please indicate your level of satisfaction with the service as a whole that consulting engineers provide you with.

- Extremely satisfied 1
- Satisfied 2
- Adequate 3
- Dissatisfied 4
- Very dissatisfied 5

Email:

APPENDIX B

SERVQUAL Questionnaire e-mailed to Clients i.e. Traditional, Architects and Contractors

Note that where the word "client" appears, this was changed to "Architects" and "Contractors" for Architectural and Contracting clients respectively.

Sir

My Masters Thesis research is an effort to improve the level of 'quality service' we as consulting engineers provide to our clients. 'Client' refers to you as Architect. It is widely publicised that the ultimate measure of quality is a satisfied client and is thus important for us to know what shortfalls, if any, there exist. We need to recognize the variables that influence the clients rating of service provided, and manage them accordingly.

I would appreciate you taking the time to assist me in this the second stage of my research. It will only require 20 minutes of you time and in return you will receive an executive summary of my findings and recommendations upon successful submission of my research thesis.

I have chosen e-mail as my medium of questionnaire presentation. The questionnaire is below and requires of you to simply first 'reply to the addressee' to allow editing, and then enter the required numbers to the questions as instructed. NB: Remember to reply "WITH ORIGINAL MESSAGE" to enable you to edit the questions. If while editing the questions the format of the document changes in any way, don't attempt to fix - just continue. Should there be any problems, I could fax the questionnaire to you. I wish to assure you that the strictest confidentiality is ensured and that the information is used in statistical aggregate form only.

Thanking you for your time

Greg de Villiers

EXPECTATIONS OF SERVICE QUALITY

DIRECTIONS: This questionnaire is designed to determine your expectations regarding excellent quality of service from consulting engineering companies. Pick a number from the scale below and jot it down next to each statement, to show your level of agreement.

SCALE

- 1 = Strongly disagree
- 2 = Disagree
- 3 = Tend to disagree
- 4 = Neutral
- 5 = Tend to agree
- 6 = Agree
- 7 = Strongly Agree

APPENDIX B- (e-mailed SERVQUAL questionnaire for clients continued)

Your expectations of Service Quality.

1. Excellent consulting engineering companies will have modern looking equipment....
2. The physical facilities at excellent civil engineering companies will be visually appealing.....
3. Employees at excellent consulting engineering companies will be neat appearing.....
4. Materials associated with the service (such as pamphlets or statements) will be visually appealing in excellent consulting engineering companies....
5. When a client has an engineering need, excellent companies will show a sincere interest in providing innovative, optimum designs.....
6. Excellent consulting engineering companies will perform the service right the first time.....
7. Excellent consulting engineering companies will provide their services at the price they promised to do so.....
8. Excellent consulting engineering companies will insist on error free services.....
9. Employees in excellent consulting engineering companies will display consistence and fairness in decision making.....
10. Employees in excellent consulting engineering companies will give prompt service to clients.....
11. Employees in excellent consulting engineering companies will always be willing to help clients.....
12. Employees in excellent consulting engineering companies will never be too busy to respond to a client's requests....
13. The professional behaviour of employees in excellent consulting engineering companies will instill confidence in clients.....
14. The service provided by excellent consulting engineers will be that which they asked for.....
15. Resident engineering services from excellent consulting companies will display consistency, fairness and provide for quick resolutions to problems.....
16. When excellent consulting engineering companies promise to do something by a certain time, and within the budget allocation they will do so.....
17. Drawing quality must facilitate construction....
18. Clients of excellent consulting engineering companies will feel safe in their transactions and experience pro-active service provision.....
19. Contractual documentation at excellent consulting engineering companies will be practical, clear and short....
20. Employees in excellent consulting engineering companies will have the technical knowledge to answer clients' questions.....
21. Excellent consulting engineering companies will give clients individual attention.....
22. Excellent consulting engineering companies will have operating hours convenient to all their clients.....
23. Excellent consulting engineering companies will have employees that give clients personal attention, as well as having team playing abilities.....
24. Excellent consulting engineering companies will have the clients' best interests at heart.....
25. The employees of excellent consulting engineering companies will understand the specific needs of their clients.....

APPENDIX B- (e-mailed SERVQUAL questionnaire for clients continued)

PART II

Below are five features pertaining to consulting engineering companies and the services they offer. Please allocate a total of 100 points among the five features according to how important each feature is to you as architect - the more important the feature is likely to be to you, the more points you should allocate to it. Please ensure that the points you allocate to the five features add up to 100.

1. The appearance of the consulting engineering company's physical facilities, equipment, personnel, and communication materials....
2. The consulting engineering company's ability to perform the promised service dependably and accurately.....
3. The consulting engineering company's willingness to help clients and provide prompt service....
4. The knowledge and professionalism of the consulting engineering company, and their ability to convey trust and confidence from their service.....
5. The accommodating, individualised attention the consulting engineering company provides its clients.....

TOTAL SHOULD EQUAL 100 POINTS

Which one feature among the above five is likely to be most important to you as client?
(Please enter the features number only).....

Which feature is likely to be the second most important to you as client?.....

Which feature is likely to be the least important to you as client?.....

PERCEPTION OF SERVICE QUALITY

DIRECTIONS: This questionnaire is designed to determine what you perceive of the current service from consulting engineering companies.

Pick a number from the scale below and jot it down next to each statement, to show your level of agreement.

SCALE

- 1 = Strongly disagree
- 2 = Disagree
- 3 = Tend to disagree
- 4 = Neutral
- 5 = Tend to agree
- 6 = Agree
- 7 = Strongly agree

APPENDIX B- (e-mailed SERVQUAL questionnaire for clients continued)

The Consulting engineering companies we as architects use:

1. have modern looking equipment.....
2. have visually appealing physical facilities.....
3. have neat appearing and well dressed staff.....
4. have visually appealing statements, brochures and/or pamphlets.....
5. show a sincere interest in solving our engineering needs optimally with innovation....
6. perform the service right the first time....
7. provide services allowing us to remain within budget....
8. provide us with accurate error free services....
9. display consistency and fairness in decision making....
10. keep to their promised deadlines/prompt service.....
11. are always be willing to help us.....
12. are never too busy to respond to our requests.....
13. instill confidence in us by their behaviour.....
14. provide exactly what we asked for....
15. provide consistent, fair resident engineering services allowing quick resolution of problems....
16. provide the promised service on time and within budget....
17. provide us with drawing quality which facilitates construction.....
18. make us feel safe in their transactions and are pro-active in their approach.....
19. have practical, clear, short documentation.....
20. have the technical knowledge to answer our questions.....
21. give us individual attention.....
22. have operating hours convenient to us.....
23. have employees that give us personal attention and have team playing abilities.....
24. have our best interests at heart.....
25. employ staff who understand our specific needs.....

Do you want to receive a copy of the findings and recommendations? (yes, no).....

Thanking you for your time.

APPENDIX C

SERVQUAL Questionnaire e-mailed to Engineers

Sir

My Masters Thesis research is an effort to improve the level of 'quality service' we as consulting engineers provide to our clients. It is widely publicised that the ultimate measure of quality is a satisfied client and is thus important for us to know what shortfalls, if any, there exist. We need to recognize the variables that influence the clients rating of service provided, and manage them accordingly.

I would appreciate you taking the time to assist me in this the second stage of my research. It will only require 20 minutes of you time and in return you will receive an executive summary of my findings and recommendations upon successful submission of my research thesis.

I have chosen e-mail as my medium of questionnaire presentation. The questionnaire is below and requires of you to simply first 'reply to the addressee' to allow editing, and then enter the required numbers to the questions as instructed. NB: Remember to reply "WITH ORIGINAL MESSAGE" to enable you to edit the questions. If while editing the questions the format of the document changes in any way, don't attempt to fix - just continue. Should there be any problems, I could fax the questionnaire to you. I wish to assure you that the strictest confidentiality is ensured and that the information is used in statistical aggregate form only.

Thanking you for your time

Greg de Villiers

PART I - (25 questions)

YOUR PERCEPTION OF CLIENT EXPECTATIONS REGARDING 'SERVICE QUALITY'

DIRECTIONS: This questionnaire is designed to determine your perception of client expectations regarding excellent quality of service from consulting engineering companies. Pick a number from the scale below and type it next to each statement, to show your level of agreement. Tip: Write down the scale on a piece of paper to prevent having to 'page up and down' to recall the scale.

SCALE

- 1 = Strongly agree
- 2 = Agree
- 3 = Tend to agree
- 4 = Neutral
- 5 = Tend to disagree
- 6 = Disagree
- 7 = Strongly disagree

Your perceptions of client expectations. - Please enter the number after the statement

As consulting engineers we believe our clients expect that:

APPENDIX C- (e-mailed SERVQUAL questionnaire for engineers continued)

1. Excellent consulting engineering companies will have modern looking equipment....
2. The physical facilities at excellent civil engineering companies will be visually appealing.....
3. Employees at excellent consulting engineering companies will be neat appearing.....
4. Materials associated with the service (such as pamphlets or statements) will be visually appealing in excellent consulting engineering companies....
5. When a client has an engineering need, excellent companies will show a sincere interest in providing innovative, optimum designs.....
6. Excellent consulting engineering companies will perform the service right the first time.....
7. Excellent consulting engineering companies will provide their services at the price they promised to do so.....
8. Excellent consulting engineering companies will insist on error free services.....
9. Employees in excellent consulting engineering companies will display consistence and fairness in decision making.....
10. Employees in excellent consulting engineering companies will give prompt service to clients.....
11. Employees in excellent consulting engineering companies will always be willing to help clients.....
12. Employees in excellent consulting engineering companies will never be too busy to respond to a client's requests....
13. The professional behaviour of employees in excellent consulting engineering companies will instill confidence in clients.....
14. The service provided by excellent consulting engineers will be that which they asked for.....
15. Resident engineering services from excellent consulting companies will display consistency, fairness and provide for quick resolutions to problems.....
16. When excellent consulting engineering companies promise to do something by a certain time, and within the budget allocation they will do so.....
17. Drawing quality must facilitate construction....
18. Clients of excellent consulting engineering companies will feel safe in their transactions and experience pro-active service provision.....
19. Contractual documentation at excellent consulting engineering companies will be practical, clear and short....
20. Employees in excellent consulting engineering companies will have the technical knowledge to answer clients' questions.....
21. Excellent consulting engineering companies will give clients individual attention.....
22. Excellent consulting engineering companies will have operating hours convenient to all their clients.....
23. Excellent consulting engineering companies will have employees that give clients personal attention, as well as having team playing abilities.....
24. Excellent consulting engineering companies will have the clients' best interests at heart.....
25. The employees of excellent consulting engineering companies will understand the specific needs of their clients.....

APPENDIX C- (e-mailed SERVQUAL questionnaire for engineers continued)

PART II - (5 Questions)

Below are five features pertaining to consulting engineering companies and the services they offer. Please allocate a total of 100 points among the five features according to how important each feature is to your clients - the more important the feature is likely to be to your clients, the more points you should allocate to it. Please ensure that the points you allocate to the five features add up to 100.

1. The appearance of the consulting engineering company's physical facilities, equipment, personnel, and communication materials.....
2. The consulting engineering company's ability to perform the promised service dependably and accurately.....
3. The consulting engineering company's willingness to help clients and provide prompt service.....
4. The knowledge and professionalism of the consulting engineering company, and their ability to convey trust and confidence from their service.....
5. The accommodating, individualised attention the consulting engineering company provides its clients.....

TOTAL SHOULD EQUAL 100 POINTS

Which one feature among the above five is likely to be most important to your clients? (Please enter the features number only)....

Which feature is likely to be the second most important to your clients?.....

Which feature is likely to be the least important to your clients?.....

Do you want to receive a copy of the findings and recommendations? (yes, no)....
Thanking you for your time.

APPENDIX D

Brief statements describing the five dimensions of service quality

TANGIBLES

1. Having modern looking equipment
2. Having visually appealing equipment
3. Having neat appearing employees
4. Having visually appealing pamphlets and brochures.

RELIABILITY

5. Providing Innovative, optimum designs
6. Performing the service right the first time
7. Remaining within budgets
8. Providing error free services

RESPONSIVENESS

9. Providing honest, consistent decisions
10. Providing prompt services to clients
11. Being willing to always help clients
12. Always having time for their clients

ASSURANCE

13. Displaying professionalism
14. Providing exactly what the client needs
15. Courteous, quick resolutions to engineering problems on site (Resident engineering)
16. Providing timeous responses
17. Providing good drawing quality: clear, complete, clearly detailed and accurate
18. Building relationships that will instill confidence in clients
19. Providing documentation that is practical, clear and short.
20. Having the knowledge and technical adequacy required

EMPATHY

21. Providing clients with individual attention
22. Being available at reasonable working hours i.e. contactable
23. Displaying team playing abilities
24. Having the clients best interests at heart
25. Being less rigid (more flexible) in understanding the clients' specific needs

APPENDIX E

The table contains the number of client and engineer references to the statements defining each dimension during each interview. The differences are plotted as 'service indicator scores' on the graphs in section 5 of the thesis.

	Government		Architects		Contractors		Combined Clients	
	Engineers	Client	Engineers	Client	Engineers	Client	Engineers	Client
Tangibles	1	0	0	0	0	0	1	0
Statement 1	1	0	0	0	0	0		
Statement 2	0	0	0	0	0	0		
Statement 3	0	0	0	0	0	0		
Statement 4	0	0	0	0	0	0		
Reliability	5	16	3	7	2	0	16	22
Statement 5	0	4	3	5	0	0		
Statement 6	0	4	0	0	0	0		
Statement 7	5	8	0	2	2	0		
Statement 8	0	0	0	0	0	0		
Responsiveness	6	8	8	11	6	12	20	31
Statement 9	0	3	0	1	2	4		
Statement 10	6	5	3	6	4	8		
Statement 11	0	0	0	0	0	0		
Statement 12	0	0	5	4	0	0		
Assurance	11	7	3	18	14	20	28	45
Statement 13	2	5	0	4	0	2		
Statement 14	3	0	1	2	0	0		
Statement 15	0	0	0	0	0	4		
Statement 16	0	0	0	0	0	0		
Statement 17	1	1	0	5	8	3		
Statement 18	2	0	2	3	0	7		
Statement 19	0	1	0	0	5	4		
Statement 20	3	0	0	4	1	0		
Empathy	3	3	3	13	0	6	6	22
Statement 21	0	0	0	0	0	0		
Statement 22	0	0	2	7	0	6		
Statement 23	0	0	0	0	0	0		
Statement 24	3	3	0	0	0	0		
Statement 25	0	0	1	6	0	0		

APPENDIX F

The following is the first and last data captured from each client group, followed by the SERVQUAL scores as seen in section 7 of the thesis.

Architects		SERVQUAL Scores																								
		TANGIBLES					RELIABILITY					RESPONSIVENESS					ASSURANCE					EMPATHY				
No. of Respondents	Respondent No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
1	16	5	4	4	8	8	5	6	8	8	5	8	4	7	5	6	8	8	7	7	8	8	5	8	7	3
		7	7	4	7	8	5	5	4	8	5	5	5	4	5	4	4	8	4	4	8	6	5	5	4	4
		2	3	0	1	0	0	-1	-2	0	0	-1	1	-3	0	-2	-2	-1	-2	-2	0	0	0	-1	-3	1
		1.50					-0.75					0.00					-1.50									
		0.10					0.40					0.15					0.10									
		0.15					-0.30					0.00					-0.30									
		-0.106 Combined weighted score																								
16		4	4	4	3	8	8	6	8	7	7	5	4	4	8	8	8	8	7	7	5	7	5	7	7	8
		6	8	7	8	5	5	4	3	4	7	5	2	4	4	3	5	3	3	5	4	5	4	3	3	3
		2	2	3	3	-1	-1	-1	-2	-4	-3	2	1	-4	-2	-3	-3	-1	-4	-4	0	-3	0	-3	-4	-3
		2.50					-1.15					-1.00					-2.50									
		0.05					0.25					0.25					0.20									
		0.13					-0.31					-0.25					-0.50									
		-0.3175 Combined weighted score																								
		0.25					-0.25					-0.23					-1.18					-1.42				
		Overall Measure of service quality (unweighted servqual)																								
		-0.57																								
		Overall Measure of service quality (weighted servqual)																								
		-0.15																								
1	39	8	3	5	5	7	7	7	7	7	7	6	7	7	7	7	6	8	8	8	8	6	4	7	7	8
		8	7	4	8	8	8	8	8	7	7	6	3	4	5	6	5	4	4	3	6	8	3	5	5	8
		0	4	-1	1	-1	-1	-1	-1	0	0	0	-4	-3	-2	-1	-2	-2	-2	-3	0	0	-1	-2	-2	0
		1.00					-1.00					-1.00					-1.88									
		0.10					0.40					0.10					0.20									
		0.10					-0.40					-0.10					-0.38									
		-0.195 Combined weighted score																								
39		5	5	5	5	7	7	8	7	7	5	8	5	7	8	7	5	7	8	7	8	8	5	5	8	7
		4	4	5	5	8	8	8	7	7	5	7	5	8	7	8	6	6	7	8	8	8	5	5	7	8
		-1	-1	0	0	-1	-1	0	0	0	1	0	-1	0	0	1	-1	1	-1	0	0	0	0	0	0	0
		-0.50					-0.50					0.25					-0.13									
		0.10					0.50					0.10					0.20									
		-0.05					-0.25					0.03					-0.03									
		-0.06 Combined weighted score																								
		0.48					-1.03					-0.83					-0.83					-0.88				
		Overall Measure of service quality (unweighted servqual)																								
		-0.82																								
		Overall Measure of service quality (weighted servqual)																								
		-0.15																								
1	16	5	1	3	8	7	7	8	7	8	7	8	5	8	1	8	9	5	8	8	8	4	4	5	7	8
		5	1	5	8	6	4	4	3	3	4	5	5	5	4	4	3	4	4	5	8	5	4	5	8	8
		0	1	2	0	-1	-3	-2	-4	-3	-3	-1	0	-1	-2	-2	-3	-1	-1	-1	0	1	0	0	-1	-1
		0.75					-2.50					-1.75					-1.38									
		0.05					0.30					0.20					0.15									
		0.04					-0.75					-0.35					-0.41									
		-0.301 Combined weighted score																								
16		4	5	7	5	4	8	7	4	5	7	8	8	8	8	4	5	7	7	7	5	4	5	5	5	5
		5	8	8	6	4	4	4	4	4	3	3	8	4	4	4	6	6	6	8	8	5	5	4	4	4
		1	1	-1	1	0	-2	-3	0	-1	-4	-3	0	-2	-2	0	1	-1	-1	-1	1	1	0	-1	-1	-1
		0.50					-1.25					-2.00					-0.83									
		0.20					0.20					0.30					0.20									
		0.10					-0.25					-0.80					-0.13									
		-0.183 Combined weighted score																								
		0.75					-2.50					-1.75					-1.38					-0.20				
		Overall Measure of service quality (unweighted servqual)																								
		-1.02																								
		Overall Measure of service quality (weighted servqual)																								
		-0.30																								
1	45	8	8	8	7	8	7	8	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
		8	8	8	7	8	7	8	5	5	5	5	4	8	7	8	8	5	8	8	8	8	8	8	8	8
		1	3	2	2	1	2	1	0	0	1	1	-1	1	2	1	1	0	1	1	1	1	0	1	-1	1
		2.00					1.00					0.25					1.00									
		0.10					0.50					0.10					0.20									
		0.20					0.50					0.03					0.20									
		0.183 Combined weighted score																								
45		5	3	4	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
		8	8	8	8	7	8	5	3	5	6	8	7	8	7	7	8	5	8	8	5	8	4	8	8	8
		1	0	2	1	1	1	0	-2	0	1	1	2	1	1	2	1	0	1	1	0	1	-1	1	0	1
		1.75					0.25					1.00					1.00									
		0.20					0.20					0.20					0.10									
		0.35					0.05					0.30					0.20									
		0.188 Combined weighted score																								
		1.20					1.27					1.18					1.11					0.78				
		Overall Measure of service quality (unweighted servqual)																								
		1.10																								
		Overall Measure of service quality (weighted servqual)																								
		0.35																								