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AN EXPLORATORY STUDY IN SERVICE QUALITY AT SELECTED SOUTH AFRICAN VEHICLE DEALERSHIPS

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A research report submitted to the Faculty of Engineering and the Built Environment, University of the Witwatersrand, Johannesburg, in partial fulfilment of the requirements for the degree of Master of Science in Engineering.

Johannesburg, 2005

DECLARATION

I declare that this research project is my own, unaided work. It is being submitted for the Degree of Master of Science in Engineering in the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination in any other University.

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ABSTRACT

This research uses the SERVQUAL instrument developed by Parasuraman, Zeithaml and Berry to evaluate the level of service quality perceived by customers at selected vehicle service dealerships in the country.

In general, none of the dealerships' performance meets or exceeds the customers' expectation. The hypothesis of "customers view selected South African vehicle service dealerships as having equal levels of service quality" is not disproved. Findings of this research coincide with that of Cronin and Taylor; indicating that measuring perception scores has a higher internal consistency than measuring the difference between expectation and perception scores. In addition, respondents consider "reliability" as the most important aspect in service quality while dealerships perform the worst in this area. Finally, the discrepancy between customers' expectations and managements' perception on such expectations contribute partially to the overall service quality gap and further research should investigate the other gaps that broaden the overall service quality gap.

For my family,

Mom, Dad and Cecilia

ACKNOWLEDGEMENTS

I am especially grateful to Prof. D.R. Snaddon for suggesting this report and for his encouragement and guidance as my supervisor. Thanks are also due to Mr. P. Roberts for his ongoing support and useful discussion as my co-supervisor.

I wish to extend my gratitude to all the managers and experts I interviewed and for their interest in this project.

Many thanks must also go to Mr. J.S. Goulding and Mr. J.D. de Franca, who incessantly corrected my English.

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1 INTRODUCTION

In the past, vehicle service workshops primarily provided maintenance work to their customers; however, this no longer remains the only task if the service workshop wants to survive. A common response to the question of what distinguishes one service provider from another often revolves around the customers' view of quality. Good service providers are dedicated to satisfying their customers. Unlike manufacturing firms, where the quality of the products can be judged objectively by whether it meets a technical specification; service firms provide intangible services where its quality is perceived and valued by customers only.

Service quality is important to companies because customers' evaluations thereof are thought to determine the likelihood of repurchase, which ultimately affects a business's success. Without the support from customers, businesses cannot exist. Brown *et al*. (1994: p.33) states that "the single most researched area in service marketing to date is service quality". This dedication to customer service leads service providers to measure customer satisfaction and to use customer responses to guide service operations.

1.1 Research Objective

The primary objective of this research is to test the hypothesis below:

Customers view selected South African Vehicle Service Dealerships as having equal levels of service quality.

In addition to the primary objective, this research also intends to supplement the knowledge on service quality within the motor vehicle servicing sector in South Africa.

1.2 Approach

Marketing research procedures are followed. Objectives are decided after identifying characteristics that can influence the research and it is followed by the design of a suitable questionnaire that is used to collect data. Discussions and conclusions are based on the analyzed data. This research concludes with further recommendations.

1.3 Benefits of this Research

This research is intended to add to the evidence of a debate between Parasuraman, Zeithaml & Berry (PZB hereafter) and Cronin & Taylor. The former suggest that service quality is a measure of the difference between customers' expectations and perceptions. The latter suggest that only the perception is important when measuring the level of service quality.

In addition, this research provides information to the service providers concerning customers' perceptions and expectations to a new inventory system. The implementation of the new system aims to increase the level of service quality as perceived by customers.

1.4 Limitations of this Research

A major limitation of this research is that the sample of respondents all own vehicles belonging to a single manufacturer. In addition, respondents tend to belong to the middle to upper income group, which is not a true reflection of the South African population.

1.5 Outline of the Report

Chapter 1 outlines the main objective, approaches, benefits and limitations of this research, followed by the structure of this report.

Chapter 2 begins with discussions on what customers think about services, followed by an outline of the advantages of good service quality. The origin of service quality, the differences in quality between the manufacturing and the service environment, and various definitions of service quality and satisfaction are also included in this chapter. A range of literature related to the field of service quality is examined and the relevant information is presented. This chapter concludes with a presentation of the conceptual model used in this research as a reference.

Chapter 3 has details on the current motor industry, with emphasis on the after-sale service sector within the industry. These include a discussion of the operations of the dealerships and current techniques of managing service quality. This leads to the formulation of the hypothesis of this research.

Chapter 4 outlines the approaches followed during the research. These include an explanation of the selection of the population, methodology of data collection and descriptions of statistical techniques used to analyse the results.

Chapter 5 presents the results obtained from the study. The raw data are presented first, followed by an analysis of these results and findings from the statistical analysis.

Chapter 6 is a discussion on the results presented in chapter 5.

Chapter 7 outlines the conclusions and further recommendations for this study. Conclusions are made based on the findings of this research and recommendations are suggested for further investigation.

The next section presents relevant literature in the field of service quality.

2 SERVICE QUALITY

The literature review begins with a brief introduction to the origin of service quality, followed by some definitions for the phrase “service quality” and a discussion of the different measurement instruments commonly used to measure service quality. This section concludes with a description of the model chosen for this research.

2.1 Origin of Service Quality

In the early 1950s, Deming, Juran and Feigenbaum emphasized the importance of quality in manufacturing. Others like Crosby and Garvin contributed to the understanding of quality; their works contained several quantitative and statistical techniques, concentrating on quality philosophy, particularly relating to management (Bicheno, 1994: pp.5-15). Early approaches to defining quality were based on the notion of “conformance to specification”, or the degree to which goods met predetermined standards was the measure of quality (Juran, 1951: pp.44-46).

Judd (1964: p.59) defines market service as “a market transaction by an enterprise or an entrepreneur where the object thereof is that other than the transfer of ownership (or title, if any) of a tangible commodity.” He is one of the first to distinguish between goods and services but little was written on service quality until the 1970s. In the late 1970s, quality in tangible goods was described and measured by marketers but quality in services was largely undefined and un-researched. Shostack brought service marketing into prominence as a discipline and stated “it is wrong to imply that services are just like products except for ‘intangibility’. By such logic, apples are just like oranges, except for their ‘appleness’.” (1977: p.73). This paved the way for further research into service and service quality.

Zeithaml *et al*. (1990: p.15) state that most of the literatures on quality are devoted to goods and, as a result, there is much less knowledge on service quality. This

predominance stems from the ways in which services differ from goods by how they are produced, consumed and evaluated. These differences are intangibility, heterogeneity, inseparability and perishability (Parasuraman *et al*., 1985: p.42) (Zeithaml *et al*., 1985: p.34). These differences are as follows:

- intangibility – services are performances rather than objects, therefore they cannot be counted, measured, inventoried, tested, or verified in advance of their sale to assure quality (Parasuraman *et al*., 1985: p.42), (Chase, 1978: pp.137-138), (Carman and Langeard, 1980: p.8), (Gronroos, 1978: p.591);
- heterogeneity – service performance often varies from producer to producer, from customer to customer and from day to day (Parasuraman *et al*., 1985: p.42);
- inseparability – production and consumption of many services are inseparable. The consumer is usually involved during the delivery of services (Parasuraman *et al*., 1985: p.42), (Carman and Langeard, 1980: p.8), (Gronroos, 1978: p.591); and
- perishability – services are performances, they cannot be stored for future use (Zeithaml *et al*., 1985: p.34).

With differences between goods and services established, Parasuraman *et al.* (1985: p.42) state that "knowledge about goods quality, however, is insufficient to understand service quality". A definition of service quality is given next.

2.2 Definition of Service Quality

"Service quality" is defined differently by various authors. Lewis and Booms' definition of service quality focuses on meeting customers' needs, requirements and how well the service delivered meets customers' expectations (1983: pp.99-100).

Gronoos (1984: p.37) states that the perceived quality of service is dependent on the comparison of expected service with perceived service, it is thus the outcome of a comparative evaluation process.

Parasuraman *et al*. (1985: p.46) define service quality as “a function of the magnitude and direction of the gap between expected service and perceived service”. They further conceptualize perceived service quality as “a global judgment or attitude, relating to the superiority of the service” (1988: p.16).

Lewis (1989: p.6) defines service quality as how well the service delivered matches the customer’s expectations.

The above authors are not the first group of researchers to adopt comparative definitions to define service quality – Howard and Sheth (1969: p.145) and Oliver (1981: p.27) defined service quality in a similar manner.

In more recent years, notions such as “providing better service than the customer expects” (Lewis, 1989: p.6) and “the consumer perceives service in their own unique, idiosyncratic, end-of-the-day, emotional, irrational and totally human terms…there is no such thing as fact or reality. There is only what the customer thinks is reality” (1989: p.7) have been advocated. Other authors agree with this notion and state that “the only criteria that count in evaluating service quality are defined by the customer” (Zeithaml *et al*., 1990: p.16).

Although wordings for these definitions are different, they all revolve around the theme of comparing the services delivered to what the customers expect. Some authors debate on the definition of service quality as “stem[ming] from a comparison of expectations with performance perceptions”. They argue that service quality is derived from perceptions of performance alone (Cronin and Taylor, 1992: p.60).

With different authors’ definitions on service quality, this research uses the earlier concept which states that service quality is a comparison between customers’ expectation and the services delivered. More precisely, this research uses the definition that is stated unambiguously in Parasuraman *et al*. (1988: p.17) that “service quality is viewed as the degree and direction of discrepancy between consumers’ perception and expectation”.

To use this definition, the terms ‘expectations’ and ‘perceptions’ must be understood first and they are discussed in the next section.

2.3 Expectations and Perceptions

For a better understanding of the definition of service quality, the terms expectations and perceptions are discussed in this section.

2.3.1 Expectations

In service quality, expectations are important and the management of expectations is an important aspect in the delivery of service quality (Carman, 1990: pp.46-48).

PZB define expectations as “desires or wants of customers, i.e., what they feel a service provider should offer rather than would offer” (Parasuraman *et al*., 1988: p.16). Other researchers have different views when defining expectations. For example, Teas (1993a: p.18) argues that the above definition is vague and believes that customers might be using one of the following six interpretations when asked about expectations (1993b: pp.33-54):

- Service attributes importance;
- Forecast performance;
- Ideal performance;
- Deserved performance;
- Equitable performance; or
- Minimum tolerable performance.

Parasuraman *et al.* (1991: p.422; 1994a: pp.111-116) responded to their claims by redefining expectations as what customers feel a service provider “would” offer, rather than what they “should” offer, and the latter is a measure of the normative expectation.

More recently, PZB have elaborated on expectations, distinguishing desired from minimum expectations. Minimum service level expectations are described as the lowest level of service that a customer would consider adequate. Between the desired and minimum levels of expectations is the zone of tolerance (1994b: pp.201-230).

With the different definitions suggested by various authors, the original interpretation of expectations with respect to service quality is used in this report. This research views expectation as “the desires and wants of customers”, which is understood as what customers feel a service provider would offer rather than should offer.

With the definitions of expectation presented, one must also consider factors that may influence the customers’ expectations. PZB indicate that there are four factors that may influence customers’ expectations: word of mouth communication, personal needs, past experience and external communications (Zeithaml *et al*., 1990: pp.19-20). These factors are shown graphically in figure 2.1.

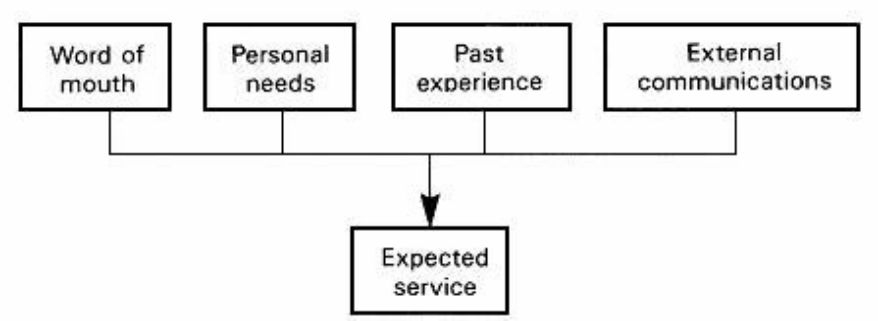


Figure 2.1 Factors influencing customers' expectations

2.3.2 Perceptions

The definition of perceptions is not under much debate. It is accepted as customers' views on "performance of the firm when providing the services" (Parasuraman *et al.,* 1988: p.16) and this is the meaning that is used in this research.

This research measures service quality by the difference between expectations and perceptions. Boulding *et al*. (1993: pp.7-26) demonstrate that customers update their expectations and perceptions during the service encounter. Therefore, a customer's present expectations affect the perception of service quality and the service quality judgement.

Parasuraman *et al*. (1988: pp.12-40) developed an instrument called SERVQUAL, which lays the foundation for the measurement of service quality. This instrument is designed to measure customer expectations and perceptions concerning a service encounter, and it has been developed following the generally recommended psychometric procedures (Brown *et al*., 1993: p.129).

With service quality defined, some criteria that are viewed as important to customers are discussed next.

2.4 Dimensions of Service Quality

Zeithaml *et al*. (1990: p.20) identify dimensions that are important to customers when evaluating service qualities. These dimensions are identified during a series of in depth interviews as well as focused group discussions with firms in four different service industries – one of them relates to repair and maintenance. These dimensions are (Parasuraman *et al.,* 1985: p.47):

Tangible:	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.
Competence:	Possession of the skills and knowledge required to perform the service.
Courtesy:	Politeness, respect, consideration and friendliness of contact personnel.
Credibility:	Trustworthiness, believability and honesty of the service provider.
Security:	Freedom form danger, risk or doubt.
Access:	Approachability and ease of contact.
Communication:	Keeping customers informed in language they can understand and listening to them.
Understanding the customer:	Making the effort to know customers and their needs.

Customers' expectation of these dimensions may be affected by the factors mentioned in section 2.3.1. These factors are: word of mouth communication, personal needs of the customer, past experience and external communications from the service provider. These can be related to the dimensions in a schematic representation in figure 2.2 called "The Customer Assessment of Service Quality" (Zeithaml *et al*., 1990: p.23).

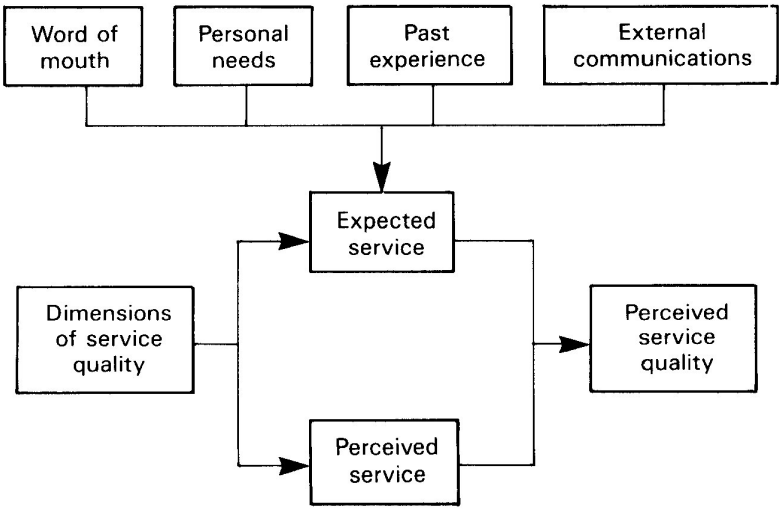


Figure 2.2 Customer assessment of service quality

Due to the overlap found between dimensions during further analysis (Parasuraman *et al.,* 1988: pp.20-21), these components are subsequently collapsed into five dimensions: reliability, assurance, tangibles, empathy and responsiveness. Reliability, tangibles and responsiveness remain distinct but the remaining seven components collapsed into two aggregate dimensions – assurance and empathy.

The definitions for the two new dimensions and the original three dimensions are listed below (Zeithaml *et al*., 1990: p.26):

1. Tangibles – refers to the establishment's physical facilities, equipment and appearance of personnel.

2. Reliability - refers to the organisations' ability to perform the promised service dependably and accurately.

3. Responsiveness - refers to the willingness of service providers to help customers and provide prompt service.

4. Assurance - relates to the knowledge and courtesy of employees and their ability to convey trust and confidence.

5. Empathy - refers to the caring, individualized attention the firm provides to its customers.

PZB claim that these five dimensions are applicable across "a broad spectrum of service industries" when measuring the level of service qualities (Parasuraman *et al*., 1988: p.30). The number of dimensions across different industries has been questioned by a number of authors. Carman (1990: pp.36-41) found six dimensions in tyre service industry; seven dimensions in the business school placement centre and five dimensions in dental services; whereas Bouman and van der Wiele (1992: pp.4-16) found three dimensions in car servicing.

Although PZB originally stated that their scale had been designed to be applicable across a broad spectrum of services (Parasuraman *et al*., 1988: pp.30-31), they acknowledged that it could be used as a 'skeleton' which could then be adapted to suit new contexts. Repair and maintenance is one of the four industries from which the five dimensions were developed. For these reasons, PZB's five dimensions are used in this study.

Subsequent to PZB's focused group studies, they have also conducted a series of face to face interviews with executives and managers of various companies in the USA. Once again, some of these managers belong to the repair and maintenance industry (Zeithaml *et al*., 1990: pp.35-36). During these interviews, PZB discovered four major gaps pertaining to executives' assessments of service quality within their companies. Existences of these four gaps result in customers not receiving the services that they have expected (Gap 5). These gaps are discussed in the next section.

2.5 The Gap Model

Parasuraman *et al*. (1985: pp.41-50) devise the Gap model of service quality which is an extension of the model shown in figure 2.2. The basic idea behind the model is that customers' perception of service quality is affected by four gaps which occur on the service provider's side. Therefore, marketing and operations managers should focus on these critical gaps in order to control gap 5 (overall service quality gap) which is the focal point of the model. These gaps are (Zeithaml *et al*., 1990: p.46):

Gap 1: The discrepancy between customers' expectations and managements' perceptions of these expectations;

Gap 2: The discrepancy between managements' perceptions of customers' expectations and service-quality specifications;

Gap 3: The discrepancy between service-quality specifications and actual service delivery;

Gap 4: The discrepancy between actual service delivery and what is communicated to customers about it;

Gap 5: The discrepancy between customers' expected services and service delivered.

These gaps are presented in a graphical form in figure 2.3. It is clearly shown that there are various people within the organization that may affect the services provided to the customers. Thus the fluctuation on the outcome of the level of service quality is not simply a variation due to customers, but also affected by the individuals that are involved in providing the services. Therefore, it is important to understand the factors that lead these gaps. Each of the four gaps is discussed separately in the following sections.

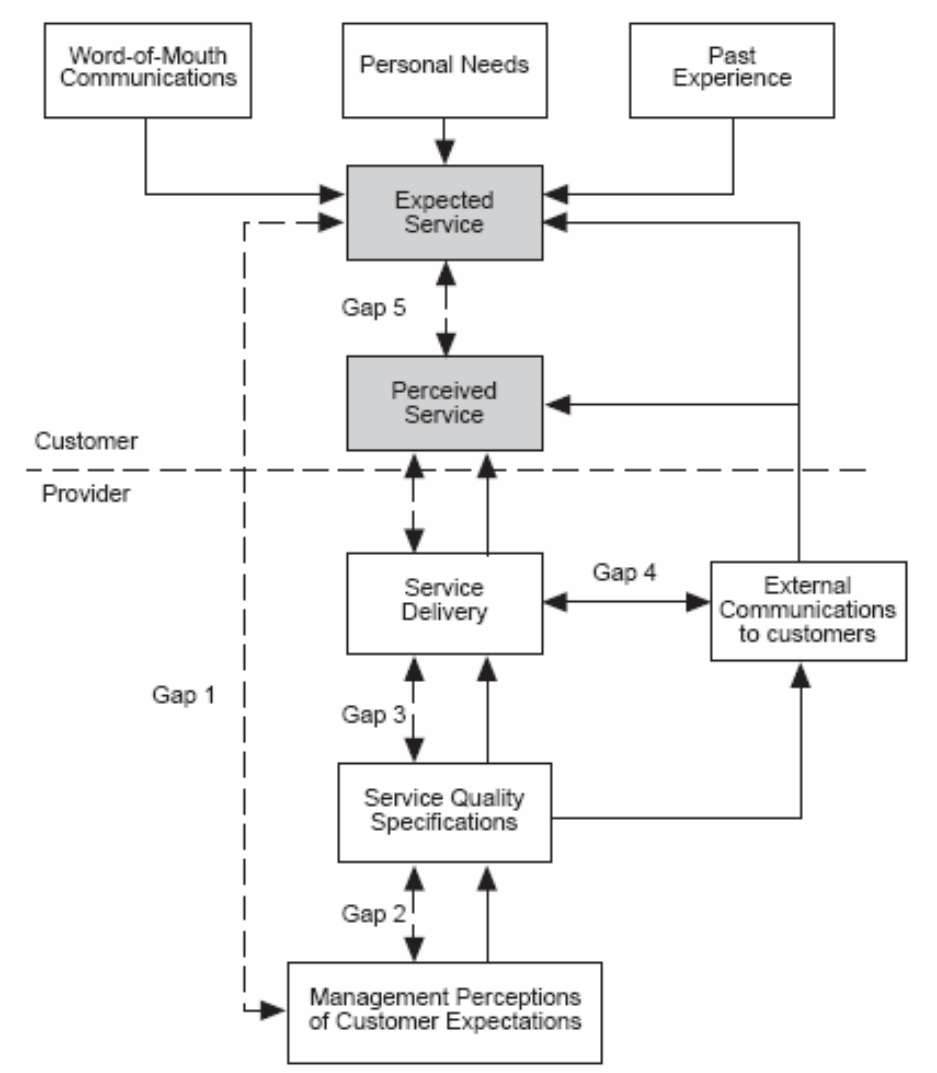


Figure 2.3 PZB's conceptual model of service quality

2.5.1 Gap 1: Customer' Expectations - Managers' Perceptions of These Expectations

Managers' perceptions of customers' expectations may differ from actual needs and wants of the customers. Knowing what customers expect is the first step in delivering quality service. Being wrong about what customers want can mean losing customers' business. Factors that contribute to this gap include insufficient marketing research of

customers' expectations, inadequate usage of marketing research findings and a lack of communication between customers and management and between management and contact employees.

PZB recommend the following actions in order to close this gap. Zeithaml *et al*. (1990: pp.54-66):

- companies should carry out marketing research and managers must learn to turn research information and insights into action;
- managers should spend time on the line, interacting with customers and experiencing service delivery;
- improving upward communication from contact personnel to management; and
- eliminating levels of management allows managers to be closer to the customers and better understand their needs and expectations.

Zeithaml *et al*. (1990: p.67) attempt to measure gap 1 by applying the SERVQUAL instrument to customers and managers. The bigger the difference between the scores, the bigger is the gap.

2.5.2 Gap 2: The Wrong Service Quality Specifications

Although management is fully aware of customers' expectations, they are unwilling to deliver service. Inadequate commitment to service quality, a lack of perception of feasibility, inadequate task standardization and an absence of goal setting may cause this gap.

Zeithaml *et al*. (1990: pp.74-86) suggest the following solutions to reduce the size of gap 2:

Management should:

- increase commitment to service quality and they should constantly and visibly express their commitments to the employees;
- be open to innovation, being receptive to different and possibly better ways of doing business;
- standardize routine transactions; and finally
- set appropriate service quality goals that are challenging but realistic.

2.5.3 Gap 3: The Service Performance Gap

This gap is caused by a discrepancy between service quality specifications and actual service delivery. In this case, it is simply that employees are unable to or unwilling to perform what is required of them. High level of service quality does not only depend on recognizing customer's desires and establishing standards, it also depends on the employees' willingness and ability to perform at a specific level.

Zeithaml *et al*. (1990: pp.92 – 93) have identified seven key conceptual factors that may contribute to gap 3. These are:

- role ambiguity;
- role conflict;
- poor employee job fit;
- poor technology job fit;
- inappropriate supervisory control system;
- lack of perceived control on the part of employees; and
- lack of teamwork.

To reduce this gap, employees need specific and frequent communication from supervisors and managers about what they are expected to do. In addition, employees need to know how well they are performing compared to the standards and expectations that management sets for them. Finally, employees need to feel confident

and competent in their jobs, this is done by training them in the skills needed to satisfy customers (Zeithaml *et al*., 1990: pp.94 – 109).

2.5.4 Gap 4: The Discrepancy between Actual Service Delivery and What is Communicated to the Customers

The fourth gap arises when promises do not match delivery e.g. the company is not able to provide what was advertised. Two key conceptual factors have been identified and these might contribute to gap 4 (Zeithaml *et al*., 1990: pp.117 and 123):

- inadequate horizontal communication: among operation, marketing and human resources; and
- propensity to over promise in communication.

These problems can be counteracted by opening channels of communication between human resources, marketing and operations. In addition, companies must develop appropriate and effective communications with their customers (Zeithaml *et al*., 1990: pp.118–128).

These four gaps are the major contributors to the overall service quality gap that customers may perceive. The fifth gap is the basis of a customer-oriented definition of service quality: the discrepancy between customers' expectations and their perceptions of service delivered. This discrepancy is the conceptual basis for the SERVQUAL instrument. Gap 5 is the theme of this research as this study intends to investigate the level of service quality between various vehicle dealerships in South Africa.

The existence of any of these four gaps will impact negatively on the level of service quality. The next section outlines some benefits arising from superior service quality.

2.6 Benefits of Good Service Quality

There are several benefits of good service quality. Berry *et al*. (1989: pp.6-14) indicate that good service quality attracts new customers and leads to customer loyalty, positive word of mouth, employee satisfaction and commitment, enhanced corporate image, reduced costs and increased business performance. Customer loyalty implies that customers are more likely to repurchase than others, and the organisation can safely charge a higher price than its competitors as loyal customers value their relationship with the organization. In addition, the initial costs of attracting and establishing these customers have already been absorbed, and together with the increased revenue, it may lead to increased profitability (Heskett *et al*., 1994: p.165), (Zeithaml *et al*., 1996: pp.32-33), (Rust and Zahorik, 1993: p.212).

Service quality is closely linked to profits, costs and market share in many industries (Lovelock, 1996: p.562). Organisations with a history of good service quality develop a reputation, which is different to other corporate assets in that it is developed an earned over time. This makes the organisation's competitive advantage more sustainable (Rapert and Wren, 1998: p.231). These arguments have recently received empirical evidence. Hendricks and Singhal (2001: p.360) indicate that firms with effective implementation of Total Quality Management (TQM) programmes outperform others by 38% to 46%.

With service quality defined and benefits to the service providers established, the next section details how service quality is measured in organizations.

2.7 Measurement of Service Quality

To deliver and maintain quality service, service providers must be capable of measuring the quality of services that are delivered to their customers. Brown *et al*. (1993: p.127) state that a prime concern for management is service quality and they suggest that, if this is the case, service providers must have the means to measure it.

Parasuraman *et al.* (1985: p.42) suggest three underlying themes after reviewing previous writings on service quality:

- service quality is more difficult for the consumer to evaluate than goods quality;
- service quality perceptions result from a comparison of consumer expectations with the actual service performance; and
- quality evaluations are not made solely on the outcome of service – they also involve evaluations of the process of service delivery.

This section investigates different models available for measuring service quality. These models are discussed briefly and their strengths and weaknesses are highlighted. A conclusion is drawn as to which instrument is suitable for this research. Before discussing any of the measurement tools, the term "disconfirmation" is defined, as it plays an important role in the measurement of service quality.

2.7.1 Disconfirmation Theory

The term "disconfirmation theory" is frequently mentioned in service quality literature, especially when it comes to the formulation of measurement instruments. Disconfirmation arises from discrepancies between prior expectations and perceived performance, therefore, three possibilities may arise (Oliver, 1980: pp.460-461; 1981: p.35), (Churchill and Surprenant, 1982: pp.491-492), (Oliver and De-Sarbo, 1988: p.495):

- zero disconfirmation occurs when a product performs as expected;
- positive disconfirmation occurs when the product performs better than expected; and
- negative disconfirmation occurs when the product performs below expectations and dissatisfaction sets in.

PZB base service quality on the difference between customers' expectations and perceived performances (Parasuraman *et al.*, 1988: pp.38-40). In other words, service

quality is seen as the differences between what customers expect and their perception of the performance of a particular service provider.

The measurement of expectations and perceptions has come under significant debate. Cronin and Taylor (1992: pp.55-66), Brown *et al.* (1993: p.128-139) and Teas (1993b: pp.18-31) have questioned the underlying disconfirmation paradigm which conceptualizes service quality as the difference between customer perceptions and expectations. The former two researchers have developed instruments to measure service quality based solely on customer perceptions, as they believed that there are shortfalls regarding the disconfirmation technique, which are listed below.

- Brown *et al*. (1993: pp.127-139) argued that the calculation of a difference score could lead to several problems; therefore, a non-difference score measure would be more desirable. In addition, "the expected or desired level of service is almost always higher than the perceived level of actual service" (1993: p.131).
- When both the expectations and perceptions are measured, the questionnaire would effectively be twice as long (Cronin and Taylor, 1994: p.126).

However, Parasuraman *et al.* (1993: pp.145-146) state that a perceptions rating alone may not lead to the same practical implications as the 'expectations and perceptions' score. They argue that the 'expectations and perceptions' scoring method allow providers to understand better whether higher expectations or lower perceptions might be responsible for declining service quality assessment over time.

In addition, the collective conceptual and empirical evidence neither demonstrates superiority for the non-difference score format nor warrants abandoning the difference-score format as Brown *et al*. (1993: pp.137-139) might imply (Parasuraman *et al.* 1993: pp.147).

With the strengths and weaknesses of the disconfirmation theory discussed, some of the models used to measure service quality are introduced briefly in the next section.

2.7.2 Different Models for the Measurement of Service Quality

In the absence of adequate measurement instruments, Jacoby (1978: p.91) wrote: "most of our measures are only measures because someone says that they are, not because they have been shown to satisfy standard measurement criteria". Some of the service quality measurement instruments are discussed in this section.

SERVQUAL

To satisfy the need of such a measurement model, Parasuraman, Zeithaml and Berry developed an instrument called SERVQUAL in 1988 (Parasuraman *et al*., 1988: pp.17-36). The model is refined and improved in 1991 (Parasuraman *et al.*, 1991: pp.420-450).

SERVQUAL is a rating scale which contains 22 pairs of Likert scales statements. The respondent is asked to rate his/her expectations and perceptions of performance on a seven-point scale ranging from 1 (strongly disagree) to 7 (strongly agree). The first 22 items are designed to measure customer expectations of service for a particular service industry, while the remaining 22 are intended to measure the perceived level of service provided by a particular service organization. Service quality is then measured by calculating the difference in scores between the corresponding items (i.e. "perceptions" minus "expectations"). Positive scores show that perceived service exceeds expected service and vice versa. A zero score implies that performance meets expectation.

A revised version of the instrument (Parasuraman *et al.,* 1991: p.424) includes a third section that measures the relative importance of the five dimensions to the customer. These scores are then used to weigh the perceived service quality measure for each dimension, the main purpose being to give a more accurate overall perceived service quality score.

The Bouman and van der Wiele Model (B&W model)

Bouman and van der Wiele (1992: pp.4-16) developed an instrument to measure the level of service quality in the motor industry in the Netherlands. Their model is based on the disconfirmation theory where the individual compares his or her experience with some set of expectations.

Their instrument consists of 40 items; each item has two 7 point Likert scales (on both sides of each item). One scale is for the respondents to enter their expectation scores and the other one for their perception scores. Their model measures service quality using three factors (p.10):

- customer kindness;
- tangibles; and
- faith.

Bouman and van der Wiele's research did not find the same dimensions as the SERVQUAL instrument. They suggested that a possible reason for the deviating dimensions is given by the far less rigorous analyses done in their research (p.13).

SERVPERF

Other than the disconfirmation based approaches, Cronin and Taylor (1992: pp.56-66) introduced SERVPERF which measures service quality using a performance based approach. They argue that current performance best reflects a customer's perception of service quality and that expectations are not part of this concept. They criticise the appropriateness of the use of disconfirmation and hence question the feasibility of PZB's approach to measurement (1994: p.126). In the SERVPERF instrument, only the perception section is measured (it is essentially the second half of the SERVQUAL instrument).

Customer Satisfaction Index (CSI)

Customer satisfaction index is an instrument consisting of a number of items related to the service provided by the organisation; the customers are required to rate[1] each of the items according to their encounter with the services provided (perceptions only).

The number and the type of questions may vary between organisations. Each of them is pre-weighted by the organisation instead of the customers. One debate is whether customer satisfaction leads to service quality. Parasuraman *et al*. (1988: p.16) define the differences between service quality and satisfaction as follows: "… perceived service quality is a global judgement, or attitude, relating to the superiority of the service, whereas satisfaction is related to a specific transaction". Other researchers support the argument that customer satisfaction leads to service quality. For example, Bitner (1990: pp.70-79) develop a model of service encounter evaluation and empirically support the effect of satisfaction on service quality.

After discussions of these models, the next section deals with the selection of the model used in this research.

2.7.3 Selection of a Measurement Instrument

Models discussed in the previous section can be divided into two main categories. Namely, disconfirmation model (SERVQUAL and B&W model) and the non-disconfirmation model (SERVPERF and CSI). Researchers over the past decade have highlighted some of the weaknesses and difficulties associated with the use of disconfirmation theory and these are mentioned in section 2.7.1; however, it remains one of the widely recognized methods of measuring service quality.

By knowing customers' expectations, researchers can discover greater useful information (Parasuraman *et al*., 1994a: p.116). They suggest that a high perception

[1] Customers usually have to rate the items from "poor" to "excellent"

score may not be high enough and could lead to an inaccurate assessment of perceived service quality. In addition, by measuring both expectations and perceptions provides the organization with a better diagnosis of the service quality problems. This is demonstrated by the following example.

In Parasuraman *et al*. (1993: p.146), the average scores of their study is as follows:

Table 2.1 Comparison of Perception Scores and Gap Scores

Dimension	Expectation Scores	Perception Scores	Gap Score
		SERVPERF	SERVQUAL
Tangibles	5.3	5.3	0.0
Reliability	6.4	4.8	-1.6
Responsiveness	6.4	5.1	-1.3
Assurance	6.4	5.4	-1.0
Empathy	6.2	5.1	-1.1

Without further investigation, perception scores suggest that management should place the same emphasis on improving responsiveness and empathy; moreover, management should place more emphasis on tangibles than assurance since the tangibles score is lower than the assurance score. This is certainly not the case when the Gap scores are considered. The above example demonstrates the usefulness of the SERVQUAL instrument and the necessity of the measurement of both expectation and perception.

Some of the recent publications involving the SERVQUAL and SERVPERF instrument are included in table 2.2.

Table 2.2 Example of SERVQUAL model adapted to different contexts

Studies	Industry	Number of dimensions	Modification on SERVQUAL	Cronbach Alpha for the study	Dimensional scores	External factors affecting the study
Carman (1990: pp.33-55)	Tyre retailing	6	Questionnaire consists of 21 items, measures perceptions only (SERVPERF)	0.51 - 0.84	N/A	-
	Business school placement centre	7	Questionnaire consists of 32 items	0.52 - 0.85	N/A	-
	Acute care hospital	9	Questionnaire consists of 30 items, measures perceptions only (SERVPERF)	0.61 - 0.94	N/A	-
	Dental services	5	Questionnaire consists of 16 items, measures perceptions only (SERVPERF)	0.55 - 0.87	N/A	-
Bouman and van der Wiele (1992: pp.4-16)	Car servicing	5	Questionnaire consists of 48 items	0.62 - 0.80	N/A	-
Lee and Hing (1995: pp.293-310)	Restaurants	5	-	N/A	Negative scores in all dimensions	Restaurants involved in the study have different culture
Youssef, Nel and Bovaird (1996: pp.15-28)	Health sector	5	Using a 9 points Likert scale	N/A	Negative scores in all dimensions	-
Tribe and Snaith (1998: pp.25-34)	Holiday resorts	-	56 items on a 5 points Likert scale, items not grouped in specific dimension	N/A	N/A	-
van Iwaarden *et al.* (2003: pp.919-935)	Internet web sites	5	Measure importance and satisfaction on a 5 points Likert scale	N/A	N/A	The sample frame consists of students only
Khan (2003: pp.109-124)	Tourism	6	29 items across 6 dimensions	0.86 - 0.98	N/A	-
Brokenshire (2003)	Banking	5	27 items on a 5 points Likert scale	N/A	Negative scores in all dimensions	-
Gilbert and Wong (2003: pp.519-532)	Airline	7	26 items on a 8 points Likert scale covering 7 dimensions	N/A	N/A	-
Cui *et al.* (2003: pp.191-201)	Banking	5	-	N/A	N/A	Snowball sampling method was used to collect data

Table 2.2 shows some of the recent studies involving the SERVQUAL and SERVPERF instrument. In addition, number of dimensions used, modifications to the original model at various studies, internal consistency and factors that influence the particular study are also included where applicable.

These studies show that the SERVQUAL and the SREVPERF model has been wildly used and tested by academics in different industries worldwide. Results obtained in this study are compared to those presented in table 2.2 which forms a basis to the discussion of this research.

The selection criteria for the model used in this study is summarized in table 2.3.

Table 2.3 Comparison of different measurement instruments

		Different instruments developed to measure service quality and appropriate for the motor industry			
		SERVQUAL	B&W	SERVPERF	CSI
Criteria used to evaluate instrument	Disconfirmation used	✔	✔		
	Widely used and tested	✔		✔	
	Suitable length	✔		✔	✔
	5 service quality dimensions	✔		✔	

In conclusion, despite the concerns raised by previous researchers, the SERVQUAL instrument is used for the measurement of service quality in this work. This is partly due to the following reasons:

- the volume of published material on SERVQUAL allows a better understanding of the method and potential problems,

- past research has provided strong support conceptually and empirically for service quality to be measured as the discrepancy between expectation and perception (e.g. Bolton and Drew, 1991: pp.1-8), and
- SERVQUAL can provide greater diagnosis on service quality.

More importantly, SERVPERF is essentially a subset of SERVQUAL. Therefore, results from both of the instruments can be analysed. This study intends to add to the knowledge of the debate between PZB and Cronin & Taylor on the use of disconfirmation theory. Further information regarding the SERVQUAL instrument is included in Appendix A.

Although the SERVQUAL instrument is widely used for measuring service quality, the internal consistency of the instrument is under significant debate. There is a difference of opinion over what is the true (i.e. valid) measure of service quality[2]. Research needs to be undertaken on this, maybe by tying the service quality measure to a more overall goal, e.g. profit (as discussed in section 2.6). However, this is beyond the scope of this research.

The following chapter outlines the trading environment of the motor industry in South Africa and the service quality within this sector.

[2] Is service quality the customers' perceptions (Cronin & Taylor's approach) or is it the difference between the customers' perceptions and expectations (PZB's approach)?

3 SA MOTOR INDUSTRY AND SERVICE QUALITY

This chapter describes the South African automotive industry, followed by a discussion of the vehicle service procedures and current approaches of managing service quality at service dealerships. The chapter concludes with the research hypothesis.

3.1 Background of the South African Motor Industry

The South African motor industry has developed considerably during the past 50 years. The industry has evolved from initially importing vehicles into an increasingly self-sufficient industry of vehicle manufacture, distribution, servicing and maintenance. During 2002, this industry contributed about 6.4 percent towards South Africa's R1098.7 billion gross domestic product (NAAMSA, 2003: p.18).

Due to the changes in the motor industry, the Motor Industry Development Programmes (MIDPs) were implemented in 1995. Part of the programme is to account for rising customer expectations in markets which were becoming increasingly demanding and fast moving in terms of fashion and trends.

3.2 The Market

Over the past five years, South Africa has had a growth in traffic volume that is seldom seen. The Minister of Trade and Industry confirmed this assertion by saying that, at an increase of 20 percent or more per annum, there are not many countries that have experienced this growth before. (MIDP, 2003: p.6)

The current market share for passenger cars alone is shown in figure 3.1 (MIDP, 2003: p.14). These numbers represent the passenger car segment during 2002. Only the biggest nine manufacturers are presented, with 'other importers' representing

collectively the smaller independent importers including Peugeot, Daewoo, Honda, Hyundai, Kia, SAAB, Subaru, Lada and Daihatsu.

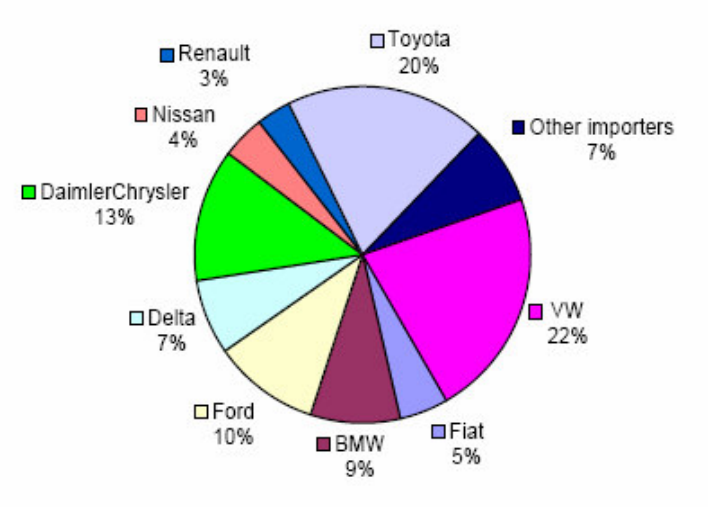


Figure 3.1 Market Share: passenger cars

Sales figures for new vehicles are shown in table 3.1. A total of 368 454 vehicles were retailed in 2003, which is an improvement on the 350 054 sales recorded in 2002. The local vehicle market has benefited from the modest average vehicle price increase of around 2 percent p.a., as well as a substantial fall of 5.5 percent in the prime-lending rate (Windell, 2004: p.13).

Table 3.1 Vehicle sale figures

Different sector	Sales				
	1999	2000	2001	2002	2003
Passenger car	189370	224122	239060	231602	247259
Light Commercial Vehicle	96169	105235	115146	104747	104884
Medium Commercial Vehicle	4668	5162	5683	5666	6100
Heavy Commercial Vehicle	5568	6563	7310	8039	10211
Total sale	295775	341082	367199	350054	368454

Source: NAAMSA (2003, p.3)

The decrease in sales in 2002 was affected by certain factors. First of all, the motor industry was affected by the interest rate increase (a 4 percent increase in the interest rate) during the year. At the same time, there was a substantial above average increase in the price of new vehicles (an average of 18.5 percent versus an average of 7.8 percent in 2001) due to the sharp weakening of the Rand towards the end of 2001.

The factors that affect the demand for, and sale of, new motor vehicles were reversed in 2003. The average inflation rate in 2003 was at 6.9 percent, which enabled the monetary authorities to reduce interest gradually by 5 percent. The inflation rate for new vehicles in the first seven months was measured at 1.7 percent in average, which is much lower than that of 2002.

The sales data for 2003 are distinguished further into different manufacturers. This is shown in table 3.2.

Table 3.2 Sales figures by different manufacturers in 2003

Make	Sales	%
Toyota	96087	26.1
VW/Audi	58230	15.8
Ford	47667	12.9
Daimler Chrysler	40725	11.1
Delta	39871	10.8
Nissan	33036	9
BMW	18046	4.9
Others	34792	9.4
Total	368454	100

Source: Windell (2004, p.13)

Vehicles sold in the market require after sale services. With an increase in market sales, the service workshop would experience a rise in demand. Discussion with dealership managers indicated that vehicle owners would spend about 20 to 30 percent of the vehicle's book value for maintenances during the life of the vehicle, where the life of the vehicle is estimated at about 7.5 years[3]. With a total sales figure of

[3] Discussions with workshop managers indicate that over 95% of the vehicles coming in to the service workshop have an age less then 10 years.

R 52 billion in 2002, this would roughly account for R 13 billion spent on vehicle servicing each year. This is a considerable market accounting for 1.2 percent of South Africa's GDP.

It is the after sale maintenance operations that is investigated in this research. The after sales service will be discussed in the next section.

3.3 After Sales Market and the Selected Vehicle Dealerships

This study selects particular after sales service dealerships for a major manufacturer. This manufacturer has specific procedures for servicing vehicles, a specific approach to service quality and a changing inventory policy. The after sales market includes scheduled maintenance, replacement of parts and emergency breakdown. The following section details the procedures of a typical vehicle service, followed by the approaches to handle service quality in the motor industry.

3.3.1 Procedures for Servicing a Vehicle

General procedures when servicing a vehicle are listed in this section. These procedures are followed by all the dealers that were visited during the study. The listing of these procedures is important as it demonstrates the appropriateness of the statements in the SERVQUAL instrument used in this research.

1. Pre Appointment Making:

   This process is carried out by team leaders or the booking clerk. They ensure enough time is available for planned service vehicles, walk in vehicles and emergency breakdown vehicles during any working day.

2. Appointment Making

This process is carried out by the booking clerks. During this process, the booking clerk schedules an appointment with the customer for the service and collects the required information.

3. Appointment Verification & Confirmation

This is also the responsibility of the booking clerks. In this process, the booking clerks check the customer's details on the system. Once the details are confirmed, the availability of parts required for the service is checked. Then, if necessary, parts are pre-ordered prior to the arrival of the customer. Job cards are also printed the day prior to the appointment.

4. Greeting & Reception

The dealer principle, the service manager and the liaison officer ensure there are enough signs and make sure the facility is clean and tidy. In addition, staff members must be neat in appearance. Once customers arrive at the premises, they are greeted by staff members and then directed to the specific team leaders.

5. Job Verification

In this process, team leaders are required to record and confirm jobs to be carried out with their customers, estimate the time and cost of the required service and provide the customer with transportation. The chief mechanic pre-tests the vehicle with the customer for accurate diagnoses when necessary.

6. Work Distribution

Once the job cards have been confirmed by the customers, jobs are allocated to different technicians by the chief technician. During the service, the chief technician is responsible for providing suggestions and alternative solutions to

their technicians. In addition, the chief technician and the service advisor keep their customers updated about delays and cost changes promptly. When the work is finished, the team leader or the chief technician test drives the vehicle and ensure that the vehicle is clean.

7. Handover

   When the vehicle is being cleaned, the team leader will notify the customer. Meanwhile, the team leader or the administration staff must ensure that the vehicle and the invoice are ready before the customer arrives. Upon arrival, the team leader reviews the repair order or the invoice with the customer and discusses each entry on the invoice. Once the customer has paid for the service, the vehicle is then handed over to the customer.

8. Follow up

   A few days after the service is carried out, the customer follow-up clerk contacts the customer for feedback and complaints. If there is a complaint, this is forwarded to the team leaders and the service manager for further action.

During work distribution, typically two out of every five vehicles in the workshop are held up for lack of parts and one out of every five is delayed by a day or more. This may impact negatively on the service quality, especially in the reliability dimension as perceived by customers. The manufacturer in this study has implemented a new inventory system in parts of the country that aims to ease this problem. The increase in the availability of parts may improve reliability, as technicians have a lesser chance of waiting for servicing parts thus able to finish the jobs on hand as promised. The implementation of the new inventory may impact the outcome of the level of service quality and this will be investigated in this study. A description of the old and new inventory system is included in Appendix B.

After detailing the processes for servicing a vehicle, the next section discusses service quality in the motor industry.

3.3.2 Service Quality in the Motor Industry

In the motor industry, an issue is whether management can perceive correctly what vehicle owners want and expect (see section 2.5, Gap 1: customers' expectation and managements' perception of these expectations). Expectations serve as standards or reference points for customers. In evaluating service quality, customers compare what they get in a service encounter, i.e. what they perceive, with their expectations of that encounter. The South African motor vehicle industry operates in an open competition market; customers are free to own any type of vehicle and are free to service their vehicle anywhere. Most customers would have encountered more than one service dealer. The effect of previous encounter with a different service dealership on service quality is also investigated in this research.

Service quality has been measured in the motor industry using Customer Satisfaction Index (CSI). A description of the CSI instrument used by the manufacturer is in Appendix C.

The SERVQUAL questions (see Appendix F) are compared to the procedures involved in the service as listed in section 3.3.1. The comparison is shown in table 3.3.

Table 3.3 Relationship between SERVQUAL questions and the service process

Service Process	SERVQUAL Questions
Pre appointment making	6,11,12,13,19
Appointment making	9,16,22
Appointment verification & Confirmation	9
Greeting & reception	1,2,3,13,14,15,16,18,20,21
Job verification	6,10,12,16,17,18,20,22
Work distribution	5,7,8,14,17
Handover	4,14,15,16,17,18,20,21
Follow up	-

After service issues (i.e. follow up after a service) are not discussed in this research[4].

[4] Interviews are conducted when customers collecting their vehicle, therefore, information regarding follow up is difficult to monitor.

It is noticed that some of the studies presented in table 2.2 involve modification to the original SERVQUAL instrument to suit its industry. As shown in table 3.3, each of the questions within the SERVQUAL instrument is related to at least one of the service processes, thus all the questions within the instrument are used in this study.

With the background to the research presented, the next section defines the objectives of this research.

3.4 Research Objective

This research aims to provide insight into the quality of services provided within the motor industry; additionally, this work also intends to add knowledge to the debate between PZB and Cronin & Taylor. The primary objective of this research is to test the hypothesis:

Customers view selected South African Vehicle Service Dealerships as having equal levels of service quality.

In addition, other factors related to this study may influence the outcome of the main hypothesis and so, the following hypotheses are also tested.

- Service quality is dependent on service dealerships for passenger vehicles
- Service quality is dependent on service dealerships for passenger and commercial vehicles
- Service quality is dependent upon the vehicle type (passenger vehicles and commercial vehicles)
- The arithmetic means of the scores between the passenger vehicle and commercial vehicle customers are different

- Service quality is dependent to the type of inventory system
- Customers view the levels of service quality provided by the dealerships under the two different inventory systems are different
- Customers' view on the level of service quality in each of the five SERVQUAL dimensions at various dealerships is the same

In addition, SERVQUAL is compared to SERVPERF and the dimensions of SERVQUAL are reported.

The next section discusses the steps taken to test the main hypothesis and investigations on the other objectives.

4 RESEARCH METHODOLOGY

This section describes the sampling frame selected for this study, followed by a discussion of the survey methods, as well as different statistical techniques used to test the main hypothesis and other objectives.

4.1 The Sampling Frame

The initial stage of marketing research is to specify the sampling frame. The sampling frame is the list of population elements from which the sample will be drawn (Churchill, 1995: p.82).

The subject of the study is to investigate whether all customers perceive South African service dealerships as having equal levels of service quality. The sample frame of this study is all the vehicle dealerships in South Africa over time. However, a number of issues may lead to partiality in the study: it is limited to one vehicle manufacturer; dealerships are selected prior to the data collection process and data are collected over a 3-month period. Bias may also arise from the following situations:

- half of the dealerships are operating under a different inventory system; and
- difference may occur because of the different form of customers (passenger cars and commercial vehicles).

This study is also restricted to well establish dealerships. Dealerships chosen for this study have been operating for over 20 years and would be expected to have a well-established approach to service delivery.

After defining the sampling frame and potential bias to the study, the next section discusses the selection of the survey method.

4.2 Survey Method Selection

Churchill (1995: p.359) lists three methods of administering survey questionnaires:

- Personal interview;
- Telephone interview; and
- Mail questionnaire.

Another method for administering survey questionnaires is by electronic means (e-mail or on-line questionnaires), which has become a common practice in the late 1990s. A number of considerations concerning the different methods of administration should be highlighted. They are:

- Anonymity of the respondent – sensitive information may be contained in the questionnaire;
- Response rate;
- Influences from the interviewer – personal interviews are done in a face-to-face situation; and
- The cost of the survey.

Table 4.1 shows the advantages and disadvantages of the different survey methods (Malhotra, 1993: p.197).

Table 4.1 Different methods of conducting survey

		Method of Data Collection			
		Telephone	Personal	Mail	E-mail
Criteria used to evaluate method	Flexibility of Data Collection	Moderate	High	Low	Low
	Diversity of Questions	Low	High	Moderate	Moderate
	Sample Control	Moderate	High	Low	Low
	Control of Data Collection	Low	High	Low	Low
	Response Rate	Moderate	High	Low	Low
	Anonymity of Respondent	Moderate	Moderate	High	Moderate
	Potential for interviewer Bias	Moderate	High	Low	Low
	Time and Cost	Moderate	High	Low	Low
	Speed	Moderate	High	Low	High

Telephone interviews allow for only a moderate degree of flexibility as answers to complex questions cannot be easily captured. In addition, the length of the survey cannot be excessive; nevertheless, it remains a popular ways of conducting surveys.

With the personal interview method, disadvantages are that respondents may be unable or unwilling to provide the desired information. Respondents may be unwilling to respond if the information requested is sensitive or personal (Malhotra, 1993: p.189). The interviewer can also jeopardise the results of a survey by the manner in which he or she selects respondents, asks research questions and records answers. The extent of the interviewer's role determines the potential for bias (Malhotra, 1993: p.202).

Mail surveys have the poorest response rate. In a mail survey of randomly selected respondents, without any pre-mailing contact, the response rate is typically less than 15%. Such a low response rate can lead to serious bias because a person has the choice to respond to such a survey or not, depending on his or her interest in the topic (Malhotra, 1993: p.201).

The e-mail method is the most cost effective and has the fastest speed. A draw back is that the return address is shown in the e-mail thus losing the anonymity of the respondent.

After reviewing all the issues highlighted in this section, the personal interview method is used to administer surveys for this research. With potential bias, a standard greeting message was used when interviewing different respondents and it is shown in Appendix D. The method used to carry out the research enables the author to reach customers who had just experienced the service delivered, so expectations and perceptions still be remembered.

After deciding the method of administrating the survey, the choice of interviewees is discussed next.

4.3 Sampling Techniques

In general, other than the complete enumeration of the population (a census), there are two types of sampling techniques - nonprobability and probability. Nonprobability sampling is techniques which do not use chance selection procedures. These techniques rely on the personal judgement of the researcher. On the other hand, probability sampling is a sampling procedure in which each element of the population has a fixed probabilistic chance of being selected for the sample (Malhotra, 1993: p.358). These are explained below, followed by a discussion of some of the potential errors and biases of sampling.

The population in this research consists of customers servicing their vehicles at various dealerships throughout the country. A full survey includes every one of these individuals in the research. This method is not practicable or economical. Due to the large population size and the inaccessibility of the entire population, this method is not considered for the purpose of this research.

In probability sampling, the researcher interviews customers who are randomly selected from the population. To draw a simple random sample, the researcher would first need to compile a sampling frame in which each of the customers is assigned a

unique number such that samples can be drawn from the population. It is often very difficult to construct a sampling frame that will permit a random sample to be drawn. In addition, it can result in samples that are very large and these samples may spread all over the country and make it impossible for researchers to approach the selected customers. Therefore, probability sampling techniques are not used in this research.

In nonprobability sampling, the population is selected based on the judgement of the researcher. This ensures the majority of the interviewed customers make suitable respondents and become more cost effective. Nonprobability sampling techniques do not require information from the entire population.

In this exploratory study, the new inventory distribution has only been implemented in certain areas of the country. In addition, it is impossible to obtain details of the entire population from all the dealerships countrywide and the costs incurred are large when running a full survey with probability sampling. Therefore, a nonprobability technique is used in the study.

Since a sample is a collection of observations representing a portion of the population, the manner in which the observed units are chosen significantly affects the adequacy of the sample (Lapin, 1978: p.73), as such, some of the predominant pitfalls are mentioned below.

Sampling error comprises the difference between the sample and the population, which arises solely from the particular elementary units that happen to have been selected (Lapin, 1978: p.74).

Sampling bias may be present due to an intentional predilection, since there is a tendency to select elementary units that have particular characteristics. This can be avoided by devising a sampling plan properly (Lapin, 1978: p.75).

The other main cause of unrepresentative samples is non-sampling error, which may occur regardless of the type of sampling method. A non-sampling error is an error that is due solely to the manner in which the observation is made (Lapin, 1978: pp. 75-76).

Taking the above issues into consideration, the researcher chose the following sampling plan after consulting with employees within the motor industry.

In general, the sample is divided into two regions – region one consists of dealerships that use the old inventory distribution system and it serves as a control for the study. Region two encompasses those that have implemented the new inventory system. Six dealerships are chosen for the study; three dealerships in each region. Within each region, these dealerships can be broken down into:

- one high volume throughput passenger vehicle dealership,
- one high volume throughput commercial vehicle dealership, and
- one medium throughput passenger vehicle dealership (located away from major cities and has half of the capacity of the high volume dealerships).

Two standard questionnaires are designed for this study. The aim of the standardized questionnaires is that each respondent is presented with the same questions without bias from the interviewer. The detailed design of the questionnaire is discussed next.

4.4 Questionnaire Design

Two questionnaires are designed for this study. The first questionnaire is designed for measuring customers' expectations and perceptions. The second questionnaire is designed for managers at the dealerships. These questionnaires are in Appendices E to G. The second questionnaire is designed in order to investigation the existence of gap 1 (customers' expectations versus managements' perception). This investigation is included in Appendix J.

The customers' questionnaire contain statements to measure the respondents' view on each of the five service quality dimensions (tangibles, reliability, responsiveness, assurance and empathy) and such statements should be consistent in what they

indicate about the characteristics of those dimensions. Internal consistency[5] refers to the extent to which the instrument produces consistent results if repeated measurements are made. The internal consistency of the measuring instrument is important and can be assessed by calculating the coefficient Cronbach's alpha (Churchill, 1979: pp.68-69). Cronbach's alpha tests the internal consistency of the items in relation to a single dimension within the instrument (Nunnally, 1978: pp.229-230).

The customer's questionnaire consists of two distinct sections. The first part of the questionnaire obtains background data from the respondents such as age, occupation, income and geographic information. These variables are used to cross-classify the other information obtained (Louis, 1991: pp.53 - 59).

The first section consists of the following questions:

1. What vehicle is coming in for service?
2. What is the respondent's occupation?
3. In which region does the respondent stay?
4. What is the name of the dealer where the respondent is interviewed?
5. Whether or not this is the first visit to this dealer?
6. Whether the respondent owns vehicles from a different manufacturer?
7. What the respondent's age is?
8. What is the respondent's annual income?

The above questions are discussed in the next section.

[5] Some authors use the word "reliability" instead of the phase "internal consistency". The latter phrase is used in this research in order to avoid confusion with the word "reliability" when describing one of the service quality dimensions.

Question 1 is included in the questionnaire so that the respondents can be grouped according to different vehicle type (passenger or commercial), such that the SERVQUAL scores can be further analysed.

Question 2 is used to verify the respondents' annual income as requested in question 8. This data is compared to the general population to identify any potential bias.

Question 3 provides information on the location of the respondent. This is useful because the data can be analysed based on demographic location.

Question 4 identifies where the respondent is interviewed.

Question 5 distinguishes respondents by whether or not they have visited this specific dealer before.

Question 6 indicates whether the respondent own vehicles from a different manufacturer. If he/she does, then he/she would have different experience with servicing vehicles; thus altering his/her expectation about vehicle servicing.

Questions 7 and 8 are derived from the age and income categories used in the 1996 census in South Africa. The 1996 income ranges used in the census are updated by adjusting for the Consumer Price Index (CPI) each year[6].

The second part of the customer's questionnaire is simply the SERVQUAL instrument (Parasuraman *et al*., 1991: pp.447-450) in which the wordings of some questions are altered to fit this study better. The SERVQUAL instrument is tested for internal consistency in other studies (Parasuraman *et al*., 1988: p.25), (1991: p.423) and these values will be compared to those obtained in this study.

The term Service Dealer is used in the questionnaire to focus on the service sector of the motor industry. Between the expectation and the perception section, there are five

[6] Calculation explained in p.73 and p.89 in "An exploratory service quality study in selected South African Retail Banks" by G.J. Brokenshire, 2003.

questions which describe the five dimensions, namely, tangible, reliability, responsiveness, assurance and empathy. The relative importance of each of the dimensions is weighted by the customers by allocating 100 points among them. These weightings will be used to calculate the final SERVQUAL scores at a later stage.

The final scores are calculated by utilising the following procedures (Zeithaml *et al.*, 1990: pp. 176-177):

1. Subtract the expectation score from the perception score for each pair of statements (P-E);
2. Add the scores on the statements pertaining to the dimension and divide the sum by the number of statements making up the dimension;
3. Multiply the SERVQUAL scores for each dimension by the importance weight assigned by the customer to that dimension;
4. Add the weighted SERVQUAL scores across all five dimensions to obtain a combined weighted SERVQUAL score; and
5. Group these weighted scores into different dealers depending on where the customer was interviewed and calculate the average SERVQUAL scores.

Once the questionnaires are designed, they are pre-tested on a number of pre-testers. A number of issues arose during the discussion and these are discussed in the following section.

4.5 Pre-testing

Pre-testing is conducted to ensure the wording of the questionnaire is clear. The questionnaire was pre-tested on 12 people over two sessions. The first focus group consisted of 7 individuals, including managers within the company and staff members from the dealerships. The second focus group consisted of a further 5 people. These were individuals from outside the motor industry and they were included in the pre-testing session to ensure the questionnaire is clear to respondents. Design flaws were highlighted and modifications were made.

Some of the more common points raised in the pre-testing sessions are discussed next.

Two people suggested the use of a 5 point Likert scale. They suggested that it would cause frustration during the interview when respondents have to distinguish between 7 levels of agreement. The focus group discussed this issue and concluded that it was not necessary to reduce the level of agreements. If the 5 point scale was used, the difference in scores would range from -4 to +4, where in a 7 point scale, the difference would vary from -6 to + 6, thus providing a higher sensitivity to the instrument. In fact, the model developed by Parasuraman *et al*. (1994b: p. 201-230) employed a 9 point Likert scale in the measurement instrument in order to increase the sensitivity.

In finding the relative importance of the five dimensions of service quality, one person suggested the use of a 10-point scale since 10 points are easier to distribute than 100 points. Upon reviewing the weighting, however, it was noted that most pre-testers used weightings such as 25 out of 100. If a 10-point scale was used, it would be unlikely for the respondent to use “2.5”, thus resulting in less sensitivity. As such, the use of a 100-point scale was kept.

Some pre-testers noticed similarity between questions. Similar questions included questions 5 and 8 as well as questions 18 and 20. After reviewing this issue at both sessions, it was noted that not all the pre-testers felt the same. In additional, it would

be undesirable to change or delete questions from the instrument as it would compromise the integrity of the SERVQUAL instrument. For these reasons, none of the questions was deleted or changed completely.

The other concern mentioned by the pre-testers was the length of the questionnaire. Most of them paged through the questionnaire before reading it and they were concerned about the time required to complete all the questions. After explaining the nature and structure of the questionnaire, the pre-testers were required to complete all the questions and the time taken was recorded. In general, they were able to complete the questionnaire between 7 and 13 minutes and they agreed that it was an acceptable time.

Finally, some of the questions' wordings were changed. All the pre-testers agreed that statements in the perception section should be personalized. For example, statement 6 in the perception section was changed from "when a customer has a problem, the service dealer shows a sincere interest in solving it" to "when I have a problem, my service dealer shows a sincere interest in solving it". In addition, the wording for statement 15 in both sections was also changed. The original statement read "customers of excellent service dealers will feel safe in their transaction", some of the pre-testers argued that the word "safe" was not applicable in the vehicle servicing environment, after discussing the issue in both testing sessions, the statements were changed to "customers of excellent service dealers will feel comfortable in their transaction".

The SERVQUAL instrument was used in its entirety, with slight modification of wording to make it specific to service workshops sampled. As in the original instrument, a 7-point Likert scale was used for respondents to indicate their extent of agreement to the given statements, which were grouped into the five service dimensions identified earlier. The final questionnaire is shown in Appendix F.

4.6 Statistical Analysis

The results obtained from the questionnaires are analysed using descriptive and inferential statistics. Descriptive statistics deal largely with the summary of calculation and graphic displays, whereas inferential statistics allow generalizations to be made based on the population (i.e. the sampling frame).

4.6.1 Descriptive Statistics

Data obtained from the questionnaires are first analysed by descriptive statistics. Descriptive statistics are useful to summarize measures, e.g. central tendency measures of the SERVQUAL scores. Central tendency measures include the arithmetic mean, median and the mode. Another measure is dispersion or variability, e.g. the range, variance and standard deviation of the SERVQUAL scores of service dealers.

As a sample is drawn to construct the arithmetic mean of a dealer's SERVQUAL score, the variation of this arithmetic mean can be generated to indicate how the true arithmetic mean may move.

The obtained data are representative only if the internal consistency is high. All the data are tested for internal consistency before further analysis. The minimum Cronbach's alpha value that is acceptable is difficult to specify. The guidance for acceptance is that the coefficient should be 0.7 or above. However, Nunnally (1967: p.226) suggests that reliabilities of 0.5 and 0.6 will suffice for early stages of basic research; but when important decisions are to be made on the basis of those results, a coefficient of 0.9 is the minimum and 0.95 is the desired standard. On the other hand, a high coefficient may not be ideal since a high alpha value for the total scale may indicate the absence of a dimensional structure. High alpha values may simply reflect poor design of the measuring instrument and may indicate that the respondents perceive duplication of items.

4.6.2 Inferential Statistics

Inferential statistics are used during the hypothesis testing. “Inductive reasoning attempts to establish the truth of hypothesis by arguing from limited information to a more general situation… a hypothesis can only be verified and, even if it is verified a thousand times, it is never proved, since a single result contradictory to the hypothesis is sufficient to disprove it” (Mimmack *et al*., 2001: p. 193).

In statistical testing, two hypotheses are required. The hypothesis being investigated is called H_1 and the alternative (null) hypothesis is called H_0. If H_0 is rejected, then H_1 is left as the alternative. If H_0 is not rejected, one cannot prove or disprove either H_0 or H_1.

The tests carried out for this study include Student’s t-test and Chi-square test. Student’s t-test is a parametric test with interval measures that assume normality of the underlying population. In contrast, the Chi-squared test is a non parametric test that can cope with ordinal measures and does not require normality of the underlying population. In certain cases, both tests are used because of the assumption of each test. These tests are discussed next.

<u>Student’s t-test</u>

This test is used to test the null hypothesis (H_0) that the arithmetic means are the same, i.e. $\mu = \mu_0$, against the alternative hypothesis (H_1) as that the arithmetic means are different, i.e. $\mu \neq \mu_0$ (Mimmack *et al*., 2001: p. 194). If the t-test value obtained lies outside the critical t-value, the null hypothesis is rejected. This is illustrated in the following example. Assume the following scores are obtained from a survey:

Table 4.2 Sample obtained in a survey

	Group 1	Group 2
Q1	5.52	6.60
Q2	5.73	6.43
Q3	6.02	6.60
Q4	5.62	5.97

The null hypothesis (H_0) of the test would be the arithmetic means are the same and the alternative hypothesis (H_1) is that the arithmetic means are different. Test results are shown in table 4.3.

Table 4.3 Student's t-test results of the sample obtained

Pooled Variance	0.0682
Degree of freedom	6
t Stat	-3.6563
P(T<=t) one-tail	0.0053
t Critical one-tail	1.9432
P(T<=t) two-tail	0.0106
t Critical two-tail	2.4469

The t-value obtained for the test is -3.6563 which is outside the critical t-value. Therefore, the null hypothesis can be rejected. Since the null hypothesis is rejected, we are left with the alternative hypothesis. Therefore, there are significant differences between the results obtained in table 4.2.

Chi-square test

The Chi-square test (χ^2) is used to determine whether a systematic association exists between the variables. Obtained data are arranged into a frequency table (F_o), each cell in the table has an observed frequency. Expected frequencies (F_e) are calculated if there is no association. The observed frequency and the expected frequency are then compared using Chi-squared statistics. An example of the Chi-square table is shown in table 4.4.

Table 4.4 Chi-square table

	SERVQUAL Scores		
	≧ 0.3	< 0.3	Total Row
Dealership A	25	15	40
Dealership B	25	23	48
Total Column	50	38	88

The null hypothesis (H_0) of the χ^2 test is that the proportion of observations in each cell is the same against the alternative hypothesis (H_1) that they differ. This test works with a relatively small sample size, provided that the expected frequency in each cell exceeds five (Mimmack *et al*., 2001: p. 509).

With the tools for the statistical analysis discussed, the next section presents the data obtained during the study.

4.7 Conducting the Survey

The survey was carried out in a period of six weeks (one week per dealership). Customers were interviewed personally at the dealerships. They were approached in the reception area at each dealership and the first customer to walk in after every half hour was approached by the author. These customers were asked to complete the questionnaire which took about 15 minutes.

Due to the nature of the questionnaire, (where expectations and perceptions of the service is measured) the questionnaire (Appendix F) was only presented to those customers collecting their vehicle.

Although care was taken prior to and during the survey, it is by no means certain that the survey is completely impartial.

5 RESEARCH RESULTS

Results obtained during the survey are presented in this section. These results are checked and coded to address the hypotheses.

5.1 Rate of Response

During visits to the dealerships, a number of customers and front line staff members were interviewed and they completed a questionnaire designed according to the SERVQUAL instrument.

A total of 111 customers were intercepted and 90 successful interviews were completed (Customer's questionnaire). In addition, a total of 30 front line staff members were interviewed (Staff's questionnaire). The number of customers interviewed at each dealership is shown in table 5.1.

Table 5.1 Success Rates of Interviews[7]

Dealers	Intercepted	Interviewed	Success Rate
Dealer 1	27	24	89%
Dealer 2	17	15	88%
Dealer 3	15	12	80%
Dealer 4	16	14	88%
Dealer 5	17	9	53%
Dealer 6	19	16	84%
Total	111	90	81%

Of the 111 customers approached, 90 successful interviews were conducted. This resulted in an average success rate of 81% between various dealerships. This coincided with the norm within the marketing research literature of 80% or above for

[7] Dealer 1, 2, 4 and 6 are passenger vehicle dealerships while Dealer 3 and 5 are commercial vehicle dealerships

personal interview (Malhotra, 1993: p.201), with the exception of dealer 5 where a success rate of 53% is recorded. This is because customers at this dealership often could not speak English so interviews could not be completed.

The following reasons lead to the 21 unsuccessful interviews during the study:

- twelve of the approached customers were not able to communicate fluently in English, this issue was particularly predominant with Dealer 5;
- six interviews were interrupted due to various reasons and questionnaires were not able to be completed;
- two interviewees did not provide their income data; and
- one interviewee was unwilling to complete the questionnaire.

5.2 Classification of Respondents

The intention of this section is to provide the reader with a summary of the classification result. A detailed description of the results is included in Appendix G.

The levels of service quality provided by the service dealerships may influence the number of customers repurchasing the service from them. Table 5.2 shows the percentage of interviewed customers that have serviced their vehicles at that specific dealership before.

Table 5.2 Returning customers at respective dealer

	Visited Before?				
Dealers	**No**		**Yes**		**Total**
Dealer 1	4	167%	20	83%	24
Dealer 2	2	13%	13	87%	15
Dealer 3	2	17%	10	83%	12
Dealer 4	2	14%	12	86%	14
Dealer 5	0	0%	9	100%	9
Dealer 6	2	13%	14	88%	16
Total	12	13%	78	87%	90
Total %					100.00%

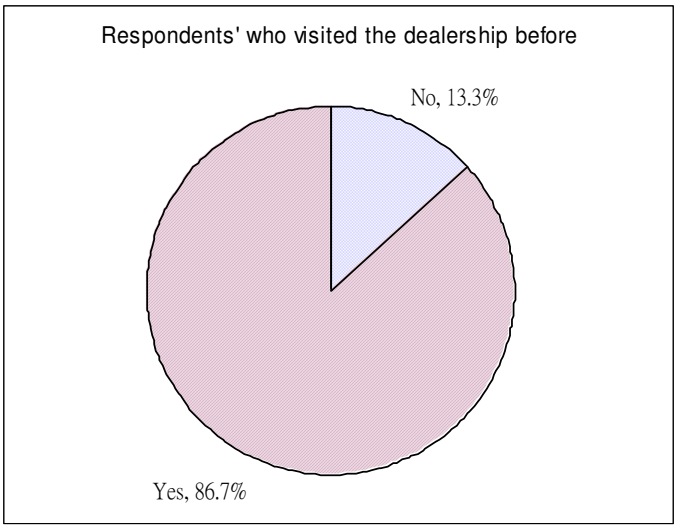


Figure 5.1 Customer Retention Rate

Results show that 86.7% of the customers have serviced their vehicles at those specific dealers before (where the interview was conducted). The customers' retention rate is affected by the level of service provided by the dealerships, but there are other factors that also influence the customers' choice (e.g. price, convenience). These influences are not investigated in this study.

The next classification is aimed at investigating how the awareness of alternative service providers may influence customers' expectations on the level of service quality. This is done by differentiating customers who own vehicles and service them with a different vehicle manufacturer. Figure 5.2 shows the percentage of respondents who own vehicles not produced by the manufacturer in this study.

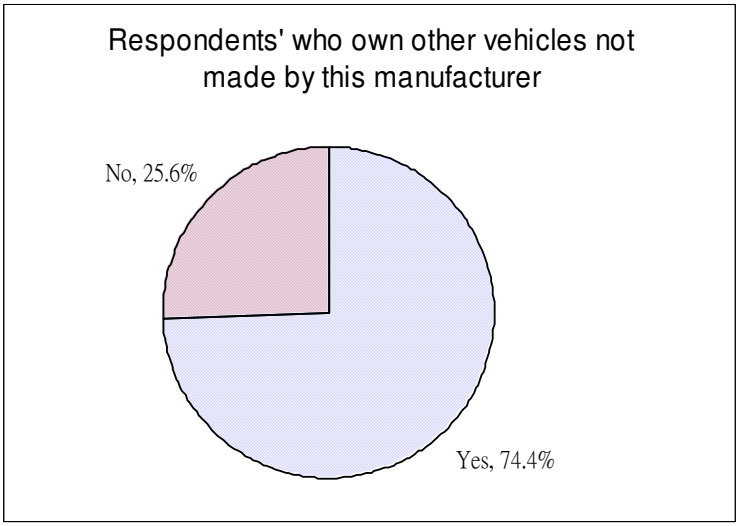


Figure 5.2 Percentage of Customers who own other vehicles

The age distribution of the respondents is shown in figure 5.3.

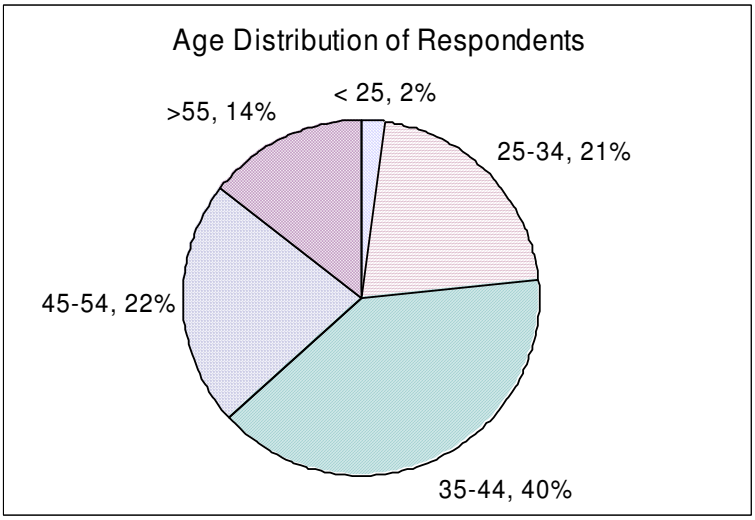


Figure 5.3 Age distribution of Respondents

Figure 5.4 shows the various income categories into which the respondents fall.

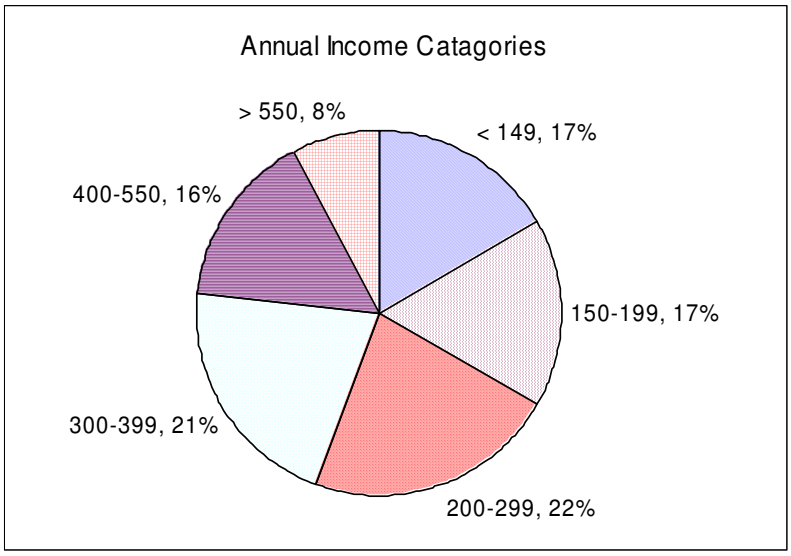


Figure 5.4 Annual income categories (R 000)

After the presentation of the classification data, results from the SERVQUAL instrument are tested for internal consistency before further analysis. These results are presented in the next section.

5.3 Cronbach's Alpha Scores

The coefficient alpha (Cronbach's alpha) values of expectation, perception and difference scores are shown in table 5.3. A sample calculation is shown in Appendix H.

Table 5.3 Comparison of Alpha scores

	Expectation only	Perception only	Difference Score
	(E)	(P)	(P-E)
Tangibles	0.82	0.80	0.80
Reliability	0.69	0.77	0.62
Responsiveness	0.72	0.73	0.67
Assurance	0.68	0.77	0.59
Empathy	0.79	0.72	0.61

The internal consistency of the "perception only" scores are higher than the "difference" scores, Cronbach's alpha for this study lies between 0.59 (assurance) to 0.8 (tangibles) and it is deemed sufficient for the early stages of the research (Nunnally 1967: p.226). Therefore, the hypotheses listed in section 3.4 are tested in the next section based on the results obtained.

5.4 Hypothesis testing

The main hypothesis of "customers view selected South African vehicle service dealerships as having equal levels of service quality", along with other hypotheses are tested in this section.

The average scores from the interviews with customers are presented in table 5.4. The weighting of each dimension and the individual final scores from each customer are shown in Appendix I.

The average scores shown in table 5.4 indicate the customers' view on how their dealers perform according to each of the statements in the SERVQUAL instrument. Negative P-E scores indicate dealerships did not reach the customers' expectation.

Table 5.4 Average expectation (E) and perception (P) scores from the Customers

E/P	Dealer 1			Dealer 2			Dealer 3			Dealer 4			Dealer 5			Dealer 6		
Tangibles	**E**	**P**	**P-E**	**E**	**P**	**P-E**	**E**	**P**	**P-E**	**E**	**P**	**P-E**	**E**	**P**	**P-E**	**E**	**P**	**P-E**
Q 1/Q23	5.583	6.083	0.500	5.333	5.467	0.133	5.417	5.167	-0.250	5.429	5.857	0.429	5.222	4.889	-0.333	5.938	5.875	-0.063
Q 2/Q24	6.125	6.417	0.292	5.267	6.133	0.867	6.083	5.333	-0.750	5.429	6.214	0.786	5.222	5.222	0.000	5.875	6.563	0.688
Q 3/Q25	6.208	6.542	0.333	6.200	6.533	0.333	5.833	5.417	-0.417	5.643	6.571	0.929	5.778	6.222	0.444	6.188	6.813	0.625
Q 4/Q26	6.042	5.917	-0.125	5.467	5.733	0.267	5.750	5.417	-0.333	5.071	5.929	0.857	5.333	5.556	0.222	5.688	5.750	0.063
Average	5.990	6.240	0.250	5.567	5.967	0.400	5.771	5.333	-0.438	5.393	6.143	0.750	5.389	5.472	0.083	5.922	6.250	0.328
Reliability																		
Q 5/Q27	6.583	6.167	-0.417	6.467	4.867	-1.600	6.500	6.000	-0.500	6.643	5.714	-0.929	6.556	6.000	-0.556	6.438	6.250	-0.188
Q 6/Q28	6.375	6.417	0.042	6.067	6.200	0.133	6.167	6.500	0.333	6.214	6.786	0.571	5.889	6.111	0.222	6.313	6.250	-0.063
Q 7/Q29	6.417	5.833	-0.583	6.600	5.667	-0.933	6.500	6.250	-0.250	6.286	5.857	-0.429	6.444	5.333	-1.111	6.625	6.063	-0.563
Q 8/Q30	6.542	6.208	-0.333	6.400	4.067	-2.333	6.417	5.833	-0.583	6.643	6.071	-0.571	6.556	5.778	-0.778	6.313	6.125	-0.188
Q 9/Q31	5.833	6.375	0.542	5.800	6.133	0.333	5.833	6.250	0.417	5.929	6.357	0.429	5.556	6.222	0.667	5.875	6.313	0.438
Average	6.350	6.200	-0.150	6.267	5.387	-0.880	6.283	6.167	-0.117	6.343	6.157	-0.186	6.200	5.889	-0.311	6.313	6.200	-0.113
Responsiveness																		
Q 10/Q32	6.250	6.417	0.167	5.867	6.200	0.333	6.583	6.833	0.250	6.000	6.643	0.643	6.111	6.556	0.444	6.313	6.125	-0.188
Q 11/Q33	6.417	5.917	-0.500	6.200	4.933	-1.267	6.333	5.583	-0.750	6.214	6.357	0.143	6.111	5.778	-0.333	6.063	4.938	-1.125
Q 12/Q34	6.417	6.625	0.208	6.267	6.267	0.000	6.583	6.583	0.000	6.500	6.714	0.214	6.111	6.556	0.444	6.438	5.938	-0.500
Q 13/Q35	6.167	6.125	-0.042	6.333	5.733	-0.600	6.583	6.000	-0.583	6.286	6.429	0.143	6.000	5.667	-0.333	5.813	4.750	-1.063
Average	6.313	6.271	-0.042	6.167	5.783	-0.383	6.521	6.250	-0.271	6.250	6.536	0.286	6.083	6.139	0.056	6.156	5.438	-0.719
Assurance																		
Q 14/Q36	6.458	6.208	-0.250	6.267	5.600	-0.667	6.333	6.333	0.000	6.500	6.714	0.214	6.333	6.000	-0.333	6.250	6.250	0.000
Q 15/Q37	6.458	6.458	0.000	6.200	5.600	-0.600	6.250	6.250	0.000	6.429	6.643	0.214	6.333	6.222	-0.111	6.000	6.250	0.250
Q 16/Q38	6.583	6.500	-0.083	6.067	6.600	0.533	6.333	5.833	-0.500	5.929	5.929	0.000	5.556	5.556	0.000	6.125	6.125	0.000
Q 17/Q39	6.542	6.333	-0.208	6.467	6.267	-0.200	6.000	5.917	-0.083	6.643	6.500	-0.143	6.444	5.667	-0.778	6.625	6.500	-0.125
Average	6.510	6.375	-0.135	6.250	6.017	-0.233	6.229	6.083	-0.146	6.375	6.446	0.071	6.167	5.861	-0.306	6.250	6.281	0.031
Empathy																		
Q 18/Q40	6.042	6.458	0.417	5.133	6.400	1.267	5.750	5.250	-0.500	5.714	5.214	-0.500	5.222	4.333	-0.889	5.250	4.625	-0.625
Q 19/Q41	6.083	6.125	0.042	6.067	5.800	-0.267	5.750	6.000	0.250	5.929	5.500	-0.429	5.889	6.889	1.000	6.188	6.500	0.313
Q 20/Q42	5.958	6.542	0.583	5.200	6.600	1.400	5.750	5.250	-0.500	5.643	5.571	-0.071	5.222	4.556	-0.667	5.125	4.563	-0.563
Q 21/Q43	6.292	6.333	0.042	6.200	5.867	-0.333	6.250	6.083	-0.167	6.286	6.286	0.000	6.000	5.778	-0.222	6.125	5.938	-0.188
Q 22/Q44	6.375	6.375	0.000	6.133	5.933	-0.200	6.250	6.333	0.083	6.643	6.357	-0.286	6.222	5.889	-0.333	6.188	6.125	-0.063
Average	6.150	6.367	0.217	5.747	6.120	0.373	5.950	5.783	-0.167	6.043	5.786	-0.257	5.711	5.489	-0.222	5.775	5.550	-0.225

The average scores shown in table 5.4 demonstrate the customers' view on how their dealerships perform on each of the individual SERVQUAL items, where four or five of these items together describe one of the service quality dimensions. These items must be factorised into the importance weighting of the dimensions in order to provide a better measurement of the service quality.

The weighted SERVQUAL scores are calculated by following the procedures outlined in section 4.4. These scores are shown in table 5.5.

Table 5.5 Weighted SERVQUAL scores

	Weight SERVQUAL Scores					
Respondent	Dealer 1	Dealer 2	Dealer 3	Dealer 4	Dealer 5	Dealer 6
1	-0.59	-0.94	-0.01	0.11	0.20	-1.19
2	0.12	-0.84	-0.05	-0.41	-0.25	-1.03
3	0.27	1.12	-0.81	0.42	0.47	-0.62
4	-0.93	-0.12	-0.10	-0.35	0.03	-0.23
5	-0.31	-0.30	-0.04	-0.34	0.54	-0.38
6	-0.21	-0.65	-0.26	-0.20	-0.80	0.65
7	0.24	-0.61	0.13	-0.18	-0.22	0.62
8	0.10	-0.44	-1.30	0.21	-1.03	-0.99
9	-0.34	1.07	0.20	-0.59	-0.63	0.01
10	0.20	-0.25	-0.01	-0.01		0.75
11	0.01	-0.30	0.09	0.21		-0.79
12	-0.19	-1.33	-0.70	0.91		-0.80
13	0.06	0.39		-0.65		0.56
14	-0.03	-1.08		-0.17		0.66
15	0.06	-0.33				-0.20
16	-0.80					-0.13
17	0.10					
18	-0.41					
19	-0.13					
20	0.15					
21	0.07					
22	0.16					
23	0.17					
24	0.21					

The final weighted SERVQUAL scores shown in table 5.5 are plotted in a scattered diagram in figure 5.5.

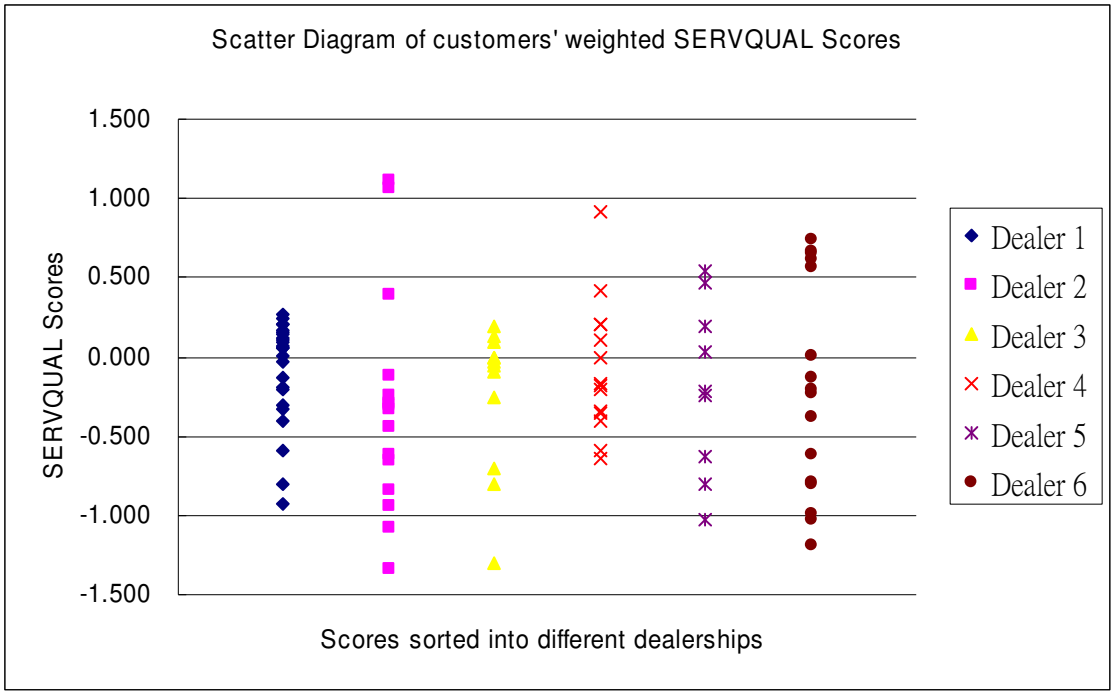


Figure 5.5 Scatter diagram of the final weighted scores

After the presentation of the final scores, the next section presents the statistical results of the study.

5.4.1 Descriptive Statistics

Descriptive statistics on the weighted SERVQUAL scores for various dealerships are shown in table 5.6.

Table 5.6 Descriptive statistical analysis of customers' data

	Dealer 1	Dealer 2	Dealer 3	Dealer 4	Dealer 5	Dealer 6	All dealers
Mean	-0.08	-0.31	-0.24	-0.07	-0.19	-0.19	-0.17
Standard Error	0.07	0.18	0.13	0.11	0.18	0.17	0.05
Median	0.06	-0.33	-0.04	-0.17	-0.22	-0.22	-0.15
Standard Deviation	0.33	0.71	0.46	0.42	0.55	0.68	0.52
Sample Variance	0.11	0.50	0.21	0.18	0.31	0.46	0.27
Range	1.20	2.45	1.50	1.56	1.57	1.94	2.45
Minimum	-0.93	-1.33	-1.30	-0.65	-1.03	-1.19	-1.33
Maximum	0.27	1.12	0.20	0.91	0.54	0.75	1.12
Count	24	15	12	14	9	16	90

5.4.2 Statistical Analysis on the Weighted SERVQUAL Scores

Four Chi-square tests and two student t-tests are conducted to test the main hypothesis: "Customers view selected South African Vehicle Service Dealerships as having equal levels of service quality". The weighted SERVQUAL scores are used in all tests as these scores are customers' view of the level of service quality provided by the dealerships.

In the first two tests, service quality is tested for independence between dealerships. In the third and fourth test, dealerships are divided into two groups according to the type of vehicles it services (i.e. passenger and commercial vehicles). In the final two tests, dealerships are also divided into two groups, based on the type of inventory method (i.e. new versus old inventory method as described in Appendix B). The last four tests are carried out in order to investigate the influence of extraneous factors that may affect the main hypothesis.

A service quality score of -0.3 is chosen as a boundary for all the Chi-square tests. This value is chosen such that each of the observed frequencies (F_o) has a value of 5 or more. When the Chi-square value obtained from the analysis is lower than the critical value at respective significant level, the hypothesis cannot be rejected. In addition, all the t-tests are carried out at 95% significant level.

The first test is performed to investigate the main hypothesis of the study. Only the passenger vehicle dealerships are included in this analysis. Results are shown in table 5.7.

Table 5.7 Chi-square analysis of the final scores across different passenger vehicle dealerships

	Fo			Fe		SQR(Fo-Fe)/Fe	
	>= -0.3	< -0.3	Row Total				
Dealer 1	18	6	24	14.61	9.39	0.787	1.225
Dealer 2	6	9	15	9.13	5.87	1.073	1.670
Dealer 4	9	5	14	8.52	5.48	0.027	0.042
Dealer 6	9	7	16	9.74	6.26	0.056	0.087
Total column	42	27	69				
						Chi-Square	4.967

The hypothesis being tested is:

H_1 : *Service quality is dependent on service dealerships for passenger vehicles*

H_0 : *Service quality is independent on service dealerships for passenger vehicles*

With three degrees of freedom, the critical Chi-square values are shown in table 5.8.

Table 5.8 Critical Chi-square value at different significance levels

Level of significance (upper tail area)	Critical Chi square value
1.0%	11.345
2.5%	9.348
5.0%	7.815

As the calculated Chi-square value in the test is 4.967, the null hypothesis cannot be rejected at 5% level of significance (4.967<7.815).

The second test is essentially the same as the first test, but involves all the vehicle dealerships this time. Due to the smaller amount of customers interviewed at the commercial vehicle dealerships, these two dealerships cannot be tested individually. The two commercial dealerships are combined together to test against the passenger vehicle dealerships. The results are shown in table 5.9.

Table 5.9 Chi-square analysis of the final scores across different dealers (including commercial dealerships)

	Fo			Fe		SQR(Fo-Fe)/Fe	
	>= -0.3	< -0.3	Row Total				
Dealer 1	18	6	24	15.20	8.80	0.516	0.891
Dealer 2	6	9	15	9.50	5.50	1.289	2.227
Dealer 4	9	5	14	8.87	5.13	0.002	0.003
Dealer 6	9	7	16	10.13	5.87	0.127	0.219
Dealer 3&5	15	6	21	13.30	7.70	0.217	0.375
Total column	57	33	90				
						Chi-Square	5.867

The hypothesis being tested is:

H_1 : *Service quality is dependent on the service dealerships for passenger and commercial vehicles*

H_0 : *Service quality is independent of the service dealerships for passenger and commercial vehicles*

At four degrees of freedom, the critical Chi-square values are shown in table 5.10.

Table 5.10 Critical Chi-square value at different significance levels

Level of significance (upper tail area)	Critical Chi square value
1.0%	13.277
2.5%	11.136
5.0%	9.488

As the calculated Chi-square value in the test is 5.867, the null hypothesis cannot be rejected at 5% level of significance (5.867<9.488).

The third test is performed on the weighted SERVQUAL scores which are divided into two groups based on the type of customers (passenger vehicles or commercial vehicles). The results are shown in table 5.11.

Table 5.11 Chi-square analysis of the final scores between commercial and passenger vehicle dealerships

	Fo			Fe		SQR(Fo-Fe)/Fe	
	>= -0.3	< -0.3	Row Total				
CV	15	6	21	13.30	7.70	0.217	0.375
PC	42	27	69	43.70	25.30	0.066	0.114
Total column	57	33	90				
						Chi-Square	0.773

The hypothesis being tested is:

H_1: *Service quality is dependent upon the vehicle type (passenger vehicles and commercial vehicles)*

H_0: *Service quality is independent upon the vehicle type (passenger vehicles and commercial vehicles)*

With one degree of freedom, the critical Chi-square values are shown in table 5.12.

Table 5.12 Critical Chi square value at different significance levels

Level of significance (upper tail area)	Critical Chi square value
1.0%	6.635
2.5%	5.024
5.0%	3.841

As the calculated Chi-square value in the test is 0.773, the null hypothesis cannot be rejected at 5% level of significance (0.773<3.841).

In addition to the Chi-square test, a t-test is also performed to check the influence of the type of vehicle dealerships has on the level of service quality provided. The hypothesis being tested is:

H_1 : *The arithmetic means of the scores between the passenger vehicle and commercial vehicle customers are different*

H_0 : *The arithmetic means of the scores between the passenger vehicle and commercial vehicle customers are the same*

Test results are shown in table 5.13.

Table 5.13 Student's t-test performed on the weighted SERVQUAL scores between passenger vehicles (PV) and commercial vehicles (CV)

	PV versus CV
Pooled Variance	0.2724
Degree of freedom	88
t Stat	0.4613
P(T<=t) one-tail	0.3229
t Critical one-tail	1.6624
P(T<=t) two-tail	0.6457
t Critical two-tail	1.9873

With a t-value of 0.46, which is in the non-rejection region within the distribution curve, the null hypothesis cannot be rejected.

The last two tests are performed on the weighted SERVQUAL scores which are divided into two groups based on the type of the inventory system the dealerships are using. These results are shown in table 5.14.

Table 5.14 Chi-square analysis of the final scores in different regions

	Fo			Fe		SQR(Fo-Fe)/Fe	
	>= -0.3	< -0.3	Row Total				
Centralized	33	18	51	32.30	18.70	0.015	0.026
Decentralized	24	15	39	24.70	14.30	0.020	0.034
Total column	57	33	90				
						Chi-Square	0.095

The hypothesis being tested is:

H_1 : *Service quality is dependent to the type of inventory system*

H_0 : *Service quality is independent to the type of inventory system*

The number of degrees of freedom in the test is one. With one degree of freedom, the critical Chi-square values are shown in table 5.15.

Table 5.15 Critical Chi square value at different significance levels

Level of significance (upper tail area)	Critical Chi square value
1.0%	6.635
2.5%	5.024
5.0%	3.841

With an obtained Chi-square value of 0.095, it is clear that the null hypothesis cannot be rejected at 5% level of significance (0.095<3.841).

Once again, the influence of the type of inventory system has on the overall SERVQUAL scores are tested by a t-test. The hypothesis being tested is:

H_1 : *Customers view the levels of service quality provided by the dealerships under the two different inventory systems are different*

H_0 : *Customers view the levels of service quality provided by the dealerships under the two different inventory systems as the same*

Test results are shown in table 5.16.

Table 5.16 Student's t-test performed on the weighted SERVQUAL scores between the old and new inventory method

	Old versus new inventory method
Pooled Variance	0.2727
Degree of Freedom	88
t Stat	-0.3280
P(T<=t) one-tail	0.3719
t Critical one-tail	1.6624
P(T<=t) two-tail	0.7437
t Critical two-tail	1.9873

A t-value of -0.328 is obtained in the analysis, which lies in the non-rejection region in the distribution graph. Therefore, the null hypothesis cannot be rejected. Although the null hypothesis cannot be rejected, it does not mean the service quality is the same in both regions. It simply states that the difference in service quality is statistically insignificant.

All six statistical tests show that customers' view on service quality is independent of the service dealerships within the accuracy of the experiment. In addition, the level of service quality is also independent to the type of vehicles the dealerships service and to the type of inventory systems. Therefore, the main hypothesis of "Customers view selected South African Vehicle Service Dealerships as having equal levels of service quality" is not disproved.

With the main hypothesis tested, the next section presents results for the testing of the secondary hypothesis "customers' view on the levels of service quality in each of the five SERVQUAL dimensions at various dealerships is the same".

5.4.3 Statistical test on the Weighted SERVQUAL Scores in each of the SERVQUAL Dimension

Results obtained in the study are further analysed by using Student's t-test. In this section, results of the five t-tests are shown. These tests are to investigate the influence of each of the five SERVQUAL dimension (tangible, reliability, responsiveness, assurance and the empathy) has on the main hypothesis. This is important as the over service quality is based on these five dimensions. In order to assume normal distribution, the sample being tested must have a size of 30 or more. All tests are performed at a 95% significance level.

These five t-tests investigate the main hypothesis from a different angle. Instead of using the overall weighted SERVQUAL scores, each sub-dimension of SERVQUAL (tangible, reliability, responsiveness, assurance and empathy) are tested individually. Due to the small sample size (less then 30) at each individual dealership, dealerships are divided into two groups based on their geographic location. The hypotheses being tested are:

Tangible dimension

H_1 : *Customers view dealerships as having different level of service quality in the tangible dimension*

H_0 : *Customers view dealerships as having the same level of service quality in the tangible dimension*

Reliability dimension

H_1 : *Customers view dealerships as having different level of service quality in the reliability dimension*

H_0 : *Customers view dealerships as having the same level of service quality in the reliability dimension*

Responsiveness dimension

H_1 : *Customers view dealerships as having different level of service quality in the responsiveness dimension*

H_0 : *Customers view dealerships as having the same level of service quality in the responsiveness dimension*

Assurance dimension

H_1 : *Customers view dealerships as having different level of service quality in the assurance dimension*

H_0 : *Customers view dealerships as having the same level of service quality in the assurance dimension*

Empathy dimension

H_1 : *Customers view dealerships as having different level of service quality in the empathy dimension*

H_0 : *Customers view dealerships as having the same level of service quality in the empathy dimension*

Test results are shown in table 5.17.

Table 5.17 Summary of the analysis on the dimensional scores

	Tangible	Reliability	Responsiveness	Assurance	Empathy
Pooled Variance	1.0859	0.5379	0.6850	0.4671	0.5490
Degree of Freedom	88	88	88	88	88
t Stat	-1.3115	-1.1041	-0.0942	-0.9259	2.5915
P(T<=t) one-tail	0.0965	0.1363	0.4626	0.1785	0.0056
t Critical one-tail	1.6624	1.6624	1.6624	1.6624	1.6624
P(T<=t) two-tail	0.1931	0.2726	0.9251	0.3570	0.0112
t Critical two-tail	1.9873	1.9873	1.9873	1.9873	1.9873

The t-values obtained in these analyses show that none of the null hypotheses can be rejected except for the empathy dimension. The t-value for the empathy dimension lies in the rejection region, meaning the difference is statistically significant. Therefore, customers view the empathy dimension of service quality as unequal between dealerships. With the other four dimensions, the t-values all lie in the non-rejection region, therefore, none of the hypotheses can be rejected. In other words, customers view dealerships as having the same level of service quality on the tangible, reliability, responsiveness and the assurance dimensions within the accuracy of this experiment.

Additional information collected by the SERVQUAL instrument are also analysed. Although the association between customers' expectations and managements' perception of these expectations (gap 1 issue) has no direct impact on the main hypothesis of this research, but the investigation of their relationship is valuable in the field of service quality. A discussion is included in Appendix J. In addition, the influence of the level of service quality by other service providers are also investigated and presented in Appendix K.

With the main hypothesis tested, the following section discusses the relationship between the SREVQUAL model and the SERVPERF model.

5.5 Perception Scores and SERVQUAL Scores

In this section, weighted SERVQUAL scores and weighted Perception scores are compared. Results are shown in table 5.18.

Table 5.18 Comparison of Perception and SERVQUAL scores

Dealers	Perceptions Scores	SERVQUAL Scores
Dealer 1	6.195	-0.084
Dealer 2	5.715	-0.308
Dealer 3	5.570	-0.237
Dealer 4	5.730	-0.074
Dealer 5	5.615	-0.188
Dealer 6	6.145	-0.194

Association between SERVQUAL scores and Perception scores are shown in figure 5.6.

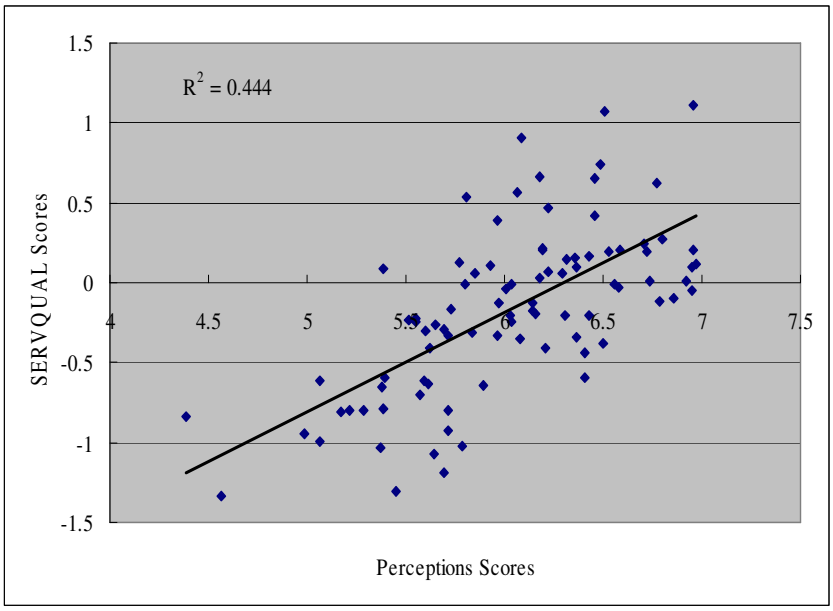


Figure 5.6 Association between SERVQUAL scores and perception scores

R^2 value is tested for significant correlation. The hypothesis is:

H_1: *There is a linear association between the SERVQUAL scores and the Perception scores*

H_0: *There is no linear association between the SERVQUAL scores and the Perception scores*

Values of the test statistic are $R = \pm 0.666$. These values are tested at 95% level of significance, standard correlation table shows critical values (R^2) are ± 0.2074. Since 0.666 is greater than 0.2074, therefore, there is a significant linear association between the two variables. The result of the association show a significant coefficient of determination (R^2) or that perception scores associate with SERVQUAL scores (sample size 90) and explain about 44 per cent of the total variation in the SERVQUAL scores using a linear model.

In addition to the above comparison, an investigation on the relationship between the CSI, SERVQUAL and Perceptions scores are shown in Appendix L.

5.6 Findings Regarding SERVQUAL's Five Dimensions

From section 4.4, the final SERVQUAL scores are calculated according to the weighting allocated by the customers. Each of the respondents is required to allocate 100 points across the five dimensions according to how important these dimensions are to them. If one dealership scores badly in one dimension and if such dimension is weighted heavily by the customer, the negative score will be magnified by such a weighting. Weighting by customers and managers are compared to the research findings of Zeithaml *et al*. (1990: p.28). These results are presented graphically in figure 5.11.

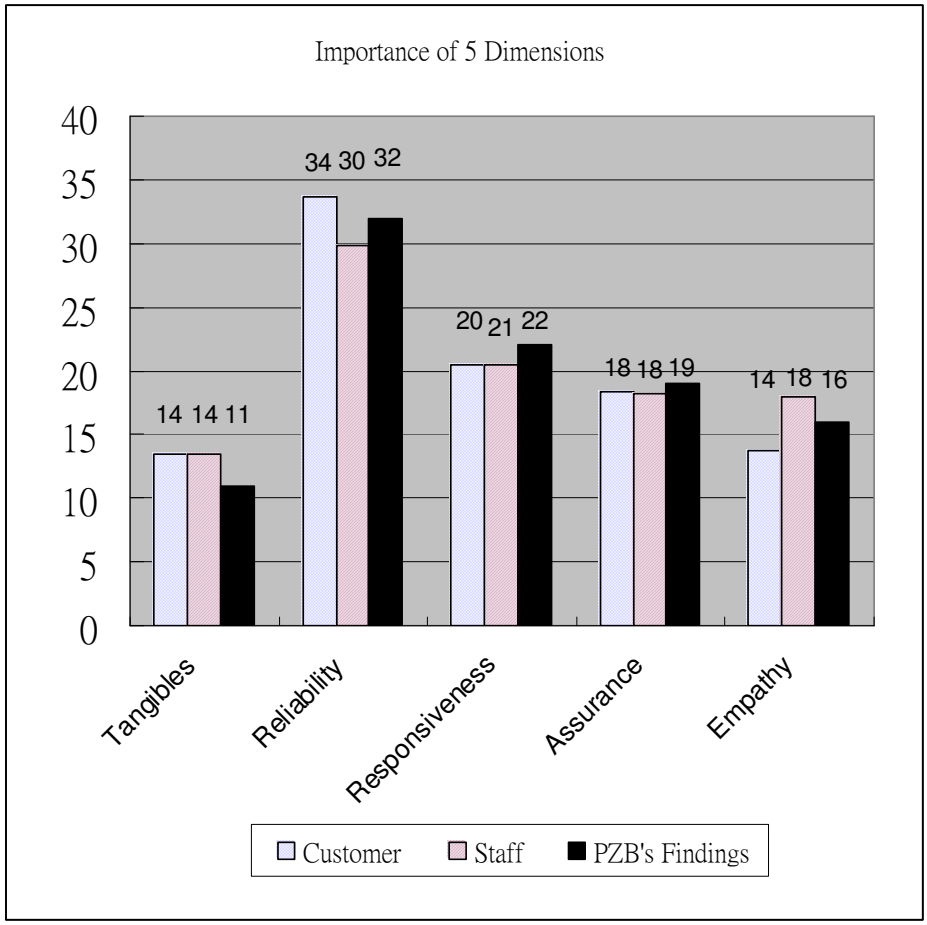


Figure 5.7 Relative importance of the five service quality dimensions

As shown in figure 5.7, relative importance of the 5 service quality dimensions between customers and managers are similar with the exception of the reliability and empathy dimension. The differences are tested statistically and the results are shown in table 5.19.

Table 5.19 Statistical test for the difference in the importance weighting

	Reliability	Empathy
Pooled Variance	170.36	78.83
Degree of freedom	118	118
t Stat	1.41	-2.20
P(T<=t) one-tail	0.08	0.01
t Critical one-tail	1.66	1.66
P(T<=t) two-tail	0.16	0.03
t Critical two-tail	1.98	1.98

Results from the statistical analysis show that the differences in the reliability dimension are insignificant while the differences in the empathy dimension are significant. Both tests are performed at the 95% significant level. The importance weightings for the customers are further grouped by different dealers. This is shown in figure 5.8.

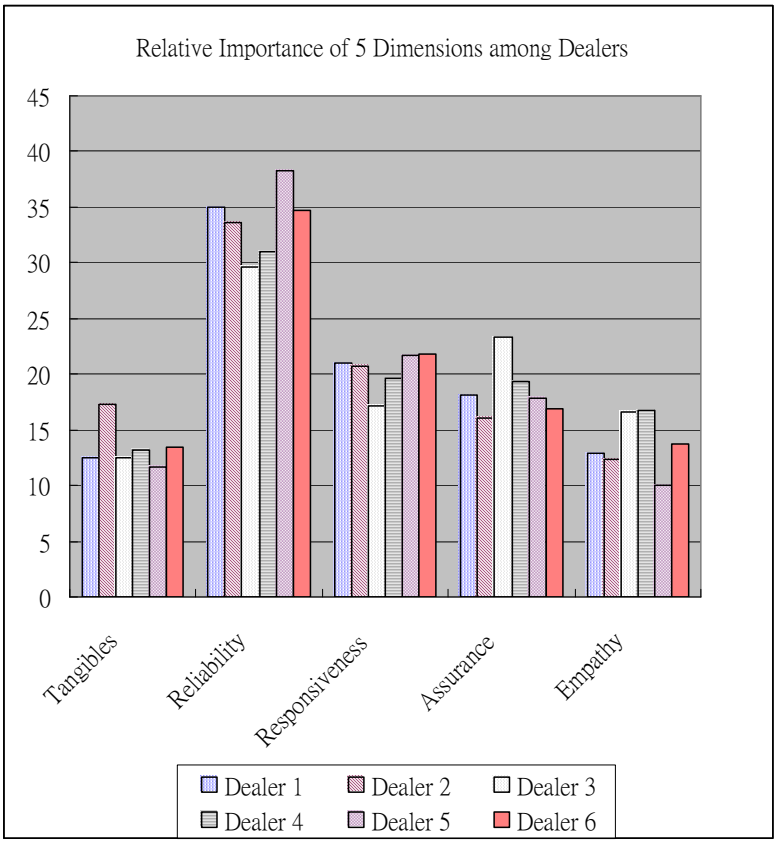


Figure 5.8 Relative importance of dimensions among dealers

It can be seen clearly that the reliability dimension is weighted as the most important from the customer's point of view. The reliability dimension is followed by responsiveness, then assurance and the least important dimensions are tangible and empathy.

With all the results presented, the next section discusses findings obtained in this study.

6. DISCUSSION

This section discusses the results presented in section 5. The classification of the respondents is discussed first, followed by the discussion of the internal consistency of the measurement instrument. This section concludes with the discussion of the testing of the hypothesis and the applicability of the PZB approach in this study.

6.1 Classification of Data

A sample from the total population is chosen in order to carry out this study. This method is used because interviewing the entire population is impossible (i.e. to interview every individual who owns a vehicle). The sample chosen for the study is limited to one manufacturer and specific dealerships are selected. As this may introduce bias to the study, the frame of the sample should be tested against the research population.

Information regarding the entire population of vehicle owners is not available. The best available frame is the latest census findings.

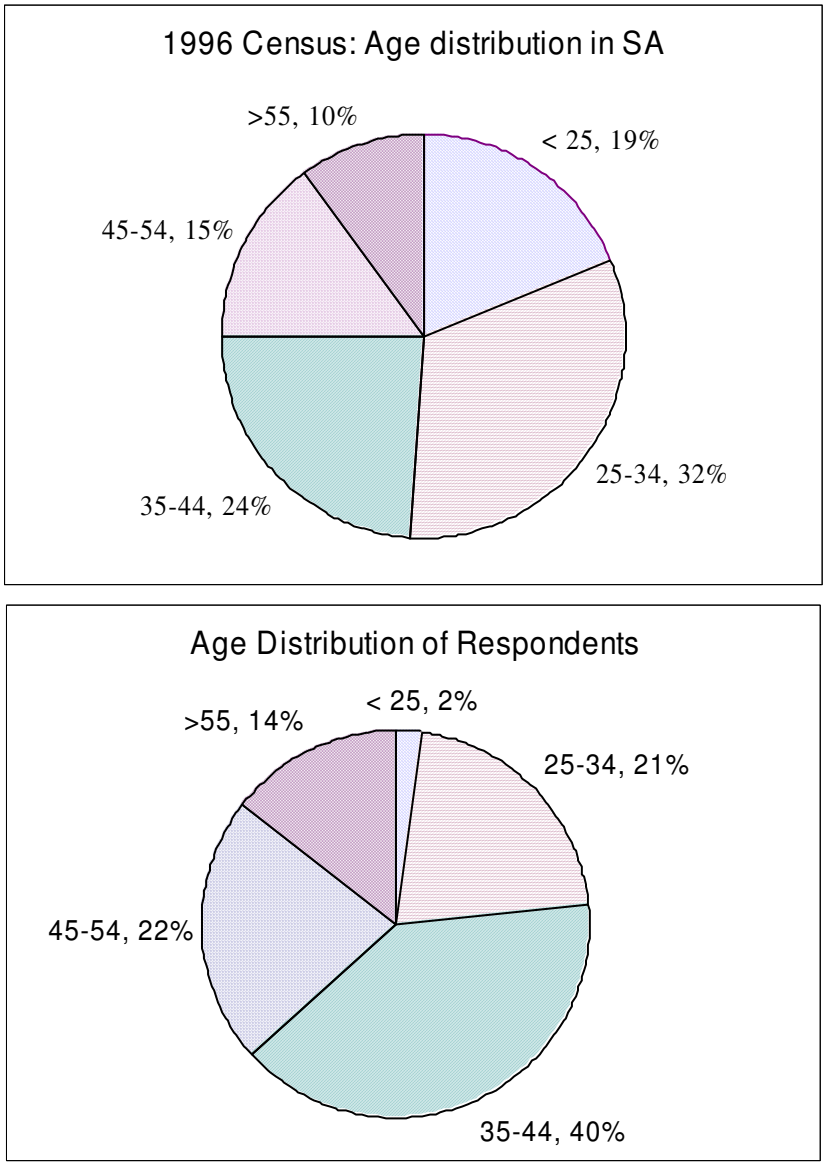
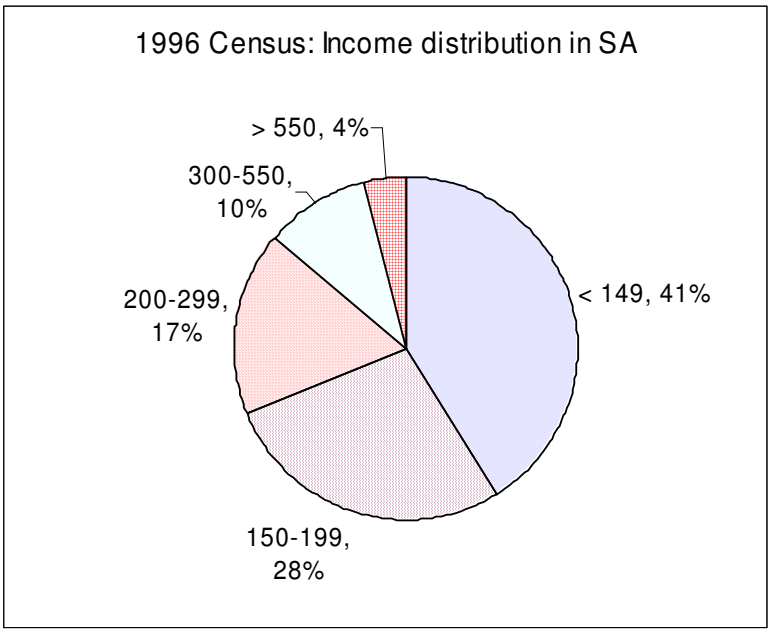


Figure 6.1 Comparison of Census and research results by age



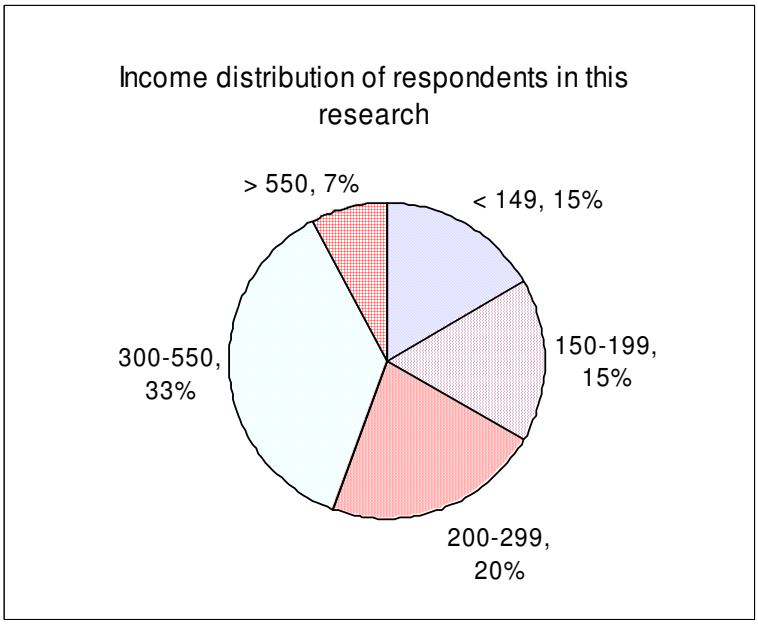


Figure 6.2 Comparison of Census and research by income

As shown in figure 6.1 and figure 6.2[8], the sample of respondents in this research is not representative of the South African population. When the age groups are compared, this study excludes individuals with an age of 18 or less as this is the legal age restriction for driving a vehicle in South Africa.

Customers tend to belong to the middle to upper income group relative to the South African population, and occupations included teachers, doctors, nurses, accountants, businessmen, lawyers, housewives, university students, and farmers. While the manufacturer studied makes vehicles for the medium to luxury segment, and the sample may reflect the manufacturer's customers, no claim is made that the service quality found in this study reflects general South African vehicle dealerships. In addition, the sample chosen for this research is considered adequate as this is an exploratory study, in which one may expect further studies to be carried out in this area.

The internal consistency of the measurement instrument is investigated prior to the discussion on the testing of hypotheses. It has been arranged thus because the testing of hypotheses are futile if the instrument is not accurate.

6.2 Internal Consistency of the SERVQUAL Instrument

The Cronbach's alpha scores of this study are shown in table 5.3 and are further compared to those presented in table 2.2. In addition, values from the original PZB study are also included.

[8] Results of the 1996 census are used in the comparison. The Consumer Price Index has been used to adjust the income categories in this study with those used in the census. Information and adjustments of the income categories are obtained from Brokenshire (2003: pp. 116-117).

Table 6.1 Summary of Cronbach's alpha values in various studies

Studies	Industry	Measurement type	Cronbach's Alpha values
PZB (1998: pp.12-40)	Banking	(P-E)	0.52 - 0.84
	Credit card company	(P-E)	0.62 - 0.80
	Repair and maintenance	(P-E)	0.64 - 0.87
	Long distance telephone company	(P-E)	0.64 - 0.84
Carman (1990: pp.33-55)	Tyre retailing	(P)	0.51 - 0.84
	Business school placement centre	(P-E)	0.52 - 0.85
	Acute care hospital	(P)	0.61 - 0.94
	Dental services	(P)	0.55 - 0.87
Bouman and van der Wiele (1992: pp.4-16)	Car servicing	(P-E)	0.62 - 0.80
Khan (2003: pp.109-124)	Tourism	(P-E)	0.86 - 0.98
This study	Motor industry	(P-E)	0.59 - 0.80
		(P)	0.72 - 0.80

In general, the internal consistency of the instrument used in this study is similar to those published in the past. Values lower then 0.59 are recorded in other studies, which indicate results obtained is sufficiently valid as an exploratory study. In additional, Cronbach's alpha values obtained show that the SERVQUAL instrument is a suitable instrument to measure service quality in the motor industry in South Africa.

A summary of the Cronbach's alpha scores from studies pertaining to the servicing industry are further compared. These include Bouman and van der Wiele (1992: p.8) and Parasuraman *et al*. (1998: p.25)[9]. The Bouman and van der Wiele study involves an evaluation of service quality using the SERVQUAL instrument with different service dealerships in the Netherlands. The comparisons are shown in table 6.2.

[9] Only these two studies are included in the direct comparison as they uses the same 5 SERVQUAL dimensions used in this study.

Table 6.2 Comparison of Cronbach's alpha scores

	Bouman and van der Wiele	PZB[10]	This Study	
	(P-E)	(P-E)	(P-E)	(P)
Tangibles	0.76	0.64	0.80	0.80
Reliability	0.76	0.84	0.62	0.77
Responsiveness	0.62	0.76	0.67	0.73
Assurance	0.80	0.87	0.59	0.77
Empathy	0.75	0.72	0.61	0.72

The values obtained in the study by Bouman and van der Wiele varies from 0.62 to 0.8, which is similar to that obtained in this study (varies from 0.59 to 0.8). On the other hand, values from the PZB study show higher internal consistencies that vary from 0.64 to 0.87.

When comparing the perception scores (P) to the difference between expectations and perceptions (P-E) scores for this study, the findings are consistent with previous SERVQUAL surveys (Cronin and Taylor, 1992: pp.55-66), which found that the "perception only" scores exhibit a higher internal consistency than difference scores, i.e. values of the coefficient alpha in the perception column is consistently higher than the values in the difference scores column in all dimensions.

The alpha score obtained in the assurance dimension for this study shows large discrepancy when compared to the PZB and Bouman and van der Wiele studies. This may suggest that questions within the assurance dimension may not be entirely suitable for measuring this dimension for the SA motor industry. Further studies can be carried out to investigate the questions (statements) used to describe each dimension with a larger sample group.

The next section discusses the testing of the hypotheses listed in section 3.4.

[10] Only the Coefficient alpha value for the repair and maintenance industry is shown.

6.3 Hypothesis Testing

No conclusive statements can be made on the main hypothesis by studying the scatter diagram in figure 5.5 or from the descriptive statistics as shown in table 5.6. Hence, the data are further analysed by using inferential statistics. Results from section 5.4 are summarised in table 6.3.

Table 6.3 Summary of testing results

Service quality is dependent on service dealerships for passenger vehicles		Not Accepted
Service quality is dependent on service dealerships for passenger and commercial vehicles		Not Accepted
Service quality is dependent upon the vehicle type (passenger vehicles and commercial vehicles)		Not Accepted
The arithmetic means of the scores between the passenger vehicle and commercial vehicle customers are different		no significant difference
Service quality is dependent to the type of inventory system		Not Accepted
Customers view the levels of service quality provided by the dealerships under the two different inventory systems are different		no significant difference
Customers view dealerships as having different level of service quality in the tangible dimension		no significant difference
Customers view dealerships as having different level of service quality in the reliability dimension		no significant difference
Customers view dealerships as having different level of service quality in the responsiveness dimension		no significant difference
Customers view dealerships as having different level of service quality in the assurance dimension		no significant difference
Customers view dealerships as having different level of service quality in the empathy dimension		significant difference

There are two predominant factors that may affect the test results of the main hypothesis; namely, the nature of the vehicle the dealerships service and the type of inventory system the dealership uses. During the interrogation of the main hypothesis, different tests were carried out by dividing the dealerships into two groups based on the above factors. Statistical comparison of the SERVQUAL scores does not indicate any significant difference in the service quality provided by dealerships under the new inventory system, which means that the advantage of increased availability of stocks has no significant influence on customers' view on the level of service quality. In

addition, no significant differences in the level of service quality are notified by customers in passenger or commercial vehicle dealerships. Results from the Chi-square tests indicate that service quality appears to be independent of the dealerships.

There are other factors that may affect the studies presented in table 2.2, but the influences by these factors are either not highlighted or investigated, thus making comparison to the current study impossible.

Once these extraneous factors are investigated, the main hypothesis is further analysed in the five dimensions that construct the overall service quality.

Various t-tests show no significant differences along the dimensions of service quality with the exception of the empathy dimension. The differences in the empathy dimension are significant but the importance of this dimension is not heavily weighted. Therefore, such a difference is not reflected on the overall service quality score when tested.

When comparing the dimensional scores in this research to the studies in table 2.2, none of the studies score positively in any dimensions. There is a difference in the current findings; in general, customers view dealerships involved in this study performed better then expected in the tangible dimension. This indicates customers' perceptions exceed their expectations in such dimension. Although dealerships generally score positively in the tangible dimension, its effects on the overall SERVQUAL scores are negligible due to its low importance weighting.

In addition to the positive scores for the tangible dimension, table 5.5 indicates 35 out of the 90 respondents provide positive scores for the dealerships. This phenomenon disagrees with the research findings of Brown *et al*. (1993: pp.127-139); which claims "the expected or desired level of service is almost always higher than the perceived level of actual service". Nonetheless, the average SERVQUAL scores for all the dealerships are negative, similar results are reported in various studies in a different industry.

From the data collected and the findings from various inferential statistics, within the accuracy of this experiment, customers' views on service quality are the same. This is not influenced by the vehicle type and the inventory method. The only significant difference found is in the empathy dimension, although no explanation is offered for this difference. This study does not disprove the main hypothesis of this research, suggesting that **customers view selected service dealerships as having equal levels of service quality**.

The next section discusses the relationship between perception scores and SERVQUAL scores.

6.4 Perception Scores and SERVQUAL Scores

Comparison between perception and SERVQUAL scores is presented in section 5.5. The degree of association between the two variables is denoted by R^2. The value of R^2 may vary from zero (no correlation) to one (perfect correlation). The correlation value is shown as $R^2 = 0.44$. If the R^2 value had been 1, it means that all the points fell on a straight line and there is a direct correlation between the two variables. This is clearly not the case as the R^2 value is much less than 1. With R^2 values much less than 1, these indicate the variables are not completely dependent on each other.

Perception scores alone only associated to 44 per cent of the total variation in the SERVQUAL scores. A reason the correlation is low is that customers have different expectations. It seems that perception scores alone provide a partial but not a full measure of service quality, especially as managers may prefer to know their customers' expectations as well. A superior approach may be to report perceptions, expectations, and SERVQUAL scores.

This chapter concludes with examining the applicability of the PZB approach in the context of this research.

6.5 Service Quality Theory

Customers involved in this research have identified reliability as the most important and tangibles as the least important of the five dimensions influencing service quality. The importance weighting shown in figure 5.8 indicates the weighting allocated by the respondents is similar to that obtained in the PZB studies (Zeithaml *et al*., 1990: p.28). Subsequent works regarding the use of the SERVQUAL instrument have also identified the reliability aspect as the most important service quality dimension. These include Lam and Zhang (1999: p.347), Sultan and Simpson (2000: p.199) and Brokenshire (2003: pp.107-107).

Although PZB's dimensions have been criticised by various authors, results from the above studies and the present research support PZB's dimensionality and indicate reliability as the most important dimension regardless of the type of service and locations. These behaviours are predicted and commented in Parasuraman *et al*. (1988: pp.31-35) stating that "a striking result in terms of the relative importance of the five dimensions in predicting overall quality is that reliability is consistently the most critical dimension… while tangible is apparently the least important of the five SERVQUAL dimension, it is by no means unimportant".

The SERVQUAL instrument appears to be an effective tool when measuring service quality in the motor industry in South Africa. The usefulness of the SERVQUAL instrument is further discussed.

The questions in the questionnaire are divided into five dimensions. These dimensions are tangibles, reliability, responsiveness, assurance and empathy. A summary of the dimensional scores at different dealers is shown in table 6.4.

Table 6.4 Summary of the SERVQUAL scores in different dimensions

	Tangibles Score	Reliability Score	Responsiveness Score	Assurance Score	Empathy Score	Final Score
Dealer 1	0.250	-0.150	-0.042	-0.135	0.217	-0.084
Dealer 2	0.400	-0.880	-0.383	-0.233	0.373	-0.308
Dealer 3	-0.438	-0.117	-0.271	-0.146	-0.167	-0.237
Dealer 4	0.750	-0.186	0.286	0.071	-0.257	-0.074
Dealer 5	0.083	-0.311	0.056	-0.306	-0.222	-0.188
Dealer 6	0.328	-0.113	-0.719	0.031	-0.225	-0.194

As Fick and Ritchie (1991: p.3) noted, “the power of the SERVQUAL tool is perhaps greatest in situations involving comparisons of one firm with another within a common service segment. In this regard, information as to which organization is perceived to provide better service is available, along with the potential to identify specific areas of excellence or weakness”.

In table 6.4, without further review within the tangible dimension, the above zero values of quality scores indicate good service provision. Yet, a review of the expectation scores in table 5.4 shows that low values are placed within this dimension among the customers. Such observations imply that service elements within the tangibles dimension need not be the focus of added attention while trying to improve the quality of these services.

In order to determine better the aspects of service that is most worthy of attention, it is necessary to consider the relative importance customers attach to the various dimensions of service quality. With the six dealerships involved in this study, the weighted SERVQUAL scores indicate that improved reliability would contribute most to raising customer’s perceptions of the service experience. These results indicate that dealerships find it easier to meet customer expectations in the dimension found least important by customers generally (tangibles), while finding it most difficult to meet expectations in the dimension valued most highly by customers (reliability).

These assessments would suggest that, if resources are limited, dealerships should spend more management attention and resources on improving the reliability dimension and less on tangibles.

With the results presented and hypotheses and experiments discussed, the general conclusion and further research are given in the next section.

7 CONCLUSIONS AND FURTHER RESEARCH

For any business to become profitable, it has to deliver high quality service that fulfils the needs and expectations of their customers. Different models have been proposed for the measurement of service quality; the SERVQUAL scale has been widely used by academics and it is used in this research to measure and compare service quality within the motor industry. With the data collected and analysed, the principle hypothesis is accepted as true within the accuracy of this study, i.e.: "**Customers View Selected South African Service Dealers as having Equal Levels of Service Quality**"; although significant differences are reported for the empathy dimension. In addition, customers' views on service quality are not substantially altered by vehicle type or inventory system for this manufacturer. This research confirms previous work in the motor industry and South Africa that reliability is the most important aspect in service quality and that the ordering of the dimensions is consistent over comparable studies. However this study is biased towards a particular manufacturer and selected dealerships. More studies must be undertaken before general conclusions are made.

Cronbach's alpha statistics indicate that the SERVQUAL scale is internally consistent but less so than measuring perception scores. This finding is consistent with previous SERVQUAL surveys which found that the "perception only" scores exhibit higher internal consistency then different scores. Perception scores explain, at most, 44 per cent of the total variation in the SERVQUAL scores. Therefore, it may be superior to report perceptions, expectations and SERVQUAL scores. In additional, alpha scores in this study are similar to those reported in other industry, which indicate the results are sufficiently reliable as an exploratory study.

Various studies have suggested different dimensions in the measuring of service quality in various industries, the use of the original five SERVQUAL dimensions in this study are valid as this is supported by acceptable Cronbach's alpha scores, indicating the that the SERVQUAL instrument can be used in its entirety when evaluating the level of service quality in the motor industry.

Findings from this study generally indicate dealerships provide services exceeding customers' expectations in the tangible dimension. In addition, about 40 percent (35 out of the 90 respondents) of the respondents rate their dealerships as providing better services then they have expected. This finding is on the contrary to those presented in Brown *et al*. (1993: 127-139).

In conclusion, this exploratory research has provided some useful information to the dealerships as to how consumers are likely to judge the quality of their business. Identifying customers' expectations and perceptions of service quality for a particular establishment allows management to tailor its marketing efforts to ensure that customers' expectations are met.

Further investigations could build on the findings of this research in a number of ways:

The restriction in length of the survey instrument and the interview time means that it was not possible to capture the richness of additional data that was available. Through employing a larger research team, more interviews could be conducted to increase the sample size. Although findings evidence that measuring perception alone has higher internal consistency than reporting the differences between perceptions and expectations, identifying customers' expectations and perceptions of service quality allows management to tailor service to customers' expectations. It is recommended that further research should report perceptions, expectations and SERVQUAL scores.

The SERVQUAL instrument is a simple and inexpensive means of assessing service quality. This implies that interested parties can regularly conduct service assessments, which Parasuraman *et al*. (1988: pp.30-36) advocate as necessary to service improvement. Regular assessments of the SERVQUAL scores can track whether customer's expectations of the service are changing over time. Measuring quality over time is useful in order to see whether or not improvements have been made. Further research may be carried out by using the Boumen and van der Wiele model to retest the hypothesis. This will provide information for the comparison of the suitability of various measurement instruments.

In addition, further research carried out in this field should take external factors into account; although such factors have had no significant influence on the outcome of this research.

Finally, to instil a better understanding of service quality, academics seeking to reduce bias can conduct similar studies in different industries, and use individuals from different backgrounds who may have different views on service quality. They should also investigate other gaps that contribute to the overall service quality perceived by customers.

Appendix A

The SERVQUAL instrument

Parasuraman *et al.* (1988: pp.30-31) claimed the SERVQUAL model "Provides a basic skeleton through its expectations/perceptions format encompassing statements for each of the five service quality dimensions. The skeleton, when necessary, can be adapted or supplemented to fit the characteristics or specific research needs of a particular organization." In other words, the instrument is applicable to a wide variety of service contexts, although it may be necessary to reword some of the items. Neither the deletion of items, nor the addition and removal of dimensions, is recommended, since the integrity of the scale may be lost (Parasuraman *et al.,* 1991: p.445).

The SERVQUAL instrument can be used to compute service quality gap scores at different levels of detail: for each statement pair, for each dimension, or combined across all dimensions. By examining these various gap scores, a company can not only assess its overall quality of service as perceived by customers but also identify the key dimensions and facets within those dimensions, on which it should focus its quality improvement efforts.

By applying the SERVQUAL model with additional questions, the data can be analysed further on the basis of demographic characteristics (e.g. sex, age, income, etc.). This in turn will provide more information to the dealership/company in order to understand the expectations of different groups of customers. However, the applicability of the model is limited to current and past customers because respondents need to have some knowledge and experience of the organization in order to be able to complete the scale.

Appendix B

Inventory systems

Inventory Distribution System

In the past, the company had a centralized warehouse where most of the parts were stored. Despite the fact that all the parts were in the store, value is only being added when the part is in the technician's hand and is being fitted to the customer's vehicle. With this philosophy in mind, the company initiated a new inventory system where all the parts are stored in a location as close as possible to the technicians - in this case, at the parts despatch within each dealership, thus forming many decentralized storage locations around the country.

With the old system, dealers independently managed their own parts and these parts were owned by the individual dealers. When the workshop needed a part which was not stocked, the parts department would send out a requisition to the neighbouring dealerships or the central warehouse. The requested parts would be delivered in the afternoon or the next day. If the parts were not available locally, the central warehouse would place an order with overseas suppliers, which would take at least six weeks from the date of order to the date of receipt. Since the dealers had to pay for the parts once taken out of the central warehouse, some of the slow moving parts were unlikely to be stocked within their own parts department.

With the new system, individual dealer's inventories are owed by the company and are combined into regional inventories, which together form a national inventory. Suppose there is a particular part that moves 20 times a year in the entire region, if this part has to be stocked by individual dealers, the part may only move once or twice a year. A dealer is unlikely to stock such a slow moving part and hence, if requested by a customer, there will be a waiting period of about 9 days (if available from the local warehouse within the country) to up to 6 weeks (if from overseas suppliers). The new inventory concept views the part from a regional perspective and determines that since the part moves 20 times a year, it is worth stocking within the region. Forecasting methods will determine where the part is most likely to be needed and ensure that it is stocked at one or more dealers closest to the point of estimated demand. With the new system, the off the shelf pick (where the part is located within the dealership) percentage increased from an average of 77% to above 95%.

Replenishment occurs on a national basis. The current available stock is compared to the expected demand during the lead time. If there is sufficient stock to cover the expected demand then replenishment does not occur. If, however, the available stock is less than the demand during the lead time, a replenishment proposal will be initiated. The decentralised inventory system (the new system) aims to get 90% of parts required for any service to the end customer within 30 minutes and the balance, within 120 minutes.

Logistic of the new system at the supply chain level

With the new inventory and delivery system, customer order logistics, forecasting, replenishment and cross-docking are all centrally controlled. It enables management to maintain a birds-eye-view of all activities relating to the total supply chain of parts from source to delivery at the customer's physical delivery address. These processes are discussed as follows:

Customer demand: As an order is placed at a dealer, the system records the transaction, giving central control an idea of the retail end of the business, enabling quicker reactions to unusual situations.

National Stock: Knowing exactly what stock is available will result in improved forecasting and replenishment practice. Areas such as seasonality and customer demands become immediately apparent, resulting in more accurate forecasting. The available customer demand information ensures parts are stocked or replenished at the point nearest to where future demand is most likely to occur, reducing accrual of obsolete stock and improving service level.

Distribution logistics: Orders received from suppliers (both locally and overseas) is cross-docked, or repacked into smaller or more manageable quantities in the warehouse and immediately shipped to various stocking points countrywide. Although distribution and delivery of parts is outsourced, all information related to the distribution and delivery aspects of the business will remain visible on the centrally controlled system.

Logistic of the new system at the dealer level

Once a customer's order is entered by the Selling Dealer, the system goes in search of the part – first at the stocking point closest to the customer, then, if necessary, move to the next nearest stocking point; and the next, until the part is located. When the part is located, the system generates a picking slip to confirm that the part is picked at the stocking point and prepared for despatch. Simultaneously, the delivery system – an outsourced logistic company receives instructions to collect the part and deliver it to the dealership. During this entire process, it remains the selling dealers responsibility to manage the customers order process – all steps pertaining to a sale, from order entry, to delivery, to the customer, will be visible on the system.

Appendix C

Current CSI instrument utilized by the manufacturer

The manufacturer involved in this study currently uses the following questions:

1. Was the reception area clean and tidy?
2. Were the staff members competent and courteous?
3. How much interest did they show in you as a customer?
4. Was the work completed correctly the first time?
5. Were you assured that your vehicle was in good hands?
6. Were you informed, in advance, of any extra work, cost or service delay?
7. Did the staff members explain the work done and the costs incurred?
8. Do you think the costs charged are reasonable?
9. Was your vehicle ready at the promised time?
10. Was your vehicle clean after the service?
11. Did the dealer have the necessary parts to complete the work?
12. After the service, did you receive any phone call from the dealership to determine your satisfaction?
13. Would you recommend this service centre to a friend?
14. Would you service at this service centre again?

With regard to these questions, only the first twelve are directly related to the service encounter. Question 13 and 14 are based on the outcomes from the previous 12 questions. The weighting of each question is predetermined by the company.

The company employs telephonic interview techniques and the number of questions is restricted. In addition, only the perception side is measured so that the interview time is minimized. Although the length of the SERVQUAL instrument is about four times longer than the current CSI questions, the information that can be extracted from it provides more specific areas on which management can focus their service.

To demonstrate the applicability of the SERVQUAL instrument, questions in the SERVQUAL instrument (Shown in Appendix F) are compared to the CSI questions. The related questions are grouped in table C1. Due to the nature of the data collection method (customers were personally interviewed in the reception area when they collected their vehicles), questions 10 and12 not applicable in this comparison.

Table C1 Relationship between CSI questions to SERVQUAL questions

CSI Questions	SERVQUAL Questions
1	2
2	16
3	18,20,21
4	7
5	14,15
6	10
7	4,17
8	-
9	5,8
11	-

As regards question 8 of the CSI question concerning the cost for the service, dealerships across the board charge a flat rate for service performed. For example, a pre-determined rate for different services is governed by the manufacturer and individual dealers are not allowed to change the price. Although the dealer can perform other 'delight' factors such as free coffee bar or a courtesy car, the dealer has no direct control on the charges of the actual work performed.

Question 11 in the CSI instrument looks at the availability of parts. Dealers are unlikely to notify their customer when a service part is not in stock (i.e. spark plugs, oil filter etc.) and some other excuses will be used instead. In the case of a lengthy job, a gear box repairs for example, any unnecessary delay for the arrival of parts will see the dealer presenting an excuse for it as "a complicated job that requires a lot of work". Therefore, the availability of parts will not be asked directly since this question is covered by SERVQUAL questions 5 and 8. In this study, the customers were asked whether the job was performed at the time they were promised regardless of the reasons.

Appendix D

Standard Greeting used during interviews

Good morning/afternoon Sir/Madam. My name is Francis Kwei and I'm studying towards my Masters degree at the University of the Witwatersrand. I'm currently involved in a study on evaluating the level of service quality at various service dealers. This interview will take about 10 minutes of your time. The interview is intended to measure the difference between the expectations and the perceptions you have of your service dealer. Your input towards this study is greatly appreciated.

If the customer is interested in the study, the questionnaire is presented next and no further explanations are made. On the other hand, if he/she is not interested in the study, the customer will be released.

Appendix E

Questionnaire used in the pre-testing session

SERVICE QUALITY SURVEY

Thank you for taking the time to complete this survey. This questionnaire is intended to measure the difference between the expectations and the perceptions you have of your Service Dealer. In essence what is being measured is the gap between what you think your Service Dealer should be like and what you actually experience.

This Questionnaire has been designed to take about 10 minutes of your time. It starts off by obtaining necessary personal details required for the study. After this are a number of questions about "an excellent Service Dealer". Finally there are a number of questions regarding your dealer.

What is the model of your vehicle? _____

What is your occupation? _____

What city/ town/ suburb do you live in? _____

What is the name of this Dealer? _____

Is this a first visit to this Dealer?

☐ Yes ☐ No

Do you own other vehicles other than XYZ[11] brand?

☐ Yes ☐ No

Which range does your age fall into?

☐ <25
☐ 25 - 34
☐ 35 - 44
☐ 45 - 54
☐ >55

Which range does your Annual income fall into?

☐ <R149,000 per annum
☐ R150,000 - R199,000 per annum
☐ R200,000 - R299,000 per annum
☐ R300,000 - R399,000 per annum
☐ R400,000 - R550,000 per annum
☐ >R 550,000per annum

[11] The actual name of the manufacturer is used in the questionnaire. For confidentially, the XYZ brand is used here instead.

Based on your experiences as a customer of vehicle services, please think about the kind of Service Dealers that would deliver excellent quality of service. Think about the kind of Service Dealers with which you would be pleased to do business. Please show the extent to which you think such a Service Dealers would possess the feature described by each statement. If you strongly disagree with the statement, please circle "1". If you strongly agree with the statement, please circle "7". If your feelings are less strong, circle one of the numbers in the middle.

Q1 Excellent Service Dealers will have modern-looking equipments.

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

Q2 The physical facilities at excellent Service dealers will be visually appealing.

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

Q3 Employees at excellent Service Dealers will be neat in appearance.

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

Q4 Materials associated with the service (such as pamphlets or statements) will be visually appealing in an excellent Service Dealers.

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

Q5 When excellent Service dealers promise to do something by a certain time, they will do so.

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

Q6 When a customer has a problem, excellent Service Dealers will show a sincere interest in solving it.

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

Q7 Excellent Service Dealers will perform the service right the first time.

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

Q8 Excellent Service Dealers will provide their services at the time they promise to do so.

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

Q9 Excellent Service Dealers will insist on error-free records.

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

Q10 Employees in excellent Service Dealers will tell customers exactly when services will be performed.

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

Q11 Employees in excellent Service Dealers will give prompt service to customers.

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

Q12 Employees in excellent Service Dealers will always be willing to help customers.

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

Q13 Employees in excellent Service Dealers will never be too busy to respond to customer's request.

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

Q14 The behaviour of employees in excellent Service Dealers will instil confidence in customers.

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

Q15 Customers of excellent Service Dealers will feel safe in their transactions.

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

Q16 Employees in excellent Service Dealers will be consistently courteous with customers.

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

Q17 Employees in excellent Service Dealers will have the knowledge to answer customer's questions.

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

Q18 Excellent Service Dealers will give customers individual attention.

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

Q19 Excellent Service Dealers will have operating hours convenient to all their customers.

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

Q20 Excellent Service Dealers will have employees who give customers personal attention.

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

Q21 Excellent Service Dealers will have the customer's best interest in heart.

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

Q22 The employees of excellent Service Dealers will understand the specific needs of their customers.

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

Listed below are five features pertaining to Services Dealers and the services they offer. This section is intended to determine how important each of these features is to you when you evaluate a Service Dealer's quality of service. Please allocate a total of 100 points among the five features according to how important each feature is to you – the more important a feature is 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 Service Dealer's physical facilities, equipment, personnel and communication materials.	
2	The Service Dealer's ability to perform the promised service dependably and accurately.	
3	The Service Dealer's willingness to help customers and provide prompt service.	
4	The knowledge and courtesy of the Service Dealer's employees and their ability to convey trust and confidence.	
5	The caring, individualized attention the Service Dealer provides its customers.	
	TOTAL	100

The following set of statements relate to your feelings about your specific Service Dealer. For each statement, please show the extent to which you believe the specific Service Dealer has the feature described by the statement. Once again, circling a "1" means that you strongly disagree with the statement. Meanwhile, circling a "7" means that you strongly agree with the statement.

Q1 My Service Dealer has modern-looking equipment.

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

Q2 The physical facilities are visually appealing in my Service Dealer.

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

Q3 Employees at my Service Dealer are neat in appearance.

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

Q4 Materials associated with the service (such as pamphlets or statements) are visually appealing in my Service Dealer

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

Q5 When my Service Dealer promises to do something by a certain time, it does so.

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

Q6 When a customer has a problem, my Service Dealer shows a sincere interest in solving it.

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

Q7 My Service Dealer performs the service right the first time.

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

Q8 My Service Dealer provides its services at the time it promises to do so.

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

Q9 My Service Dealer insists on error-free records.

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

Q10 Employees in my Service Dealer tell the customer when services will be performed.

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

Q11 Employees in my Service Dealer give prompt service to customers.

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

Q12 Employees in my Service Dealer are always willing to help customers.

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

Q13 Employees in my Service Dealer are never too busy to respond to customer's request.

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

Q14 The behaviour of employees in my Service Dealer instils confidence in customers.

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

Q15 Customers of my Service Dealer feel safe in their transactions.

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

Q16 Employees in my Service Dealer are consistently courteous with customers.

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

Q17 Employees in my Service Dealer have the knowledge to answer a customer's questions.

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

Q18 My Service Dealer gives customers individual attention.

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

Q19 My Service Dealer has operating hours convenient to all its customers.

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

Q20 My Service Dealer has employees who give you personal attention.

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

Q21 My Service Dealer has the customers' best interest in heart.

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

Q22 The employees of my Service Dealer understand the specific needs of their customers.

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

You have now completed the questionnaire. Thank you!

Appendix F

Questionnaire Presented to Customers

SERVICE QUALITY SURVEY

Thank you for taking the time to complete this survey. This questionnaire is intended to measure the difference between the expectations and the perceptions you have of your Service Dealer. In essence what is being measured is the gap between what you think your Service Dealer should be like and what you actually experience.

This Questionnaire has been designed to take about 10 minutes of your time. It starts off by obtaining necessary personal details required for the study. After this are a number of questions about "an excellent Service Dealer". Finally there are a number of questions regarding your dealer.

What is the model of your vehicle? _____

What is your occupation? _____

What city/ town/ suburb do you live in? _____

What is the name of this Dealer? _____

Is this a first visit to this Dealer?

☐ Yes ☐ No

Do you own other vehicles other than XYZ brand?

☐ Yes ☐ No

Which range does your age fall into?

☐ <25
☐ 25 - 34
☐ 35 - 44
☐ 45 - 54
☐ >55

Which range does your Annual income fall into?

☐ <R149,000 per annum
☐ R150,000 - R199,000 per annum
☐ R200,000 - R299,000 per annum
☐ R300,000 - R399,000 per annum
☐ R400,000 - R550,000 per annum
☐ >R 550,000per annum

Based on your past experiences in servicing your vehicle, please consider the kind of Service Dealers that would deliver excellent service quality. Think about the kind of Service Dealers with which you would be pleased to do business. Please show the extent to which you believe a Service Dealer would reflects the feature described by each statement. If you strongly disagree with the statement, please circle "1". If you strongly agree with the statement, please circle "7". If your feelings are less strong, circle one of the numbers in the middle.

Q1 Excellent Service Dealers will have modern-looking equipment.

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

Q2 The physical facilities at excellent Service dealers will be visually appealing.

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

Q3 Employees at excellent Service Dealers will be neat in appearance.

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

Q4 Materials associated with the service (such as pamphlets or statements) will be visually appealing in excellent Service Dealers.

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

Q5 When excellent Service dealers promise to do something by a certain time, they will do so.

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

Q6 When a customer has a problem, excellent Service Dealers will show a sincere interest in solving it.

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

Q7 Excellent Service Dealers will perform the service right the first time.

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

Q8 Excellent Service Dealers will provide their services at the time they promise to do so.

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

Q9 Excellent Service Dealers will insist on error-free records.

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

Q10 Employees in excellent Service Dealers will tell customers exactly when services will be performed.

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

Q11 Employees in excellent Service Dealers will give prompt service to customers.

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

Q12 Employees in excellent Service Dealers will always be willing to help customers.

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

Q13 Employees in excellent Service Dealers will never be too busy to respond to customer's request.

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

Q14 The behaviour of employees in excellent Service Dealers will instil confidence in customers.

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

Q15 Customers of excellent Service Dealers will feel comfortable in their transactions.

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

Q16 Employees in excellent Service Dealers will be consistently courteous to customers.

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

Q17 Employees in excellent Service Dealers will have the knowledge to answer customer's questions.

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

Q18 Excellent Service Dealers will give customers individual attention.

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

Q19 Excellent Service Dealers will have operating hours convenient to all their customers.

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

Q20 Excellent Service Dealers will have employees who give customers personal attention.

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

Q21 Excellent Service Dealers will have the customer's best interest in heart.

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

Q22 The employees of excellent Service Dealers will understand the specific needs of their customers.

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

Listed below are five features pertaining to Services Dealers and the services they offer. This section is intended to determine how important each of these features is to you when you evaluate a Service Dealer's quality of service. Please allocate a total of 100 points among the five features according to how important each feature is to you – the more important a feature is 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 Service Dealer's physical facilities, equipment, personnel and communication materials.	
2	The Service Dealer's ability to perform the promised service dependably and accurately.	
3	The Service Dealer's willingness to help customers and provide prompt service.	
4	The knowledge and courtesy of the Service Dealer's employees and their ability to convey trust and confidence.	
5	The caring, individualized attention the Service Dealer provides its customers.	
	TOTAL	100

The following set of statements relate to your feelings about your specific Service Dealer. For each statement, please show the extent to which you believe the specific Service Dealer has the feature described by the statement. Once again, circling a "1" means that you strongly disagree with the statement. Meanwhile, circling a "7" means that you strongly agree with the statement.

Q1 My Service Dealer has modern-looking equipment.

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

Q2 The physical facilities are visually appealing in my Service Dealer.

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

Q3 Employees at my Service Dealer are neat in appearance.

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

Q4 Materials associated with the service (such as pamphlets or statements) are visually appealing in my Service Dealer

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

Q5 When my Service Dealer promises to do something by a certain time, it does so.

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

Q6 When I have a problem, my Service Dealer shows a sincere interest in solving it.

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

Q7 My Service Dealer performs the service right the first time.

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

Q8 My Service Dealer provides its services at the time it promises to do so.

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

Q9 My Service Dealer insists on error-free records.

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

Q10 Employees in my Service Dealer tell me when services will be performed.

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

Q11 Employees in my Service Dealer provide prompt services.

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

Q12 Employees in my Service Dealer are always willing to help.

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

Q13 Employees in my Service Dealer are never too busy to respond to my request.

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

Q14 The behaviour of employees in my Service Dealer instils confidence on me.

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

Q15 I feel comfortable with my transactions at the Service Dealer.

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

Q16 Employees in my Service Dealer are consistently courteous towards me.

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

Q17 Employees in my Service Dealer have the knowledge to answer my questions.

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

Q18 My Service Dealer gives me individual attention.

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

Q19 My Service Dealer has operating hours convenient to me.

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

Q20 My Service Dealer has employees who give me personal attention.

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

Q21 My Service Dealer has my best interest in heart.

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

Q22 The employees at my Service Dealer understand my specific needs.

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

Thank you for completing this questionnaire!

Appendix G

Questionnaire presented to managers

Based on your experiences as a chief technician/service advisor, please consider the kind of Service Dealers that would deliver excellent Service Quality. **This section is intended to measure what you think your customer would expect from such a Service Dealer**. If you strongly disagree with the statement, please circle "1". If you strongly agree with the statement, please circle "7". If your feelings are less strong, circle one of the numbers in the middle.

Q1	Excellent Service Dealers will have modern-looking equipment.						
	1	2	3	4	5	6	7
	Strongly Disagree						Strongly Agree

Q2	The physical facilities at excellent Service dealers will be visually appealing.						
	1	2	3	4	5	6	7
	Strongly Disagree						Strongly Agree

Q3	Employees at excellent Service Dealers will be neat in appearance.						
	1	2	3	4	5	6	7
	Strongly Disagree						Strongly Agree

Q4	Materials associated with the service (such as pamphlets or statements) will be visually appealing in excellent Service Dealers.						
	1	2	3	4	5	6	7
	Strongly Disagree						Strongly Agree

Q5	When excellent Service dealers promise to do something by a certain time, they will do so.						
	1	2	3	4	5	6	7
	Strongly Disagree						Strongly Agree

Q6	When a customer has a problem, excellent Service Dealers will show a sincere interest in solving it.						
	1	2	3	4	5	6	7
	Strongly Disagree						Strongly Agree

Q7	Excellent Service Dealers will perform the service right the first time.						
	1	2	3	4	5	6	7
	Strongly Disagree						Strongly Agree

Q8 Excellent Service Dealers will provide their services at the time they promise to do so.

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

Q9 Excellent Service Dealers will insist on error-free records.

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

Q10 Employees in excellent Service Dealers will tell customers exactly when services will be performed.

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

Q11 Employees in excellent Service Dealers will give prompt service to customers.

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

Q12 Employees in excellent Service Dealers will always be willing to help customers.

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

Q13 Employees in excellent Service Dealers will never be too busy to respond to customer's request.

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

Q14 The behaviour of employees in excellent Service Dealers will instil confidence in customers.

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

Q15 Customers of excellent Service Dealers will feel comfortable in their transactions.

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

Q16 Employees in excellent Service Dealers will be consistently courteous to customers.

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

Q17 Employees in excellent Service Dealers will have the knowledge to answer customer's questions.

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

Q18 Excellent Service Dealers will give customers individual attention.

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

Q19 Excellent Service Dealers will have operating hours convenient to all their customers.

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

Q20 Excellent Service Dealers will have employees who give customers personal attention.

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

Q21 Excellent Service Dealers will have the customer's best interest in heart.

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

Q22 The employees of excellent Service Dealers will understand the specific needs of their customers.

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

Listed below are five features pertaining to Services Dealers and the services they offer. This section is intended to determine what you think the importance of these features is to your customers.

Please allocate a total of 100 points among the five features. More points should be allocated to the more important features. Please ensure that the points you allocate to the five features add up to 100.

1	The appearance of the Service Dealer's physical facilities, equipment, personnel and communication materials.	
2	The Service Dealer's ability to perform the promised service dependably and accurately.	
3	The Service Dealer's willingness to help customers and provide prompt service.	
4	The knowledge and courtesy of the Service Dealer's employees and their ability to convey trust and confidence.	
5	The caring, individualized attention the Service Dealer provides its customers.	
	TOTAL	100

Appendix H

Cronbach's Alpha Calculation

Cronbach's alpha measures how well a set of items measures a single dimension. The coefficient of alpha can be calculated by using the following equation (Starview, 2004)

Cronbach's alpha = (number of item/(number of item -1)) * ((Variance of the total score – sum of the variances of the items)/Variance of the total score)

In this case, the number of items in the tangible dimensions is 4. The variances of each of the item were calculated by using the descriptive statistics function in Excel and the variances are as follows:

Question 1: 1.99
Question 2: 2.01
Question 3: 1.45
Question 4: 1.53
Sum of the variances: 6.98

Variance of the total scores was calculated by obtaining the variances of the total score across all the items within the dimension. Item 1 to item 4 is the different scores of P-E. The fifth column is the sum of the first 4 columns. The variance was calculated based on the number shown in the fifth column - which is 17.51

	Item 1	Item 2	Item 3	Item 4	Sum
Respondent 1	0	0	0	-2	-2
Respondent 2	4	0	0	-1	3
Respondent 3	0	0	0	1	1
Respondent 4	1	1	0	-1	1
⋮	⋮	⋮	⋮	⋮	⋮
Respondent 89	0	0	0	0	0
Respondent 90	-1	-1	-1	-1	-4

By substituting all the numbers into the above equation, the coefficient of alpha would equate to:

= (4/(4-1))*((17.51-6.98)/17.51)
= 0.80

The remaining coefficient alphas were calculated with the same method.

Appendix I

Tables of respondents' data

Weighted SERVQUAL Scores and Weighting of each Dimensions

	Dealers	First visit?	Other vehicles from a different manufacturer	Age Range	Income Range	Tangibles	Reliability	Responsiveness	Assurance	Empathy	Weighted Score
1	Dealer 1	no	yes	25-34	200-299	20	20	20	20	20	**-0.590**
2	Dealer 1	yes	yes	>55	400-550	10	70	10	5	5	**0.120**
3	Dealer 1	no	no	25-34	200-299	20	30	10	30	10	**0.270**
4	Dealer 1	no	yes	35-44	> 550	5	50	30	10	5	**-0.928**
5	Dealer 1	no	yes	>55	>550	10	20	10	30	20	**-0.310**
6	Dealer 1	no	yes	>55	400-550	10	50	20	10	10	**-0.205**
7	Dealer 1	no	yes	25-34	300-399	10	30	10	10	40	**0.240**
8	Dealer 1	no	yes	35-44	150-199	20	20	20	20	20	**0.100**
9	Dealer 1	no	no	45-55	400-550	15	25	25	20	15	**-0.335**
10	Dealer 1	no	yes	35-44	>550	20	30	30	10	10	**0.200**
11	Dealer 1	no	yes	45-54	400-550	10	40	25	15	10	**0.010**
12	Dealer 1	no	yes	35-44	400-550	5	40	20	20	15	**-0.193**
13	Dealer 1	no	yes	35-44	150-199	10	30	25	20	15	**0.060**
14	Dealer 1	no	no	45-54	> 550	20	30	20	20	10	**-0.030**
15	Dealer 1	yes	yes	35-44	300-399	5	60	20	10	5	**0.058**
16	Dealer 1	no	yes	>55	>550	10	40	10	30	10	**-0.800**
17	Dealer 1	yes	yes	35-44	300-399	10	5	40	15	30	**0.095**
18	Dealer 1	no	no	<25	<149	5	50	25	15	5	**-0.408**
19	Dealer 1	no	no	35-44	<149	10	30	20	30	10	**-0.125**
20	Dealer 1	no	yes	35-44	200-299	5	30	30	30	5	**0.148**
21	Dealer 1	no	yes	35-44	300-399	20	30	20	20	10	**0.070**
22	Dealer 1	yes	yes	25-34	300-399	30	40	10	10	10	**0.155**
23	Dealer 1	no	yes	45-54	400-550	10	40	25	15	10	**0.168**
24	Dealer 1	no	yes	>55	300-399	10	30	30	20	10	**0.205**
25	Dealer 2	no	yes	25-35	200-299	15	35	20	20	10	**-0.943**
26	Dealer 2	no	no	>55	150-199	5	20	40	30	5	**-0.843**
27	Dealer 2	no	no	45-54	300-399	70	20	0	10	0	**1.115**
28	Dealer 2	no	yes	45-54	400-550	20	40	5	30	5	**-0.118**
29	Dealer 2	no	yes	25-34	200-299	10	50	20	10	10	**-0.295**
30	Dealer 2	no	yes	45-54	300-399	20	30	20	10	20	**-0.650**
31	Dealer 2	no	yes	35-44	200-299	10	40	20	10	20	**-0.610**

	Dealers	First visit?	Other vehicles from a different manufacturer	Age Range	Income Range	Tangibles	Reliability	Responsiveness	Assurance	Empathy	Weighted Score
32	Dealer 2	yes	yes	25-34	<149	20	30	30	10	10	**-0.440**
33	Dealer 2	yes	yes	35-44	200-299	10	25	25	20	20	**1.068**
34	Dealer 2	no	yes	23-34	<149	30	25	25	10	10	**-0.248**
35	Dealer 2	no	no	35-44	300-399	5	30	30	20	15	**-0.303**
36	Dealer 2	no	yes	45-54	400-550	15	30	20	20	15	**-1.333**
37	Dealer 2	no	yes	45-54	300-399	10	40	15	20	15	**0.390**
38	Dealer 2	no	yes	45-54	400-550	10	40	20	10	20	**-1.075**
39	Dealer 2	no	yes	35-44	200-299	10	50	20	10	10	**-0.330**
40	Dealer 3	no	yes	35-44	150-199	15	15	15	15	40	**-0.007**
41	Dealer 3	no	yes	45-54	< 149	20	20	20	20	20	**-0.050**
42	Dealer 3	no	yes	35-44	300-399	10	30	15	30	15	**-0.808**
43	Dealer 3	yes	yes	25-34	150-199	10	10	10	60	10	**-0.095**
44	Dealer 3	yes	yes	35-44	300-399	15	20	20	30	15	**-0.035**
45	Dealer 3	no	no	45-54	400-550	20	20	20	20	20	**-0.260**
46	Dealer 3	no	no	35-44	<149	10	50	20	10	10	**0.125**
47	Dealer 3	no	yes	25-34	<149	15	40	20	20	5	**-1.303**
48	Dealer 3	no	yes	25-34	150-199	5	60	15	10	10	**0.198**
49	Dealer 3	no	no	35-44	150-199	15	20	30	15	20	**-0.005**
50	Dealer 3	no	yes	35-44	300-399	10	20	10	30	20	**0.090**
51	Dealer 3	no	no	25-34	< 149	5	50	10	20	15	**-0.698**
52	Dealer 4	no	yes	35-44	200-299	5	60	20	10	5	**0.108**
53	Dealer 4	no	yes	> 55	300-399	10	20	20	30	20	**-0.405**
54	Dealer 4	no	no	> 55	300-399	15	30	15	10	30	**0.418**
55	Dealer 4	no	yes	45-54	200-299	10	30	15	15	30	**-0.353**
56	Dealer 4	yes	yes	25-34	150-199	20	25	15	30	10	**-0.343**
57	Dealer 4	no	yes	45-54	400-550	0	50	20	30	0	**-0.200**
58	Dealer 4	no	no	35-44	400-550	20	25	25	20	10	**-0.175**
59	Dealer 4	no	yes	35-44	400-550	10	30	15	10	35	**0.205**
60	Dealer 4	no	yes	25-34	150-199	30	20	20	10	20	**-0.590**
61	Dealer 4	no	yes	45-54	300-399	5	45	30	15	5	**-0.005**
62	Dealer 4	no	yes	35-44	<149	20	20	20	20	20	**0.210**
63	Dealer 4	no	no	45-54	150-199	10	30	20	30	10	**0.910**

	Dealers	First visit?	Other vehicles from a different manufacturer	Age Range	Income Range	Tangibles	Reliability	Responsiveness	Assurance	Empathy	Weighted Score
64	Dealer 4	no	yes	> 55	150-199	10	10	20	30	30	**-0.645**
65	Dealer 4	yes	yes	35-44	200-299	20	40	20	10	10	**-0.170**
66	Dealer 5	no	yes	>55	< 149	5	30	30	30	5	**0.198**
67	Dealer 5	no	yes	25-34	< 149	10	20	30	20	20	**-0.245**
68	Dealer 5	no	yes	35-44	300-399	0	40	20	30	10	**0.470**
69	Dealer 5	no	yes	45-54	150-199	20	50	15	10	5	**0.025**
70	Dealer 5	no	yes	25-34	150-199	10	40	25	15	10	**0.540**
71	Dealer 5	no	yes	35-44	200-299	15	50	20	10	5	**-0.800**
72	Dealer 5	no	yes	35-44	<149	20	30	20	20	10	**-0.220**
73	Dealer 5	no	yes	35-44	200-299	10	35	20	15	15	**-1.030**
74	Dealer 5	no	no	25-34	<149	15	50	15	10	10	**-0.630**
75	Dealer 6	no	yes	35-44	200-299	5	60	10	15	10	**-1.190**
76	Dealer 6	no	no	> 55	> 550	15	40	25	15	15	**-1.025**
77	Dealer 6	yes	yes	45-54	200-299	10	25	25	25	15	**-0.618**
78	Dealer 6	no	yes	35-44	150-199	20	35	10	15	20	**-0.233**
79	Dealer 6	no	yes	> 55	> 550	10	30	20	10	30	**-0.375**
80	Dealer 6	no	yes	25-34	150-199	20	20	30	20	10	**0.650**
81	Dealer 6	no	no	25-34	150-199	20	20	20	20	20	**0.620**
82	Dealer 6	no	no	45-54	200-299	5	40	25	20	10	**-0.993**
83	Dealer 6	no	yes	35-44	200-299	15	30	20	15	20	**0.005**
84	Dealer 6	yes	no	< 25	< 149	10	50	20	10	10	**0.745**
85	Dealer 6	no	no	35-44	300-399	15	35	25	15	10	**-0.785**
86	Dealer 6	no	no	35-44	< 149	5	50	30	10	5	**-0.803**
87	Dealer 6	no	no	> 55	200-299	5	30	30	30	5	**0.563**
88	Dealer 6	no	yes	25-34	200-299	20	40	15	15	10	**0.663**
89	Dealer 6	no	yes	45-54	400-550	30	30	15	15	10	**-0.200**
90	Dealer 6	no	yes	35-44	200-299	10	20	30	20	20	**-0.130**

Appendix J

Association between Customers' expectations and managements' perception of these expectations (gap 1 issue)

In the questionnaire for the management staffs[12], only the expectation section within the SERVQUAL instrument is included. The 22 questions in the expectation section are intended to measure the managers' perceptions of their customers' expectations. Scores shown in table J1 are raw data obtained from managers.

Table J1 Average expectation (E) scores from managers

	Dealer 1		Dealer 2		Dealer 3		Dealer 4		Dealer 5		Dealer 6
Tangibles	**E**		**E**		**E**		**E**		**E**		**E**
Q 1	6.3		6.7		7.0		6.3		6.8		6.8
Q 2	6.3		5.7		7.0		7.0		6.8		6.8
Q 3	6.0		6.6		7.0		7.0		6.8		7.0
Q 4	4.9		6.6		6.5		5.7		6.0		6.8
Average	5.8		6.4		6.9		6.5		6.6		6.9
Reliability											
Q5	5.6		6.9		6.5		7.0		6.8		6.6
Q6	5.9		6.9		7.0		7.0		6.6		7.0
Q7	6.3		7.0		6.5		7.0		6.8		6.2
Q8	6.6		6.9		6.5		7.0		6.8		6.4
Q9	6.1		6.9		6.5		7.0		6.2		6.6
Average	6.1		6.9		6.6		7.0		6.6		6.6
Responsiveness											
Q10	6.6		6.6		7.0		7.0		6.4		6.8
Q11	6.8		6.7		6.5		7.0		6.6		6.8
Q12	6.4		6.9		7.0		6.7		6.6		7.0
Q13	6.1		6.9		7.0		7.0		4.8		6.6
Average	6.5		6.8		6.9		6.9		6.1		6.8
Assurance											
Q14	6.5		6.9		7.0		7.0		6.2		6.6
Q15	6.8		6.9		7.0		7.0		6.6		6.6
Q16	6.8		6.7		5.5		7.0		6.4		6.6
Q17	6.8		6.4		6.5		7.0		6.2		6.6
Average	6.7		6.7		6.5		7.0		6.4		6.6
Empathy											
Q18	6.3		6.6		6.0		6.0		6.4		6.6
Q19	5.8		6.7		7.0		7.0		3.8		5.2
Q20	6.5		6.6		6.0		6.3		6.2		6.6
Q21	6.5		6.9		6.5		7.0		6.6		6.6
Q22	6.6		6.9		6.5		7.0		6.6		6.8
Average	6.3		6.7		6.4		6.7		5.9		6.4

Once the scores from the managers are obtained, they are compared to the expectation scores from the customers. These values are shown in table J2.

[12] Management staffs include service manager, chief technicians and service advisors, these personnel are referred as "managers" in this study. They are responsible for managing the service workshop.

Table J2 Comparison of expectation scores (un-weighted)

	Customer	Staff
Q1	5.52	6.60
Q2	5.73	6.43
Q3	6.02	6.60
Q4	5.62	5.97
Q5	6.53	6.47
Q6	6.21	6.60
Q7	6.48	6.60
Q8	6.48	6.70
Q9	5.82	6.50
Q10	6.19	6.67
Q11	6.24	6.73
Q12	6.40	6.70
Q13	6.19	6.30
Q14	6.37	6.63
Q15	6.29	6.77
Q16	6.18	6.60
Q17	6.48	6.57
Q18	5.58	6.37
Q19	6.01	5.77
Q20	5.53	6.43
Q21	6.21	6.67
Q22	6.31	6.73

The existence of the gap between customer's expectations and management's perception of these expectations are tested and the results are shown in the table J3.

Table J3 Summary of the analysis on the expectation scores

	Expectations
Pooled Variance	0.0851
Degree of freedom	42
t Stat	-4.6506
P(T<=t) one-tail	0.0000
t Critical one-tail	1.6819
P(T<=t) two-tail	0.0000
t Critical two-tail	2.0180

This test is suggested by Zeithaml *et al*. (1990: pp.66-68) to measure gap 1 - the discrepancy between customers' expectations and managements' perceptions of these expectations. The hypotheses being tested are:

H_1 : *Customers' expectation and the managements' perception of these expectations are different*

H_0 : *Customers' expectation and the managements' perception of these expectations are the same*

In this case, the expectation scores between the customers and that of the front line staff members are tested. A t-value of -4.65 is obtained, which is in the rejection region on the distribution graph. Therefore, the null hypothesis can be rejected. Thus there is a difference between customers' expectation and the staffs' perception of these expectations and the difference is statistically significant. In looking at the managements' perceptions on customers' expectations, table J2 show that managers overstate customers' actual expectations for every dimension of SERVQUAL. This shows that management overstate customers' expectations and have little understanding of them.

The differences between customers' expectation and the staffs' perception of these expectations indicate gap 1 exists. The existence of gap 1 may contribute to the overall service quality gap. The association between gap 5 (overall service quality gap) and gap 1 (managements' perception of customers' expectation) are presented in figures J1 and J2. Gaps are compared at each of the five service quality dimensions within each dealership. Therefore, there is a total of 30 points in figure J1.

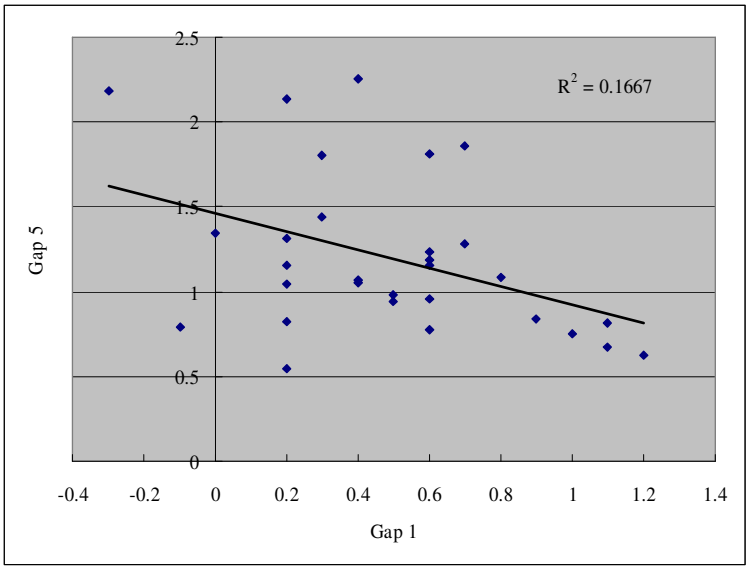


Figure J1 Association between gap 5 and gap 1

R^2 value is tested for significant correlation. The hypotheses tested are:

H_1 : *There is a linear association between gap 5 and gap 1*

H_0 : *There is no linear association between gap 5 and gap 1*

Values of the test statistic are $R = \pm 0.4082$ (square root of 0.1667), standard correlation table shows critical values (R_C) are ± 0.3061. Since 0.4082 is greater than 0.3061, the null hypothesis is rejected and there is a significant linear association between gap 5 and gap 1. Although there is a linear association between the two variables, the two variables are not strongly correlated as only 16.7% of the total variations in gap 5 about its mean are associated with the existence of gap 1.

The association is further investigated by eliminating the empathy dimension among dealerships as it was indicated in previous test that there is a significant difference in this dimension between dealerships. Therefore, there is a total of 24 points in figure J2.

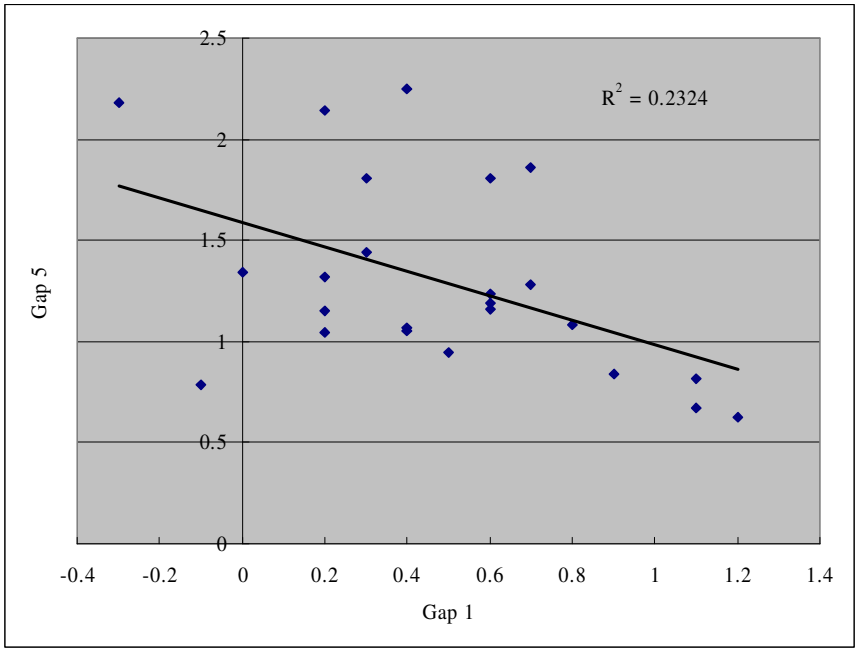


Figure J2 Association between gap 5 and gap 1 (excluding empathy dimension)

R^2 value is tested for significant correlation. The hypotheses tested are:

H_1: *There is a linear association between gap 5 and gap 1*

H_0: *There is no linear association between gap 5 and gap 1*

Values of the test statistic are $R = \pm 0.482$, standard correlation table shows critical values (R_C) are ± 0.4044. Since 0.482 is greater than 0.4044, the null hypothesis is rejected and there is a significant linear association between gap 5 and gap 1. Although there is a stronger correlation between the two variables when the empathy dimension is excluded, only 23% of the total variations in gap 5 about its mean are associated with the existence of gap 1.

A significant difference occurs between managers' perception of, and customers' actual expectations. Mangers overstate customers' actual expectations and have little understanding of them. Consider associating the discrepancy in customers' expectations and managers' perception on such expectations (gap 1) on the one hand,

and the discrepancy between customers' expected services and perceived service delivered (gap 5) on the other. Gap 1 explains less than a quarter of the overall service quality gap (gap 5 is influenced by four other gaps) and only measuring gap 1's influence on gap 5 by least squares gives an optimistic indication as to the importance of gap 1 in controlling the service quality gap. It is possible that other gaps may be more important, especially when coupled to the lack of understanding that managers has in estimating customers' expectations. Managers may find other gaps associate more with service quality more but more research is needed. Further studies may look into other gaps (gaps 2 to 4) within the model as to identify their contribution towards the overall service quality gap.

Appendix K

The Influence of the Level of Service Quality by Other Service Providers

Customers who own different brands of vehicle may approach a different dealership for maintenance work. These customers will be exposed to differently branded service dealerships and will have different levels of expectations. Therefore, it is useful to investigate whether this factor will impact the outcome of the service quality scores. From figure 5.2, 74.4% of the respondents own another vehicle from a different manufacturer. Their service quality scores are compared by using the t-test and the results are as follows:

Table K1 T-test result of customers who own other vehicles

Pooled Variance	0.2720
Degree of freedom	88
t Stat	0.5860
P(T<=t) one-tail	0.2797
t Critical one-tail	1.6624
P(T<=t) two-tail	0.5594
t Critical two-tail	1.9873

The null hypotheses being tested are:

H_1 : *Service quality is dependent of whether the customer owns other vehicles or not*

H_0 : *Service quality is independent of whether the customer owns other vehicles or not*

The t-test was carried out at a 95% significant level; a t-value of 0.586 indicates the null hypothesis cannot be rejected, which means the difference is statistically insignificant and service quality is not dependent on whether the customer owns other vehicles or not.

Appendix L

Comparison between CSI Scores, Perception Scores and SERVQUAL Scores

In this section, weighted SERVQUAL scores, Perception scores and the CSI scores are compared. Results are shown in table L1.

Table L1 Comparison of CSI, Perception and SERVQUAL scores

Dealers	CSI Scores	Perceptions Scores[13]	SERVQUAL Scores
Dealer 1	85.6	89.4	-0.084
Dealer 2	79.7	82.1	-0.308
Dealer 3	76.2	85.4	-0.237
Dealer 4	83.5	87.9	-0.074
Dealer 5	79.1	82.9	-0.188
Dealer 6	83.4	85.7	-0.194

The CSI scores published by the company are compared to the SERVQUAL scores and the perception scores obtained during the study. The CSI scores are based on the measurement of customers' perceptions only (questions are shown in Appendix C), instead of the difference between perceptions and expectation as in the case with the SERVQUAL scores. The perception scores obtained in the study and the CSI scores are compared first, followed by the comparison of the SERVQUAL scores to the CSI scores. These results are plotted in figure L1 and L2 respectively. Each sample point represents one dealership.

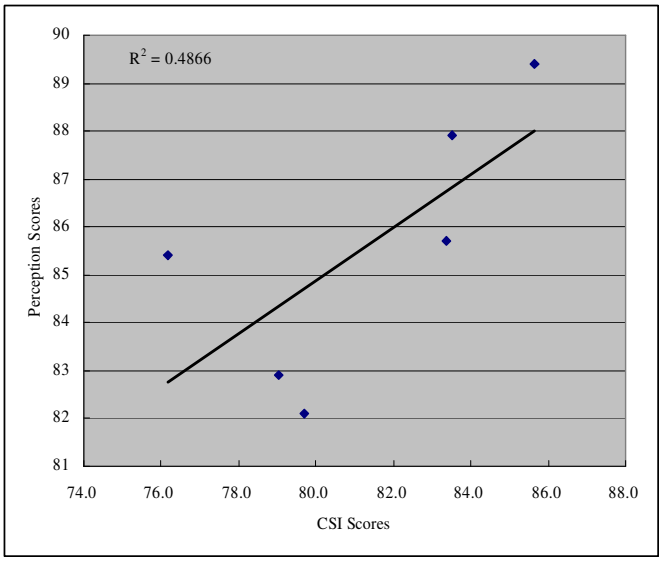


Figure L1 Comparison between Perception scores and CSI scores

[13] Perception scores shown in this table is out of 100. These values are converted from the original scores in order to facilitate the comparison to the CSI scores.

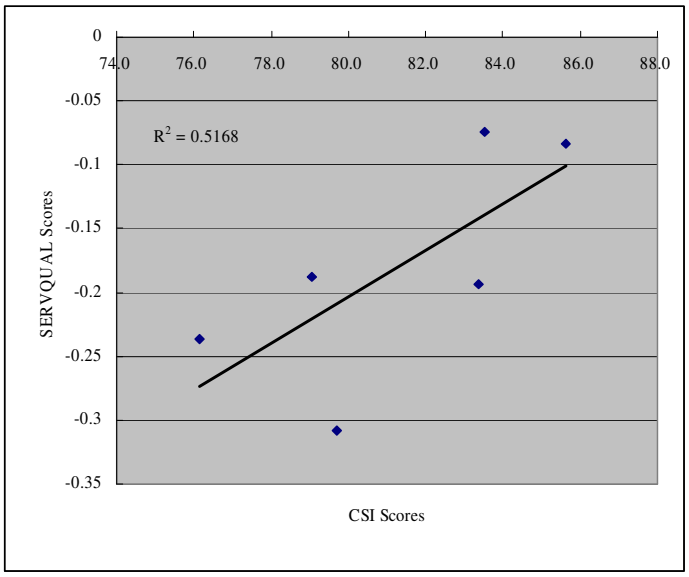


Figure L2 Comparison between SERVQUAL scores and CSI scores

In these comparisons, CSI scores are more correlated to the SERVQUAL scores than the Perception scores (0.5168>0.4866).

R^2 values shown in figure 5.8 and 5.9 cannot be tested for significance as the sample size is much smaller than 30. Therefore, no conclusive comments may be drawn from the two figures.

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