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UNIVERSITY OF KWAZULU-NATAL

**How the ISO 9001:2008 Quality Management System affects the Rubber and Plastics
Industry of South Africa.**

By

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**A dissertation submitted in fulfillment of the requirements for the degree of
Master of Business Administration**

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Faculty of Management Studies**

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DECLARATION

I, Vinodachandra Gowda declare that:

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ABSTRACT

The International Organization for Standardization is one of the most popular quality management systems in the modern business environment. The International Organization for Standardization (ISO) and Total Quality Management (TQM) interface the quality management systems within an organization. Over the last decade, the International Organization for Standardization has established a variety of quality management systems such as ISO9001:2008; ISO14001:2004; ISO10002:2007; ISO13485:2003; ISO9000:2005, ISO 9000:2008, ISO14971:2007; ISO18000:2007, and other ISO quality management systems are facilitating many professionally-run the businesses. This research topic, however, investigates how the ISO 9001:2008 quality management system affects the rubber and plastics industry of South Africa.

This research is based on the qualitative and quantitative methods used to ascertain how the ISO 9001:2008 quality management system affects the rubber and plastics industry of South Africa. Samples are selected randomly at 95% confidence levels with a margin of error of 5%. The study was also retrospective in that it relied on the data collected from individuals who had been exposed to the ISO9001:2008 quality management system in the rubber and plastics industry in a South African manufacturing environment.

The ISO 9001:2008 quality management system distinguishes between the end results and the means of achieving organizational objectives. The final recommendation after the in-depth discussion in Chapter Six is aimed at improving levels of product and service quality; the reduction of product cost; an improvement in the working relationship between employer and employee; increasing customer satisfaction; offering confidence to suppliers, competitors, investors and in business ventures in general, while attaining greater profitability in the rubber and plastics industry of South Africa in particular.

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CHAPTER ONE

Overview

1.1 Introduction

In today's quality-driven market, it is not the product or service itself that matters most, but the perceived value to the customer of the entire relationship with product quality. The way companies measure the quality of their product and services has evolved from internal and external customer satisfaction. The ISO 9001:2008 quality management system is an integrated management system involving both the customer and the organization. Furthermore, every chapter highlights the research objectives and how the ISO 9001: 2008 quality management system affects the rubber and plastics industry of South Africa.

Chapter one sets out a brief introduction of each chapter of the research study, with the motivation behind the study followed by the focus of the study. A problem statement is then explored, followed by the objectives of the study. Limitations of the study are articulated; the relevance of the remaining five chapters of the study are detailed and expounded upon regarding the reliability and validity of the study.

The literature review in Chapter Two expanded on the background to the ISO 9001:2008 quality management system and how the concept resulted in an organization to establish standards and techniques ensuring the quality of products leaving the factory. Further-more looked at ISO 9001:2008 quality management system benefiting product performance, features, reliability, conformance, durability of the products, serviceability, aesthetics, and other quality-related elements. The literature review outlined how management systems interacted with resource management systems, product realization, measurement analysis and improvement. The effect of the ISO quality management system on an industry is also highlighted in this chapter.

Chapter Three discussed the sampling strategy and how the research method deployed qualitative and quantitative methods. The Qualitative data-collection strategy for this study was put together by carefully considering the data sources, data instrument, and measurement questions that appeared on the questionnaires - this provided valid and

reliable data. The literature review in Chapter Two was completed by using primary data comprising ISO quality-management journals, books, SABS, ISO9001:2008 registered companies and internet sources. From these sources, qualitative information was gleaned, thereby improving the structured, quantitative questionnaire. The secondary data was established by a theoretical background to the study on the effect of the ISO 9001:2008 quality management system on management and employees in the rubber and plastics industry of South Africa.

Chapter Four presented data on the reliability and validity of the survey in the form of descriptive and inferential statistics. The results were presented in the form of graphs, cross-tabulations and problem statements of the data. These results indicated that the ISO 9001:2008 quality management system has a significant effect on the rubber and plastics industry in South Africa.

Chapter Five discussed the research finding of ISO9001:2008 - elements such as resource management, product realization, measurement analysis and improvement and continual improvement in an organization, provided an in-depth relationship of the study objectives.

Chapter Six outlined the implication of the research, recommendations for future study and the conclusion of the research study within the rubber and plastics industry of South Africa.

1.2 Motivation for the Study

The motivation for this study was that an ISO9001:2008 quality management system could assist certified companies suffering with poor-quality production, unrest between employees and employers as well as customer dissatisfaction.

This study focuses on the ISO 9001:2008 quality management system elements influencing quality production in improving the overall performance of an organization. The ISO 9001:2008 quality management system elements, such as continual improvement of performance standard goals, achievement of a zero defect- customer requirement, are focused on.

1.3 Focus of the Study

In this chapter the following will be addressed: the problem statement, the purpose of the study, the significance of the study and the research objectives. The focus of the study is the various elements of the ISO 9001:2008 quality management system.

An ISO 9001:2008 Quality Management System identifies various processes and techniques that are required, in order to establish a sound platform for the interaction between;

- Top management commitment: ISO clause 5;
- Resource management: ISO clause 6;
- Product realization: ISO clause 7;
- Measurement analysis and improvement; ISO clause 8;
- Continual improvement, discussed throughout the study.

The above five elements, the driving force, were judged to be the most dominant and influential within the ISO 9001:2008 quality management system of the rubber and plastics industry of South Africa.

This study is unique, owing to all these elements covered being related to the rubber and plastics industry, analysed and detailed for use by the ISO 9001:2008 quality management system. This study offers feedback from the overall perspective of the rubber and plastics industry of South Africa.

The research methodology focuses on the collection of data from the rubber and plastics industry. The respondents were sourced primarily from interaction with those who worked in the rubber and plastics industry from whence the relevant data was obtained. Qualitative data-gathering was established; phenomenological discussions were held on results of the questionnaire conducted between September 2010 and October 2010 and obtained from 105 respondents (Appendix One).

The focus of the research is on both quantitative and qualitative perspectives in order to ascertain the effects of the ISO 9001:2008 quality management system on an industry. In developing these substantive studies, the researcher has drawn upon work experience in the field, which knowledge contributed to the topic in question, assisting in understanding quality management systems in national and international operations.

This is empirical work in that new, primary data from survey (questionnaire) was collected for analysis in this study. To relate to what follows, this research offers a qualitative and quantitative paradigm with a methodological approach, underpinned by a realistic, scientific result for the rubber and plastics industry.

1.4 Problem Statement

The problem statement revolved around ISO9001:2008 quality management systems. The ISO 9001:2008 Quality management systems is a major focus of business throughout the world where various organizations develop. The ISO standards and guideline terms such as Quality Management Systems, quality control, and quality assurances have acquired different, sometimes conflicting meanings from country to country; within a country and even within an industry.

Technological invention, globalization and external affects the current business environment by influencing the product quality, cost, delivery, and availability in the market place. This situation creates a major challenge for employees and employers to meet customer requirements. Customer requirement is an important component of the business environment, as both employees and employers try to design operating systems that produce outputs having the attributes desired by the customer. The attributes of organizational outputs - product quality, cost, availability and features determined by the organization's operating management systems, have become more problematic. Furthermore sub problem such as Human Resource issue; Employee recruitment issue; Company resource issue; People management issue; Company future strategy; Product development; Corrective and preventive cost; Internal Auditing cost; Customer satisfaction these issues are interacting in daily basis in to-day's business environment.

The focus of this research is on how an ISO 9001:2008 quality management system affects the rubber and plastics industry of South Africa. Today most companies have an ISO9001:2008 quality management system in place, nevertheless industry is suffering from high employee turnover; product quality becomes a key strategic objective issue, these factors affecting company profitability.

The ISO 9001:2008 quality management system elements support continual improvement of every aspect of an organization's operations at the professional level, equally, the sustainability of both employers and employees meeting customers' requirement. This includes every activity, every decision, every element of behaviour of every employee and employer. This presents severe challenges to the traditional thinking of management, bringing to it the human dimension as seen in resource management, product realization, measurement analysis and improvement.

1.5 Research Questions

The research questionnaire covered the following aspects of the ISO 9001:2008 quality management system elements:

- Resource management (HR, training, employee turnover, people management).
- Product realization (planning, quality and product development issue) Good manufacturing practices(product cost, time).
- Measurements analysis and improvement (Internal audit, corrective and preventive measures, customer feedback method).

The purpose of the research questionnaire is to meet the study objectives. There are two types of research method that can be associated with various types of research design. These are the quantitative and the qualitative methods. These research methodologies establish the nature of the relationship between theory and research and the degree to which the natural science approach is an appropriate framework for the study of businesses.

The quantitative data-collection strategy for this study was decided upon after carefully considering the data sources, data instrument, and measurement questions that appeared on the questionnaires, which provided valid and reliable data. The literature review in Chapter Two was completed by using secondary data which comprised ISO Quality Management Systems journals, books, SABS, ISO9001:2008 registered companies and internet sources, all of which provided the qualitative information and improved the structured quantitative questionnaire.

Bryman & Bell (2007) stated that quantitative approach deals with numerical measurements. It is typical of the mainstream scientific approach to psychology, the preferred methodologies of this discipline being empirical, hypothetic, deductive and experimental psychology. Trochim (2006) discussed that the Likert-style questionnaire is one which is able to show that each item of the questionnaire has a similar psychological weight in the respondent's mind, and that each item is making a statement about the same structure (Bryman & Bell 2007).

The structure of the Likert scale used was based on responses such as 'Strongly agree', 'Agree', 'Disagree' and 'Strongly disagree' which defined in (Appendix one).

1.6 Objectives

The performance of the rubber and plastics industry is a measure of the product's primary operating characteristics, since performance can usually be measured in specific quantitative terms. A product's performance characteristics are often compared with company resource management, product realization, measurement analysis, together with continual improvement in an organization.

The main study objectives focused on the following aspects of the ISO 9001:2008 quality management system's principles; that required an improved working relationship between employer and employee; product quality and continual improvement of an operation to meet customer and stakeholders' requirements based on:

- Resource Management. (Human Resource issue; Employee recruitment issue; Company resource programme; People management issue; Company Future Strategy).
- Product Realization.(Product quality, Product development, Product cost, Product delivery).
- Measurements analysis and improvement (Corrective and Preventive cost; Internal Auditing benefit; Customer satisfaction).

1.7 Limitations of the Study

This research was non-experimental in that there was no intervention in the ISO 9001:2008 quality management systems process; the study was, however, retrospective in that it relied on the data collected for individuals who had been exposed to the ISO system in the rubber and plastics industries in the South African manufacturing environment.

The main limitation of the study has been the time and cost, which did not meet the recommended variables such as sampling techniques, target respondents, administration of questionnaires and sample error. To access information from the South Africa Bureau of Standards (SABS) such as contact details (email addresses and telephone numbers) proved to be another limitation.

1.8 Summary

This chapter introduced the broad field of the study and also explored the need or motivation for the study and identified those who would benefit from the study. The chapter set out the broad parameters or focus of the study and identified what would not be covered by this study. A problem statement to be addressed was offered and research objectives articulated. The study highlighted how an ISO 9001:2008 quality management system affected the rubber and plastics industry of South Africa. This research covered various elements of the Quality Management System such as resource management systems, product realization, measurement analysis and improvement and continual improvement. The next chapter focuses on a review of the related literature study of an ISO 9001:2008 quality management system and its effects on the rubber and plastics industry.

CHAPTER TWO

Literature Review

2.1 Introduction

This Chapter will focus on how the ISO 9001:2008 quality management system affects the rubber and plastics industry of South Africa. ISO 9001:2008 quality management system is process approach towards achieving high-quality products throughout the operation. Furthermore these process approaches will interact between internal and external customer satisfaction and also meet statutory and regulatory requirements will be given rubber and plastics industry of South Africa.

The aim of this study is to enhance customer satisfaction through the effective application of the ISO 9001:2008 quality management system, to the benefit of both employers and employees. The ISO 9001:2008 quality management system comprises five principles: management responsibility, resource management, product realization, measurement analysis and improvement, and continuous improvement.

ISO Standards... (9001:2008) stated that quality management systems are designed to focus on the process approach method. This method develops process implementing, while improving the effectiveness of quality management systems interfacing with ISO 9001:2008 Clauses 4 to 8 of the (ISO Standards...9001:2008).

2.2 Definition of the ISO 9001:2008 Quality Management System

The ISO 9001:2008 Quality Management System (QMS) has become a popular tool, guiding business practices in a variety of areas of quality management.

David & Michael (2008) stated that the ISO 9001:2008 quality management system approach is not left to a few quality controllers; each employee has the responsibility for ensuring that the product that is produced within any industry using ISO standards is of top quality, in other words, that the outputs are of a very high standard and are fit for usage (David & Michael 2008).

Michael (2008) stated that the effect of the ISO 9001:2008 Quality Management System is to set employee and employer behaviour in relation to a process which embraces everyone within an organization. This determines their relationship with the outside world; customers, suppliers, competitors, society and the external environment (Michael 2008).

Mark, Nicholas & Richard (2003) stated that the ISO 9001 Quality Management System (QMS) displaying the behavioural relationship between employee and employer distinguishes between the end results and the means of achieving them. The end result should be the continual improving of levels of quality, product and service, thus continuously reducing cost and providing increasing levels of customer satisfaction, which together lead to greater profitability (Mark, Nicholas & Richard 2003).

Plames (2006) stated that to achieve this objective, people must interact with the process. This interaction will lead to attaining the end of customer satisfaction, stemming from meeting the need of the consumer. The ISO 9001:2008 quality management system interacts with and encompasses the determination of the customer needs, combining this with delivering a quality product (Plames 2006).

Koc (2007) stated that the ISO 9001:2008 quality management system affects employees and employers equally; this includes the goals and objectives of every aspect of an operation based on the fastest pace that the employee and management can sustain. This includes every activity, every decision, every element of behaviour of every manager and every employee. This brings together both product quality and the human dimension, presenting severe challenges to our traditional thinking of management. In 2000, ISO 9001 standards were revised significantly so that their structures were helpful to the way in which organizations are managed (Koc 2007).

William (2005) stated that the wording of the ISO 9001:2008 standard was made generic so that it is applicable to a wider variety of business sectors, including government services, business enterprises, manufacturing and service industry. All effective organizations recognize that the real value of pursuing certification is internal. In order to

achieve certification, the organization must develop the discipline necessary to sustain performance excellence in the rubber and plastics industry of South Africa (William 2005).

2.3 Overview of the ISO 9001:2008 Quality Management System

Naveh & Erez (2006) stated that the International Organization for Standardization (ISO) is the world's largest standards-developing organization. The development of the International Organization for Standardization (ISO) took place originally in 1947, and is still being updated to the present day. The ISO organization has published more than 18 000 International Standards, ranging from standards for activities such as agriculture and construction, through mechanical engineering, to medical devices and information technology (Naveh & Erez 2006).

Maliah & Nik (2004) stated that ISO is a non-governmental organization forming a bridge between the public and the private sectors. The many members and institutes are part of both individual entities and governmental structures of their respective countries, or entities that are mandated by their government. In addition, other members have their roots uniquely in the private sector, having been set up by national partnerships of industry associations. ISO systems therefore enable a consensus to be reached on solutions meeting both the requirements of business and the broader needs of society (Maliah & Nik 2004).

Donna (2009) stated that the continued growth within international trade has revealed a need for a set quality standard to facilitate the relationship between suppliers and purchasers. The creation of the ISO 9000 series of international standards began in 1979 with the formation of a technical committee, with participants from 20 countries, named the international organization for standardization. This Geneva-based association developed and continues to revise and update the standard. The nickname ISO has its origin in the Greek word 'isos', meaning 'equal'. The intent is to make equal comparisons between industries (Donna 2009).

Heras & Gavin (2002) stated that the ISO standards facilitate the multinational exchange of products and services by providing a clear set of quality systems meeting both public and government requirements. Steve (2000) discussed that the ISO created quality management

systems standards in 1987. They were the ISO 9000:1987 series of standards comprising ISO 9001:1987, ISO 9002:1987 and ISO 9003:1987; which were applicable to various types of industry, based on the type of activity or process: designing, production or service delivery. The standards are reviewed every five years by the International Organization. Bamford & Deibler (2003) discussed the version in 1994. It was termed the ISO 9000:1994 series, consisting of the ISO 9001:1994, 9002:1994 and 9003:1994 versions. The last major revision was in the year 2008 and the series was called the ISO 9000:2000 series (Heras & Gavin 2002).

Gorden (2003) stated that the ISO 9002 and 9003 standards were integrated into one single certifiable standard: ISO 9001:2008. After December 2003, organizations holding ISO 9002 or 9003 standards had to complete a transition to the new standard. The ISO released a minor revision, i.e. ISO 9001:2008 on 14 October 2008. This contains no new requirements. Many of the changes were to improve consistency in grammar, facilitating translation of the standard into other languages for use by over 950,000 certified organizations in 175 countries. As at December 2007 the ISO 9004:2009 document gives guidelines for performance improvement over and above the basic standard ISO 9001:2000 (Gorden 2003).

The Evolution of ISO Standards

Years	ISO Standards' Descriptions
1947	MIL Q9858- Quality Programme
1968	NATO-AQAP-QC Systems
1970	UK MOD -05-08(AQAP 1)
1972	BS 4891- Guide to Quality Assurance
1974	BS 5179 Operational Evaluation of a QA System
1979	BS 5750 Quality Systems
1984	Revised BS 5750 Quality Systems
1987	ISO 9000:1987 Conceive management systems
1994	ISO 9000:1994, 18 elements of the management systems
2000	ISO 9000:2000 Major changes in the systems, user friendly and five elements of the management systems
2008	9001: ISO 9001:2008, the standard revised

Table 2.1 The Evolution of ISO 9001:2008 Quality Management Systems.

2.3.1 ISO 9001:2008 Certification Process,

Owen (2002) stated that many countries have formed accreditation bodies which authorize certification, and audit organizations applying for ISO 9001 compliance certification. Although commonly referred to as ISO 9000:2000 certifications, the actual standard to which an organization's quality management can be certified is ISO 9001:2008. The accreditation bodies and the certification bodies charge fees for their services. The various accreditation bodies have mutual agreements to ensure that certificates are issued by one of the accredited bodies recognized worldwide (Owen 2002).

Jackson & David (2005) stated that the organization applying for accreditation must be assessed. Such accreditation must be based on an extensive sample of its sites, functions, products, services and processes and a list of problems, corrective action requests, or non-compliance must be made known to the management. Steve (2000) argued that the accreditation body will (if there are no major problems on this list, or after it receives a

satisfactory improvement plan from the management of the applying organization showing how any problems will be resolved) issue an ISO 9001 certificate for each geographical site it has visited (www.iso.org). The ISO9001 certificate is not a once-for-all award, but must be renewed at regular intervals recommended by the certification body, usually about every three years (Jackson & David 2005).

2.3.2 Advantages of the ISO 9001:2008 Quality Management System

Terlaak & King (2006) stated that organizations having successfully received ISO 9001:2008 quality management systems, can list a wide variety of advantages. Terlaak & King (2006) argue that three of these are universal. By achieving the ISO 9001:2008 quality management system, organizations are laying down the foundation of good quality systems. Maintaining an ISO 9001:2008 quality management system means that systems and processes are reviewed regularly through organizational discipline. This will be beneficial for both employees and employers. As an internationally-recognized standard, ISO 9001:2008 provides access to markets and suppliers worldwide (Sharma 2005). Organizations that have achieved quality management systems cite increased revenue as a major benefit, through increased retention of satisfied customers in the rubber and plastics industry of South Africa (Terlaak & King 2006).

Gorden (2003) stated that another advantage of the ISO 9001:2008 quality management system, recognized globally, is that the ISO 9001:2008 quality management system allows companies to expand their geographic market, gaining new business investment, organizational profitability, employee benefits, customer satisfaction and avoidance of litigation (Barnes2008). Another advantage is that the new customer who requires the ISO 9001:2008 quality management system will be in compliance with their suppliers. The ISO 9001:2008 has become particularly necessary as companies purchasing their supplies worldwide have had to deal with inconsistent quality products (Gorden 2003).

Palmes & Paul (2009) discussed that the advantage, of the ISO 9001:2008 quality management system is as a link between their suppliers and their customers in order to create a continual quality-improvement chain. Michael (2008) argued that existing customer benefits from the ISO 9001:2008 quality management system, also the ISO

9001:2008 requirements have been improved product and service quality (Palmer & Paul 2009).

Tague (2005) states that the ISO 9001:2008 quality management system's high cost is counterbalanced by the advantage an organization receives when using the requirements as a guide to improve their processes. Quality becomes more consistent and the percentage of first-time jobs correctly done increases when applying the ISO standard...(2008), The advantage of the quality procedure: upgraded record keeping and the removal of redundant operations also dramatically improves an organization's effectiveness while facilitating international trade (Tague 2005).

Davis, Aquilano & Chase (2004) stated that the ISO 9001:2008 quality management system's advantages revolved around internal organizations' benefiting from reduction of costs, minimizing of rework, improved customer satisfaction, reduced customer support costs, improved productivity, reduction of corrective and prevention cost, and ultimately providing both internal and external customer satisfaction in the rubber and plastics industry of South Africa (Davis, Aquilano & Chase 2004).

2.3.3 ISO 9001:2008 Disadvantages

Dearing (2009) stated that the common criticism of the ISO 9001: 2008 quality management system is the amount of money, time and paperwork that is required for registration. (Barnes 2008; Donna 2009) discussed that obtaining the ISO 9001:2008 quality management system is a time-consuming and costly process, depending on the current state of an organization's quality system, employees' training hours, production down time and cost of preparation of the process (Dearing 2009).

Greene (2002) stated that the disadvantage of maintaining the ISO 9001:2008 quality management systems in the organization is the risk of failure depending on the size of the company, the strength of the organization's existing quality systems, and the number of plants within the company requesting quality management systems and also major process improvement. A further disadvantage of the management system is the extra burden of

paperwork; also, top management, without an understanding of the ISO 9001:2008 quality management systems' information, can find itself beset by problems (Greene 2002).

Steven (2004) stated that the disadvantage of the ISO 9001:2008 quality management system is that the standardized procedures such as the quality manual (QM) are not maintained. Standard operation procedure (SOP), work instruction (WI) product specification (PS) and organized information go a long way towards preventing errors leading to poor quality products and services (Steven 2004).

Hooper (2002) stated that one of the disadvantages of the ISO 9001:2008 is that it promotes the focus on specification, control, and procedures rather than understanding and improvement. The ISO 9001:2008 is effective as a guideline, but promoting it as a standard misleads companies into thinking that certification means better quality, undermining the need for an organization to set its own quality standard. The reliance on the specifications of ISO 9001 does not guarantee a successful quality system. The added cost to certify and then maintain certification may not be justified if the product end-users do not require ISO 9000. The cost can actually put a company at a disadvantage when competing against a non-ISO 9001:2008 quality management system company (Hooper 2002).

Roger (2007) stated the standard 9001:2008 is seen as especially prone to failure when a company is interested in certification before quality. The ISO 9001:2008 quality management system is in fact often based on customer contractual requirements rather than on a desire actually to improve quality. Roger (2007) also stated that "If you just want the certificate on the wall, chances are, you will create a paper system that doesn't have much to do with the way you actually run your business," Greene (2002) stated that the ISO's certification by an independent auditor is often seen as the problem area because the top management strategy issue is the business interaction (Roger 2007).

Liebesman (2006) stated that in the final process the company or organization that has been independently audited and certified to be in conformance with ISO 9001 may publicly state that it is 'ISO 9001:2008 certified or ISO9001 registered'(ISO Standard ...2008). The

certification to an ISO 9001:2008 standard does not guarantee any quality of end products and services; rather, it certifies that formalized business processes are being applied (Liebesman 2006).

2.4 ISO 9001:2008 Quality Management Systems Process

Sharma (2005) stated that the ISO 9001:2008 is the process-orientated approach. The standards focus on a quality- management system requiring the identification of quality management processes as well as their sequence and their interactions with key business processes. King & Lenox (2001) discussed the quality management system, describing the organizational structure, procedures and resources necessary to manage quality and to afford customer satisfaction. The 9001:2008 requirements are described in “what a company must accomplish in order” to meet customer expectations (Brumm 2003). How these goals are accomplished, however, is left to the particular company (Sharma 2005).

The ISO 9001:2008 quality management system integrates processes encompassing both customer and company. The integration process applies the following principles helping organizations to run both effectively and systematically:

- Customer focus
- Leadership
- Involvement of people
- Systems approach to management
- Process approach & continual improvement approach

These are the five ISO management-system principles. The ISO 9001:2008 standards are based on these five business principles as defined by the ISO 9001:2008 document (ISO Standard ...2008); these principles focus on business processes relating to different areas of the operation.

2.4.1 Customer focus

Hooper (2002) stated that in today’s customer-driven market it is not the product or service itself that matters most, but the perceived value to the customer of the entire relationship

with a company and the way companies measure the quality of their products and services. There has been an evolution from internal quality assurance to external customer satisfaction; this process integrates the ISO 9001:2008, quality management systems (Hooper2002).

Leonard (2008) argued that the current global business environment is extremely competitive. Quality is a dynamic component because today's consumers are more than willing to switch from supplier to supplier looking for a better service or better product availability and price or for several other reasons. To retain customers, effective organizations need to focus on determining and then providing customer requirements. Schiller (2009) discussed that today's micro/macroeconomic, situation demands that customers' needs, wants and expectations are met (Leonard 2008).

Lakhal, Pasin & Liman (2006) discussed that the customer focus is a most important element in the 9001:2008 quality management system, Clause 5.2, ISO standard...(2008) defined that the employer / top management focuses on efforts to serve the needs of its customers. This means that the organization must monitor how its external customer requirements may be changing; also how customers perceive the quality of its products and service in relation to those of its competitors in the rubber and plastics industry of South Africa (Lakhal, Pasin & Liman 2006).

Rao, Ragu, & Solis (2009) stated that the customer focus depends on quality based on the customer's actual experience of the product, as evidenced by processes such as conformance, reliability, durability and aesthetics (Rao, Ragu & Solis, 2009) 'Customer focus' includes two meanings (Foster 2007) defined the characteristics on the ability to satisfy needs while keeping products free of deficiencies. Furthermore, Dr. W. Edwards Deming defines quality as 'non-faulty systems'. Dr. Joseph Juran describes quality as 'fitness for use'. Dr. Armand Feigenbaum's definition states that "quality is a customer determination based on the customer's actual experience with a product or service and its requirements" (Rao, Ragu, & Solis 2009).

Davis, Aquilano, & Chase (2004) stated that the ISO 9001:2008 quality management system customer satisfaction and customer perception of the quality must be taken into

account in setting acceptable quality levels. The translating of customer quality demands into specification requires marketing to determine accurately what the customer wants; product designers must develop a product that can consistently achieve that desired level of quality (Davis, Aquilano & Chase 2004).

Rao, Ragu & Solis (2005) stated that product designer an understanding of various dimensions of product realizations process including the voice of the customer specifications. The quality of its design product is the quality of its conformance to that design process. The design quality's inherent value of the product in the market place is thus a strategic conformance quality refers to the degree to which products meet design specifications (Rao, Ragu & Solis 2005).

Plames (2009) discussed that the operation function and the quality management system within organizations are primarily concerned with quality conformance. Achieving all the quality specification for manufacturing products is typically the responsibility of management. Both design quality and conformance quality should provide products that meet the customer's objectives for such products. This is often termed the product's fitness for use and entails identifying those dimensions of the products that the customer wants, developing ISO 9001:2008 quality management system programme to ensure that these dimensions are met (Plames 2009).

2.4.2 Leadership

George & Jones (2006) stated that leadership is a powerful tool if used properly. Leadership is the process by which a person exerts influence over other people and inspires, motivates, and directs their activities to help achieve organizational goals. Leaders provide direction to improve the performance of man and machine to raise the quality, to increase output and simultaneously to bring pride of workmanship to people (Kreitner&Kinicki 2008). The ISO 9001:2008 quality management system's clause 6, ISO standard... (2008) detailed problems relating to people and their improvement. These problems are usually very complex, owing to extreme factors that are involved e.g., their background and culture of diverse peoples, ethnic and technological inventions and how these affect quality. The leadership process should be the compelling way in which an

organization manages change while meeting customer requirements. The commitment to quality management systems can come only from leaders (George & Jones 2006).

Smith & Cronje (2007) argued that for an organization to be committed to an ongoing focus of providing customer satisfaction, its leadership must align this expectation to three levels: the overall organizational goals and objectives; the organization's processes; and the performance of individuals during their day-to-day activities. The leadership must define systems and ISO standards that support the overall organizational goals and quality, with the objective of improving customer satisfaction (Smith & Cronje 2007).

Kreitner & Kinicki (2008) stated that leaders provide direction and purpose for an organization. Leaders are the people who realise that there is compelling reason to change the way an organization operates. Employees can learn that co-operation can be established if groups of staff members stand under the command of an individual leader (Smith & Crowje 2007). Leadership, therefore, presupposes that one individual has the ability or knowledge to influence others on a continuous basis and to act in a specific, desirable way in order to achieve the quality objective such as customer satisfaction, customer perception, production performance and organizational profitability (Kreitner & Kinicki 2008).

Ehlers & Lazenby (2007) stated that leadership starts at the executive level and cascades down the whole organization. (Sharma 2005) stated that leadership is a strategic rather than an operational commitment made by top management: the strategic management team is a driving force behind the transformation of their business through the ISO 900:2008 quality management system. Their culture is defined as a pattern of shared beliefs and values that provide the members of an organization with rules of behaviour when conducting operations. George & Jones (2006) stated that the effective leader applies a missionary passion to the job, thereby creating an organizational culture focused on creating value for their customers (Ehlers & Lazenby 2007).

Hellriegel, Jackson, Slocum, Staude, Amos, Klopper, Louw & Oosthuizen (2006) stated that leadership is not something for which a formula can be drawn up, through systems

such as the ISO 9001:2008 quality management system. This is mainly owing to the requirements for leadership that are derived from the specific situations in which action has to take place; because situations differ. Kreitner & Kinicki (2008) argued that leadership takes a decision-strategic approach from top management, owing to the ISO 9001: 2008 quality management system's dictation of the integration process between the organizational process and customer requirements (Hellriegel et al .2006).

Pinho (2008) stated that leadership and the ISO 9001:2008 quality management systems are integrated into the process, thus encouraging people to create value for their organization. The organization's strategic objectives include willingness to undertake a process of learning that will challenge employees' preconceived notions of good management practice, with management willing to change personal behaviour, willing to support and coach others through a journey of self-discovery. The manager undertakes to demonstrate commitment by action; he is a patient leader who uses his talent to train staff, supplying skills to serve the rubber and plastics industry in South Africa (Pinho 2008).

2.4.3 Involvement of people

Leonard &Mc Guire (2007) stated that people involvement is the most important part of the ISO9001:2008 quality management system approach. The involvement of people includes employee trust, communication, motivation, leadership, team building and respect. As these factors change, many employees seek changes in fringe benefits (Leonard &McGuire2007).

Terlaak & King (2006) stated that communication is an important part of the ISO standards clause 5.5.3; (ISO standards...2008) stated that the employer's job should be to supply a direct personal link between the employees and management at higher levels. An employer has a clear responsibility to communicate downwards to staff and an employee has the responsibility to communicate upwards to his superior. Smith & Cronje (2007) stated that employers must obtain and pass on sufficient relevant information about the job, the department and the organization as a whole. The communication will clearly outline how to work intelligently and with enthusiasm in order to maintain the effectiveness of the ISO 9001:2008 quality management system. Rajan & Tamimi (2003) stated that top managers

must take the lead by demonstrating their personal commitment to continual improvement. This can be done by effective communication based on listening; and employer-training programmes based on employees' behaviour and attitudes. When management behaves in a manner consistent with the values and beliefs implicit in a quality management system, only then can management expect its workforce to improve in behaviour (Terlaak & King 2006).

Benner & Veloso (2008) stated that the ISO 9001:2008 quality management system affected the employer's behavioural component which is concerned with building an environment in which people can realize their full potential through mutual trust, respect and mutual support between employer and staff. Leonard & McGuire (2007) stated that the quality management system starts at the top but should permeate the workplace. Management will fail, however, without the full involvement of employees. Since it is understood that workers know more about their jobs than management does, their input is vital to improving the ISO 9001:2008 quality management system. It is a manager's responsibility continually to train employees, motivating them in the methods of the Quality Management System (QMS), thereby involving them in management decisions. Management must also listen to their suggestions for system change, working to implement those changes (Benner & Veloso 2008).

Barnes (2008) Deming management philosophy suggested an environment that promotes unity, creating a comfortable environment for discussing problems and suggesting solutions. Managers need to work at breaking down barriers between departments, so that interactive discussion can take place. The perception of fear of personnel's interaction with management must be eliminated. Russell (2007) argued that managers should focus on a way that assists the company to achieve its goals, while meeting the customer's requirements, encouraging competition between workers, so that they can focus on individual results rather than process results: employers should empower the people in that organization (Barnes,2008).

Jay & Barry (2008) stated that the ISO 9001:2008 quality management system motivated the organization to promote quality and product standardization, providing information,

guidance and education in this connection, with a view to promoting the general and ‘material welfare of everyone concerned’ (Rao, Ragu & Solis 2005) discussed that to achieve the organizational objective, human performance is crucial. An organization does not function well without competent people. Neither does it excel without competent, motivated employees and employers (Jay & Barry 2008).

Smith & Crowje (2007) stated that people involvement is the key issue in the ISO 9001:2008 quality management system; the integrating process in the human resources management is relevant. In clause 6.2 within ISO 9001:2008 the necessity of competence is stated, when personnel perform work affecting product quality. Training must be provided in order to satisfy these needs; to evaluate the effectiveness of the action taken to the achievement of the quality objective and to meet the customer requirement (ISO Standard 2008). Siplely (2003) argued that effective organizations seek out and employ effective people. These employees are the ones who understand how their jobs fit into the overall scheme of providing products and services to the customer. Their knowledge, skills and efforts are invaluable to the rubber and plastics industries of South Africa; for this the human resources selection is important, which means “the right people in the right place to perform the task” (Mc Guire, 2008). The ISO 9001: 2008 quality management system integrates human resources processes to achieve involvement of people and company objectives; all team members should understand the goals while committing to the process approach method (Smith & Cronje 2007).

2.4.4 Systems approach to management

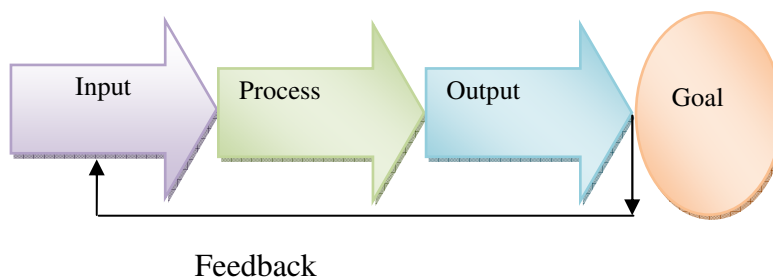


Figure 2.1

Systems approach

Adapted from: Hunter.C, 2000, *Managing people in South Africa*, 2nd ed. July 2000.University of Natal Pietermaritzburg.

Figure 2.1 demonstrates the main components of a systems approach to management, with a process that converts the inputs and the outputs from the system, the feedback of energy and information and the elements making up the systems as a whole. Figure 2.1 demonstrates the best way of explaining a management systems approach.

Smith & Crowje (2007) stated that the systems approach to management started developing during the 1950s; to a large extent it formed the basis for the development of more recent approaches such as Total quality management (TQM) and the ISO 9001:2008 quality management system, which focuses on achieving a very high level of quality and customer satisfaction. Robbin (2007) stated that during the 1990s, ISO developed and popularized the learning organization, which is in many ways a development of TQM and the ISO 9001:2008 quality management system. The latest South African systems approach should be widely adopted for the re-engineering of jobs and the organization as a whole, to achieve competitiveness (Russell 2007). The ISO 9001:2008 quality management system's framework as depicted in Figure 2.2 is a helpful way of viewing, from a systems approach, organizations and people that work in such organizations. It illustrates a framework for managing people, helping in the understanding of relevant concepts and terminology (Smith & Crowje 2007).

Russell (2007) argued that the process approach has 'input' with customer requirement and employee involvement as well as ISO 9001:2008 requirements such as a quality plan, quality objectives, and employer commitment. The 'process' which converts the inputs into products (systems approach to managements) are the 'output' of the ISO 9001:2008 quality management system. This output must be produced in sufficient qualitative and quantitative measures, ensuring that the system can achieve its company goals (internal and external customer satisfaction) through the organizational profit-making in the rubber and plastics industry of South Africa. In order to maintain 'feedback' systems the ISO 9001:2008 quality management system facilitates the process which will benefit both employers and employees in an organization (Russell 2007).

2.4.4.1 Goals

Staw & Epstein (2005) stated that an organization exists for the purpose of achieving specific goals so as to meet customer satisfaction. The ISO 9001:2008 sub-clause 5.2 stated that customer focus clearly defined goals for the organization as a whole. The organizational goals should first be set; the department and individual employees' goals should be based on organizational goals so that everybody in the organization works in unity to achieve the organization's objectives (Staw & Epstein 2005).

2.4.4.2 Outputs

Greene (2002) stated that the output is the improvement component of the ISO9001:2008 quality management system, starting not with the inputs or the process, but with customer requirements and the extent to which the outputs can meet those needs. In order, therefore, to satisfy customer needs, the outputs are products that must be supplied in the required quality and quantity and at the right time and cost (Greene 2002).

2.4.4.3 Processes

Sharma (2005) stated that the ISO 9001:2008 quality management system integrates the conversion processes - these are all activities involved in producing and delivering the outputs, i.e. the method and technique used for manufacturing. The ISO Standard talks about the 'first step'. ISO 9001:2008 standards sub-clause 7.5 mentions which steps will help the organization to survive in the long term. The process objective, however, must be clear to employees, i.e. to achieve quantity and quality while remaining cost effective less rework must be involved; while customer satisfaction must be upheld; this, rather, than the organization's being intent only on making profit. The 'second step' in the ISO 9001:2008 standards sub-clause 7.4, is efficient purchasing method processes, in the sense that the best use is made of the inputs. The third step in the ISO 9001:2008 standards sub-clause 5, 5.1 is processing methods which are constantly reviewed and improved where necessary to ensure high levels of efficiency and productivity (Sharma 2005).

2.4.4.4 Feedback

Tague (2005) argued that the feedback mechanism within the ISO 9001:2008 quality management system comes in a variety of forms and from various sources, these being

given in ISO sub-clause 8 - measurement analysis and improvement, ISO section 8.2 - monitoring and measurement, 8.3 - control of non-conforming products, 8.4 - analysis of data; improvements - this includes revenue and information from the market place. This feedback mechanism is critical for the survival of the industry, e.g. Without income generated, the business will become bankrupt; also, without day-to-day employee information, business may be negatively affected in that it will not be able to react quickly enough to changing circumstances (Tague 2005).

Serenko, Bontis & Hardie (2007) stated that in order to evaluate the degree of success or failure of an organization, management and employees must compare the information that is fed back to them with set standards such as forecasts or budgeted sales volumes and revenue, so that action can be taken where necessary to ensure that standards are met. Sandford (2005) argued that the ISO 9001:2008 quality management system principles such as the systems approach management are essentially the controlling functions of employees and management, dependent on accurate and quick feedback of information in the rubber and plastics industry of South Africa (Serenko, Bontis & Hardie 2007).

Kumar, Choisine & U Kumar (2009) argued that the feedback mechanism is important in ensuring the success of the rubber and plastics industry of South Africa. The feedback must be in place: the ISO 9001:2008 quality management system sub-clause points out: 4.2 Documentation requirement, 4.2.2 Quality manual, 4.2.3 Control of documentation, 4.2.4 Control of records, 8.5 Improvement of measuring and recording the information similar to ISO Sub-clause 5.6 Management review. This information is required by various departments, managers and employees - how much raw material is wasted in a production department; all such waste needing to be weighed each day and a record kept of these figures. Both employees and employers concerned should have up-to-date knowledge of these figures (the feedback) so that they are aware of any problems, taking corrective action to resolve them. Other feedback includes customer focus; the ISO standards sub-clause 5.6.2 suggests review of input and feedback from products, service and quality. The systems approach to recording both positive and negative customer reactions, is important, giving a balanced picture of what customers feel about products and services; this information should be fed back to as many employees in the organization as possible,

enabling the rubber and plastics industry to become more customer-orientated in South Africa (Kumar, Choisne & U Kumar 2009).

2.4.4.5 Input

Jacobs, Chase & Aquilano (2009) stated that inputs vary according to operational factors such as materials, money, people, land, buildings, management technology, information etc. (Jacobs, Chase & Aquilano 2009).

2.5 Employee relationship ISO 9001:2008 Quality Management System

Leonard (2008) stated that the ISO 9001:2008 quality management system integrates the relationship between the internal and external customer. The internal customer relationships are the ways in which people react or behave in understanding one other. Levinson (2001) pointed out that the process-approach management concept of relationship includes formal business transactions between departments within organizations and between people in the organization as well as the numerous ways in which people interact informally. The ISO standards clause 6.2 (Resource Management) stated that the ways in which people relate to one another depends on a wide variety of factors such as their attitudes towards others, their values, goals and simply whether they like one another or not. The ISO 9001:2008 quality management system describes relationships that can be negative, thereby decreasing the production efficiency and effectiveness of the organization. Relationships can of course, conversely, be positive, depending on customer feedback (Leonard 2008).

Thomas (2005) stated that the ISO 9001:2008 quality management system chooses a positive interpersonal relationship which helps the organization to achieve its goals and to be competitive. Having positive relationships, however, does not mean that there will never be any conflict, but that, if there is conflict between people, this conflict would be resolved constructively rather than destructively, to the benefit of the rubber and plastics industry (Thomas 2005).

Faster (2007) stated that the ISO 9001:2008 quality management system focuses on the important aspect of relationships in networking, referring to the way in which

organizations and people connect or link up with one other to exchange products, services, information and ideas. Sandford (2005) stated that networking exists at different levels within organizations and between them; this does not necessarily coincide with the formal organizational structure and communication channels within the ISO9001:2008. In sub-clause 5.5.3 (internal communication), Donna (2009), stated that interaction between employer and employee is extremely important for the success of business and for the people within those businesses. The obvious example of modern networking is the internet which is rapidly becoming an important communications channel for doing business (Faster 2007).

2.6 The ISO 9001:2008 Quality Management System affects employers.

Terziovski, Power & Shoal (2003) stated that the systems approach points to the ISO 9001:2008 quality management system integrating employees' motivation and employers' ideals and goals: employers have, then to motivate employees. Ackerman (2006) states that productivity must be stimulated, lines of communication must be established and cooperation must be fostered at all levels. Donna (2009) argued that the end goal will be accomplished effectively only through the ISO 9001:2008 quality management system if manager and entrepreneur find more knowledge on their functional areas in the industry (Terziovski, Power & Shoal 2003).

Jacoba, Chase & Aquilano (2009) discussed that the ISO 9001:2008 quality management system affects the employers; they must be given comprehensive training about quality concepts so that they will commit to the concept. Zu (2009) stated that the employee recognition (motivation) reinforcements for employee efforts and achievements should be planned and offered at different levels throughout the organization (Jacoba, Chase & Aquilano 2009).

2.7 Process Approach and Continual Improvement.

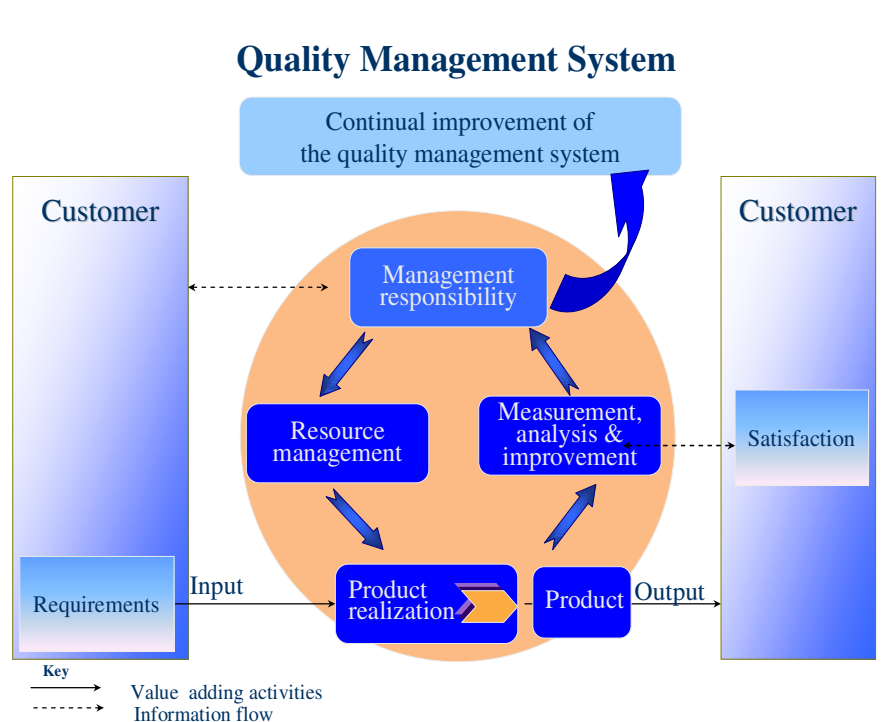


Figure 2.2 **The Process Approach**
 Adapted from; SANS 9001:2008. *Model of a process-based quality management system.*
 P(vi) ISO 9001:2008, 4th ed. South African National Standard (SABS)

Figure 2.2 illustrates the interrelationship between the ISO 9001:2008 quality management system and the business processes: Product Realization Processes (PRP), Measurement, Analysis and Improvement Processes (MIP), Management Responsibility Processes (MRP), Resource Management Processes (RMP), are all organized into a Plan-Do-Check-Act loop, fulfilling the organizational objective.

The processes approach diagram is further broken down into its sub-processes, as defined in the QMS Processes diagram figure 2.2. The process approach 9001; 2008 QMS procedures that cover all the key processes in the business, such as monitoring processes to ensure that they are effective, keeping adequate records, checking output for defects, taking appropriate and corrective action where necessary, regularly reviewing individual processes and the quality system itself for effectiveness, and facilitating continual

improvement to the benefit of both employer and employee in the rubber and plastics industry of South Africa.

Naveh & Marcus (2007) stated that the process approach model as indicated in Figure 2.2 is structured for the continual improvement process in order for an organization to function effectively. Hooper (2002) discussed that an activity or set activities using resources, managed in order to enable transformation of inputs into outputs, can be considered a process. Often the output from one process directly forms the input for the next (Naveh & Marcus 2007).

Russell (2007) argued that the application of a system of processes within an organization, together with the identification and interaction of those processes, and their management to produce the desired outcome, can be referred to as the process approach. The process approach implementation of quality improvement to operations requires movement from the philosophical concept of the ISO to a strategic framework for implementation to benefit employees and employers in the rubber and plastics industry of South Africa. The process approach map gives a clear picture of the organization's various activities revolving around the ISO 9001:2008 quality management system process (Russell 2007).

2.7.1 Management Responsibility

Michel (2008) stated that the ISO 9001:2008 system starts with top management commitment; he argued that the established procedures for managing the quality management system describe the responsibilities and actions required for compliancy with mandatory and statutory requirements in South Africa. McGuire & Dilts (2008) stated that the ISO 9001:2008 quality management system integrates QMS systems, on the strategic, tactical and operational decision-making level, thereby assisting top management in making the correct decisions (Michel 2008).

Corbert, Montes & Kirsch (2005) maintained that top management represents the relatively small group of managers controlling the organization, with whom the final authority and responsibility for executing the management processes rest. Top management, also known as 'strategic management' is usually responsible for the organization as a whole, likewise

for determining its mission, goals and overall strategies. Top management is concerned mainly with long-term planning, designing of the organizational structure, leading the organization by means of control through the top executives. Top management is also responsible for investigating, evaluating and adopting the quality management system of the organization (Corbert, Montes & Kirsch 2005).

Sharma (2005) stated that the tactical management role revolves around the ISO 9001:2008 quality objectives and the quality policy of the quality management system. King & Lenox (2001) argued that lower management is responsible for the compatibility of the product realization process, installation, servicing, inspection and test procedures and applicable documentation. Top management manages their employees; processes scheduling, production cycle time, supplier partnerships and supply chains inbound and outbound. The ISO 9001:2008 quality management system updates, where necessary, quality control, inspection and testing techniques, including the development of new instrumentation to meet customer satisfaction (Sharma 2005).

2.7.2 Resource Management

Bamford & Deiber (2003) stated that resource management processes are resource availability and deployment of elements within the rubber and plastics industry of South Africa; such resources as processes, equipment, infrastructure, raw materials and effective employee training programmes (Wayhan 2007). There simply is not enough money, time, energy, labour, machinery, or material available. Strategic planning and communication aims to improve the use of these precious resources. The (ISO 9001:2008 clause, 5.1, P3) clearly states that top management strategy shall provide evidence of its commitment to the development and implementation of the quality management system and shall continually improve its effectiveness by communicating to the organization the importance of meeting long-term customer needs as well as statutory and regulatory requirements, (McGuire & Dilts 2008) spoke of establishing quality objectives, conducting management reviews, employee training programmes, employee involvement in the management systems and ensuring the availability of resources (Bamford & Deibler 2003).

David & Michel (2008) stated that the employer's participation is part of the ISO 9001:2008 quality management system; employers must give comprehensive training to employees to run the management systems effectively. Greene (2001) stated that resource management should consider employee recognition, for instance motivation: this should be reinforced in that employee efforts and achievements should be planned for and offered at different levels throughout the organization (David & Michel 2008).

David & Alan (2009) stated that the ISO 9001:2008 quality management system takes into account employee motivation; employers must be motivated, productivity stimulated, lines of communication established and co-operation fostered at all levels. Michael (2006) argued that systems will only effectively be accomplished through the ISO 9001:2008 quality management system if managers and entrepreneurs obtain more knowledge in their functional area (David & Alan 2009).

2.7.3 Product Realization Processes

ISO 9001:2008(E), ISO Clause 7 (2008) overviewed the product realization process. The ISO process revolved around four fillers such as planning of production, customer-related process, design and development and purchasing.

Donna (2009) stated that production planning starts with customer requirement or market demand and current plant capacity. Furthermore, in the planning process the ISO 9001:2008 quality management system facilitates the sales and marketing process to help give better customer service, lower inventory customer lead times; stabilizing production rate and giving top management confidence (Donna 2009).

White, Rawland & Thomas (2009) stated that the planning process needs cross-functional support such as sales, operations, human resources, finance, and product development. The process is designed to help a company obtain demand while keeping supply in balance; this also over time. Balancing supply and demand is essential to the proper running of a business. The ISO 9001:2008 quality management system's planning of product realization states that the organization shall determine the following as appropriate quality objectives and requirements for the product: the need to establish process documents and to provide

resources specific to the product required: verification, validation and monitoring, measurement inspection and test activities specific to the product and the criteria for product acceptance (ISO 9001:2008(E), ISO Clause 7...2008) (White, Rawland & Thomas 2009).

Liebesman (2006) stated that, the ISO 9001:2008 quality management system improves the customer-related process in meeting customer satisfaction. Furthermore, Liebesman (2006) discussed that a customer–supplier partnership is a long-term relationship between a buyer and supplier, characterized by teamwork and mutual understanding of the process (Liebesman 2006).

William (2005) stated that the supplier is considered an extension of the buyer’s organization. The partnership is based on commitment, the buyer providing a long-term contract and using fewer supplies. Suppliers implement quality assurance processes so that incoming inspection can be minimized; non-conforming products can be scrutinized, so that the quality of the product is improved, along with maximized profits (William 2005).

Rabbitt (2004) stated that the product realization processes interlink with benchmarking, which is a process that many firms choose in order to compare their performance against that of another firm, establishing their performance in the marketplace. Benchmarking entails a continual improvement process. Benchmarking assessment using the ISO 9001:2008 quality management system documentation SOP (Standard operating procedure) occurs when a company is ISO 9001:2008 certified (Rajan & Tamimi 2003). The ISO 9001:2008 standard was developed to help the rubber and plastics industry of South Africa effectively to document the quality systems that they needed to create and implement in order to maintain an effective total quality system (Rabbitt 2004).

King & Lenox (2001) stated that the ISO standard covers areas such as process management and quality assurance and serves as a guide during benchmarking. Comparisons can be made between the company’s existing systems and those required by the ISO 9001:2008 quality management system. In addition, a gap analysis technique is used to study the difference between actual and planned progress. This allows

organizations effectively to learn where their efforts should be focused in relation to their strategic plans. The gap analysis is a critical component of a measurement system because it drives organizational change (King & Lenox 2001).

2.7.4 Measurement, Analysis and Improvement Processes

Jeff (2002) stated that the ISO 9001:2008 quality management system (ISO Clause 8) shall plan and implement the monitoring, measurement analysis and improvement processes (ISO9001:2008,Clause 8, P12) needed to demonstrate conformity to product requirement, ensuring conformity of the quality management system, continually improving the effectiveness of this quality management system (Jeff 2002).

Russell (2007) stated that the first step is the internal audit. The ISO 9001:2008 system can be implemented so as to ensure that the system is working properly. Russell (2007) stated that the organization can then choose to be audited by an independent external auditor, who can issue a certificate announcing to the world and to its customers that the organization has an effective and recognized system. Palmes (2006) stated that the ISO 9001:2008 quality management system introduces suitable procedure, necessary work instructions, planning and implementing of internal management audits to verify whether management activities and related results comply with planned arrangements, determining the effectiveness of the management system (Russell 2007).

Gorden (2003) argued that the second step, control of non-conforming product must be put into place. The ISO 9001:2008 quality management system ensures that all products that do not conform to specified requirements are prevented from unintended use or installation. The control provides for identification, documentation, evaluation, segregation and disposal of the non-conforming product. It defines the responsibilities for establishing and maintaining the various functions of the ISO 9001: 2008 system. Gorden (2003) and Dearing (2009) insisted that that all non-conforming products be reworked to meet the specified requirements, via concession approval; alternatively, they should be rejected (Gorden 2003).

Koc (2007) discussed the third step, Corrective Action: the ISO 9001:2008 quality management system's affecting an appropriate procedure for the implementation of corrective action has been established. Naveh (2006) stressed that corrective action taken to eliminate the causes of non-conformance, shall be appropriate to the magnitude of the problems, and commensurate with the risks encountered. Leonard (2007), The ISO 9001:2008 (clause 8.5.2) deals with effective handling of customer complaints and reports of product non-conformities; an investigation of the causes, the non-conformities relating to product, process and the management system. The results of such investigations shall be recorded in accordance with prescribed procedures. Corrective action will ensure the effective application of conformity (Koc 2007).

Tague (2005) spoke of the fourth step; preventative action; The ISO 9001:2008, Clause 8.5.3 was established for implementation of any preventative action. Sharma (2005) suggested that preventative action be instituted to eliminate the causes of potential non-conformances; it shall be appropriate to the magnitude of problems and commensurate with the risks encountered. Tague (2005) argued that this procedure shall include an investigation of the causes of non-conformities relating to product, process and the management system. The results of such investigations should be recorded in accordance with prescribed procedures (Tague 2005).

2.7.5 Continual Improvement

Ketola & Roberts (2001) stated that the continuous improvement attitude boosts the overall quality of the processes, keeping customers well satisfied. Levinson (2001) argued that improvement depends on continuous, incremental change and innovation initiated at all levels within the organization and not on periodic radical change initiated from above (Ketola & Roberts 2001).

Hooper (2002) stated that the continual improvement discussed in the ISO 9001:2008 document encompassed cost-reduction, profitability and job-creation: ISO 9001:2008... (Clause, 0.2) the adoption of a process (Hooper 2002).

Maliah & Nik (2004) argued that for an organization to function effectively, it has to determine and manage numerous linked activities. The ISO 9001:2008 quality management system set of activities, using resources and being managed in order to enable transformation of inputs into outputs, can be considered a process (Maliah & Nik 2004).

Barnes (2008) stated that often the output from one process directly forms the input to the next. The application of a system of processes within an organization, together with the identification and interaction of those processes and their management to produce the desired outcome, can be referred to as the process approach. This process approach to the implementation of quality improvement of operations requires movement from the philosophical concept of the ISO to a strategic framework for implementation. Poor tactics and lack of a strategic framework are a result of ISO standards' being ineffectually applied (Barnes 2008).

Benner & Velosa (2008) stated that the ISO 9001:2008 quality management system and its sub-processes are documented in this quality manual and in associated operational procedural and work instructions. This documentation defines the quality management system processes, their sequence and interaction, offering instruction on how to implement and apply these processes throughout the organization. The quality management system (QMS) documentation also defines criteria and methods needed to ensure that the operation and control of quality system processes remains effective. This includes assignment of responsibilities and allocation of resources for the process, instructions on how to operate the process, and definition of methods for monitoring and/or measuring the effectiveness of the process (Benner & Velosa 2008).

2.8 Customer Satisfaction

King & Lenox (2001) stated that customer satisfaction is the focus of everyone's efforts: servicing the needs of the customer is the priority. This means that the organization must monitor the changing patterns of its customer requirements (Dale 2000), noting the perception customers have of the quality of its products and services in relation to those of its competitors. The ISO 9001:2008 quality management system's (ISO 9001:2008

standards clause 5.2, p4) states that top management shall ensure that requirements are determined and met, with the aim of ensuring customer satisfaction (King & Lenox 2001).

Maliah & Nik (2004) stated that top management, includes the board of directors who lead quality management efforts. One of the first tasks for top management is to become conversant with the various theories, models, and techniques in the field. At this point top management should formulate a quality-management model suited to the nuances of its organization. Quality management models will differ from organization to organization, but each model must meet the particular organisational objectives (Maliah & Nik 2006).

Navesh & Erez (2006) stated that the continual improvement and development method identifies opportunities and integrates the improvement process into daily operations. The QMS strategy begins with the drawing up of a quality policy and quality objective statement and the establishment of an organizational framework for both managing and encouraging the involvement of all parties in attaining quality through teamwork, thus offering customer satisfaction (Navesh & Erez 2006).

2.9 Summary

There are many benefits of implementing an ISO9001:2008 quality management system in an organization, the most important being management success in business. This depends on the attitude of both employer and employee towards implementation and maintaining the ISO 9001:2008 quality management system.

The ISO 9001:2008 quality management system employs process-approach methods, on the cross-functional teams, citing the benefits by pointing out that with good facilitation, these teams can result in improved communications, increased involvement and improved quality and efficiency in a general context. Increased potential for productivity in the rubber & plastics industry of South Africa can be had by adopting the ISO 9001:2008 quality management system's principles, striving to improve the quality and cost-effectiveness of their operations and ensuring customer satisfaction.

2.10 Conclusion

This chapter discussed the ISO 9001 quality management system and how it affects employees' and employers' basic requirements for maintaining quality production. The primary objectives of the management system are to assist an organization to meet both customer requirements and regulatory requirements.

Chapter Three will deal with the qualitative and quantitative techniques of research methodology. The design of the research instrument will be detailed and reviewed. Secondary data was collected from the rubber and plastics industry of South Africa. The data-collecting method is the questionnaire. This will be reviewed and discussed in the next chapter.

CHAPTER THREE

Research Methodology

3.1 Introduction

This chapter discusses the research methodology and data-collecting techniques used to expose the positive benefits of the implementation of the ISO 9001:2008 quality management system and effects on the rubber and plastics industry of South Africa, based on:

- Resource management
- Product realization
- Measurement analysis and improvement

This research makes use of the qualitative and quantitative methods used to ascertain the relationship between the ISO 9001:2008 quality management system and quality production in the workplace. In addition, the study objectives of the research and the choice of techniques for the thesis and paradigms will be discussed.

3.2. Aims and Objectives of the Study

The aim of the study is to show the effect of an ISO 9001:2008 quality management system on the rubber and plastics industry of South Africa, based on the above 3 elements (Resource management, product realization & measurement analysis and improvement). The objective of the study involved non-experimental research as there was no planned intervention during the data collection. There are three main objectives and sub objectives of this research as detailed in Chapter One, which deals with the effects of the ISO 9001:2008 quality management systems on the rubber and plastics industry of South Africa.

3.2 Data Collecting Strategy

This research was non-experimental in that there was no intervention in the ISO 9001:2008 quality management system process. The study was also retrospective in that it relied on the data collected from individuals who had been exposed to the ISO quality management system in the rubber and plastics industry of the South African manufacturing environment.

Information containing a certified list of companies employing the ISO 9001:2008 quality management system, was obtained from the South African Bureau of Standards (SABS), inclusive of contact persons and their email addresses and telephone numbers. The SABS organization is the accredited ISO 9001:2008-certifying body of South Africa. There are more than 100 organizations that have ISO 9001:2008 accreditations in South Africa.

The samples are selected randomly at 95% confidence levels. Lind, Marchal & Wathen (2009) stated that the population size of 100, at a confidence level of 95%, and a margin of error of 5%, is applicable as a sample size.

3.3.1 Formulating Questionnaires

Trochim (2006) stated that a Likert-style questionnaire is one in which one has been able to prove that each item of the questionnaire has a similar psychological weight in the respondent's mind, and that each item is making a statement about the same structure. The structure of the Likert scale to be used is based on "Strongly agree", "Agree", "Disagree" and "Strongly disagree" responses. Uebersax (2006) stated that it is difficult to get this right, but when it is right, one is able to add up the scores on the individual items to yield a questionnaire score that one can interpret as differentiating between various opinions from completely against the questions posed to completely for the construct one is measuring (Trochim 2006).

This research questionnaire is formulated according to the Likert scale in order to measure attitudinal intensity of the relationship between the ISO 9001:2008 quality management systems and those who fall within its compass. (Merriam, 2009) maintains that the reliability and validity of the research is in evidence.

3.3.2 Data collection method

After evaluating various forms of research methodology, the questionnaire method was chosen as the data-collecting instrument; a standardized questionnaire will be interpreted the same way by all respondents. Merriam (2009) pointed out that the questionnaire can be used for both descriptive and explanatory research. Questionnaires are divided into different types: i.e. Self-administrated and interviewer-administered (Merriam2009).

Interviewer-administered questionnaires are completed by the interviewer on the basis of the respondents' answers and may be conducted either via a telephone or by a structured interview.

In this study a self-administered questionnaire was used. The questionnaire was sent via the electronic media and personal interview method was also used-the respondent was required to fill in the questionnaire and return it. One hundred people were sent emails which introduced the researcher's and the supervisor's name and contact details, assuring the legitimacy of the research. A copy of this email is contained in the appendix section of this research. The self-administered questionnaires covering the purpose of the study, were easy to fill in, given the information supplied by the researcher.

3.3.3 Random sampling

It will be almost impossible to send out questionnaires to every individual employed by the rubber and plastics industry of South Africa; a sample representing the population is required. The probability sampling method was therefore used in this study. Merriam (2009) stated that probability sampling is a sample where random selection is employed so that each individual in the population has a known chance of being selected.

When this selection of the population is used, it is generally assumed that a representative sample is the outcome of the process. Probability sampling also keeps sampling error to a minimum. Bryman and Bell (2007) stated that probability sampling, using this technique, ensures a non-random selection method. This translates to some individuals of a population having a better chance of being selected for the survey.

Trochim (2006) stated that probability sampling includes simple random sampling. Simple random sampling has an equal probability selection; this method not being subdivided or partitioned. Furthermore, any given pair of elements has the same chance of selection as any other such pair. This method minimizes bias and simplifies analysis of the results. In particular, the variance between individual results within the sample is a good indicator of variance in the overall population. This makes it relatively easy to estimate the accuracy of results (Trochim 2006).

Lind, Marchal & Wathen (2009) stated that the sampling techniques available are divided into two types, 'probability' or 'non-probability' sampling. The use of either of these techniques depends on the type of information required by the researcher. In this research, however, probability sampling was used. The probability of a value between Zero and One, inclusive, describes the relative possibility (chance or likelihood) of an event's occurring. The probability sampling scheme is one in which every unit in the population has a chance greater than zero of being selected; this probability can be accurately determined. The combination of these traits makes it possible to produce unbiased estimates of population totals by weighting sampled units according to their probability of selection (Lind, Marchal & Wathen (2009)

Bryman & Bell (2007) discussed everybody's having the same probability of selection. What makes it a probability sample is that each person's probability is known. When every element in the population has the same probability of selection, this is known as an equal probability of selection design. Such designs are also referred to as 'self-weighting' because all sampled units are given the same weight (Bryman & Bell 2007).

3.4 Research Design & Method

Loseke & Cahil (2007) stated that there are two ways research can be done via the quantitative and qualitative research technique. These two approaches too often are presented as if they were in opposition to one another, whereas they may also be used to complement one another. This study makes use of both approaches. The investigators methodological choices are always informed by their theoretical and philosophical positions (Loseke & Cahil 2007).

Denzin & Lincoln (2005) stated that the quantitative approach deals with numerical measurements. This is typical of the mainstream scientific approach to psychology. They are the preferred methodologies of empirical, hypothetical, deductive and experimental psychology. Quantitative approaches aim to test hypotheses, usually in order to identify numerical differences between the variables (Denzin & Lincoln 2005).

Creswell (2003) stated that qualitative research explores attitudes, behaviour and experiences through such methods such as interviews or focus groups. Mayers (2008) stated

that the qualitative approaches deal with how people understand their experiences. The use of these approaches in psychology is often associated with a broader theoretical critique of quantitative approaches. This critique tends to point to certain problems with naturalism, this being the application of the methods of the natural sciences to the study of social or psychological phenomena. Thus, qualitative methods in psychology aim to explore meaning, and might well be chosen for the investigation of issues which, for ethical, practical or epistemological reasons, are difficult to measure because we have a philosophical concern whether or not something can be known (Creswell 2003).

Bryman & Bell (2007) stated that qualitative research, on the other hand, may involve specific complex skills but these are not always recognized. Qualitative research, therefore, is more open to criticism. The argument ran that qualitative research was often inappropriately criticized because commentators underestimate the skills involved, and are unaware of the epistemological assumptions behind the research. If the researcher uses qualitative and / or quantitative research strategies, both methods give clear and strong evidence on the research objective (Bryman & Bell 2007).

Keith (2005) stated that whether quantitative or qualitative, these methods dictate the acquisition of the data, arrange them in logical relationships, set up a means of refining the raw data, contrive an approach so that the meanings that lie below the surface of those data become manifest, and finally issue a conclusion or series of conclusions that lead to an expansion of knowledge (Keith 2005).

It is therefore important to understand these assumptions in order to conduct and evaluate qualitative or quantitative research, deciding what constitutes valid research and which research methods are appropriate for this study.

3.4.1 Qualitative versus quantitative

Table 3.1 shows the differing features of qualitative & quantitative research methodologies James (2007). These differences offer the following relationship between the two research and data-gathering methods.

QUALITATIVE	QUANTITATIVE
All research ultimately has a qualitative grounding.	Quantitative data - everything is either 1 or 0.
The aim is a complete, detailed description.	The aim is to classify features, count them, and construct statistical models in an attempt to explain what is observed.
Researcher may in advance only roughly know what he/she is looking for.	Researcher knows clearly in advance what he/she is looking for.
Recommended during earlier phases of research projects.	Recommended during latter phases of research projects.
The design emerges as the study unfolds.	All aspects of the study are carefully designed before data is collected.
The researcher is the data-gathering instrument.	The researcher uses tools, such as questionnaires or equipment to collect numerical data.
Data is in the form of words, pictures or objects.	Data is in the form of numbers and statistics.
Subjective – individuals' interpretation of events is important, e.g. participant observation, in-depth interviews or discussions etc. are used	Objective seeks precise measurement & analysis of target concepts e.g., uses surveys, questionnaires etc.
Qualitative data is richer, more, time-consuming, and less able to be generalized.	Quantitative data is more efficient, in testing hypotheses, however, contextual details may be glossed over
Researcher tends to become subjectively immersed in the subject matter.	Researcher tends to remain objectively separated from the subject matter.

Table 3. 1

Qualitative versus Quantitative data

Source from James Neill 2007. *Qualitative versus Quantitative research* Internet available at [http:// www wilderdom.com/ research /Qualitative Versus Quantitative Research. Html](http://www.wilderdom.com/research/Qualitative%20Versus%20Quantitative%20Research.html) (Last Update 28 Feb 2007).

3.4.2 Choice of methodology

Lichtman (2006) argued that researchers think that quantitative research is better than qualitative research; however, each method has its strengths and weaknesses. The choice of method by the researcher is based on which method the researcher deems more appropriate for application to the research work. “Listen to one’s instincts, as the researcher will find it more productive to conduct the type of research with which he feels more comfortable, especially if he is to keep motivation levels high” assisted greatly in making this choice (Lichtman 2006).

Table 3.1 distinguishes the difference between each of the elements used in the two research techniques, highlighting the various focus areas. In addition, the qualitative and quantitative methods allow for in-depth investigation of people’s experiences and perceptions (Patton, 2006) and these would elicit the emotions, attitudes and experiences that comprise the ‘human factor’ in social research. Morgan (2007) stated that the human factor in social research is the ability to communicate with the respondents. By studying and interpreting respondents’ words, it is possible to gain deeper insights into and understanding of their emotions and experiences, as the following quotation suggests: “Qualitative research places emphasis on understanding through looking closely at people’s words, actions and records” (Merriam, 2009). Qualitative researchers mainly rely on interpretive critical social science where the emphasis is on experience and interpretation. The primary concern of interpretive research is to create meaning while at the same time attempting to understand situations. This ties in with the aim of the researcher to gain a deep level of comprehension regarding the perceptions of respondents and their understanding of situations.

3.4.3 Description and Purpose

The purpose of the study is covered in the literature review. It discusses the effect of the ISO9001:2008 quality management system on the rubber and plastics industry of South Africa, based on specific elements, within ISO 9001:2008, as previously stated

The scientific approach to the research was discussed, establishing that it is impossible to explore the entire problem by means of this approach because the exact nature of it varies from one scientific discipline to another. Saunders & Thornhill (2003) stated that, despite these differences, there are basic foundations that underlie the idea, drawing on the cycle of deductive versus inductive scientific reasoning,

Kultar (2007) stated that there are two very different approaches for obtaining research data: deductive and inductive research. In general, deductive research tends to proceed from theory to data (theory, method, data, findings), while inductive research tends to proceed from data to theory (data method, data, findings, theory) (Kultar 2007).

Guba &Lincon (2005) argued that the deductive research method entails the development of a conceptual and theoretical structure prior to its testing through empirical observation. Lindlof & Taylor (2002) states that inductive reasoning moves from the specific to the general; deductive reasoning moving from the general to the specific. Inductive reasoning is based on observation. Researchers using inductive reasoning find a pattern in a collection of specific observations, drawing a general conclusion based on that pattern (Guba & Lincon 2005).

3.4.4 Construction of the Instrument

Bryman & Bell (2007) stated that the research instrument discusses the research methodology implemented and understands the depth and prevalence of the ISO 9001:2008 quality management system in the rubber and plastics industry of South Africa. This is discussed under Aim and Objectives in Chapter One. Lind, Marchal &Wathen (2008) argued that quantitative researchers do not know at an early stage how their data will be analyzed. The two reasons put forward for researchers' needing to know how their data is to be analyzed are that appropriate techniques have to be matched to the variables that were

created through the research instrument; and the size and nature of the sample are likely to create challenges to the techniques deployed (Bryman & Bell 2007).

The research questionnaire emphasizes the principles of the ISO 9001; 2008 quality management system such as management responsibility, resources management, product realization, measurement analysis and improvement within the organization.

The questions used in the Likert scale to measure the ISO 9001:2008 quality management system related to the rubber and plastics industry. Each ISO principle in the questionnaire is compared with the results from the rubber and plastics industry; these results are then tested to reveal whether a significant correlation exists between the problem areas identified and the results of the ISO 9001:2008 quality management system as affecting the rubber and plastics industry.

The first few questions dealt with demographics which were important for later analysis. These included questions such as age, race, and gender. The next few questions elicited the respondents' background experience in the industry, the ISO 9001:2008 quality management system experience, total years of experience in the rubber and plastics industry and finally their functional experience.

The covering letter plays a vital role (appendix one). Bryman & Bell (2007) advised the inclusion of a covering letter in a questionnaire as it has the capacity to affect the response rate. This suggestion was therefore adopted by the researcher. The questionnaire cover page consisted of the following: introduction to the purpose of the study, the confidentiality clause, and instructions on how to complete the questionnaire.

3.4.5 Recruitment of Study Participants

The population for the research sample included all ISO 9001:2008 quality management system certified companies in the rubber and plastics industry of South Africa. The sample was selected from the rubber and plastics industry, owing to the limited time constraints of this study.

The questionnaire survey had initially been selected taking into account the large geographical spread of the rubber and plastics industry in South Africa. This method of gathering data promised to be very cost-effective and convenient for the purpose of this exploratory research. The respondents, however, could have been contacted by email to clarify their response to the questions or to motivate them to complete the questionnaires and return them to the researcher.

The questionnaires were sent out to the relevant respondents in September 2010 by e-mail, and personal interview method was also used-the respondent was required to fill in the questionnaire. The completed questionnaires were requested returned by October 2010. Fortnightly emails were sent out to the respondents to track their progress on the completion of the questionnaire and to facilitate communication between the respondents and the researcher, necessary to resolve all questions that were asked by the respondents regarding the questionnaire.

3.4.6 Pre-testing and validation

Prior to the questionnaire's being distributed, a pilot study was conducted. It was initially submitted to the supervisor for approval; ten colleagues were chosen on which the questionnaire was to be administered.

In order to improve the reliability and validity of the study it was decided that a pre-test of the questionnaire would be done. Pilot questionnaires were given by the researcher to ten colleagues. Questions that were found to be unclear and unsuitable were either removed from the questionnaire or re-worded so as to maximize effectiveness of the responses. Due consideration was given to ensure that the questionnaire did not deviate from the specified objectives. The questionnaire was pre-tested by the supervisor to ensure that:

- a) Respondents answered all questions.
- b) Questions were phrased to promote suitable responses.
- c) Questions were not biased, derogatory, nor did they make the respondent feel uncomfortable.
- d) Wording of questions did not lead the respondent.

- e) The questions answered the study objectives.
- f) Respondents could complete the questionnaire without assistance.

Bryman & Bell (2007) stated that validity is the most important criterion of research. It “is concerned with the integrity of the conclusions that are generated from a piece of research”. Validation has to do with whether or not a measure of a concept really fulfils the validity concept. The measurement validity is commonly referred to as ‘construct validity’. Validity falls into the categories of measurement validity, internal validity, external validity, and ecological validity. The measurement category is predominantly for quantitative research, in the quest for social scientific concepts. Measurement validity is related to reliability; therefore, if measuring a concept produces fluctuating results, the result is not valid. The internal validity checks whether the conclusion reached between two or more variables is reliable, e.g. if A1 causes B1, we need to be sure that only A2 is responsible for a variation in B2; and not any other external factors. In other words, how confident are we that the independent variable really is responsible for the change in the dependent variables? The external validity issue addresses the question of whether results of one study can be generalized beyond the research context. Quantitative researchers go to great lengths to ensure that their research generates representative samples. The ecological validity is concerned with whether or not social scientific findings whose instruments capture daily life conditions, opinions, values and attitudes are applicable to people’s everyday, natural, social settings. Business research sometimes produces findings that may be technically valid but have little to do with what happens in people’s everyday lives (Bryman and Bell 2007).

Saunders & Thornhill (2003) stated that the reason for checking validity is to compare the results of this survey with other well-known research. Strong similarities between other research data and this research will imply that the measurement instrument was constructed correctly. It will also mean that the random sample of respondents chosen for this survey provided responses that closely resembled those of other surveys. External validity, as previously explained, will yield a positive result (Saunders & Thornhill 2003).

The validity of the processes shows how units link, using this information to coordinate and streamline organizational processes. The ISO 9001:2008 quality management system influences the various dimensions of operational performance, e.g., operational efficiency and employee recruitment processes such that an overall improvement in the operational performance results.

3.4.7 Administration of the Questionnaire

The self-administered questionnaire survey was chosen as the primary data-collection technique over other collection methods because of the wide geographical spread of the rubber and plastics industry in South Africa. The first reason for choosing this method was the increased opportunity of contacting respondents who might otherwise have been inaccessible owing to other commitments.

The second reason for choosing self-administration of the questionnaires was the email option, which allowed respondents the freedom to complete the questionnaire at a time that was convenient for them, given that the email facility was the quickest method to contact the entire rubber and plastics industry of South Africa.

The questions contained in the questionnaire were simple and straightforward so that they would be clearly understood. Closed and open-ended questions as well as probing questions were asked to ensure objectivity in the study. One hundred questionnaires were sent out to employees of the rubber and plastics industry in South Africa. This questionnaire contained sixteen open-ended and six closed ended questions using the Likert scale to achieve the study objective

3.5 Analysis of data

The data obtained from the rubber and plastics industry reveals that those organizations that implemented the ISO 9001:2008 quality management system have found that it has had a significant impact on their functioning. Statistical analysis of the data used the statistical package MS Excel, version 2003 and SPSS.

More tests compared the observed frequencies in each category with the theoretically expected frequency, to ascertain whether any of the categories for specific questions were chosen more often or whether they were equally chosen. Thus, expected frequencies in each category were set to be equal. The testing was to determine whether the observed frequency differed significantly from the expected frequency. The 0.5 level of significance was used in most cases. This means that 5% of the time one rejects the null hypothesis when in fact it should be accepted.

The hypotheses were as follows;

H0: each category is equally likely to be chosen

H1: some categories are chosen more often

This method was applied with success to numeral and ordinal data, as is the case with these analyses while each category is mutually exclusive and the observations are independent.

The analysis of the data will be presented in the form of graphs with short descriptions of each one. Furthermore, outlines of the validity of this study, Pearson's correlation, cross-tabulations and frequency tables will be given, along with the analysis used for this study.

Lind, Marchal & Wathen (2008) stated that correlation is a numerical measure of the degree of agreement between two sets of scores from the same individuals. Correlation measures can run from +1 to -1: +1 indicates full agreement, 0 indicates no relationship and -1 denotes complete disagreement. This is not true in all circumstances, however, and is dependent on the measurement tool (Kultar 2007). A correlation therefore, describes the relationships between variables, estimating the extent to which the changes in one variable are associated with changes in the other variable. This technique will therefore be used in the analysis of data received from the target population of this study. A correlation describes the degree of relationship between two variables (Trochim 2006). A positive correlation reflects a direct relationship and one in which an increase in one variable corresponds with an increase in the other variable. Two variables which were inversely related would produce a negative correlation, indicating that an increase in one variable is associated with a decrease in the other variable, (Keith 2005). Saunders & Thornhill (2003)

stated that a correlation coefficient quantified the strength of the relationship between two quantifiable variables. A value of plus one represented a perfect positive correlation. The two variables were precisely related and as the values of one variable increased, values of the other variable also increased. A value of minus one represented a perfect negative correlation. Again the two variables were precisely related, but as the value of one variable increased those of the other variable decreased. Correlation coefficients between plus one and minus one represented weaker, positive and negative correlations, whereas a value of 0 meant that the variables were perfectly independent. Saunders & Thornhill (2003) also stated that in business research it is extremely unusual to obtain perfect correlations (Lind, Marchal & Wathen 2008).

3.6 Summary

The quantitative and qualitative research methodology will be employed, to achieve a deeper understanding of the research objectives; which is to understand how the ISO 9001:2008 quality management system affects the rubber and plastics industry of South Africa.

The research instruments incorporate the aim and the objectives of this study so as to obtain relevant and reliable data. The questionnaires were pre-tested for accuracy as well as to ensure that none of the questions were offensive, biased, and derogatory, nor did they lead the respondents.

Data will be analyzed from questions pertaining to the effects of the ISO 9001:2008 quality management system on the rubber and plastics industry of South Africa. In the next chapter the data analysis will be applied to descriptive statistics and inferential statistics, which will introduce the data collected from the completed questionnaires and the analysis techniques, frequency tables, graphs, cross-tabulations, together with Pearson's correlations.

CHAPTER FOUR

Presentation of Results

4.1 Introduction

The previous chapter established the data structure that detailed the research tools to be used by this study. The qualitative and quantitative data analyzes the descriptive and inferential statistical tools (Pearson correlation method and regression analysis) used to analyze the richness of the data reflected in this chapter.

The secondary data analyzes each question presented in tabular or graph form with a brief explanation of each table or graph given. The analysis of the study is divided into two parts, the first being the questionnaire dealing with the background of the study; the second part being the actual information pertaining to this study. This information brought out a deeper understanding of the research objectives which exposed how the ISO9001:2008 quality management system affects the rubber & plastics industry of South Africa.

4.2 Research Objective

The aim of the study is to clarify how an ISO9001:2008 quality management system affects the rubber and plastics industry of South Africa. The study objectives focused on the following aspects of the ISO 9001:2008 quality management system principles, detailed as follows:

- Resource management
- Product realization
- Measurement analysis and improvement

4.3 Descriptive statistics

Trochim (2006) stated that descriptive statistics are used to state the basic features of data in a study. They provide simple summaries about the sample and the measures. Together with simple graphics analysis, they form the basis of virtually every quantitative analysis of data. In most cases, descriptive statistics are used to examine or explore one variable at a time, the frequency of each score in the data set, deriving percentages and visualizing and

describing the shape of the distribution. While these are important, numerical descriptions of central tendency and variability are much more important. (Trochim 2006)

4.3 Inferential Statistics

The framework for reporting the qualitative and quantitative data will now follow the schema of the research objectives. These will be mainly inferential statistical techniques that are most appropriate and helpful for interpreting the data. The objectives were explored through factor analysis. The factor analysis results reflect the questionnaire as a whole and are not divided into sub-periods. For each of the objectives, the numerical sequence of the questionnaire will be followed by the presentation of data factor analysis also being used. A discussion of the data analysed below is offered in Chapter Five, which again follows the schema of the research objectives.

4.5 Background Analysis

The first part of the study analyzes demographic information such as age and gender. These form part of the resource management's objective for people with experience in the rubber and plastics industry who have been involved in the ISO 9001:2008 quality management system. The number of years of experience in the manufacturing industry together with functional experience are also considered.

Age	No. of responses
18-24	10
25-34	30
35-44	29
45-54	27
55>	9
Total	105

Table 4.1 Age of respondents

In Table 4.1 there were 10 respondents who fell into the age group 18-24 years, 30 respondents were found in the 25-34 years group, 29 respondents were between 35 and 44 years, 27 of the respondents fell between 45-54 years, with only 9 of the respondents

within the rubber and plastics industry of South Africa being 55 years old or older. Of 108 respondents, 47% females and 53% males participated in this research project.

Years of experience	Rubber & Plastics Experience	ISO 9001:2008 Experience	No of years Experience
1-5	46	48	20%
6-10	42	37	36%
11-15	12	13	20%
16-20	3	5	10%
20 More	2	2	14%
Total	105	105	105

Table 4.2 Background information of respondents

In Table 4.2 the respondents were asked to indicate the number of years of experience in the rubber and plastics industry. A total of 105 responses were collected from the rubber and plastics industry in the various demographic areas of South Africa. Of this number, 46 respondents had between 1 and 5 years' experience, 42 respondents had 6 to 10 years' experience, 12 respondents had 11 to 15 years' experience, 3 respondents had 16-20 years' experience and only 2 respondents had 20 and more years of experience in the same industry.

In Table 4.2, ISO 9001:2008 quality management system experience shows that 48 respondents have between 1 and 5 years of experience, 37 respondents have between 6 and 10 years of experience, 13 respondents have between 11 and 15 years of experience, 5 respondents have between 16 and 20 years of experience and only 3 respondents have 20 or more years' experience in the same industry.

In Table 4.2, the data indicated that 20% of respondents have between 1 and 5 years of experience; 36% of respondents have 6-10 years' experience, 20% of respondents have 11-15 years' experience, 10% of the respondents have 16-20 years' experience and 14% respondents have 20 and more years of experience in the same industry. Background

information indicated that respondents had some years of experience in an area other than that which made use of the ISO 9001:2008 quality management system of the rubber and plastics industry.

Coefficients^a

Model	Unstandardized Coefficients		Standard Coefficients	T	Sig.
	B	Std Error	Beta		
(Constant)	.334	.181		1.845	.068
Q3: Rubber & Plastics Industry experience	.426	.081	.422	5.272	.000
Q5: No of years' experience	.236	.055	.385	4.809	.000

a. Dependent Variable: ISO 9001:2008 work experience

Table 4.3; Regression analysis; background information of respondents

Table 4.3 results indicate that respondents have more years of experience of the ISO 9001:2008 quality management systems experience (.236) and rubber and plastics industry experience (.426) have a high correlation. This background information helps the researcher achieve the study objective of resource management, product realization and measurement analysis and improvement of the rubber and plastics industry of South Africa.

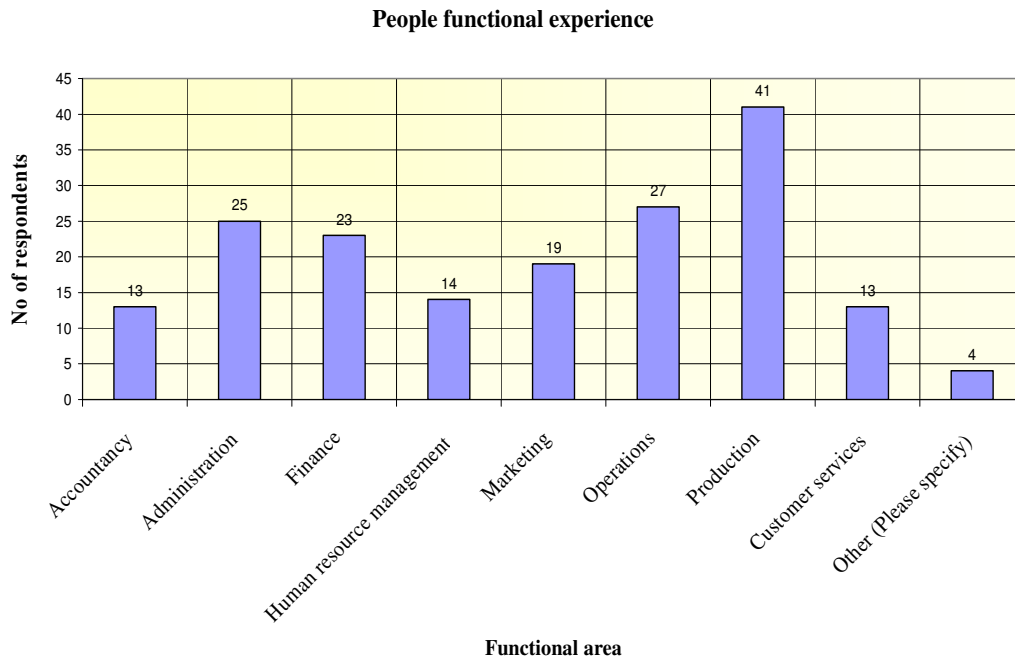


Figure 4.1; Personnel functional experience

In Figure 4.1 the respondents were asked to indicate their functional areas in the rubber and plastics industry. The 105 responses collected from various demographic areas of South Africa identify the areas of specialization. Thirteen respondents were found to be in the accounts section, twenty-five respondents were in administration, twenty-three respondents were in finance, fourteen respondents were found in human-resources management, nineteen respondents were in marketing, twenty-seven respondents were in operations, forty-one respondents were found to be in production and thirteen respondents were in customer services. Four respondents had other areas of specialization (not specified). The majority of respondents (41%), however, were found to have production as their functional area of experience. This indicated that most of the respondents are habituated to the ISO 9001:2008 quality management system.

4.6 Analysis of study objectives

The study objectives were broken down into product's performance, namely, resource-management, product realization and the measurement analysis and improvement sectors of the rubber and plastics industry of South Africa. The research objectives are analyzed in

this chapter, including the main element and sub-clause of the ISO 9001:2008 quality management system, together with the cross-functional areas of the operation.

4.7 First objective: resource management

The resource management takes care of the employee recruitment process, company resources programme, employee turnover and people management as well as top management strategy. The effects of resources management are discussed in Chapter Five.

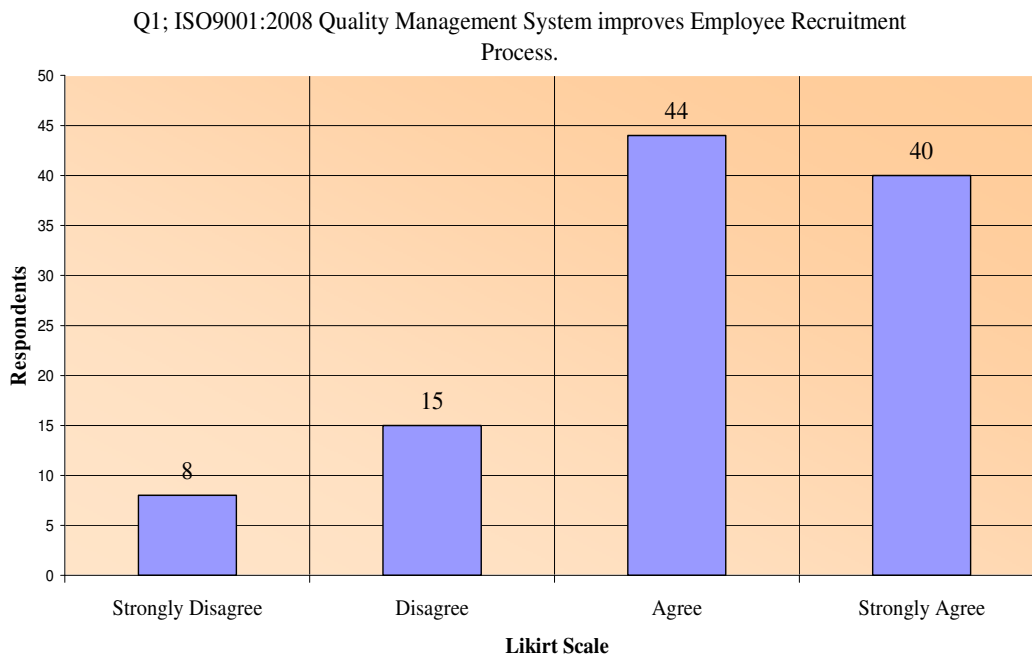


Figure 4.2 Employee recruitment process

Figure 4.2 indicated that 7% of respondents strongly disagreed; 14% of respondents disagreed, 41% of respondents agreed and 37% of respondents strongly agreed that an ISO 9001:2008 quality management system improved the recruitment process.

Q2; ISO900:2008 Quality Management System improves Company Resource Management.

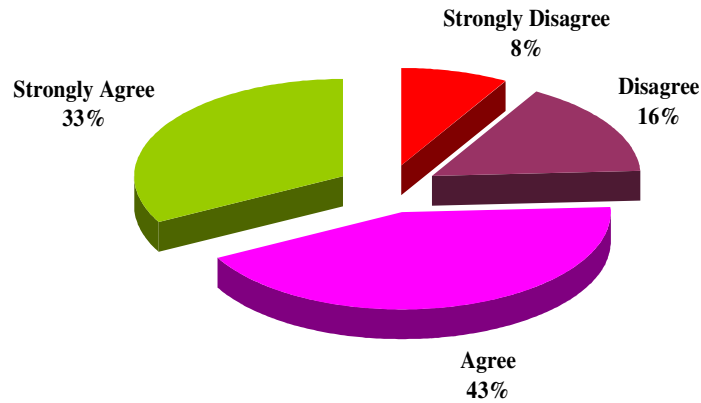


Figure 4.3 Company resource management

In Figure 4.3 105 respondents indicated their responses regarding whether the ISO 9001:2008 quality management system will improve the company's resources programme within the rubber and plastics industry. In the analysis, only 8% of respondents stated that they strongly disagreed, 16% of respondents disagreed, 43% of respondents agreed, 33% of respondents strongly agreed; a total of 105 responses from the rubber and plastics industry in South Africa. The respondents agreed that an ISO 9001:2008 quality management system (ISO clause 6 and sub-clause) will improve the resources management. This result will be discussed in Chapter Five.

Q3; ISO 9001:2008, Quality Management System improves Employee Turnover.

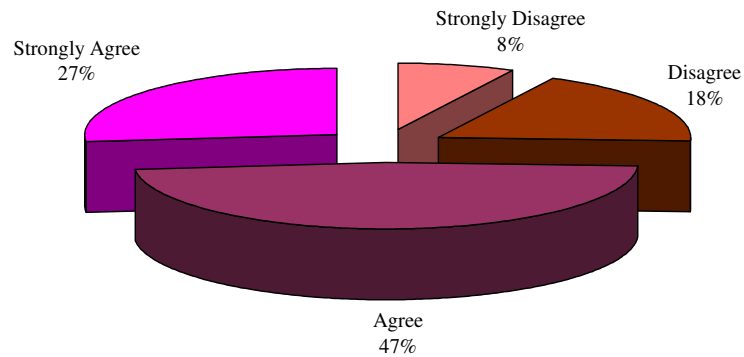


Figure 4.4 Employee Turnover

In Figure 4.4 the analysis clearly outlined to what extent an ISO quality management system integrates the company human resources programme, effectively improving the reduction of employee turnover. The analysis showed that 8% of respondents strongly disagreed, 18% of respondents disagreed, 47% of respondents agreed, 27% of respondents strongly agreed. 47% of respondents indicated that an ISO 9001:2008 quality management system positively improved the employee turnover.

Q4; ISO 9001:2008 Quality Management System improves People Management Process.

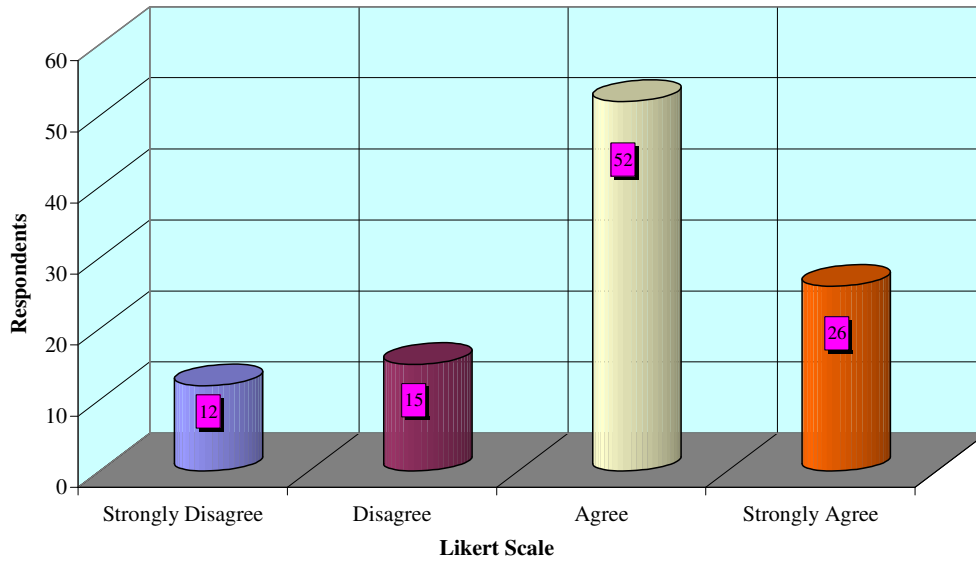


Figure 4.5 People management: i.e. the 'right people in the right place'

In Figure 4.5 only 11% of the respondents strongly disagreed, 14% of respondents disagreed, 49% respondents agreed and 24% of respondents strongly agreed. The respondents indicated that the resource management principles of an ISO9001:2008 quality management system helped to improve people management in the organization. This element will be discussed in detail in Chapter Five.

Q5; ISO 9001:2008 Quality Management System improves Top Management Strategy.

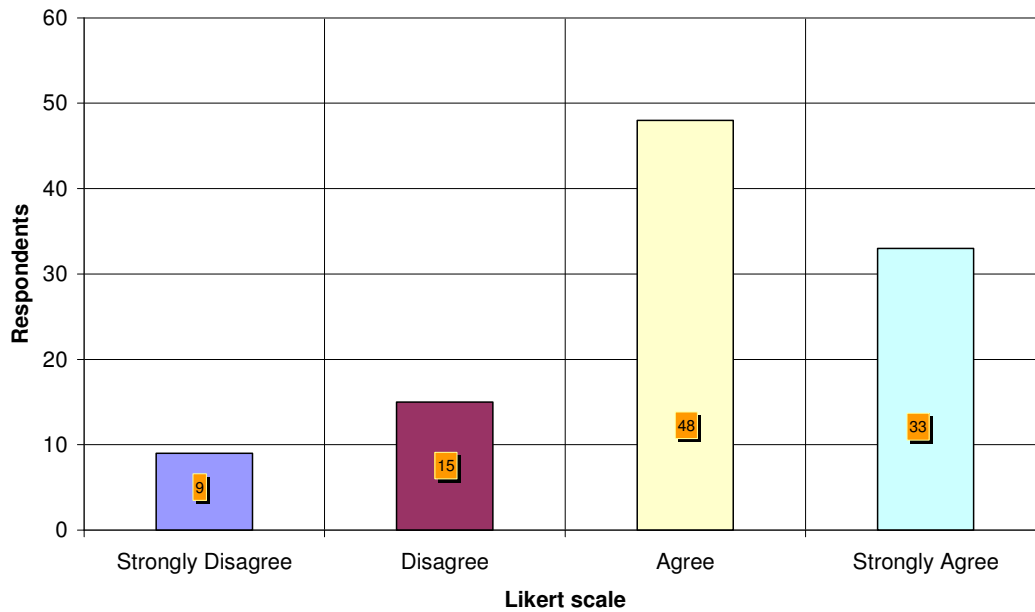


Figure 4.6 Top management strategy

In Figure 4.6 data showed the responses of 105 respondents drawn from the rubber and plastics industry of South Africa, with 9% who strongly disagreed, 14% who disagreed, 46% who agreed, and 31% who strongly agreed. The respondents indicated that an ISO 9001:2008 quality management system improved strategic decision making, such as planning, organizing, leading and controlling, thus benefiting the rubber and plastics industry of South Africa. These results are further expounded upon in Chapter Five.

4.8 Second Objective: Product Realization

The second study objective was to evaluate the effect of an ISO 9001:2008 quality management system on product quality, product development, good manufacturing practices, product cost, and delivery time. The product realization element covers various manufacturing functional areas in the rubber and plastics industry. There were 105 responses received from different areas of the operation within the rubber and plastics industry.

Q6; ISO 9001:2008 Quality Management System improves Product Quality.

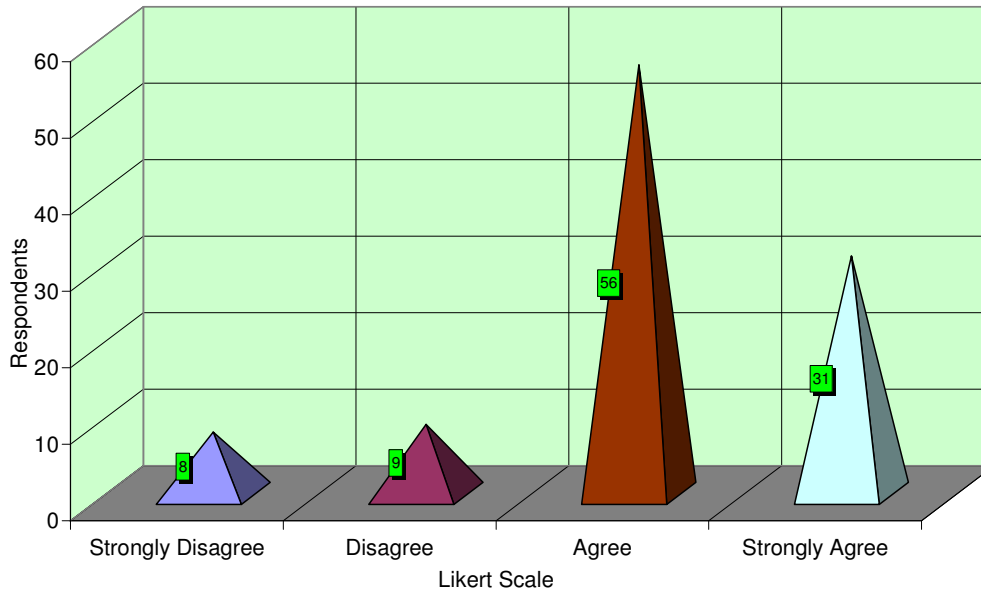


Figure 4.7 Improving Product Quality

Figure 4.7 indicated that eight of the respondents strongly disagreed, nine respondents disagreed, fifty-five respondents agreed and thirty-one respondents strongly agreed, this comprising a total of 105 respondents from the rubber and plastics industry of South Africa. These results indicate that there is a relationship between the ISO9001:2008 quality management system and product quality. These results are justified in Chapter Five.

Q7; ISO 9001:2008 Quality Management System improves product development.

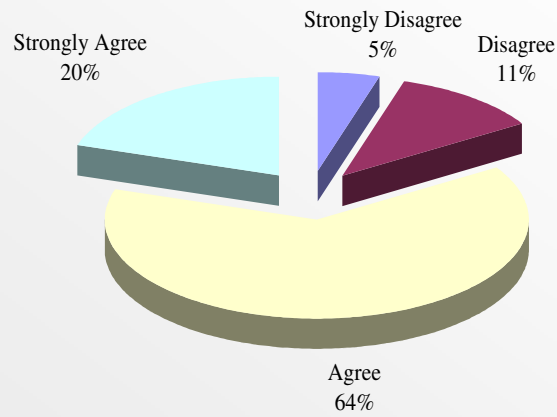


Figure 4.8 Improving product development

In figure 4.8 only 5% of respondents strongly disagreed, 11% of respondents disagreed, 64% of respondents agreed, and 20% of respondents strongly agreed, totalling 105 responses from the rubber and plastics industry of South Africa. Respondents indicated that the ISO9001:2008 quality management system principles have a beneficial effect on the product development process.

Q8; ISO 9001:2008 Quality Management System improves good manufacturing practices

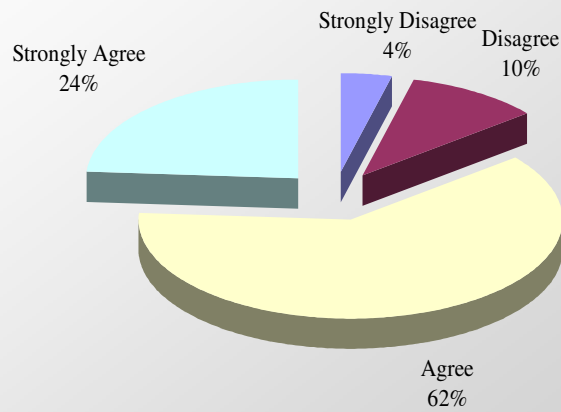


Figure 4.9 Improving good manufacturing practices

In figure 4.9 there were 4% of respondents who strongly disagreed, 10% of respondents who disagreed, 62% of respondents who agreed and 24% of respondents who strongly agreed, making up a total of 105 responses from the rubber and plastics industry of South Africa. The study objective indicated that an ISO9001:2008 quality management system improved good manufacturing practices (GMP) in the organization.

Q9;ISO 9001:2008 Quality Management System reduces the product cost.

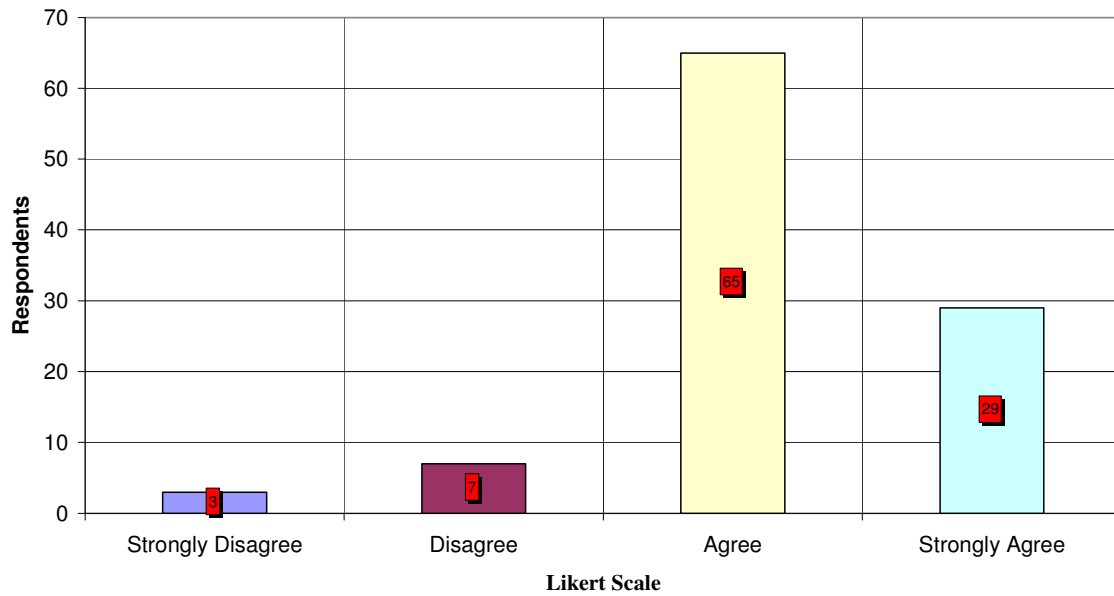


Figure 4.10 Reducing the product cost

In figure 4.10 the results indicated that 3% of respondents strongly disagreed, 7% of respondents disagreed, 63% of respondents agreed and 28% of respondents strongly agreed. Respondents indicated that an ISO 9001:2008 quality management system played a major role in reducing product cost; this will be discussed in the next chapter.

Q10; ISO 9001:2008 Quality Management System improves delivery time.

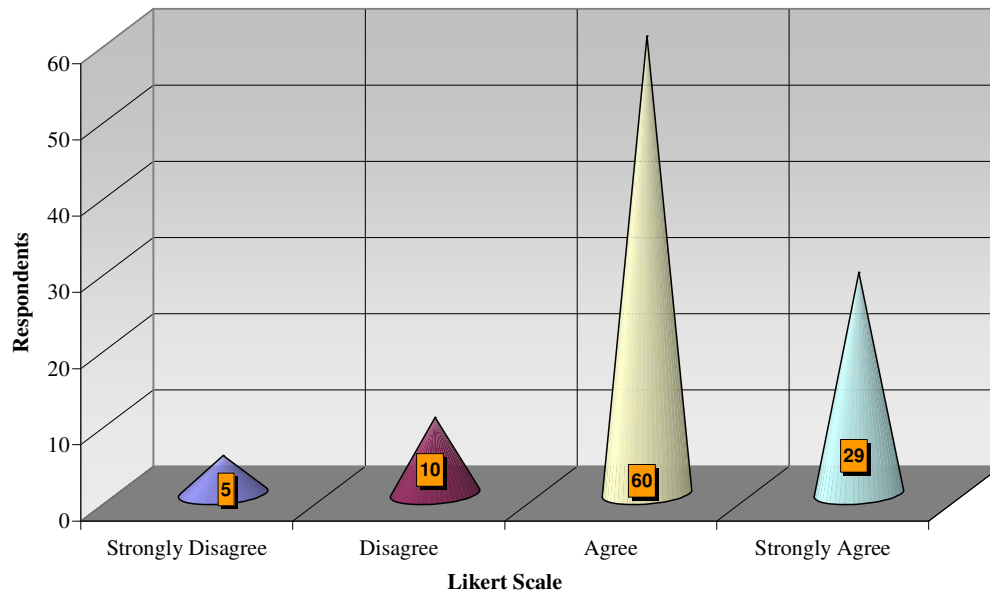


Figure 4.11 Improving the delivery time

Figure 4.11 results reflected that 5 of respondents strongly disagreed, 10 of the respondents disagreed, 60 of the respondents agreed, and 29 of the respondents strongly agreed. This information indicated that there is a relationship between the ISO9001:2008 quality management system and product delivery time.

4.9 Third Objective: Measurement analysis and improvement

The third research objective focused on measurement analysis and improvement elements such as internal auditing, corrective and preventative action, customer feedback, quality control & quality assurance, continual improvement and customer satisfaction. 105 respondents were asked to indicate whether the ISO 9001:2008 quality management system affected measurement analysis and improvement.

Q11; Internal Audit Technique improves ISO 9001:2008 Quality Management System.

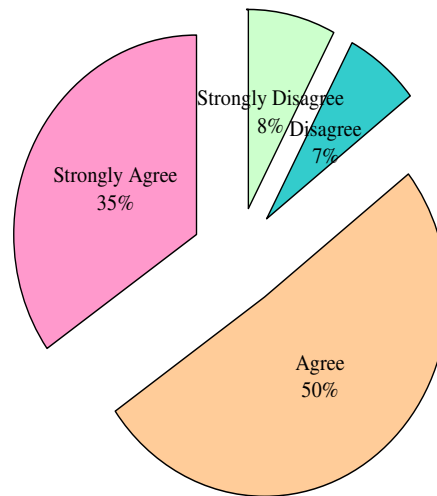


Figure 4.12 Internal Audit

Figure 4.12 indicated that a small number - 8% of respondents strongly disagreed, 7% of respondents disagreed, 50% of respondents agreed while 35% of respondents strongly agreed. These results show that most of the respondents view an internal audit as having a significant effect on the ISO 9001:2008 quality management's effective functioning within the organization.

The ISO 9001:2008 clause 8.2.2 stated that the organization shall conduct internal audits at planned intervals to ascertain whether the quality management system conforms to the planned product realization and resource management, as well as to the requirement of the international standard and to the quality management system requirements of the rubber and plastics industry. These results are discussed in detail in Chapter Five.

Q12; Corrective and Preventive Action method improves ISO 9001:2008 Quality Management System.

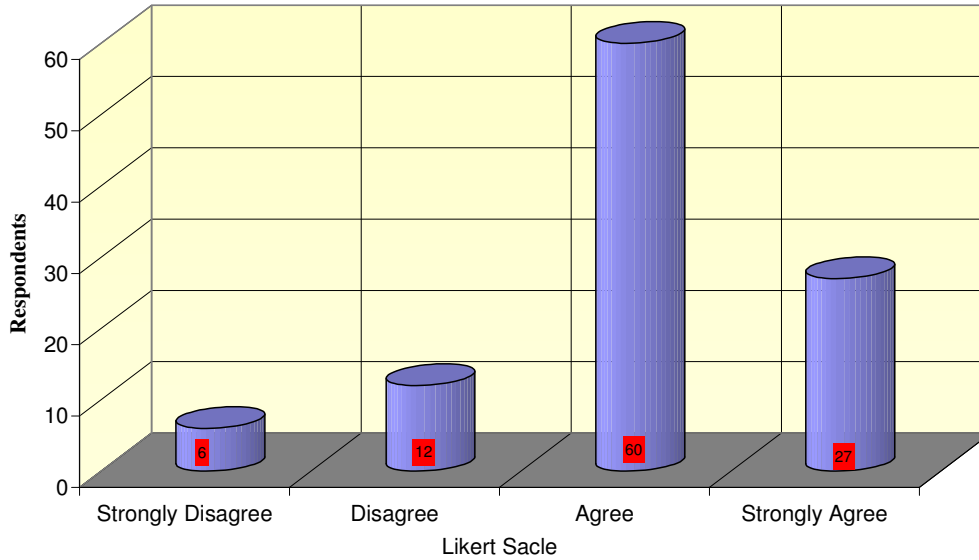


Figure 4.13 Corrective and preventative action

In Figure 4.13, 6 of the respondents strongly disagreed, 12 respondents disagreed, 60 respondents agreed, 27 respondents strongly agreed, giving a total of 105 responses altogether from the rubber and plastics industry of South Africa. The majority of respondents' responses were that corrective and preventative action methods (ISO 9001:2008 clause 8, and sub-clause 8.5.1, sub-clause 8.5.3) reduced non-conforming products in production areas, reduced customer complaints and improved the ISO 9001:2008 quality management system in the organization, thus benefiting both employee and employer. These results, however, indicated that the corrective and preventative action method is the interaction between customer and quality management system in an organization.

Q13; Customer Feedback Technique improves ISO 9001:2008 Quality Management System.

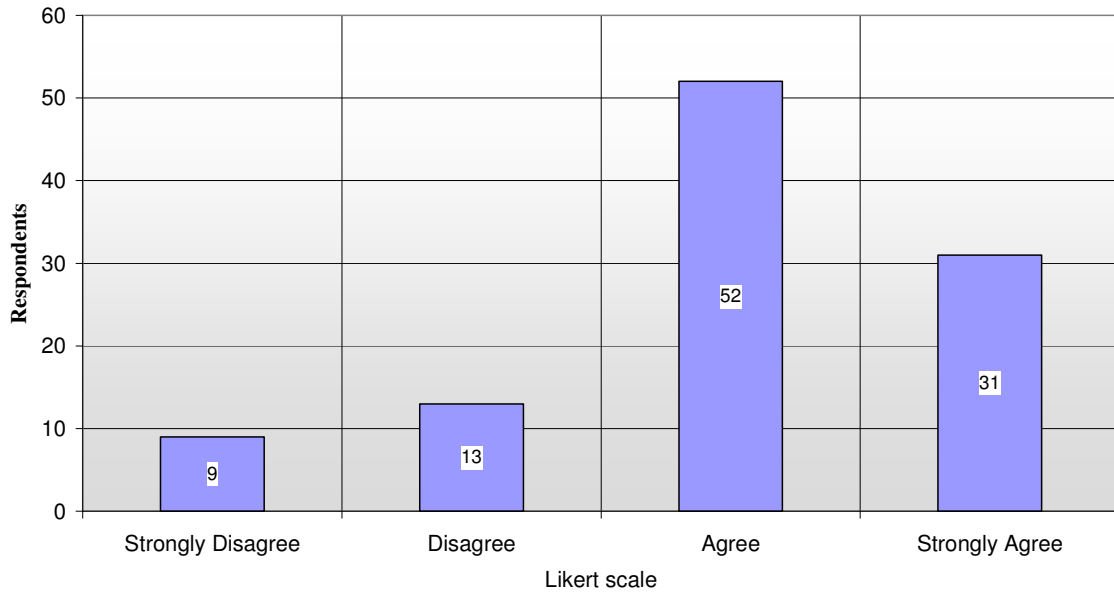


Figure 4.14 Customer Feedback

The results obtained from this study are reflected in Figure 4.14, showing that 9 of the respondents strongly disagreed, 13 of the respondents disagreed, 52 of the respondents agreed, 31 of the respondents strongly agreed. A total of 105 responses were obtained from the rubber and plastics industry of South Africa. Respondents indicated that customer feedback and the ISO 9001:2008 clause 5.2 (Customer focus) improved the ISO 9001:2008 quality management system. These results will be discussed in Chapter Five.

Q14; Quality Control and Quality Assurance functions improves ISO 9001:2008 Quality Management System.

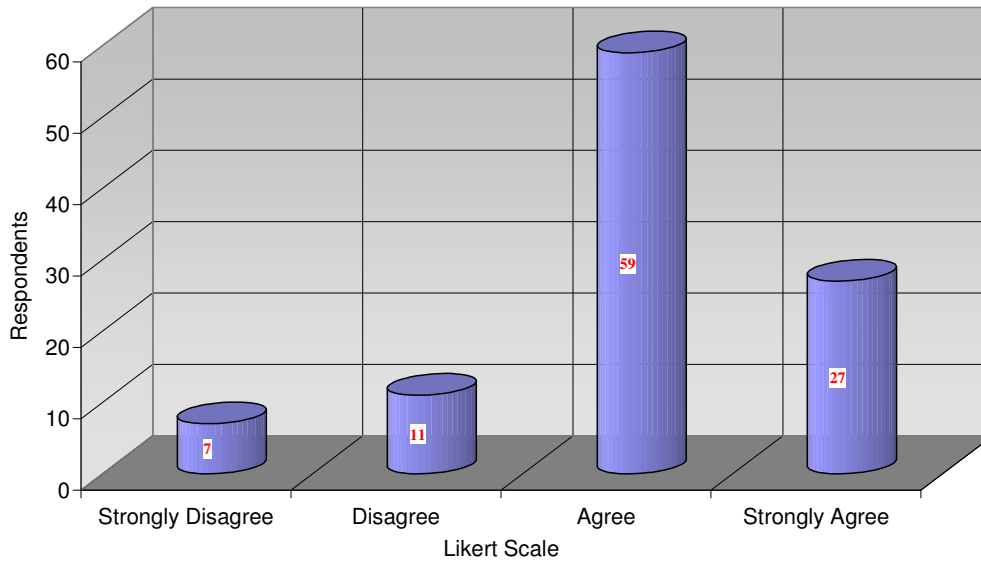


Figure 4.15 Quality Control and Quality Assurance

Figure 4.15 showed that only 7 respondents strongly disagreed, 11 respondents disagreed, 59 respondents agreed, and 27 respondents strongly agreed. These results indicate that quality control and quality assurance have a significant impact on the ISO 9001:2008 quality management system. These results show, furthermore, that the ISO 9001:2008 clause 8.2 and sub-clause 8.2.2, when put into effect do result in improved product realization, resource management and measurement analysis of the quality management system within the organization.

Q15; Would Continual Improvement affect an ISO 9001:2008 Quality Management System by enhancing the relationship of the employees and employers.

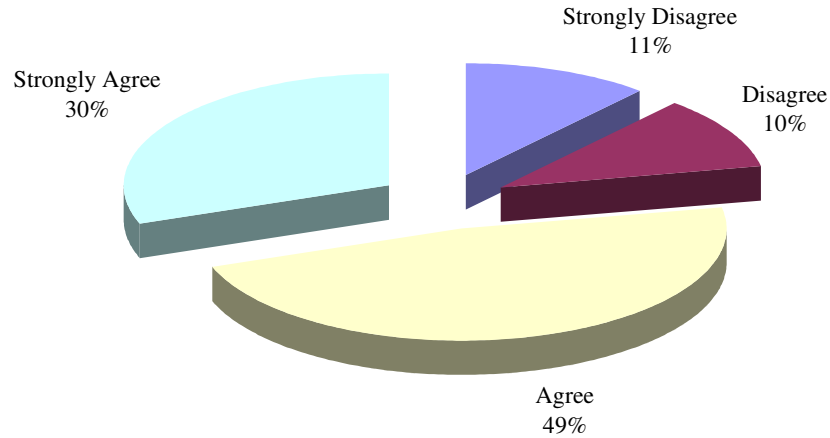


Figure 4.16 Continual Improvement

In Figure 4.16 the results indicated that 11% of respondents strongly disagreed, 10% of respondents disagreed, 49% of respondents agreed, 30% of respondents strongly agreed, of a total of 105 responses from the rubber and plastics industry of South Africa. The above outcome shows that continual improvement results in organization profitability, while building a relationship between employee and employer (ISO 9001:2008 Clause 8.5.1) indicates that the continual improvement aspect improved the internal national standards of the quality management system.

Q16; ISO 9001:2008 Quality Management System improves Customer Satisfaction.

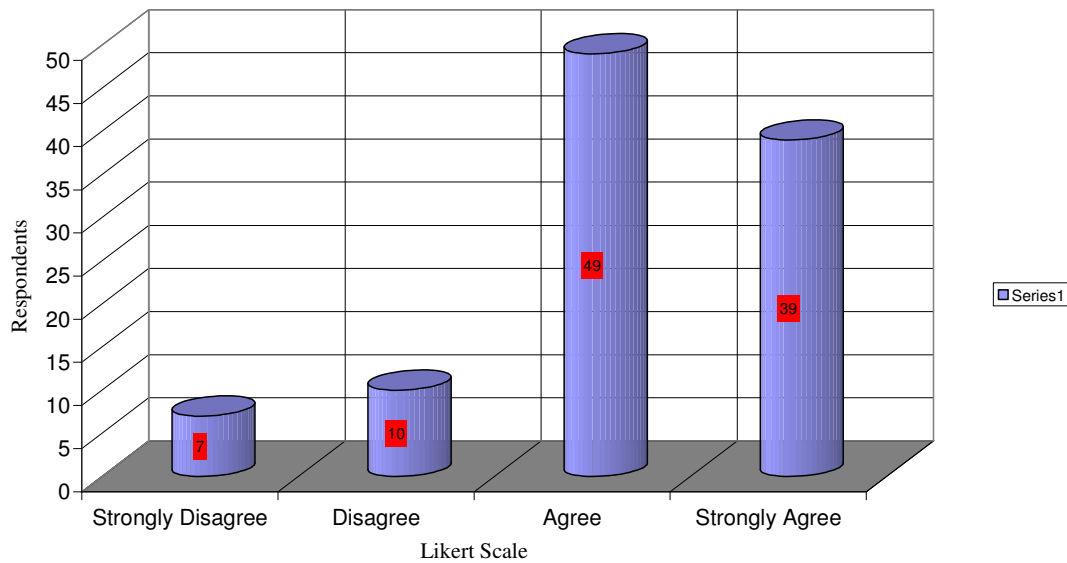


Figure 4.17 Customer satisfaction

Figure 4.17 indicates that only 7 of the respondents strongly disagreed, 10 of the respondents disagreed, 49 of the respondents agreed, 39 of the respondents strongly agreed that ISO 9001:2008 quality management system improved customer satisfaction. A total 105 responses were obtained from the rubber and plastics industry of South Africa. The respondents indicated that an ISO9001:2008 quality management system improved customer satisfaction. The respondents indicated that customer satisfaction is an important element of a quality management system. The ISO 9001:2008 quality management system is the bridge between the customer and an organization. The above results show that the implementation of ISO 9001:2008 clause 7.2(customer-related processes) and clause 5.2 (customer focuses) have a significant effect on the quality management system.

4.10 Pearson's correlation

Barry, Ralph & Michael (2009) stated that the most common measure of 'correlation' or 'predictability' is Pearson's coefficient of correlation, although there are certainly many others. Pearson's r , as it is often symbolized, can have a value anywhere between -1 and 1. The larger the r , ignoring sign, the stronger the association between the two variables and the more accurately one variable from one's knowledge of the other variable may be

predicted at its extreme, a correlation of 1 or -1 means that the two variables are perfectly correlated, meaning that one can predict with perfect accuracy the values of one variable from the values of the other variable. At the other extreme, an r of zero implies an absence of a correlation, there being no relationship between the two variables. Knowledge of one variable gives absolutely no information about what the value of the other variable is likely to be. The sign of the correlation implies the ‘direction’ of the association. A positive correlation means that relatively high scores on one variable are paired with relatively high scores on the other variable, low scores being paired with relatively low scores. On the other hand, a negative correlation means that relatively high scores on one variable are paired with relatively low scores on the other variable (Barry, Ralph & Michael, 2009)

Correlation			
		Q1	Q6
Q1;Employee recruitment process	Pearson Correlation	1	.486
	N	105	105
Q6; product quality	Pearson Correlation	.486	1
	N	105	105

Table 4.4: Employee recruitment process & product quality

Table 4.4 analyses the relationship between employee recruitment processes and product quality. The relationship between employee recruitment processes and product quality is indicated by a correlation coefficient of $r = .486$, implying that a positive employee recruitment process plays a major role in the rubber and plastics industry of South Africa. The next table shows the analysis of the resource management and product development.

Correlation			
		Q2	Q7
Q2;Resource Management	Pearson Correlation	1	.483
	N	105	105
Q7; Product Development.	Pearson Correlation	.483	1
	N	105	105

Table 4.5: Resource Management & Product Development

In Table 4.5 results indicate that the Pearson correlations have a positive meaning for the resource management and product development. Pearson correlation $r = .483$ these results indicate that there is a relationship between these two variables, to be discussed in Chapter Five.

Correlation			
		Q3	Q8
Q3; Employee Turnover	Pearson Correlation	1	.367
	N	105	105
Q8; Good Manufacturing Practices	Pearson Correlation	.367	1
	N	105	105

Table 4.6; Employee turnover and good manufacturing practices

Table 4.6 above reflects the employee turnover and good manufacturing practices analyses. The results indicate that both variables have a Pearson correlation $r = .367$ coefficient, indicating a positive relationship between low employee turnover and good manufacturing practices. This relationship is discussed in the next chapter.

Correlation			
		Q9	Q4
Q9; People Management	Pearson Correlation	1	.330
	N	105	105
Q4; Product Cost	Pearson Correlation	.330	1
	N	105	105

Table 4.7: People Management (right people in the right place) & Product Cost;

In table 4.7 the number $r = .330$ can be seen at the entry of the matrix of correlations where the people management column and product cost row meet. This is the result of the Pearson correlation between two variables 'significance' of the correlation. Below that in Q4, is the total of 105 which simply means the number of respondents contributing to this correlation and the number of respondents in this study. The correlation is positive, meaning that there is a relationship between people management and product cost.

Correlation			
		Q5	Q10
Q5; Top Management Strategy	Pearson Correlation	1	.406
	N	105	105
Q10; Product Delivery time	Pearson Correlation	.406	1
	N	105	105

Table 4.8: Top management strategy and Product delivery time;

Table 4.8 indicates two variable correlations consisting of the top management strategy and product delivery time. These two variables show a Pearson correlation $r = .406$, which shows the 'significance' of the correlation. The correlation is positive, meaning that there a relationship between top management strategy and product delivery time. The next table illustrates the relationship between product quality and internal audit: these findings are discussed in the next chapter.

Correlation			
		Q6	Q11
Q6; Product Quality	Pearson Correlation	1	.357
	N	105	105
Q11; Internal Audit	Pearson Correlation	.357	1
	N	105	105

Table 4.9: Product Quality & Internal Audit;

Table 4.9 indicates that both variables have a Pearson correlation result of $r = .357$. The correlation is positive, meaning that there is a relationship between product quality and internal audit. These findings are discussed in Chapter Five. The respondents indicate that resource management has a significant relationship on product realization.

Correlation			
		Q7	Q12
Q7; Product development	Pearson Correlation	1	.295
	N	105	105
Q12; Corrective and Preventative action	Pearson Correlation	.295	1
	N	105	105

Table 4.10: Product Development, Corrective & Preventative Actions;

Table 4.10, indicates that where two variable correlations - product development and corrective and preventative action intersect, these variables show a Pearson correlation of $r = .295$. The figure 105 is the number of respondents contributing to this correlation and the number of respondents in this study. The correlation is positive, meaning that there is a relationship between product development and corrective and preventative action. The next table depicts good manufacturing practices and customer feedback.

Correlation			
		Q8	Q13
Q8; Good manufacturing practices	Pearson correlation	1	.451
	N	105	105
Q13Customer feedback	Pearson correlation	.451	1
	N	105	105

Table 4.11: Good manufacturing practices & customer feedback

Table 4.11 indicates the relationship between good manufacturing practices and customer feedback analyses. The above table (4.11) shows that variables have a positive correlation coefficient of $r = .451$ Good manufacturing practices and customer feedback, therefore, are significantly related. These results are discussed in depth in the next chapter.

Correlation			
		Q9	Q14
Q9; Product Cost	Pearson Correlation	1	.314
	N	105	105
Q14; Quality Assurance Quality Control	Pearson Correlation	.314	1
	N	105	105

Table 4.12: Product cost & quality assurance, quality control

Table 4.12 indicates that two variables, product cost and quality assurance and quality Control, show a Pearson correlation result of $r = .314$, which indicate that there is 'significance' of the correlation. The correlation is positive, meaning that there is a relationship between the product cost and quality assurance and quality control.

Correlation			
		Q10	Q15
Q10; Product Delivery	Pearson Correlation	1	.250
	N	105	105
Q15;Continual Improvement	Pearson Correlation	.250	1
	N	105	105

Table 4.13: Product Delivery & Continual Improvement

Table 4.13 shows the relationship between product delivery and continual improvement. The above table (4.13) shows the variable correlation coefficient to be $r = .250$ which is positive. Product delivery and continual improvement enjoy a significant relationship. The remaining study objective is discussed in Chapter Five.

Correlation			
		Q16	Q1
Q16;Customer Satisfaction	Pearson Correlation	1	.248
	N	105	105
Q1;Employee Recruitment	Pearson Correlation	.248	1
	N	105	105

Table 4.14: Customer Satisfaction & Employee Recruitment

Table 4.14; indicates that two variables show a Pearson correlation result of $r = .248$. The correlation is positive, meaning that there is a relationship between customer satisfaction and employee recruitment. The next table presents a depiction of the internal auditing and recruitment process.

Correlation			
		Q11	Q1
Q16;Internal Audit	Pearson Correlation	1	.495
	N	105	105
Q1;Employee Recruitment Process	Pearson Correlation	.495	1
	N	105	105

Table 4.15: Internal Audit & Employee Recruitment Process

Table 4.15 indicates an analysis of the relationship between internal audit and employee recruitment. The above results in table 4.15 show that both variables scored a correlation coefficient of $r = .495$ which is positive, from which it can be inferred that, internal audit and employee recruitment processes have a significant relationship. These objectives are discussed in the next chapter.

Correlation			
		Q2	Q12
Q2;Resource Management	Pearson Correlation	1	.274
	N	105	105
Q12;Corrective and preventative action	Pearson Correlation	.274	1
	N	105	105

Table 4.16: Resource Management & Corrective and Preventative Action

Table 4.16 indicates that apropos the two variable correlations of customer satisfaction and employee recruitment, Pearson correlation results indicate $r = .274$. The correlation is positive, meaning that there is a relationship between customer satisfaction and employee recruitment in the rubber and plastics industry of South Africa.

Correlation			
		Q14	Q4
Q14; People Management	Pearson Correlation	1	.478
	N	105	105
Q4; Quality control And Quality Assurance	Pearson Correlation	.478	1
	N	105	105

Table 4.17: People Management (Right People in Right Place) & Quality Assurance and Quality Control

Table 4.17 indicates a relationship between people management and quality control and quality assurance process analyses. The above table (4.17) shows that both variables scored a correlation coefficient of $r = .478$ which is positive. People management and quality control and quality assurance are significantly related. These findings are discussed in Chapter Five.

Correlation			
		Q5	Q15
Q5; Top management Strategy	Pearson Correlation	1	.244
	N	105	105
Q15; Continual Improvement	Pearson Correlation	.244	1
	N	105	105

Table 4.18: Top management strategy and continual improvement

Table 4.18 indicates that two variables, top management strategy and continual improvement show the Pearson correlation results of $r = .244$. The correlation is positive, meaning that there is a relationship between top management strategy and continual improvement as it affects the rubber and plastics industry of South Africa.

4.11 Regression Analysis

Coefficients^a

Model	Unstandardized Coefficients		Standard Coefficients	T	Sig
	B	Std Error	Beta		
(Constant)	.829	.508		1.631	.105
Q1: Employee recruitment process	.156	.137	.171	1.146	.255
Q2: Company resource management	-.434	.151	-.457	-2.874	.005
Q5: Top management strategy	.127	.140	.137	.906	.368
Q6: Product quality	.086	.131	.087	.662	.510
Q7: Product development	.119	.155	.100	.762	.448
Q8: Good manufacturing practice	.051	.151	.043	.338	.736
Q9: Product cost	.063	.170	.045	.371	.712
Q14: Quality control and quality assurance	.204	.135	.203	1.515	.134
Q15: Continual improvement	.277	.101	.294	2.740	.008

Dependent variable: Customer satisfaction

Table 4.19: Q16 Customer satisfaction;

Dependant variable Customer satisfaction: extraction method; principle component method

Table 4.19 is consistent with the results from the customer satisfaction review where there is a high correlation between the ISO 9001:2008 management system and the cross-functional operation (employee recruitment process, company resource management, product development, continual improvement, etc.).

The responses of the 105 respondents indicated that strongly disagree, disagree, agree or strongly agree, an employee recruiting process can have a positive relationship on customer satisfaction (.156). Furthermore, in their responses of strongly disagree, disagree, agree or strongly agree, of the 105 respondents there is a relationship between company resources management programmes and customer satisfaction (-.434).

Table 4.19 in their response of strongly disagree, disagree, agree or strongly agree, the 105 respondents indicated that top management strategy influences customer satisfaction (.127). Furthermore, responses from the 105 respondents indicated that strongly disagree, disagree, agree or strongly agree, the product quality influences customer satisfaction (.086).

Table 4.19 also in the responses of the 105 respondents indicated that strongly disagree, disagree, agree or strongly agree, the product development has a positive effect on customer satisfaction (.119). The 105 respondents indicated that strongly disagree, disagree, agree or strongly agree, good manufacturing practice has a positive effect on customer satisfaction (.051). The responses of the 105 respondents indicated that strongly disagree, disagree, agree or strongly agree, product cost will have an influence on customer satisfaction (.063).

Table 4.19 also individual respondents response of the strongly disagree, disagree, agree or strongly agree, the 105 respondents indicated that quality control and quality assurance functions have a positive effect on customer satisfaction (.024). The responses of the 105 respondents indicated that, strongly disagree, disagree, agree or strongly agree, continual improvement quality management systems have a positive influence on customer satisfaction (.277).

Coefficients^a

Model	Unstandardized Coefficients		Standard Coefficients	T	Sig.
	B	Std Error	Beta		
(Constant)	.405	.545		.743	.460
Q3: Employee turnover	.045	.145	.044	.309	.758
Q4: People Management	.010	.135	.010	.074	.942
Q10: Product Delivery Time	.127	.129	.113	.989	.325
Q11: Internal Audit	.109	.129	-.104	-.839	.404
Q12: Corrective & preventative method	.252	.142	.221	1.769	.081
Q13: Customer feedback	.162	.153	.161	1.059	.293

a. Dependent Variable: Continual Improvement

Table 4.20: Q15 Continual Improvement

Dependent variable continual improvement: extraction method principle, component method

Table 4.20 shows results from the continual improvement to have a high correlation between the cross-functional areas of an operation within the ISO 9001:2008 management system. The 105 respondents indicated that employee turnover, strongly disagree, disagree, agree or strongly agree related to continual improvement (.045). The responses of the 105 respondents indicated that strongly disagree, disagree, agree or strongly agree, people management is favourable to continual improvement (.010).

Table 4.20; the 105 respondents indicated that strongly disagree, disagree, agree or strongly agree, continual improvement reduces the product delivery time (.127). Further analyses of the results, in their responses, strongly disagree, disagree, agree or strongly agree, of the 105 respondents, the majority indicated that an internal audit improved the continual improvement process (.109).

Table 4.20; in their response of strongly disagree, disagree, agree or strongly agree, the 105 respondents indicated that corrective and preventative action improved the continual improvement (.252). Furthermore, the responses of the 105 respondents indicated that, strongly disagree, disagree, agree or strongly agree, customer feedback has a positive influence on continual improvement (.162). The above results show a significant relationship between the ISO 9001:2008 quality management system and continual improvement programmes.

4.12 Conclusion

The analysis of the twenty-two questions contained in the research instrument was structured according to the schema of the research objectives. The Pearson correlation and regression analysis techniques were deployed for most questions, further to expand on the data and to offer an insight into the data. The strength of the views held by respondents gave a strong indication of a positive relationship between variables. The qualitative and quantitative research instruments were expressed as abbreviated SPSS and MS Excel outputs with the data being analysed. The data analysis follows in the next chapter. This in turn leads to recommendations substantiated by the data and findings with a focus on limitations of the study, suggestions for further research, a summary and a conclusion to the study.

CHAPTER FIVE

Discussion

5.1 Introduction

The previous chapter analysed the data for reliability and validity of the study, using Pearson's correlation and regression analysis techniques. The raw data was subjected to interrogation via the MS Office Excel and SPSS analytical tool, in order to achieve the desired results; this analysis followed the schema of the research objectives. From the data information the results have been validated: based on the findings that used the statistics technique, it was found that there was a strong correlation that supported the data as presented in the results discussed in Chapter Four.

This chapter presents a discussion of the data. It has been structured on the schema of the study objective. The objectives of the study will also be discussed, this being the extent of the effects on the rubber & plastics industry of the ISO 9001:2008 quality management system based on the research objective and 3 elements of Resource management, Product realization & Measurement analysis and improvement. It must again be noted that this research was specifically aimed at the industry for rubber and plastics in South Africa.

Twenty-two questions were posed to respondents in the different functional areas of the rubber and plastics industry, who were operating within an ISO 9001:2008 quality management system. The 105 respondents were selected from the rubber and plastics industry. All of these companies have been certified as compliant for the ISO 9001:2008 and all have received an ISO 9001:2008 quality management system certificate.

The ISO 9001:2008 quality management system, ISO 9001:2008 Clause 5 addresses top management responsibility, Clause 6: resource management; ISO 9001:2008 Clause 7: product realizations; Clause 8: measurement analyses and improvement and cross-functional relationships in the rubber and plastics industry; all these are highlighted in this chapter.

5.2 Resources Management and Product Realization.

The ISO quality management system has become a popular tool in guiding business practices in a variety of areas in industry. In today's quality-driven market, however, it is not the product or service itself that matters the most, but the perceived value to the customer of the entire relationship with a company. The way companies measure the quality of their products and services has evolved from internal quality assurance to external customer satisfaction in the rubber and plastics industry of South Africa.

The ISO 9001:2008 quality management system Clause 6, Clause 7 and sub- Clause (7.2) provide guidelines for best management decision-making on a day-to-day basis, based on business activities in the industry. Dearing (2009) stated that there are many ways that an ISO 9001:2008 quality management system can improve an organization.

An ISO 9001:2008 quality management system requires a common terminology which improves the communication of goals, procedures, resource requirement, people management and trained personnel. This leads to greater efficiency in decision-making. The ISO 9001:2008 quality management system Clauses 4 to 8 and sub-clauses set out how management systems should be integrated, facilitating smooth running of the organization

5.2.1 Question 1; Employee Recruitment Process *Question 6; Product Quality

In the rubber and plastics industry the role of the employee recruitment process (ISO 9001:2008 Clause 6.2) is vital: selecting the right people for the right task is the main concern of human resources managers of South Africa (Hunter 2007). In Chapter Four, figure 4.5.1.2 shows that the employee recruitment process is important: 44% of respondents agree and 40% strongly agree on this, implying that the ISO 9001:2008 quality management system has a significant effect on the recruitment process. According to George & Jones (2007), managers use recruitment and selection as the first component of a human resources management system, to attract and hire new employees having the abilities, skills and experience that will help an organization achieve its goal of supplying a quality product.

The Pearson correlation coefficient analysis conducted on the reliability of the recruitment process and product quality, Chapter Four (Table 4.3) shows a positive Pearson correlation coefficient of $r = .486$, meaning that employee recruitment has a significant effect on product quality within the rubber and plastics industry of South Africa. Sharma (2005) discussed that the employee selection process is the gateway to an organization: the successful candidate has demonstrated, under the exhaustive scrutiny of a team of employers making use of the ISO 9001:2008 quality management system that their approaches and processes lead to sustained results in organizations in South Africa. This clearly indicates that resources management and product realization are closely linked within an ISO 9001:2008 quality management system (ISO Clause 6.2 & ISO Clause 7 and sub-clause 7.2.2).

5.2.2 Question 2 ; Resources management *Question 7; Product Development

In Chapter Four (Figure 4.5.1.3) the results show that 43% of respondent agreed and 33% strongly agreed, indicating that an ISO9001:2008 quality management system does positively affect the product development programme. Dearing (2009) stated that the ISO 9001:2008 quality management system programme (ISO 9001:2008 clause 6.1, Clause 7 and sub-clause 7.3) encourages organizations to use a training programme to identify strengths and opportunities in key processes. Leonard (2007) argued that those who had implemented an ISO 9001:2008 quality management system in their organization were able to improve on internal and external communication, while improving the resources and decisions that make the organization profitable.

64% of the respondents agreed and 20% strongly agreed that product development is a critical issue in an organization. Simmons (2005) stated that product development relies on planning and co-ordination of the design development activities in accordance with approved procedures. The design/development plans shall be specific for each development or design activity and shall describe these activities and responsibilities for implementation. The design/development activities shall be assigned only to qualified personnel equipped with adequate resources. The ISO 9001:2008 quality management system's approach ensures that the organizational and or technical interfaces between

different groups are identified; the necessary information documented, transmitted and regularly reviewed, in accordance with established procedures.

Table 4.4 in Chapter Four shows the results of the Pearson correlation coefficients as applied to resources management and product development: $r = .483$ being a positive score, this leads one to accept the fact of a relationship between these variables. The ISO 9001:2008 quality management system's approach ensures that the design development, input criteria pertaining to the product under review, including any applicable statutory and regulatory requirements, are identified and documented; that their selections are reviewed for adequacy. Incomplete, ambiguous or conflicting requirements shall be resolved with those responsible for imposing these requirements. Consideration shall be given to the results of contract reviews pertaining to the product.

5.2.3 Question 3; Employee turnover * Question 8; Good Manufacturing Practices

Here 47% of respondents agreed that an ISO 9001:2008 quality management system reduces employee turnover. Brown (2006) stated that a high labour turnover negatively affected the company's profitability: operational costs would increase the cost of recruitment and training, thus affecting the company's performance.

A higher portion of the 62% respondents agree and 24% strongly agree that good manufacturing practice is improved when labour turnover is low in the rubber and plastics industry of South Africa. The validity of the two variables, the Pearson's correlation coefficient shows $r = .367$, which is positive and which indicates that good manufacturing practice (GMP) has improved through the reduction of employee turnover.

Rajan & Tamimi (2007) argued that GMP practices do not lie in the product as such, but in its people. Correct selection of staff, expert motivation and moulding of these staff members into a cohesive team, surrounding them with the right support systems are critical to a company's ability to practice good customer relations, to react quickly to market change and to innovate. These issues used to be considered soft as opposed to hard-edged, product-related bottom-line issues, but today human resources is where the real arena is,

where the battle is won or lost. The ISO 9001:2008 quality management system's strategic values are no longer built around the product, but around people.

5.2.4 Question 5; Top Management Strategy * question 10; Product Delivery Time

Top management strategy is an important component in the industry. 46% of respondents agreed and 31 % strongly agreed that the ISO 9001:2008 quality management system reduced delivery time. 60% of respondents maintain that an ISO 9001:2008 quality management system reduces the product delivery time. Leonard (2007) stated that the ISO 9001:2008 quality management system had a systematic approach to improving quality and productivity within the industry. Robbin (2007) stated that top management's strategic philosophies have emphasized continual improvement, a do-it-right-the-first-time mentality, minimizing scrap, rework and defects, affording a better balance between time, money, and quality product, improving the delivery time and customer satisfaction. Navesh & Marcus (2004) stated that adherence to such approaches requires a top-down, bottom-up orientation requiring personal commitment, support, and participation on the part of the CEO, the management team, and the workforce.

Results obtained in Table 4.6 Chapter Four showed Pearson's correlation coefficients of $r = .406$ which is positive, meaning that there is a relationship between top management strategy and product delivery. Top management strategy emphasized the importance of good quality of the product as it leaves the premises. It stresses the importance of quality in all processes related to productivity, including human resources and other functional areas within the organization. Successful quality underlined the importance of a clear vision and a well-defined philosophy, as well as the provision of training and education in problem-solving, teamwork, statistical process control (SPC), and human resources management across all functional areas within the business enterprise. The fostering of an attitude of working together with internal customers, external customers, suppliers, and all other business partners is essential to this philosophy.

5.3 Product Realization and Measurement, Analysis and Improvement

Product realization is an important area of the ISO 9001:2008 quality management system. Plames (2006) stated that an ISO 9001:2008 quality management system approach will improve product realization and measurement analysis. In addition, improvement by means of adequate and approved procedures and work instructions, provided that adequate resources and assigned trained personnel to fulfill these tasks are in place, will also assist towards the success of an organization. Measurement analysis demonstrated improvements against baselines and higher marks against established benchmarks. Donna (2009) stated that learning/sharing must be the key management tools of the organization. Product realization tools (ISO 9001:2008 Clause 8, and Sub-clause 8.2.1, Clause 8.2.2, Clause 8.2.3 Clause 8.2.4) emphasize strong refinement and integration backed by excellent organizational-level analysis and sharing. The product realization and measurement analysis and improvement approach must be fully integrated with the needs and core values of the organization, as identified in the ISO 9001:2008 quality management system.

5.3.1 Question 6; Product Quality *Question 11; Internal Auditing

The questionnaire survey data confirmed the Pearson correlation analysis of $r = .357$, a positive result, clearly indicating that product quality has a positive effect on customer satisfaction and strategic business performance. These findings are consistent with the results obtained from internal auditing. The ISO 9001:2008 clause 8.2.2 states that the organization shall conduct internal audits at planned intervals, determining whether the quality management system conforms to the product realization and to the requirements of the international standards of the ISO 9001:2008 quality management system requirements as established by the organization, being effectively implemented and maintained. 50% of respondents agreed and 35% of respondents strongly agreed that an ISO 9001:2008 quality management system reduced product cost and improved product quality and that these were equally important. Plames (2006) stated that customers would be satisfied if firms could provide high quality products at a reasonable price. Top management's strategically-driven business performance would be improved concomitantly with cost reduction and product quality improvement. Based on (ISO Clause 7, Clause 8 and Sub-clause 8.2.2, Clause 8.2.4) the improvement in product quality must be aligned to meet customer satisfaction.

5.3.2 Question 7; Product Development *Question 12; Corrective and Preventive Action

Figure 4.5.2.8 in Chapter Four indicated that 64% of respondents agreed and 20% respondents strongly agreed that an ISO 9001:2008 quality management system had a significant effect on the rubber and plastics industry of South Africa. The ISO 9001:2008 Clause 7 has demonstrated that the product development input/ process and product development output are key factors in corrective and preventative measures. The development input coming from the corrective and preventative action is the feedback from the customer. Product development has a significant effect on the corrective and preventative approach. The Pearson correlation analysis of these two variables $r = .295$, indicates a positive result: the inferential statistics in figure 4.5.13 show that 60 respondents agreed and 27 respondents strongly agreed that the corrective and preventative-action approach ensured that the design development input criteria pertaining to the product under review, including any applicable statutory and regulatory requirements, are identified and documented and that their selections are reviewed for adequacy. Incomplete, ambiguous or conflicting requirements shall be resolved with those responsible for imposing these requirements. Consideration shall be given to the results of contract reviews pertaining to the product. Furthermore, the ISO 9001:2008 quality management system approach: (ISO 9001:2008 Clause 7 and sub-clause 7.3, Clause 7.3.1 Clause 7.3.2, Clause 7.3.3, Clause 7.3.4, Clause 7.3.5, Clause 7.3.6, and Clause 7.3.7) required that the design output be documented and expressed in terms that can be verified and validated against the design input, in accordance with established procedures. The design output shall meet the design input requirements and contain or make reference to the acceptance criteria as well as identifying those characteristics of the design that are crucial to the safe and proper functioning of the product. Design output documentation shall be reviewed before release.

Gorden (2003) stated that the corrective and preventative action approach ensures that participants at each review include representatives of all the functions concerned with the design stage under review, as well as other specialist personnel. Records of such reviews shall be maintained in accordance with established procedures and design verification and validation. The design verification shall establish that the design output meets the design input by means of the following: comparing the new design with a similar proven design, if

available, undertaking controlled tests and providing verification that the product conforms to defined user needs and or requirements. Design and development activities are verified as suitable for manufacture; before becoming final production specifications, all legal and other requirements have to been met (Gorden 2003).

5.3.3 Question 8; Good Manufacturing Practices (GMP) *Question 13; Customer feedback

Data obtained in this research study reflects the results that 62% of respondents agree that good manufacturing practices have a significant effect on an industry, This emphasis on quality is essential to the future success of every business endeavour. Without total commitment and total support from top-level management, quality programmes will have at best only limited success. Steven (2000) stated that top management must be committed to a quality culture and must demonstrate this commitment to quality through its operation, thereby achieving customer satisfaction. The commitment to quality must be transparent in the rubber and plastics industry, customer feedback playing an important role. The analysis test showed a positive Pearson correlation of $r = .451$ which confirms a relationship between on these two variables.

5.3.4 Question 9; Product cost *Question 14; Quality Control & Quality Assurance.

63% of respondents agree that an ISO 9001: quality management system will reduce product cost, and that quality control and quality assurance play a major role in the quality management system. 57% of respondents agreed and 36 % strongly agreed that the ISO 9001: 2008 quality management systems underpin quality assurance and quality control. The Pearson correlation coefficient $r = .314$ shows a positive relationship, meaning that quality control and quality assurance do affect product cost.

Jacobs, Chase & Aquilano (2009) stated that the quality control focuses on the various manufacturing activities, such as testing designs for their reliability in the laboratory and in the field, gathering performance data on products in the field and resolving quality problems in the field, planning and budgeting the quality control programme in the plant, and designing and overseeing quality-control systems and inspection procedures. Inspection activities requiring special technical knowledge must be accomplished. Donna

(2009) stated that quality assurance focuses on overall surveillance of everything to do with quality throughout the organization. It is therefore concerned with the quality aspects of sales, research, design, development, pre-production, material, plant tooling, operators, inspectors, manufacturing, storage, packaging, transit, installation, commissioning, customer comments and complaints (Jacobs, Chase & Aquilano 2009).

Quality assurance and quality control, however, focus on customer satisfaction, while aiming to meet the organizational objectives. Michael (2008) stated that the ISO 9001:2008 Clause 7.5.6 inspection test statutes, discuss the control of each area of the production floor. An ISO 9001:2008 quality management system ensures that the inspection and test status of a product is identified, indicating conformance or non-conformance with inspection and tests performed. The quality control and quality assurances identify the inspection and test status to be maintained, as defined in the applicable procedures, throughout production, to ensure that only products that have passed the required inspections and tests are dispatched, used or installed. The ISO 9001:2008 quality management system clause 4.2.2 established suitable procedure and necessary work instructions which have been established to ensure that not all incoming products are used or processed until they have been inspected or otherwise verified as conforming to specified requirements, improving the product realization issue and reducing the product cost in the rubber and plastics industry of South Africa.

5.4 Measurement Analysis and Improvement and Resource Management

This research attempted to clarify some of these findings in measurement analysis and improvement and resource management by exploring further the effect of an ISO 9001:2008 quality management system and operational performance. The ISO 9001:2008 Clause 8.0 focuses on processes, rather than output control. It establishes guidelines that aim to optimize and standardize operational processes. Kaynak (2003) pointed out that through quality planning and goal-setting, a clear assignment of task authority and responsibility, adequate skills, and systems for documenting process performance and responding to process failures will emerge. The measurement analysis guidelines cover activities from product design and development, to production, inspection, installation, and product servicing in the rubber and plastics industry.

5.4.1 Question 16; Customer Satisfaction * Question 1; Employee Recruitment

55% of respondents agree and 45% respondents strongly agree that employee recruitment has a significant effect on customer satisfaction. The Pearson correlation between customer satisfaction and employee recruitment, $r = .248$, shows that employee recruitment and customer satisfaction are strongly linked. According to Bateman & Snell (2007), product quality, efficiency and service have become top priorities. The employee recruitment process is a vital component of the manufacturing industry: customer satisfaction entails everyone's efforts to serve the needs of the customer. This means that the organization must select the right people for the right type of job in the rubber and plastic industry of South Africa.

5.4.2 Question 4; People Management * Question 14; Quality Control and Quality Assurance.

The descriptive statistics analysis based on Pearson's correlation of these two variables supplied a positive $r = .478$, which means that a significant relationship exists. The inferential statistics show both variables i.e. people management systems with 49% and quality control and quality assurance with 57% of respondents maintaining that these variables should have established a procedure for identifying training needs and providing for the training of all personnel performing activities which help the world-class manufacturing approach. Personnel performing specific, assigned tasks shall be qualified on the basis of appropriate education, training and experience as required for the job. Clive (2000) argued that the training and development of employees played a critical role in the manufacturing industry, not only in manufacturing products and service reliably at a competitive price and quality; quantity is equally important to their competitors in the rubber and plastics industry.

5.4.3 Question 5; Top Management Strategy * Question 15; Employee and Employer Relationship (continual improvement).

The theory that employee satisfaction had a positive effect on product quality and customer satisfaction was confirmed by the questionnaire survey data; employees are the ones who deliver satisfaction to their customers. They are a firm's eyes and ears for transferring customer needs and expectations into products and services. Employees are enablers of the

firm's vision and strategies to deliver value to customers, making the firm competitive in the marketplace. The interviewees also admitted that satisfied employees could make more contributions to the improvement of product quality and customer satisfaction than could dissatisfied colleagues. In order to value customers, a firm must first value its employees.

5.5 Customer satisfaction

Table 4.19 outlined the regression analysis results between customer satisfaction and cross-functional activities; these had a high correlation. Furthermore the two variables between the (independent and dependent) results indicated that customer satisfaction depended on the employee recruitment process, company resources programmes, product quality, top management strategy, good manufacturing practices and product delivery; these being interacting processes.

Table 4.19, shows that the 105 respondents indicated that employee recruitment correlated with customer satisfaction, responses being strongly disagree, disagree, agree or strongly agree (.156) a positive relationship exists between employee recruitment and customer satisfaction. Teraak & King (2006) argued that people-related problems are usually complex and unique. ISO 9001:2008 clause 6.2 indicates that the employee recruitment process is a very important function of the organization. The ISO 9001:2008 quality management system helps in the employee recruiting and training programmes of an organization. Customer satisfaction is a function of top management strategy, ISO 9001:2008 clause 6 and sub-clause 6.1, Clause 6.2, outlines the top management strategy and clause 6.2.2 emphasizes that competence training and awareness are also important factors.

The 105 respondents indicated that top-management strategy processes are related to customer satisfaction, responding strongly disagree, disagree, agree or strongly agree to the question of this relationship (.127). Donna (2009) stated that top management shall provide evidence of its commitment to the development and implementation of the quality management system in an organization, to meet customer requirements.

Table 4.19 results shows that the 105 respondents indicated that a strong relationship exists between product quality and customer satisfaction, responding strongly disagree, disagree, agree or strongly agree (.086). Results clearly indicate a significant relationship between product quality and customer satisfaction. Customer satisfaction is the province of top management. The ISO 9001:2008 clause 5.2 states that top management shall ensure that customer requirements are met, with the aim of enhancing customer satisfaction. Customer requirements include delivery and postal delivery activities together with statutory and regulatory requirements.

Table 4.19 shows that the 105 respondents indicated that the product development process was strongly linked to customer satisfaction, by responding strongly disagree, disagree, agree or strongly agree to this link (119). Positive correlation indicates that product development and customer satisfaction are closely tied. Steven (2000) stated that the organization shall follow the processes described in the ISO 9001:2008 clause 7 and sub-clause 7.2, clause 7.1: product development shall meet customer requirement.

Table 4.19 indicated that good manufacturing practice and customer satisfaction are closely related, in that the responses ranged from strongly disagree, disagree, and agree to strongly agree on this relationship (.051). The high correlation between these two variables indicates that good manufacturing practices improve the organization's profitability and improve the ISO 9001:2008 quality management system. Rao, Ragu & Solis (2005) stated that good manufacturing practices have a benefit to both internal and external customers.

Table 4.19 shows that the 105 respondents indicated that quality control and quality assurance related closely to customer satisfaction, indicating strongly disagree, disagree, agree or strongly agree (.024). This result shows the positive relationship between quality control, quality assurance and customer satisfaction. Quality control and assurance impacts on customer satisfaction, both internally and externally. Product development, as found in ISO 9001:2008 Clause 7.5 and Clause 8.2.3 of the quality management system, exists to meet customer requirement. Sharma (2007) stated that an organization shall monitor and measure the quality of products leaving the factory, establishing that they meet customer requirement.

5.6 Continual Improvement

Results shown in Chapter Four Table 4.20 indicate the relationship between the continual improvement process and cross-functional areas of an operation (employee turnover, people management, product delivery, and internal audit).

The 105 respondents indicated that employee turnover processes correlate with continual improvement, giving responses of strongly disagree, disagree, agree or strongly agree with this connection. (.045). The results indicate that continual improvement processes have a significant effect on employee turnover. The continual improvement process has the effect of reducing employee turnover in an organization. Furthermore, the ISO 9001:2008 quality management system integrates resources management, product realization and measurement analysis and improvement of the management system. The ISO 9001:2008 clause 8.5.1, on continual improvement process, offers ways of identifying problems, finding their root causes, and eliminating those causes; thus the quality improvement process reduces labour turnover, benefiting the employee/ employer relationship. .

Results shown in table 4.20 indicate that people-management has a direct influence on continual improvement; respondents answering strongly agree, disagree, agree or strongly agree (.010). The correlation of these two variables clearly emphasizes the significant relationship between people-management and continual improvement. As mentioned earlier, the ISO 9001:2008 quality management system integrates all management systems within an organization. King &Lenox (2001) stated that organizations shall continually improve through the effectiveness of the ISO 9001:2008 quality management system.

In Table 4.20, results show the link between product delivery time and continual improvement. The 105 respondents indicated strongly disagree, disagree, agree or strongly agree to this link (127). The correlation reflects a positive relationship between product delivery and continual improvement. The ISO 9001:2008 quality management system assists manufacturing functions that lead to improving product delivery time. Reid (2000) stated that product delivery is an important component of customer satisfaction The continual improvement process interacts with the cross-functional departments of an organization

Table 4.20 indicates the strong connection between an internal auditing process and continual improvement, respondents giving answers strongly disagree, disagree, agree or strongly agree to this connection (.109). An internal auditing process has, therefore, a significant effect on continual improvement within the organization. (Greene 2001) stated that an internal auditing process functions to collect all the data within the company; to quantify waste and unnecessary activity and to understand staff perceptions and production activities. The respondents indicated that an internal audit identifies the main causes of process delays and disruptions, gaps and deficiencies apropos internal employees and customer services. It also functions to improve efficiency and effectiveness and to surmount perceived barriers to the ISO 9001:2008 quality management system.

5.7 Conclusion

This chapter has presented a discussion on the data, following the framework expressed in the schema of the objectives. All the research objectives have been met, findings made, substantiated by data. The next chapter draws this study to a close by presenting, among other topics discussed, recommendations to enhance an ISO 9001:2008 quality management system as it affects the rubber and plastics industry of South Africa.

CHAPTER SIX

Recommendations and Conclusions

6.1 Introduction

Chapter Five established the link between the research data that was gathered and analysed. The data was reviewed, based on the schema of the research objectives. This chapter draws the study to a close. It presents recommendations, identifies the limitations of the study, makes suggestions for further research, and articulates the unique contribution of this study to the body of knowledge, finally reaching a conclusion. The question to be answered at the end of Chapter Six is the extent to which this study convincingly explored the problem statement it set out to address and how it met the objectives.

6.2 Has the problem been solved?

Chapter Four presented the results of the research topic. The respondents are consistent in their feedback that the ISO 9001:2008 quality management system does benefit both internal and external customers. The ISO 9001:2008 quality management system has a positive impact on an organization, indicating that organizational problems can be resolved by implementing the system.

Chapters Four and Five discuss hypothesis testing; (Pearson correlation coefficient and regression analysis) results of which emerge as positive. The questions of validity and reliability of the survey are given the reply that there is a relationship between the study objectives in Chapter One. It would appear that the ISO 9001:2008 quality management system has a significant effect on the rubber and plastics industry of South Africa based on resource management, product realization & measurement analysis and improvement.

6.3 Implications of this Research

The ISO 9001:2008 quality management system is a popular management system, used within certain industries. Information about the rubber and plastics industry was obtained through the South African Bureau of Standards (SABS). The SABS maintains records of the ISO 9001:2008 quality management systems used throughout South Africa. The SABS applies accreditation of all management systems both nationally and internationally

(www.sabs.co.za) or (www.iso.org). As an ISO 9001:2008 quality management system points out, most of the stakeholders, entrepreneurs, employers, employees, suppliers and customers are willing to participate in this research, because it was targeted at specific industry and quality management systems. An entrepreneur, stakeholder, employer, employee or customer believes that an ISO 9001:2008 quality management system creates constancy of purpose in improvement of product quality, cost and service, with the aim of becoming competitive, remaining in business, thus providing employment.

6.4 Recommendation for improving the Quality Management System

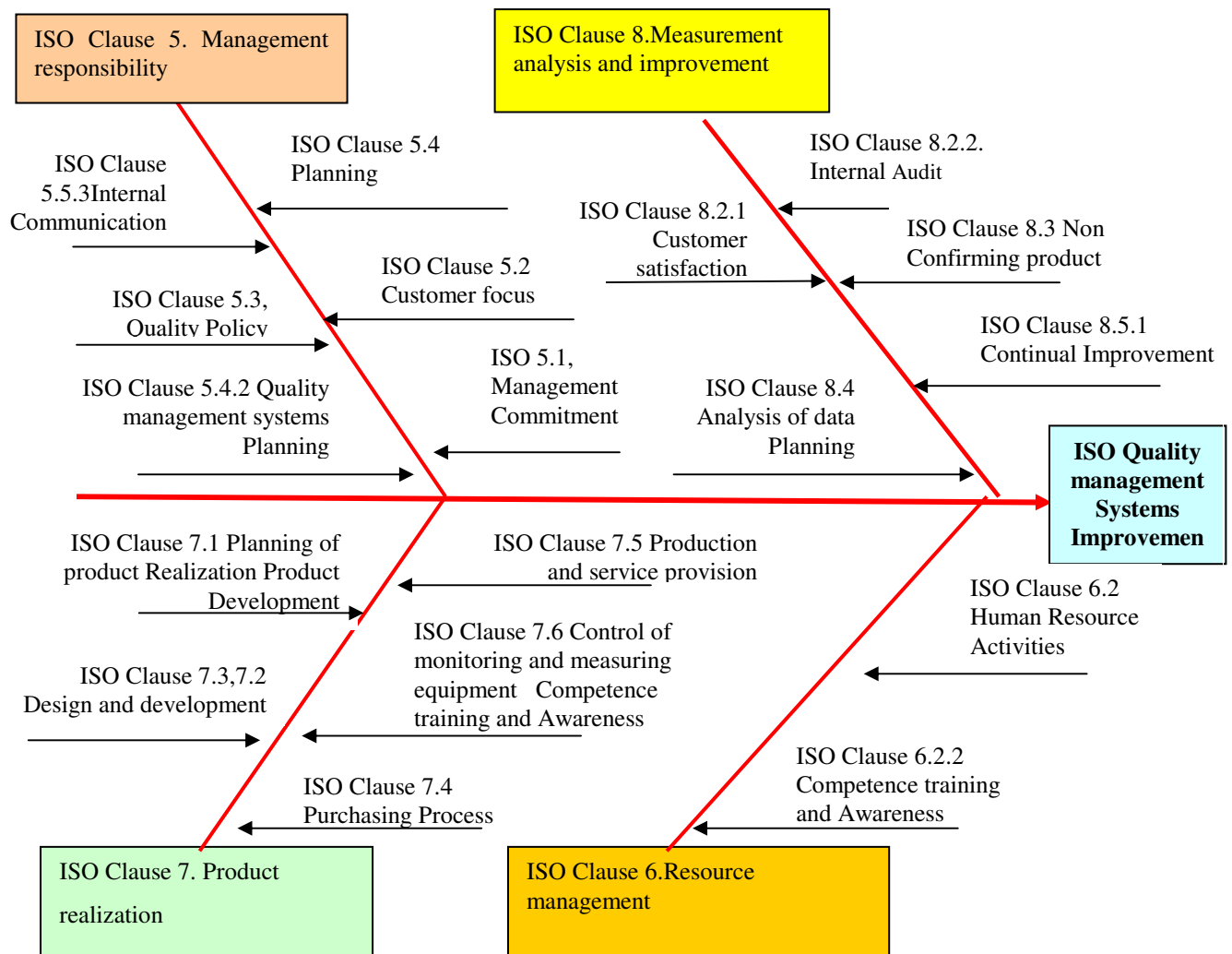


Figure 6.1; Dr.Deming’s shewhart cycle

Fish bone diagram

Adapted from: Jacobs, Chase, Aquilano, *Operations & Supply management P, 317, 12th edition 2009, McCraw Hill.*

Figure 6.1, illustrated how management systems can be improved. The ISO 9001:2008 quality management system has a main clause and sub-clauses in the structure. The fishbone or Ishikawa chart is frequently used for identifying cause and effects phenomena. The above chart indicates lines coming off the core horizontal line: the main causes; the lines coming off those are sub-causes, all causes being improved under the ISO 9001:2008 quality management system of South Africa. Below is given the recommendation for improving a quality management system.

6.4.1 Management responsibility.

Management should establish procedures for controlling the ISO 9001:2008 quality management system, describing the responsibilities (ISO Clause 5.1) and actions required to achieve consistency with mandatory, statutory requirements and customer focus (ISO Clause 5.2).

Management must ensure that (ISO Clause 5.4) planning; the compatibility of the (ISO Clause 7) product realization process, installation, servicing, inspection and testing procedures and applicable documentation conform to the standard set.

Top management should update (ISO Clause 8) procedures whenever necessary, keeping a close eye on quality control, inspection and testing techniques, including the development of new instrumentation and the identification of any measurement requirement involving capability exceeding the known state of the art; performing timeous interventions.

Management has the responsibility to establish and maintain company objectives and policies (ISO Clause 5.4.1, ISO Clause 5.3).

Management has the responsibility of ensuring appropriate communication processes (ISO Clause 5.5, ISO Clause 5.5.3). These are established within the organization and are maintained for the effectiveness of the quality management system. This is done in the form of Work Instructions, (ISO Clause 6.2.2) Quality Procedures, and Flow Charts, etc.

Management must ensure that (ISO Clause 5.4.2) the ISO 9001:2008 quality management system affords the planning of interrelationships between all personnel who manage, perform and verify processes affecting quality of products and services.

6.4.2 Resources management

An organization shall, (ISO Clause 6.1) by means of adequate and approved procedures and work instructions, identify in-house verification activities and requirements, provide adequate resources and assign trained personnel to fulfil these tasks.

The organization established (ISO Clause 6.2) procedures for identifying training needs and providing for the training of all personnel performing activities affecting quality. Personnel performing specific assigned tasks shall be qualified on the basis of appropriate education, training and/ or experience, as required.

The organization's establishing (ISO Clause 6.2.2) of competence, awareness and training, are discussed in detail in the ISO Standard, The line manager and the supervisors shall ensure that all personnel are aware of the relevance and importance of their activities and how they contribute to the achievement of the quality objectives. Appropriate records of education, training, skills, and experience must be maintained.

6.4.3 Product realization

Product design planning (ISO Clause 7.1) ensures that planning and co-ordination of the design/development activities are in accordance with approved procedures.

The design/development plans shall be specific for each development or design (ISO Clause 7.2) activity and shall describe these activities and responsibilities for implementation.

Organizational and or technical interfaces between different groups, (ISO Clause 7.3) are identified and the necessary information documented, transmitted and regularly reviewed in accordance with established procedures.

An organization ensures that the design/development input criteria pertaining to the product under review, including any applicable statutory and (ISO Clause 7.1) regulatory requirements, are identified and documented and that their selections are reviewed for adequacy.

As an organizational purchasing procedure (ISO Clause 7.4), evaluation of suppliers means that the company selects its suppliers on their ability to meet specified requirements including those pertaining to quality.

An organizational purchasing data (ISO Clause 7.4) ensures that purchasing documentation contains data clearly describing the product ordered, including, where applicable, the type, class, grade and other precise identification.

An organization shall establish suitable procedures and work instructions (ISO Clause 6.4) that identify and plan the production and delivery processes which directly affect quality; these processes must be expedited under controlled conditions.

6.4.4 Control of Monitoring and Measuring Equipment

The ISO 9001:2008 quality management system has established an appropriate procedure and work instructions for controlling (ISO Clause 8), calibrating and maintaining of monitoring and measuring devices that are used to demonstrate the conformance of products to the specified requirements.

The ISO 9001:2008 quality management system identifies all monitoring and measuring equipment that can affect product quality, calibrating and adjusting them at prescribed intervals (ISO Clause 8.3) prior to use.

The (ISO 9001:2008 Clause 8.4) procedure shall ensure that the inspection and test status of product is identified by suitable means, indicating conformance or non- conformance with regard to inspection and tests performed.

The (ISO9001:2008 Clause 8.5.1) identification of inspection and test status shall be maintained, as defined by the applicable procedures throughout production, to ensure that only products that have passed the required inspections and testing are manufactured.

6.5 Recommendations for Future Studies

The presents recommendations, identifies the limitations of the study, makes suggestions for further research, and articulates the unique contribution of this study to the body of knowledge, finally reaching a conclusion of an ISO9001:2008 quality management system may adopt a new philosophy.

The first recommendation of the study is that management undergo a transformation, believing in quality products and customer services.

The second recommendation of the study of the ISO 9001:2008 quality management system is to reduce mass inspection in production area.

The third recommendation of the study is that ISO 9001:2008 quality management system integrates low-price and highest quality.

The fourth recommendation of the study is that an ISO 9001:2008 quality management system benefits the leadership role of an organization.

The fifth recommendation of the study on the ISO 9001:2008 quality management system is that it should break down barriers between employee and employers.

6.6 Conclusion

This study is titled, 'How the ISO 9001:2008 quality management system affects the rubber and plastics industry of South Africa'. The study gathered data from the ISO 9001:2008 registered companies in the rubber and plastics industry of South Africa. The data gleaned from the respondents was analysed through statistical techniques so as to define who and how these entities applied ISO 9001:2008 quality management system effectiveness in the rubber and plastics industry in the industry.

The question was asked to what extent these systems or processes were used and what the success factor of their systems, processes and methodologies on organizations; enabling the researcher to make recommendations based on the data obtained. This study presented the first codified, interpreted and accessible data on ISO 9001:2008 quality management system as it affects the rubber and plastics industry of South Africa.

The ISO 9001:2008 quality management system's conceptualizing and operational tools assist in identifying problems, finding their root causes, and eliminating those causes; this being known as the 'quality improvement process'. The improvement of quality is itself a

process - the process of applying the scientific method to one's work. The literature on the ISO 9001:2008 quality management system (Clause 0.2 process approach), often refers to this idea as the Dr. Deming's shewhart cycle, the 'Plan-Do-Check-Act cycle', or 'the PDCA cycle'.

The study has, therefore, successfully explored and answered the problem statement, and has met the objectives. Successfully implementing an ISO 9001:2008 quality management system in the manufacturing industry will result in an attitude change by employees and employers. Initial efforts to adopting of the ISO 9001:2008 quality management system focused on cultural change and getting everyone to buy into a mentality that saw co-workers, supervisors and employees as valuable human beings who deserved the best possible service.

The ISO9001:2008 quality management system requires a change of attitude on the part of an organization's management and staff wherein all workers are encouraged, empowered and committed to seek out improvements in processes, products, and services and to accept responsibility for solving problems as they arise. This promotes the use of interdisciplinary teams of workers who must work co-operatively and collaboratively to achieve common objectives; it requires the backing of management as evidenced by allocation of time for team meetings and the identification of areas for staff development.

The response is that an ISO 9001:2008 quality management system effects an interdisciplinary relationship between the resources management systems and product realization, measurement analysis and improvement and continual improvement of the system, thus interacting with cross-functional teams. With good facilitation, these teams can show results in improved communications, increased involvement, improved quality and efficiency in a general context, and increased potential for productivity. Business and industry as they strive to improve the quality and cost-effectiveness of their operations can benefit by adopting the ISO 9001:2008 quality management system principles to achieve this end.

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APPENDICES

Appendix 1 Questionnaire

UNIVERSITY OF KWAZULU-NATAL

MBA Research Project

Researcher; Vinodachandra (0329416023)

Supervisor: Danny Mc Cabe (0317645939) 0825678998

Research Office: Ms P Ximba 031-2603587

Cover Page and Questionnaire

Dear Respondents:

The purpose of this survey is to solicit information from the rubber and plastics industry regarding the ISO 9001:2008 quality management system and how it affects employees and employers in the rubber and plastics industry of South Africa.

The information and ratings you provide us will go a long way in helping us identify how the ISO 9001:2008 quality management system affects both employees and employers. The questionnaire should take 15-20 minutes to complete. In this questionnaire, you are asked to indicate what is true for you, so there are no 'right' or 'wrong' answers to any question. Work as rapidly as you can. If you wish to make a comment please write it directly on the booklet itself. Kindly answer every question. To ensure anonymity your company will be allocated a number in the results section of this review

Thank you for participating!

Background Information

1. Your age is _____ years

18-24

25-34

35-44

45-54

55 and

Over

2. Gender?

Male	<input type="checkbox"/>	Female	<input type="checkbox"/>
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3. How many years of work experience in the plastics and rubber industry ? _____ years.

1-5	<input type="checkbox"/>	6-10	<input type="checkbox"/>	11-15	<input type="checkbox"/>	16-20	<input type="checkbox"/>	20 and Over	<input type="checkbox"/>
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4. How long have you been working under the ISO 9001:2008 quality management system? _____ Years

1-5	<input type="checkbox"/>	6-10	<input type="checkbox"/>	11-15	<input type="checkbox"/>	16-20	<input type="checkbox"/>	20 and Over	<input type="checkbox"/>
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5. For how many years have you been employed? _____ years

1-5	<input type="checkbox"/>	6-10	<input type="checkbox"/>	11-15	<input type="checkbox"/>	16-20	<input type="checkbox"/>	20 and Over	<input type="checkbox"/>
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6. Please indicate your main organizational function:

_____ Accountancy

_____ Administration

_____ Finance

_____ Human resource management

_____ Marketing

_____ Operations

_____ Production

_____ Customer services

_____ Other (Please specify): _____

Please rate how strongly you agree or disagree with each of the following statements by placing a check mark in the appropriate box.

Strongly Disagree	Disagree	Agree	Strongly Agree	1.The ISO quality management system improves the employee recruitments process:
Strongly Disagree	Disagree	Agree	Strongly Agree	2. Do you believe the ISO quality management system improves the company resource programme?
Strongly Disagree	Disagree	Agree	Strongly Agree	3. The ISO quality management system can reduce employee turnover:
Strongly Disagree	Disagree	Agree	Strongly Agree	4.The ISO quality management system helps to ensure people management: i.e. the 'right people in the right place'
Strongly Disagree	Disagree	Agree	Strongly Agree	5. TheISO quality management system helps to run the organization's planning, leading and control systems process:(SOP)
Strongly Disagree	Disagree	Agree	Strongly Agree	6. The ISO quality management system, will improve the product quality:
Strongly Disagree	Disagree	Agree	Strongly Agree	7. The ISO quality management system, will benefit product development:
Strongly Disagree	Disagree	Agree	Strongly Agree	8. The ISO quality management system, improves good manufacturing practices: (GMP's).
Strongly Disagree	Disagree	Agree	Strongly Agree	9. Do ISO Quality management systems, reduce the Product Cost:
Strongly Disagree	Disagree	Agree	Strongly Agree	10. ISO Quality management systems, reduce the Product delivery time:
Strongly Disagree	Disagree	Agree	Strongly Agree	11. Internal Audit procedures can improve the ISO quality management system
				12. Corrective and preventative action can improve the ISO quality management system's

Strongly Disagree	Disagree	Agree	Strongly Agree	organization: (?)
Strongly Disagree	Disagree	Agree	Strongly Agree	13. Customer feedback methods improve the ISO quality management system
Strongly Disagree	Disagree	Agree	Strongly Agree	14. Do you believe that quality controls and quality assurance underpin the quality management systems?
Strongly Disagree	Disagree	Agree	Strongly Agree	15. The continual improvement of a quality management system will enhance the employee / employer relationship
Strongly Disagree	Disagree	Agree	Strongly Agree	16. The ISO quality managements system improved customer satisfaction:

End of the Questionnaire

Thank you for taking the time to complete the questionnaire.

Appendix 2 Ethical Clearance



13 September 2010

Mr V Gowda
No 58 Protea Place
La Mercy
DURBAN
4399

Dear Mr Gowda

PROTOCOL: How ISO 9001:2008 Quality Managements Systems affect the Rubber and Plastics industry in South Africa
ETHICAL APPROVAL NUMBER: HSS/0963/2010 MBA: Faculty of Management Studies

In response to your application dated 03 September 2010, Student Number: **201296572** the Humanities & Social Sciences Ethics Committee has considered the abovementioned application and the protocol has been given **FULL APPROVAL**.

PLEASE NOTE: Research data should be securely stored in the school/department for a period of 5 years.

I take this opportunity of wishing you everything of the best with your study.

Yours faithfully


Professor Steve Collings (Chair)
HUMANITIES & SOCIAL SCIENCES ETHICS COMMITTEE

SC/sn

cc: Mr. D McCabe (Supervisor)
cc: Mrs C Haddon