SUPPLY CHAIN MANAGEMENT CHALLENGES AND BUSINESS PERFORMANCE IN THE FOOD PROCESSING INDUSTRY IN GAUTENG PROVINCE

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DECLARATION

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ABSTRACT

Effective supply chain management is largely contributing to the success of many companies around the world. From publicly owned companies to sole proprietorships, supply chain management is crucial in facilitating the effectiveness of all operations. In the food processing industry, supply chain management is regarded as important capital for both inbound and outbound logistical activities. However, implementation of supply chain management initiatives presents several challenges that hinder the effectiveness of the operations of most companies. The aim of this study was to investigate supply chain management challenges facing the food processing industry in South Africa and the effects of these challenges on business performance. Through a review of literature, seven challenges are identified, namely, human resources management, technology, facilities, supplier relationship management, customer relationship management, regulatory factors, logistics and transportation. A nine-section questionnaire was then developed using adapted measurement scales and distributed to 303 supply management professionals in food processing companies in Gauteng province. Respondents were selected using the non-probability convenience sampling technique.

The collected data were analysed using the Statistical Packages for the Social Sciences (Version 23.0). After testing for validity and reliability, descriptive statistics were applied in testing perceptions of respondents towards the seven supply chain management challenges and business performance. Pearson correlations were used to test for the strength and direction of associations between supply chain management challenges and business performance. Regression analysis is applied in testing whether supply chain management predicted business performance.

Application of Pearson correlations revealed negative associations between all seven supply chain management challenges and business performance. This implies that business performance decreases as the intensity of the challenges increases. Regression analysis indicated that, apart from regulatory factors, six of the supply chain management challenges predict business performance. Technology emerged as the strongest predictor of business performance. The study concludes by suggesting recommendations for limiting the impact of the identified challenges on business performance.

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LIST OF ABBREVIATIONS

ACRONYM	FULL ANNOTATION
SCM	Supply Chain Management
JIT	Just in Time
TOC	Theory of Constraints
TQM	Total Quality Management
GSCM	Green Supply Chain Management
SRM	Supplier Relationship Management
CRM	Customer Relationship Management
HRM	Human Resource Management
ISO	International Standardisation Organisation

CHAPTER 1

INTRODUCTION AND BACKGROUND

TO THE RESEARCH

1.1 INTRODUCTION

Most companies, from manufacturing to service providers have the realised the importance of supply chain management (SCM) as an important business process that determines their performance (Gupta & Palsule-Desai, 2011:234). The supply chain, also known as the procurement line, overarches to every level of a company from the raw material stage to the reverse delivery of products and information (Zhou & Benton, 2010:1365). Any party in the supply chain that does not comply with the focal company's corporate sustainability standards can potentially damage corporate reputation and/or harm customer confidence (Koplin, Seuring & Mesterharm, 2011:1033) A supply chain is a vigorous element, which implies the constant flow of relevant information, necessary product and financial means between different levels in a company (Adebanjo, 2011:226). Gold, Seuring and Beske (2011:245) suggested that sustainable management of the supply chain enables companies to implement various important practices and achieve a higher efficiency in logistics performance and resource usage. However, despite these benefits and competitive advantages to companies, the management of supply chains comprises significant constraints to them, which merit both managerial as well as empirical attention (Mishra, 2012:127).

The areas of SCM seem to be gathering interest amongst researchers and practitioners from varied disciplines (Arshinder & Balaji, 2016:156). Chow, *et al*. (2010:679) defines supply chain management as a set of approaches utilised to efficiently integrate suppliers, manufacturers, warehouses and stores, so that merchandise is produced and distributed in the right quantities, to the right locations and at the right time, to minimise system wide costs while satisfying service level requirements. As defined by Vaagen, Wallace and Kaut (2011:236), SCM is the act of sharing material, information and financial information within organisational units, to meet customer' needs and thus enhances the entire supply chain involved. The performance of supply chains is influenced by managing and integrating key elements of information into their supply chain (Gunasekaran, Patel & McGaughey, 2004:347). Over the years, the field of SCM has evolved rapidly, moving from the initial focus on internal integration (Monczka, Handfield, Giunipero & Patterson, 2011:545) to suppliers (Lummus, Duclos & Vokurka 2009:323) and customers

(Lagrosen, 2015:36) to reach optimal levels of performance necessary to ensure the success of the organisation. Therefore, it is crucial to state that supply chain includes manufacturers, suppliers, transporters, warehouses, retailers as well as customers themselves.

1.2 BACKGROUND OF THE STUDY

In the food processing industry, SCM seemed to be more complex because the nature of the product must be taken into consideration. In this case, the major challenge was the fact that in the food processing industry supply line, the handling of the transported product (raw, semi-finished and finished) plays an important role and required specific equipment, such as refrigerators for perishable products (Chung-Kee & Chuwonganant, 2014:489). Carter and Easton (2011:62) also alluded to the fact that food safety is a concern of almost every consumer and governments are closely investigating how the products are made but also how they are transported from the manufacturing site to the place where the demand exists. Deimel, Frentrup and Theuvsen (2011:21) found that in the food processing industry, customer demand and preferences played an important role in the development of a supply chain, leading to direct influence on the companies' success and profit. Furthermore, it was observed that the need for sustainable practices in the food supply chain was a determinant element for the South African food processing industry (Van Rooyen, Esterhuizen & Stroebel, 2011:181). This is because the food processing industry in the country was content with various competing pressures involving issues of sustainable production, in particular, reducing energy consumption and the impact on the environment, which leads to green practices (Boiral, 2010: 330). In light of these challenges, every company has the obligation to identify where its limits lie and how they affect their supply chain management or procurement line, to ensure that the performance level is positive (Koh, *et al.,* 2011:124).

Despite the existence of the challenges mentioned in the preceding paragraph, it is well-known that there are numerous benefits associated with the proper management of supply chains. SCM enables the organisation to deliver the right product at the right time, to the right place, in the right quantity or volume to the right customers (Fawcett, Wallin & Alfred, 2011:35). The results of a study conducted by Thakkar, Kanda and Deshmukh (2012: 970) also show that management of the supply chain fundamentally reduces the inventory held in stock, increases the speed of transactions by removing non-essential activities, which lead to the reduction in the costs that enable a business to work smarter. SCM eases direct relationships in an organisation at management level and allows the creation of strong relationships with suppliers, customers and other stakeholders (Sufian,

2010:137). Effective SCM is also important in building and sustaining competitive advantage regarding the products and services of firms (Kumar & Bala, 2013:55). In the food processing industry, where the sensitivity of the product as well as the scheduling of the product transfer are issues of important foci, SCM has become renowned for improving sustainability of operations (Yakovleva, Sarkis & Sloan, 2012:1317). It is an important supposition then, that supply chain management is an important tool for stimulating business performance in the organisation.

To counter these challenges and sustain the benefits of SCM, companies have learnt to develop new business practices that would help create a significant competitive advantage for the company towards the competitors. Just in Time (JIT), Supply chain Management (SCM), Theory of Constraints (TOC) and Total Quality Management (TQM) are examples of strategies that assist companies in complex supply chains to improve production processes, reduce overhead costs and successfully compete in a variety of business environments (Arshinder & Balaji, 2016:1666). The introduction of packaging and extensive mechanisation and development of factory processes also serve as important SCM strategies for the food processing industry. These strategies are important in that they enable the companies which have adopted them to create a competitive advantage towards the competitors targeting the same or similar market niche (Van Rooyen *et al.,* 2011:182).

1.3 RESEARCH THEORY

The Theory of Constraints (TOC) is adopted as the research concept for this study. The theory was developed in the 1980s by Eliyahu Moshe Goldratt (Boyd & Gupta, 2014:150). It emphasises the role of constraints in limiting the performance of a company and further suggests that these constraints should be identified and logically solved to improve the performance of the system (Van Rooyen *et al.*, 2011:184). The theory acknowledges that every system must have at least one constraint but the existence of constraints represents opportunities for improvement (Kim, Mabin & Davies, 2008:184). A constraint is perceived as anything that limits a system from achieving higher performance versus its goal (Watson, *et al.,* 2011:33). Organisational performance may be optimised within the defined set of constraints of the existing processes and product offerings (Kee, 2011:36). Boyd and Gupta (2014:171) state that the TOC is a transition shaped by several fundamental concepts that can be used to build a profitable foundation for a company. These concepts include:

- a new measuring system;
- a process of continuous process improvement;

- a fundamental decision process focusing on global rather than local issues;
- a new method for analysing the relationships between resources and processes and determining where to focus the company's efforts;
- new methods for analysing policy problems to arrive at simpler solutions; and
- a new management approach for providing strategic and tactical direction.

The above information shows that the TOC provides an action framework that combines the activities of managers around a few highly visible system elements and represents a tremendous change in management, focus and direction. It incorporates the idea that the goal or mission of a company is the reason it exists and only the owners of the company can determine its goal or mission (Coman & Ronen, 2009:580).

The food processing industry or food manufacturing industry includes companies that transform livestock and agricultural products into products used for intermediate or final consumption. Although there are many promising dynamics which support good growth of this industry, there are still some significant constraints which, if not addressed, can negatively impact the growth prospects of the food processing industry in South Africa (Zeimpekis & Giaglis, 2016:12). In this study, these complex challenges that the food processing industry is facing in its day-to-day supply chain operations are presented. The TOC presented techniques of finding ways to deal with these challenges in the process of manufacturing as well as distribution processes, to achieve full potential of the South African food processing industry.

1.4 PROBLEM STATEMENT

The food processing industry, one of the major industries in South Africa, is important for revenue and employs millions of people in the Industrial Development Corporation (Tuominen, Kitaygorodskaya & Helo, 2011:419). This factor alone implies that continued research in this industry and others is necessary for the generation of information for the purposes of problem-solving and decision-making. SCM performs a crucial role in the food processing industry by ensuring the efficient movement of required materials, information as well as the transportation of the products from the factories to the market close to the customers (Hesse & Rodrigue, 2004:184). As the food processing industry in South Africa grows and becomes more complex, so do the challenges encountered in that industry. These challenges associated with the adoption of SCM had to be captured empirically to foster a better understanding of the dynamics occurring within the industry (Kumar & Bala, 2013:57). This may be achieved by closely analysing the different

elements, from direct sources (inside the company) or indirect sources (outside the company) that positively or negatively impact the overall operations occurring in the supply chain (Resse, 2012:21).

Although some studies (Adebanjo, 2011:224; Beulens, et *al.,* 2005:486; Bigliardi & Bottani, 2010:249) have investigated SCM challenges in the food processing industry, a notable fact is that the studies have been based on either European or American contexts. Evidence of studies that have examined the relationship between supply chain management challenges and business performance in the context of the food processing industry in South Africa is severely limited. This study is intended to occupy this gap. The significance of the study lay in that such an investigation enables supply chain practitioners in food companies to understand the sources of challenges and transform them into productive elements for their organisations. Analysing SCM is also crucial for companies concerned with their operational success since management of the supply chain line has a direct impact on customer service (Pamela & Pietro 2011:230). By using the information derived from this study, companies in the food processing industry have gained the capability of determining SCM challenges on how to solve them and initiate strategies for reaping the benefits associated with SCM.

1.5 PURPOSE OF THE STUDY

The purpose of the current study is to investigate challenges to supply chain management and their impact on business performance in the food processing industry in Gauteng Province, South Africa.

1.6 OBJECTIVES OF THE STUDY

For the purposes of the present study, the objectives are classified into three categories, namely, the primary, theoretical and empirical objectives.

1.6.1 Primary objective

The primary objective is to investigate the challenges of supply chain management practices and the business's overall performance in the food processing industry in the Gauteng Province of South Africa.

1.6.2 Theoretical objectives

The following theoretical objectives were formulated for the study:

- to review literature on the nature and composition of the food processing industry;
- to review literature on SCM and business performance;
- to review literature on the challenges associated with SCM; and
- to review literature on the effect of SCM challenges on business performance.

1.6.3 Empirical objectives

The following empirical objectives were formulated for the study:

- to establish perceptions of SCM professionals, managers and owners of companies in the food processing industry in Gauteng Province regarding SCM challenges faced by their companies; and
- To analyse the effect of SCM challenges on business performance in the food processing industry in Gauteng Province.

1.7 DEMARCATION OF THE FIELD OF STUDY

The study was conducted in the Gauteng Province, focusing on companies operating within the food processing industry.

1.8 RESEARCH DESIGN AND METHODOLOGY

For the purposes of this study, a quantitative approach was used. Quantitative research is essentially about collecting numerical data to explain a particular phenomenon. Particular questions seem immediately suited to being answered using quantitative methods (Hopkins 2013:23). The rationale for adopting a quantitative approach is that the study was conducted on a particular segment rather than on a vague range within the industry. In addition, the aim here is also to understand the supply chain constraints and benefits facing a cross-section of companies within the food processing industry in South Africa (causes and effects). The research design included both a review of the literature and an empirical study.

1.8.1 Literature review

The literature review is the part of the study where all the details regarding the key concepts are elaborated (Boote, 2005:16). In this study, textbooks, articles in journals, the Internet, newspapers and magazines were used as sources of literature. The literature review mainly focused on the food processing industry, the nature of SCM, the challenges associated with supply chain management as well as the potential benefits associated with adopting supply chain management practices.

1.8.2 Empirical study

An empirical study uses data derived from observation, questionnaires or experiments. The empirical portion of this study comprised the following methodological dimensions:

1.8.3 Target population

The target population included SCM professionals of companies operating in the food processing industry in Gauteng Province. It was proposed that the target population within the food processing industry must focus on the fast-moving consumer goods because the supply chain in such categories presents various elements that can be elaborated in this study.

1.8.4 Research sample

The respondents for the study were drawn from supply chain practitioners within the FMCG of the food processing industry in Gauteng Province. The proposed sample size was 500 respondents. There were two major reasons for adopting this sample size. Firstly, Hopkins (2013:23) suggested that, for any population of 10 000 (N), the recommended sample size should be approximately 380. Secondly, this sample size is in line with several previous studies (Haan, Kisperska-Moron & Placzek, 2013:43; Thakkar, Kanda & Deshmukh, 2012:973) that focused on challenges encountered in supply chains. Respondents were selected by means of a non-probability convenience sampling technique. This approach was necessitated because there was no single sample frame from which all respondents could be drawn. In addition, it was envisaged that it would be difficult to locate the respondents at the same place and time since they were drawn from different companies.

1.8.5 Method of data collection and measuring instrument

Data were collected using a structured questionnaire partitioned into nine sections. Section A of the questionnaire elicited information on the demographic profile of the respondents. Sections B to H of the questionnaire elicited information on challenges associated with SCM. Section I of the questionnaire elicited information on business performance. The questions on SCM challenges and business performance were adapted from various validated scales used in previous studies (Refer to Section 4.6 and Table 4.1). Questions on Sections B to H measuring SCM challenges were presented in the form of 5-point Likert-scales, anchored by 1=Strongly Disagree and 5=Strongly Agree. Questions on Sections I measuring business performance were presented in the form of 5-

point Likert-scale, anchored by 1=Much Worse and 5=Much Better. It was envisaged that the collection of data be conducted over a period of between one and three months. The researcher administered the questionnaires to the respondents in person.

1.9 DATA ANALYSIS

In this study, a data analysis was conducted using the Statistical Packages for the Social Sciences (SPSS Version 23.0). Simple descriptive statistics such as percentages, frequency tables and graphs were used as the preliminary statistical analysis techniques in the analysis of the demographic profile of the sample as well as perceptions towards the individual items in the scale. Pearson correlations were used to analyse the strength and direction of the relationship between SCM challenges and business performance. Regression analysis was used to analyse predictive relationships between SCM challenges and business performance. The mean-score ranking technique was used to determine the strength of the challenges as well as the importance of the benefits relative to each other.

1.10 VALIDITY AND RELIABILITY

Validity determines whether the research truly measures what it intends to measure or how truthful the research results are (Blanche, Durrheim & Painter 2013:489). Considering this, it becomes a major responsibility for the researcher to determine if the data used for the study is relevant and valid to yield truthful recommendations and to conduct relevant analysis. Content and face validity were ascertained through pilot testing the questionnaire with a conveniently selected sample of 50 respondents as well as through an evaluation of the questionnaire by experts in the field of SCM. Convergent validity of the scale was assessed through Person Correlation analysis. Predictive validity was assessed through predictive analysis.

As defined by Johnson (2012:286), reliability is the extent to which results are consistent over time and an accurate representation of the total population under study. As such, if the results of the study can be reproduced under a similar methodology, then the research instrument is considered to be reliable. In this study, reliability was ascertained using the Cronbach alpha coefficient. According to Nunnally and Bernstein (2014:43), a Cronbach alpha value which is above 0.7 is considered adequate. This value was adopted as the principal indicator for internal consistency reliability in this study.

1.11 ETHICAL CONSIDERATIONS

In scientific research, all stakeholders have ethical issues, which should be considered (Kumar, 2015:16). Special consideration was given to ethical respects such as right to privacy, confidentiality and anonymity of research participants. Furthermore, the respondents' right to equality, justice, freedom of choice, expression and access to information as well the right to human dignity/life and protection against harm were ensured. Since this study used people as respondents, the principle of informed consent was followed. The study was conducted after permission to conduct it had been granted by the companies involved. In addition, all sources from which the information was obtained were acknowledged, as recommended by Goddard and Melville (2015:110).

1.12 CHAPTER LAYOUT

The following is the proposed structure of the eventual dissertation:

Chapter One: Introduction and background of the study

This chapter provides a brief description of the study. It highlights the main focus of the topic and presents an outline of its structure.

Chapter Two: Nature and composition of the food processing industry in South Africa

This chapter discusses the food processing industry in South Africa. Major emphasis is placed on the presentation of the composition of the industry and recent developments in terms of the different activities performed as well as the challenges experienced.

Chapter Three: Supply chain management and business performance

This chapter provides a literature review, which focuses on supply chain management and business performance. The chapter provides a comprehensive description of what supply chain management and business performance entails and the advantages and challenges faced in the management of the supply chain in general.

Chapter Four: Research methodology

This chapter discusses the research methodology adopted for the study. Typical topics to be discussed include the research design, the selection of respondents, instrumentation, data collection procedures, ethical considerations and statistical analyses.

Chapter Five: Data analysis and interpretation

This chapter focuses on the analysis, interpretation and evaluation of the research results.

Chapter Six: Conclusions and recommendations

In this chapter the main results are summarised and the shortcomings of the study highlighted. Recommendations are made regarding the supply chain management challenges and business performance in the food processing industry.

CHAPTER 2
NATURE AND COMPOSITION OF THE FOOD PROCESSING INDUSTRY IN SOUTH AFRICA

2.1 INTRODUCTION

The food we eat reaches us by the way of food supply chains through which food moves systematically from producers to consumers. The money consumers pay for food which goes to people who work at various stages along the food supply chain in the reverse direction. Every step of the supply chain requires human and/or natural resources. When one part of the food supply chain is affected, the whole food supply chain is affected, which is often manifested through changes in price. The purpose of this chapter is to analyse literature on the South African food processing industry. The chapter emphasises the history of the South African food processing industry, the challenges it faces from the industrial side to the household sector, the value added by this industry on the economy as well as the achievements attained. The chapter gives special attention to the challenges faced, which include the lack of equipment, infrastructure, inflation and the shortage of skills.

2.2 HISTORY OF THE SOUTH AFRICAN FOOD PROCESSING INDUSTRY

A food supply chain or food system refers to the processes that describe how food from a farm ends up on our tables (Fantazy, & Kumar 2010:685-691). The processes include production, processing, distribution, consumption and disposal (Apaiah, Linnemann & Kooi 2011:21). The industry in South Africa has changed a great deal, due to the dramatic change in purchasing power resulting after the abolishment of the apartheid regime, the introduction of packaging and extensive mechanisation, technologies, techniques and development of factory processes (Bac, *et al.,* 2011:4264). It could be argued that such developments have increased the food processing industry's dependency on energy at the industrial manufacturing stage.

The South African food processing industry is composed of companies dedicated to manufacturing and processing/transformation of raw materials and semi-finished products that come from primary activities such as agriculture, zoo technics, forestry and fishing (Cousins & Scoones, 2014:35). This transformation is supported by logistics and operations. An example of a simple food chain is shown in Figure 2.1.
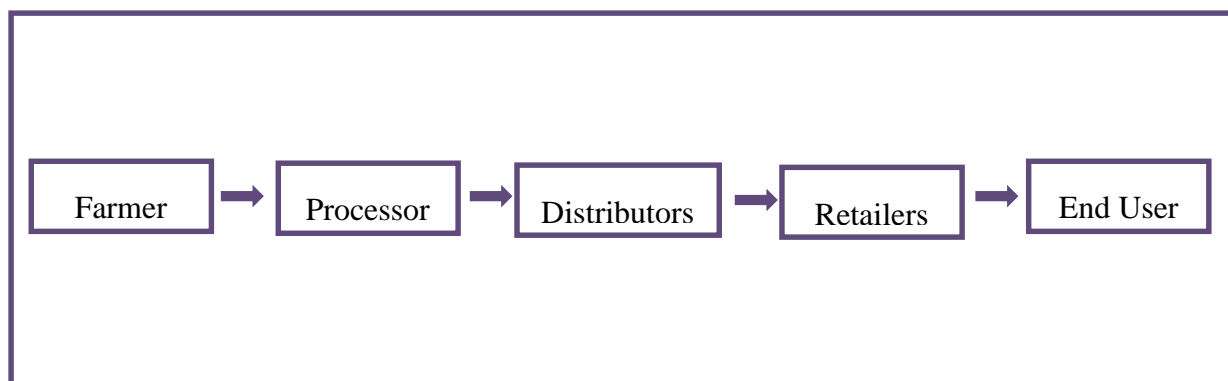
Figure 2.1: Simple Food Supply Chain

Source: Du Toit *et al*. (2011:33)

Figure 2.1 shows a basic food chain. It starts with a farmer who produces the raw food, which will be processed at a later stage to manufacture the product. The distributor oversees transporting the semi-finished products along the chain or the finished products to where the demand exists. Retailers then take over to sell the products to the final user represented on the chain.

Food processing industry accounts for two percent of South African gross profit and 13.5 percent of total employment sector (Federalimentare, 2012:23). The food processing industry is number one in Africa and comes second in South Africa for revenues. It plays a vital role to satisfy the needs of consumers and contributes annually to the South African economy. The number of employees amounts to 4.3 million in South Africa, which plays a special role as the ambassador of the 'Made in South Africa' brand (Fedderke & Hill, 2012:43). The largest production sectors of food processing industry are brewing, milling, baking, confectionery, animal and vegetable oils, sugar, dairy products, fruits and vegetables, soft drinks, fish and meat processing, ethyl alcohol distillation, sprit blending, wines, bottling of natural spring and mineral waters, among others (Beske, 2012: 382).

According to the KwaZulu Natal Provincial Executive Committee, classification of economic activities in South Africa, held in 2006, the food and beverages sector includes the manufacture of food products and the manufacture of beverages, although contrary to practice in most other countries, it excludes the tobacco manufacturing sector, which is included in the agricultural sector.

This section discusses the history of the food processing industry in South Africa, which plays a pivotal role in the South African mainstream economy in terms of job creation and contribution to

the gross domestic product of the country. Many people, including consumers, are dependent on the well-being of the food processing industry. The next section discusses recent developments in the industry.

2.3 RECENT DEVELOPMENTS IN THE SOUTH AFRICAN FOOD PROCESSING INDUSTRY

The economic environment in South Africa has provided opportunities for the private sector to participate actively in investment activities as opposed to the previous socialist policies, which put investment activities under state control (De Cock, 2013:270). The economic environment has received significant encouragement for local and multinational investors to invest in different sectors of the economy (Drimie & McLachlan, 2013:220). Protecting consumers from unsafe food, the environment from over-exploitation of resources and pollution and workers and producers from unjust labour and trade relations are generally considered objectives worthy of intervention in development circles, whether through public regulation or, increasingly, through the establishment of voluntary standards, labels and codes of conduct (Gold, *et al.* 2011:233). Food safety, environmental and social standards have become key features in the South African food processing industry in the last 15 years (Greenberg, 2013:59). International organisations, government agencies, non-governmental organisations, corporations and industrial associations behind the formulation of these standards were originally defensive of efforts aimed at critically observing their impacts in diverse areas (Cummins, 2012:87).

From the early 1990s, the South African government launched a deliberate programme to restructure and privatise public owned enterprises. Government withdrawal of state control brought a big challenge to the industry sector. The food and beverages manufacturing sector is a significant component of the South African economy, accounting for 18percent of manufacturing sales (food –13,5%, beverages – 4,4%) and 17 percent of gross value added in the manufacturing sector and employing approximately 230 000 employees in 2009 (Cloete, *et al.,* 2012:47). According to Groenmeyer (2013:159), this sector is part of the food processing industry value chain, which comprises a range of activities, including farming and the production of raw agricultural produce, processing of raw agricultural commodities, manufacturing, transforming the raw and processed produce into finished/processed commodities, wholesalers and retailers of the finished products, and finally, consumers. The contribution of the food processing industry to drive the South Africa economy has increased quite significantly over the last two decades. During the 1980s the contribution of this industry was proportional to the consumer price index (CPI). However,

between 2000 and 2008, the economic contribution of the food sector rose to approximately 1,4 times in the consumption basket (Aliber, *et al.,* 2011:40-41).

Since the abolishment of apartheid, the country has observed several companies which were run by local investors who performed inefficiently or went out of the business because they could hardly resist competition from local multinational invested companies and importers (Palmer & Sender 2013:349). As the country endures more pressure from globalisation, the food processing industry sector is also subjected to the increased competition in the domestic market. The processors should meet those challenges by responding fast to avoid delays, which can take them out of the business. Wood (2014:19-22) identified several improvements in the food processing industry in South Africa, which are:

- greater differentiation of food products to meet diverse customer preferences and expectation to create different market niche;
- the competition for consumer expenditure which will allow firms to get the maximum of customers in a competitive market as such as a food market through various efforts and improvements both in the operations and on the products;
- changing in the operating environment to facilitate the accessibility of the products wherever the demand exists and when the demand is created;
- improvement of product quality through personnel training and product innovations;
- consumers' sensitivity to quality, safety, health and nutritional factors of food products such as green consumers who are cautious with what they buy; and
- interest in place of origin and means of production, including non-food values such as environmental sustainability and animal welfare, because manufacturing companies must ensure that all activities they operate in do not affect their environment as they do not operate in isolation.

This section discusses the developments in the food processing industry in South Africa in the past few years. It is obvious that consumer preferences and lifestyle greatly affects the structure of the food processing industry in South Africa. Preferences for green manufactured foods are a great innovation in the industry as consumers now focus on health and safety issues when buying a product, and go further to assess how it was manufactured. The history of the country shows that more developments occurred after the year 1994, where the number of consumers increased and placed the food processing industry among one of the most important sectors contributing to the country's economy. The next section discusses contributions of the industry.

2.4 CONTRIBUTION OF THE SOUTH AFRICAN FOOD PROCESSING INDUSTRY

The food processing industry must contend with multiple competing pressures alongside the new challenges of sustainable production, in particular, reducing energy consumption (Boiral 2010:316). It has changed a great deal with the increases in purchasing power, the introduction of packaging and extensive mechanisation and development of factory processes (Hofman, 2014:41). Presently in South Africa, companies addressing the educational and research and development requirements are very few but are fully utilised for innovation (Msaki & Hendriks, 2014: 194). Previously, people were used to buying and consuming fresh products only, and did not develop preferences for canned, pre-cooked or frozen products (Kepe & Tessaro, 2014:267). Nowadays, this has changed. People are not attracted to fresh products and likely to purchase cans, pre-cooked of frozen products because the life-span if these products is likely to be more than direct fresh products, even though they cost more and are therefore not always accessible to all. Time available and on-hand ingredients hence drive meal choices. South African marketers therefore put effort into presenting consumers with products that require less preparation time and less cognitive energy expended on deciding what to cook (Hopkins, 2013:23).

In the global market, food professionals develop sufficient awareness and other relevant food processing principles, including a wide variety of knowledge such as waste management and disposal, food regulations and packaging (Johari, *et al.,* 2012: 2912). The professional develops an appreciation of research and development as well as innovation in critical technology areas such as novel process development in preservation and storage techniques, packaging, process control, rheology, colloids, among others, as it is very important in the food processing industry for sustainable growth (Boiral 2010:320). Halal food products are also coming into the South African food processing industry and are the main and most recognised components of this industry, making up approximately about 16% of the current food trade (Abdul Talib, *et al.,* 2011:57). The Halal food processing industry is no longer viewed as exclusively religious requirements for Muslim communities; non-Muslims have also started to demand this particular food group due to the perception that Halal foods are cleaner, hygienic and tasty (Ambe, *et al*., 2012:11104). It is therefore important to state that in the Halal food supply chain, the main goal is not only to ensure that the satisfaction of the customer is achieved, but also to ensure that the Halaal status of the food product remains intact throughout the whole process of the supply chain (Bahrudin, Illyas & Desa, 2011:279).

2.5 PROFILE OF THE SOUTH AFRICAN FOOD PROCESSING INDUSTRY

Beginning two decades ago, the industry faced increasing pressures for deregulation. The origins of this change can be found in the shift in monetary policy in the late 1970s and the fiscal strategies in the 1980's (Msaki & Hendriks 2014:210). According to the South African National Treasury (2015:37), the South African overall food and beverage industry today comprises 4143 companies. These are owned by the government as well as the private sector. In South Africa, food and beverage manufacturing is fragmented and highly concentrated, with a relatively small group of large companies with both forward and backward linkages, producing most of the output and value added and many small and medium sized companies producing for local markets. In 2009, out of total income of R225 421 million, large enterprises accounted for R204 672 million (91%), medium enterprises R13 280 million, small enterprises R4 413 million and micro enterprises R3 056 million (Bell *et al*. 2009:300).

According to Kepe *et al.* (2014:270), the food processing industry sector is vast and diversified, categorised by different segments such as fresh food processing industry, organic food processing industry, processed food processing industry and livestock food processing industry. Each segment needs different supply chain strategies such as procurement and sourcing, inventory management, warehouse management, packaging and labelling system and distribution management, thus, the uniqueness characteristics of a food supply chain (Mooketsi & Gestring, 2001:74). Sales in the South African food processing industry sector grew by some 2.5 percent per annum in real terms in the period 2002-2009, a rate close to the overall rate of growth of the economy (Fedderke*, et al*., 2012:81). Production in the food and beverages group accounted for about 18.5 percent of total manufacturing output for the country in 2009, while employment was 15.9 percent of total manufacturing sector employment. External trade in the South African food processing industry still largely consists of managing importation and exportation to influence domestic prices (e.g. maize, wheat), or of monopoly export schemes (e.g. fruits). (Müller, 2012:298). The composition of the South African food processing industry is shown in Table 2.1.

Table 2.1: Composition of the South African Food processing industry

MAJOR GROUP AND SUBGROUP	NUMBER OF COMPANIES
Meat, Fish, Fruit, Vegetables, Oil and Fats	2001
Dressing and packaging	549
Prepared and preserved meat	349

MAJOR GROUP AND SUBGROUP	NUMBER OF COMPANIES
Canned, preserved and processed fish	480
Canned and processed fruits and vegetables	357
Vegetables and animal oils and fats	266
Dairy Products	466
Processing of fresh milk	46
Butter and cheese	17
Ice cream and other edible ice	45
Milk powder and edible milk products	13
Grain mill products	273
Starched products and prepared animal feeds	72
Other Food Products	875
Bakery products	522
Sugar, golden syrup and castor sugar	47
Cocoa chocolate and sugar confectionery	78
Coffee, coffee substitutes and tea	15
Nut food	31
Beverages	801
Rectifying and blending of spirit	335
Beer and other malt liquors	223
Soft drinks and mineral waters	243

Source: The Sowetan 2012:7

Table 2.1 shows the major groups and subgroups of the food processing industry in South Africa. These are the meat, fish, vegetables and oils, dairy products, canned products and beverages. Each major group has sub-groups, which comprise the overall South African food sector. The most dominant group in terms of number is the meat, fish, vegetables, fruits and oil group, with 2001 companies in total. Each major group has challenges to face that affect the efficiency of its activities, which are discussed further in the study.

This section analysed literature on the profile of the South African food processing industry. There is clearly great diversity in this country when it comes to food and beverages. Meat, fish, fruit, vegetables, oil and fats are the predominant food groups and have the biggest number in terms of

companies. The dairy sector is less composed but also has a great diversity in terms of products. The next section discusses challenges facing the South African food processing industry.

2.6 CHALLENGES FACING THE SOUTH AFRICAN FOOD PROCESSING INDUSTRY

South Africa's food processing industry, which has lagged for many years in terms of technology and equipment, faces enormous, diverse and demanding challenges which hinder the sector from growing at a noticeable pace to significantly contribute to the country's economic development (Cloete, Lenka, Marais & Venter 2012:89). In addition to technology and equipment, other challenges identified by processors include: technical knowledge, research and development, capital, managerial and physical infrastructure (Verdouw *et al.*, 2010:232). McLachlan and Landman (2013:859) state that foreign investors have grabbed a bigger market share by using their innovative technologies and massive capital resources. This has presented great pressure to small and medium entrepreneurs in South Africa as they are still not able to generate sufficient value added products while their small scale of production, due to low investment resources and irrationally structured companies, make them less economical. Some of the challenges faced by this industry include the lack of equipment, infrastructure and skilled workforce, supply chain challenges, food wastage, scarcity of water in South Africa, globalisation, importation and exportation and socio-economic factors such as poverty, inflation and inequality.

2.6.1 Lack of equipment, infrastructure and skilled workforce

In South Africa, current skills are not often associated with new technologies or advanced engineering skills in operations and maintenance and are also hard to find (Daniels, 2012:27). Thus, decision-making often is not optimised or based on sound real-time data. Operators are frequently not equipped to use new technology optimally, which implies that a skills shortage exists. Apart from the lack of processing equipment, the food processing industry has been facing difficulties in securing primary and secondary raw materials. Ndobo and Sekhampu (2013:311) suggest that insufficient capital to acquire secondary raw materials, such as suitable packaging resources, food additives and preservatives, as well as label printers, explains the absence of well-established manufacturers and printers of packaging materials. This remains a major obstacle faced by food processors.

Good quality packaging materials and food additives all need to be imported from abroad, which many of the processors can hardly manage or afford. However, outsourcing of raw materials and replacement parts from overseas, results into long lead times and high stock levels (Naudé, *et al.,*

2011:70). Additionally, consistent product quality depends on raw materials' consistency accompanied by appropriate processing technology and conditions. Since agricultural activities are not modernised, to get consistent raw materials, for example, tomatoes, oranges, mangoes, pineapples, among others, from one farm to another or from season to season, is not easy (Oelofse & Nahman, 2013:81). Many processors, therefore, fail to offer consistent quality products to their respective consumers as they find difficulties in getting consistent quality raw materials from their suppliers (Nahman, 2011:2047).

Poor storage facilities not only lead to product spoilage but also may present health risks to traders as well as consumers. Electricity plays a major role in the country's economic development. Although there are deliberate efforts to increase electrification, electricity is still not a reliable commodity in South Africa (Department of Energy, 2011:23). This does not only affect production processes but also products that depend on cold chain distribution and storage, for example, pasteurised and fermented dairy products, meat and meat products, fish etc. (Zhang et *al.,* 2009:29-30). Prolonged electricity blackouts accompanied with favourable tropical conditions for microbial development result in a great loss to the processors, wholesalers, retailers, consumers or the entire supply chain system. Most traders have small storage areas and facilities, which force them to pile up their products, resulting in poor ventilation and dusty and uncomfortable working environment, which may affect their health.

Moreover, there is an evident lack of modern influences of environmental factors,. with few businesses having devices to control multiple stresses, such as temperature, humidity, vibrations, ambient pressure and light exposure (Zhang *et al.,* 2009:31).

Some efforts have been made in the pharmaceutical and in the biochemical sectors (Marsh & Bugusu, 2011:41), but without considering the possibility of an integrated approach on testing food products. Sustainable development of any society depends on a safe, nutritious, dependable and affordable food supply. According to Naicker, Mathee and Teare (2015:269), an appropriately trained and educated workforce is essential through all stages of the food system, as in some countries of Sub-Saharan Africa, which have been identified as being largely under-served in their professional development needs, particularly in the agro-food sector.

Typically, food processing industry workers in Sub-Saharan Africa have a secondary school level education. While some may have matriculated, many have not completed high school. Most workers have family commitments and need to be gainfully employed to support their families.

Therefore it is not possible for most of them to seek additional training or formal education through traditional methods such as attending colleges or universities, even if they had the requisite secondary school education. A study conducted by Montouri (2013:47) concluded that these challenges in education render difficult for the employees to acquire the necessary skills training for personal advancement to meet the requirements of an industry sector urgently in need of trained employees.

2.6.2 Supply chain challenges

The food supply chain is the network of companies that produce and sell fresh or processed products from vegetables, crops or animals (Van der Vorst, Beulens & Van Beek 2013: 292). In order to ensure materials, information and financial flows between supply chain partners, supply chains must be dynamic and flexible, built on cooperation, coordination, control and trust (Van Der Vorst, *et al*., 2011:299; Naspetti, *et al*. 2009:195). A supply chain plays a central role in achieving sustainability (Ageron, Gunasekaran & Spalanzani 2012:168), through changing buying practices and impacts on the natural environment (Wolf, 2011:230).

A supply chain has a strong and deep impact on the natural environment because it deals with the resources needed for the production in the food processing industry. (Min & Mentzer 2007:234). In South Africa, the industry faces difficulties such as limited shelf life, perish ability, weather variability, risk of infestation, rigid food quality and safety requirements, demand and price variability (Widodo, Nagasawa, Morizawa & Ota, 2012:43; Van Der Vorst, *et al*. 2011:86). In addition, it is important to highlight the impact of the E-toll system, which is another problem faced by the supply chain of the food processing industry. This recent regulation forces companies within the food processing industry to redefine the distribution channel and to add relevant costs stemming from E-tolls. The lack of information amongst supply chain partners as well as the difficulties in the right choice of supply chain partners is a further significant element that affects the food supply chain (Hommes & Holmmer,2013:46).

Logistics plays an increasingly important role in food supply chain, which needs growing awareness shared between different representative actors in the chain. Food scientists know some effects on foodstuffs generated by the uncontrolled exposition to light, heat, variability of temperature and pressure, vibrations and mechanical shock. However, this knowledge is not comprehensive and rarely has been associated to decisions of logistics, e.g. transport and packaging. Systems are not meant to succeed if the communication is not relevant (Naspetti *et al*.

2009:80). Water availability and quality will impact on companies in the sector because of its close links to agricultural productivity and the need for safe and high-quality water in manufacturing processes. According to Eberhard (2009:198), the access to stable water supplies is a prerequisite for reliable production of agricultural inputs required for the food and beverage sector. Consumer trends towards more processed foods and increased meat and dairy consumption require more water per unit of food produced. Together, these trends are increasing the sector's use of water at a time when water scarcity, increased demand and climate changes threaten to reduce its supply.

Environmental and safety concerns cover increased consumer awareness of the quality, hygiene and safety issues surrounding their food and beverages. Among the supply chain risk-management practices, the most prominent is the adoption of standards and certifications with 24 articles mentioning this approach. Such standards come in the form of code of conducts of individual focal companies (Kolk, 2011:98) or in the form of general certifications like the ISO 14001or SA8000 (Vermeulen, 2010:265). Individual monitoring by members throughout the entire supply chain is particularly necessary in food supply chains as tracking and tracing are crucial to sustainable food production (Parmigianietal 2011:89). Nutritional value issues have become increasingly important. In addition, the conditions in which food is grown or raised and the effect of transporting produce on the environment (calculated by greenhouse gas emissions during transport) are now concerns for consumers, especially in developed economies (Liu, *et al.,*2011:16).

Supplying in rural areas is rather difficult and quasi impossible because of the accessibility issue. This supply issue was elaborated by Baiphethi and Jacobs (2009:460), where the authors concentrated on the post-apartheid Constitution (Constitution of the Republic of South Africa, Act 108 of 1996), which contains clauses that seek to address poverty reduction and other racial inequalities. Section 27(subsection 1b) of the Constitution states that "everyone has the right to have access to sufficient food and water" and that "the state must take reasonable legislative and other measures, within its available resources, to achieve the progressive realisation of these rights", leading to encourage the agriculture subsistence in case of supply difficulties in rural areas.

Food safety is critical in the food and beverages manufacturing sector and of increasing concern as the food supply chain widens. Incidents such as the 2005 non-nutritional infant powdered milk and milk products tainted with melamine in China, the Belgian dioxin scandal, bovine spongiform encephalopathy (mad cow disease) have highlighted concerns for food safety (Fritzand & Schiefer 2009:120). Despite being specifically regulated, the food processing industry has gone through many crises during the last decade, namely, mad listeria, bird flu or the recent horsemeat scandal.

The final consumer has become increasingly sensitive to the origin and conservation of the products they buy (Kolk, 2011:99). The logistics of this segment must be able to show responsiveness, precision and transparency to regain and maintain consumer confidence. The appearance of labels, continuous changes in international regulations as well as technological innovations have influenced and transformed the food supply chain and established principles like product traceability, cold supply chain control or hygiene and quality (Liu *et al*, 2011:19).

2.6.3 Food wastage

Food waste broadly includes losses that arise before food reaches the end-user (pre-consumer food losses), as well as food that is discarded by consumers (post-consumer food waste). Globally, it is estimated that food waste throughout the food supply chain (including both pre- and post-consumer food waste) amounts to 50 percent of all food produced for human consumption (Baiphethi & Jacobs, 2009:480). Food waste arises mainly due to financial, managerial and technical limitations in harvesting techniques, storage and cooling facilities (exacerbated by difficult climatic conditions), infrastructure, packaging and marketing systems (Parfitt, Barthel & MacNaughton, 2010:3066). In a previous paper presented by Nahman, De Lange, Oelofse and Godfrey (2012:2149), the authors estimated the cost of post-consumer food waste (specifically, food waste at the household level) in South Africa at approximately R21.7 billion (approximately US$2.7 billion) per annum, or 0.7% of South Africa's annual gross domestic product (GDP). This included the costs of wasted edible food that could be used to feed the hungry, valued according to weighted market prices for income group-specific food baskets (obtained from the South African Consumer Price Index for Food (Statistics South Africa, 2011:97).

From a social and environmental perspective, food waste is problematic for several reasons. Firstly, a substantial proportion of discarded food is still edible, implying that it could have been used to feed those in need, if it had been better managed or distributed (Nahman, *et al*., 2012:2151). Nahman *et al.* (2012:2159) developed a methodology for reporting on the results of an assessment of the costs of food waste throughout the entire food value chain in South Africa, from agricultural production through to food waste at the household level (with a specific focus on edible food waste). Secondly, even in the case of inedible food waste, disposal to landfill or by incineration implies the loss of a potentially valuable resources that could have been used in other processes (e.g. energy generation or composting) (Parfitt, *et al.,*2010:3067). In addition, the decomposition of organic waste at landfill or by incineration leads to a range of environmental and social impacts. Finally, the production of food that ends up going to waste entails wasted resources and emissions

in the food supply chain. From an economic perspective, the costs of food waste tend to be under-valued (and therefore ignored by policy-makers), particularly in developed countries, where food represents only a small proportion of consumers' total budgets (Gunders 2012:72; Institution of Mechanical Engineers, 2013:9). The quantity of total food wastage in South Africa are provided in Figure 2.2.
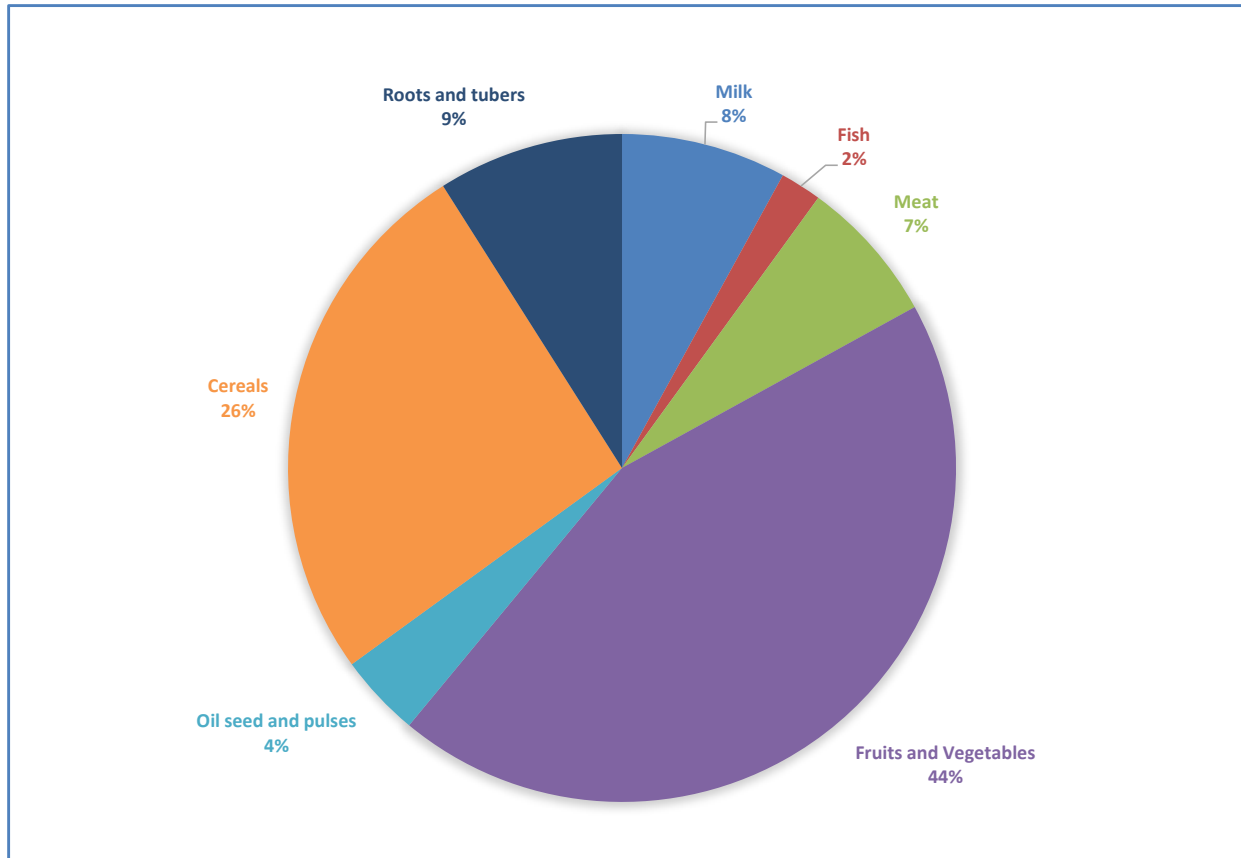
Figure 2.2: Quantity of Total Food Wastage in South Africa

Source: Nahman *et al.* (2012:215)

The proportions illustrated in Figure 2.2 are useful for identifying specific commodity groups and stages in the value chain where the bulk of the overall amount of food waste in South Africa originates. The Fruits and Vegetables group appears to be the sub-group where the wastage of food is the highest compared to the others. Furthermore, Nahman *et al.* (2012:2156) provided several recommendations with respect to key areas in which the research needed to be extended by incorporating the inedible portion of household food waste, by addressing food waste throughout the value chain and by including the costs of other impacts associated with food waste, such as wasted emissions and resource usage throughout the value chain. In particular, it was argued that

post-consumer food waste only represented a small proportion of overall food waste in developing countries (3.5% for sub-Saharan Africa according to Gustavsson, Cederberg, Sonesson, van Otterdijk and Meybeck (2011:257) and 4.14 percent for South Africa, according to Oelofse and Nahman (2013:89). Zilberman *et al. (*2008:265), in their investigation, discuss the interconnectedness of water, energy and food manufacturing which has a direct impact on the food production cycles. Their paper interrogates the level of interconnectedness between these elements (water, energy and food) in South Africa and elaborates on the influence of water, energy and eventually equipment and supply capabilities on the country's level of food quality. Their findings lead to state that if the degree to which the relationship between water, energy and food production has not received sufficient attention in policy to date, food wastage will not be inevitable.

2.6.4 Scarcity of water in South Africa

Water in South Africa has historically been under-priced. South Africa is approaching physical water scarcity (IWMI 2007:23), with a level of demand estimated to outstrip supply at the current consumption rates (Smith & Perks, 2010:98). It is therefore important to highlight that water pricing has begun to dramatically impact on the electricity prices, affecting the pricing strategies in the food processing industry. The increasing scarcity of water is going to have a profound impact on food production. South Africa is water scarce, being the 29th driest of 193 countries and having an estimated 1110 m³ of water per capita in 2005. Water scarcity will also affect food production indirectly through competing with energy production, which will lead to trade-offs with the energy and resources sectors (Gulati, et *al.,* 2013:160). Moreover, with the productivity of water use in agriculture being low compared to other sectors, agriculture contributes 3 percent to GDP but uses 60 percent of the water, leading to significant pressures to reallocate water from agriculture to other more productive uses (Pretorius, 2010:32). If this happens, the immediate impacts on food security could be through wine, fruit and vegetable production, 90 percent of which are produced under irrigation and wheat cultivation, 30 percent of which are produced under irrigation. Gulati, *et al.* (2012:156) have stressed the fact that food production demands energy and water. They state that energy is an important input in fertilizers, irrigation, raising livestock and accessing marine food resources as well as throughout the value chain in processing, packaging, distributing, storing, preparing, serving and disposing of food.

2.6.5 Globalisation, importation and exportation

Globalisation has affected the food and beverages manufacturing sector, beverages in particular, and more durable food products in several ways. Ingram (2011:417) stated, for example, the lowering of trade tariffs, development of new markets and suppliers and increased global sourcing of raw materials have led to extended and more complex supply chains and competitiveness in local and world markets. In response, cost-efficiency in production and reliable supply chain management have become increasingly important criteria for success in the sector (Gulati, *et al.,* 2012:158). Increasing competition has increased net imports especially in the food sector in South Africa, although net imports have increased less than in the total economy and in manufacturing. Population growth, increase of income levels and the decline on trade barriers have led to the import and export of products between countries (Carter & Easton, 2011:101)

These are the result of the opening of the South African market due to globalisation. Increased economic participation and the increased disposable incomes of the South African population have also spurred the demand for imported food products. The beverage manufacturing industry shows the inverse, with more exports than imports. Wine is the main component of these exports. In 2009, imports accounted for around 17 percent and 12 percent of domestic consumption of manufactured food and beverages respectively (Cloete *et al.,* 2012:54). According to the South African National Treasury (2015:24), the exports are mainly to the traditional markets of the England, Mozambique, Germany, Japan and the Netherlands. New markets are also developing in China, Somalia, Norway, Malaysia, Thailand and Denmark and efforts to create strategic international partnerships point to further measures to grow markets. It is therefore important to state that intensive exports will require appropriate skills in the workforce to meet rigorous international food and beverage handling, processing and packaging procedures.

South African exporters have been able to take advantage of the increasing demand from developed markets in the wake of the cod crisis, while at least until 2002, the weakened rand has made imports uncompetitive in a price-sensitive local market and the export growth to developing countries has been less impressive. African trade has remained insignificant, with exports struggling to stay above $25 million in real terms and to some extent falling after the economic collapse of Zimbabwe in the late 1990s (Cole 2012:88). The levels of food imports and exports in South Africa are provided in Figure 2.3.
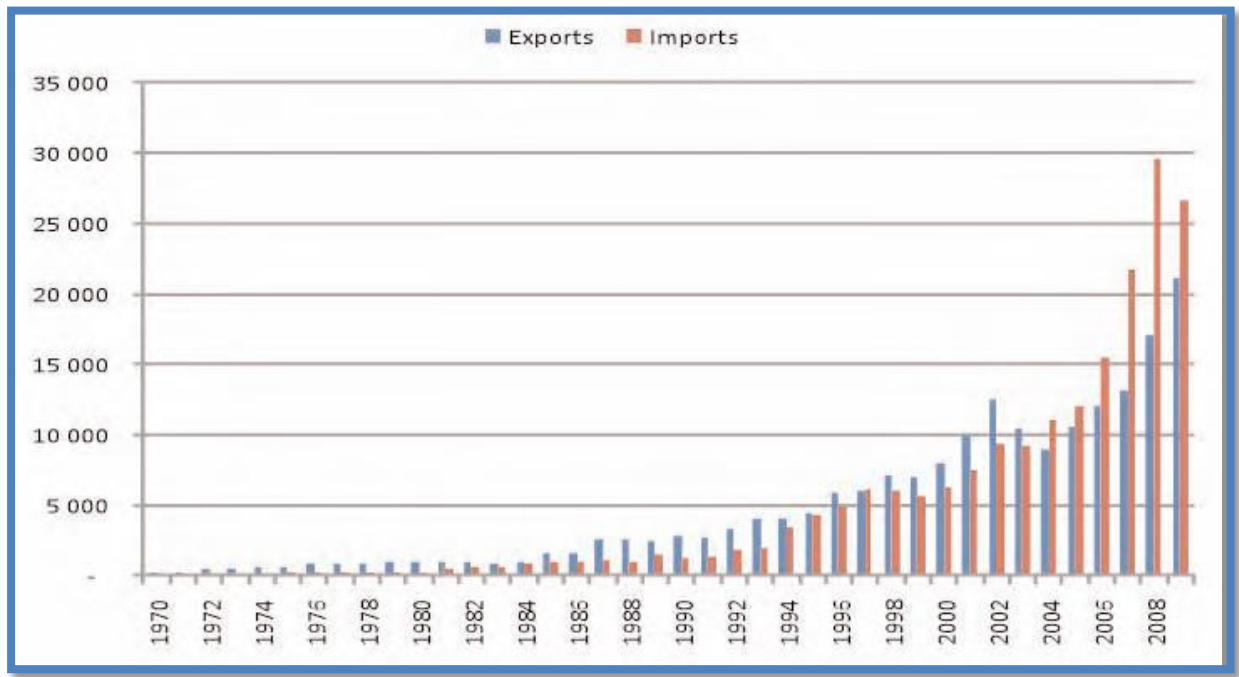
Figure 2.3: Food Imports and Exports in South Africa

Source: Quantec Economic Database (2013:12)

The Figure 2.3 shows the inbound and outbound products observed and recorded in South Africa from the year 1970 to 2010. Here, one can obviously see that both activities grew in a different year but not at the same rate as consumers' expectations differ and vary. Between 1972 and 1980, South Africa was not importing products from abroad. All the food products were essentially locally produced. Importation activities start in early 1981 and grew in proportion till 2008. From 2004, importation starts to be greater in quantity than exportation (from 10 000 in 2004 to 30 000 in 2007). The large movement on consuming only South African made products has an impact on the lever of imported products from 2009 till today, which has not stopped importation but reduced the number of products people tend to prefer from outside its boundaries.

2.6.6 Poverty, inflation and inequality effects on the South African food processing industry

According to a report by Cascio (2011:45), 53 percent of South Africans were poor in 2000, which is in line with the lower bound 'cost of basic needs approach' poverty line of 3864 South African rands per year in 2000 prices. The poverty gap was 25 percent while the poverty gap squared (severity) was 15 percent. Poverty affects mainly African households and to some extent Coloured

households where 61 and 36.2 percent respectively are classified as poor (National Treasury, 2010:34). Poverty is very low among Asian households and virtually non-existent amongst white households at 0.1 percent. The impact of increased agricultural protection with indirect tax adjustment on poverty is captured by changes in the poverty indices. The changes in poverty are largely motivated by changes in the consumer price table and changes in household consumption. Urban households shoulder the highest poverty burden. This is largely because of their higher dependence on food consumption (whose price has risen due to protection of agriculture) and lower participation in agriculture labour markets (Carter & Easton, 2011:109).

Poverty levels for rural households remain virtually unchanged. Poverty increases slightly more among Asian households, followed by White households and then Coloured households (McDonald, *et al.,* 2013:86). While the increase in poverty for Asian and White households is due to declining income levels, the increase in poverty levels for Coloured households can directly be traced back to its higher consumption share of foodstuffs (Fedderke, *et al.,* 2012:244). African households are the clear winners as they experience small declines in poverty. On the inflation front, rising food prices have become a subject of serious focus in recent years, through the inflationary episodes in South Africa, which has been increasing over the last two decades. Between 2000 and 2008, the contribution of food products to the head time of the inflation rose to approximately 1.4 times its weight in the consumption basket (Rangasamy 2011:192).

Specifically, the year-on-year inflation rate for all food items roses from 1.2% in September 2010 to 10.3 percent in January 2012 and was well above the general inflation level (Jooste, 2012:13). The impact of the inflation on the food processing industry is creating a serious concern in the South African household and manufacturing sector on their capabilities to purchase the necessary food commodities. Studies show that 60 percent of local households in South Africa experience food insecurity (Du Toit *et al.* 2011:27). Additionally, the impact that inflation has on the poor is considerable because the poor class South African tends to spend a greater proportion of their income on food products (36.4% of their overall income) than the rich South African who spends around 2.9 percent of their income, creating a difference of 7.4 percent between the two most dominant social classes in South Africa (Jooste, 2012:14). Additionally, the exchange rate is an important determinant of the net impact of fluctuations in international market conditions on domestic prices. There are three points worth mentioning in this regard. Firstly, the pass-through effects from international to domestic prices depend on the pricing practices of international producers (Fedderke & Szalontai, 2012:241). Secondly, a depreciation (appreciation) of the

exchange rate could result in domestic prices increasing (decreasing) even though prices on the international market may not have changed (Gustavsson, *et al.,* 2011:234). Thirdly, import parity pricing practices could result in domestic prices following international prices even though there may be little or no imports of food products. As far as domestic impacts are concerned, domestic demand, supply and cost factors also have an attitude on local food price tendencies (Jooste, 2012:18).

Therefore, several factors have been identified as responsible for increasing the food prices. These elements can differ from one county to another, can have different gravities and can be generic to the food value chain of food commodities (Richardson & Snaddon, 2011:156). In South Africa, current research lead to conclude that input costs are the major contributors in driving up the food prices, emphasising more on the energy and water prices (Joubert, 2011:126). Added to this is the fact that energy and water are regulated in South Africa in that they are administrated by government policies (Rangasamy, 2011:187).

This section discusses the major challenges affecting the food processing industry in the Gauteng province. It is evident that these challenges are still important and prevent companies from fully operating and contributing at their best to the South African economy. One of the most important challenges for future research in food supply chain integration and food logistics research is the measurement of correlations between logistics operations and decisions (e.g. shipment typologies, transportation modes, packaging solutions, environmental and climatic conditions), multi stress monitoring and evaluation, quality and safety effects of food products at the point of consumption (Manzini, *et al.,* 2011:52). The next section discusses the benefits of transparency in food supply chains.

2.7 TRANSPARENCY BENEFITS IN FOOD SUPPLY CHAINS

Consumers/government and food companies are the most important claimants of transparency.

The transparency enablers we previously recognise are strongly interlinked in most food supply chains: companies in the food supply chain are linked through governance mechanisms that are supported by information systems (Byrne & Heavey, 2010:420). A framework on transparency in the food processing industry is shown in Figure 2.2.
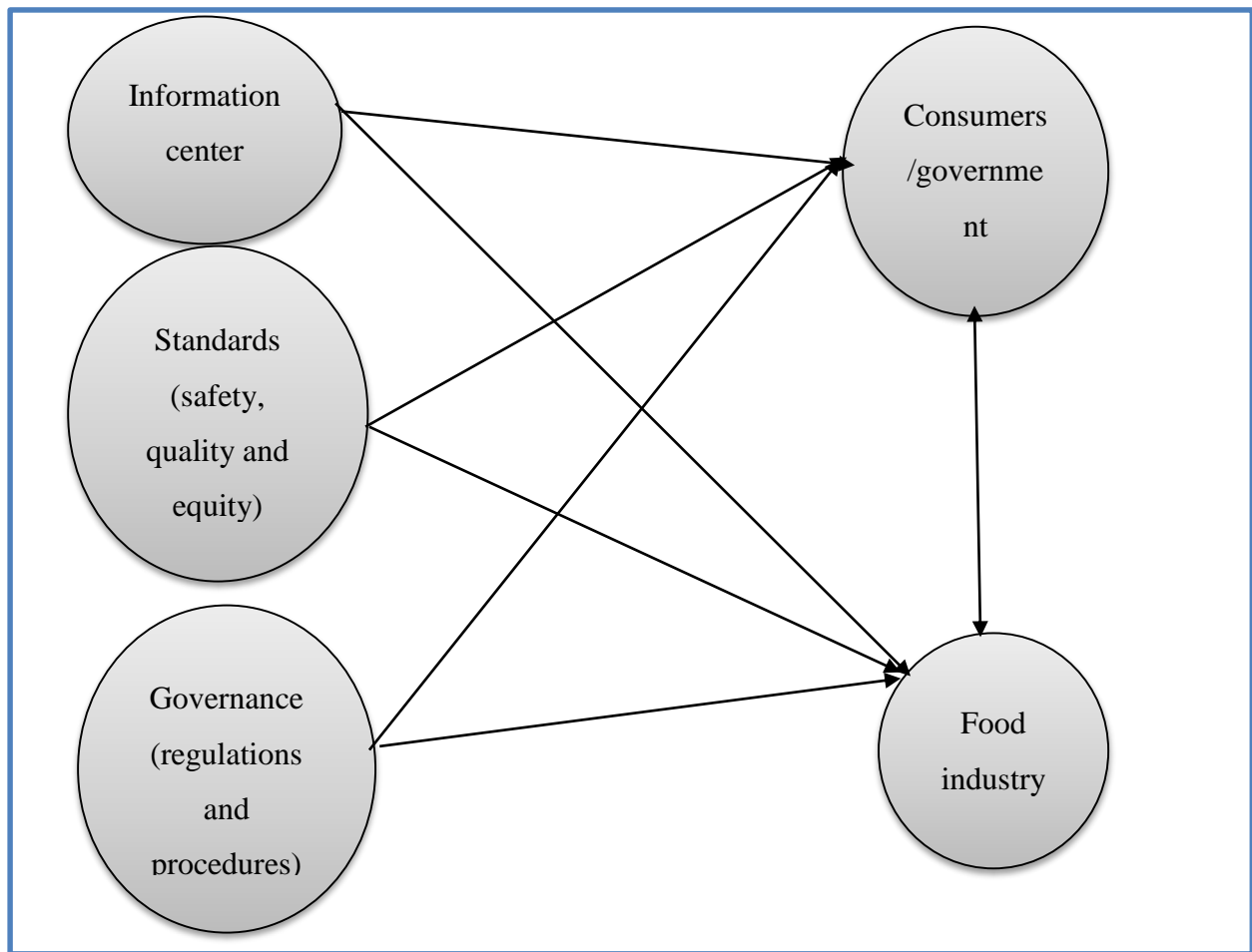
Figure 2.4: Transparency Framework

Source: Byrne and Heavey (2010:421)

Figure 2.2 shows how food companies are, on the one hand, responsible for delivering transparency, by using information systems, working according to quality and safety standards and having the right arrangements with their supply chain partners. On the other hand, these corporations must make sure that information is effectively delivered by other companies in the supply chain with whom they cooperate in supply chain processes. Besides being a claimant of transparency in food supply chains, food industries are at the same time deliverers of information to other actors in the food supply chain and to consumers and government companies. As identified by Stolze, *et al.* (2011: 229-233), the industry motivation regarding transparency is fourfold. Firstly, companies need to comply with differentiating demands from consumers as well as legislative demands. Secondly, when incidents occur, companies are required and want to be able to quickly recall products from markets or links downstream the supply chain to limit the incident and minimise costs. Thirdly, by improving information exchange through integrated information

systems, optimisation of business processes will be much easier as product and process attributes can be coupled with process performance. Fourthly, an important way for food companies to add value is by paying attention to and labelling products according to distinguishing intrinsic and extrinsic food product attributes.

To enable transparent information exchange, a detailed registration of the process, resource and product characteristics, such as history of products, quality variation, etc., is essential for the food processing industry for product differentiation, traceability and recall management, production management and for complying with new rules and regulations (Sapp, 2013:482). The transparency created would contribute to tracking and tracing efforts implemented in many food chains in response to food scandals and subsequent legal action Product information concerns the composition and sensory aspects of the products, as well as residue information (pesticides, hormones) (Ndobo, *et al.,* 2013:316). Process information to be exchanged includes the origin of the product (and its components in the case of a composite product); the history of the product (where the products has been on its trajectory through the food supply chain and who has dealt with it), storage time and quality decay, quality variation within and between different product lots and resources used and waste (Deimel, Trentrup & Theuvsen 2011:21-32).

2.8 CONTRIBUTION OF THE FOOD PROCESSING INDUSTRY TO THE SOUTH AFRICAN ECONOMY

The food processing industry has contributed extensively to the South African economy. Demographic and social factors include population and household numbers, which affect sales, particularly for basic foodstuffs and market segmentation. Also, different population groups have different patterns of expenditure on foods and beverages. South Africa's population has grown steadily over the last decade, with mid-year population estimates for 2009 being 49 320 500. The population growth rate of 1, 3 percent mirrors the rate of household formation at 1.1 percent. This will place increasing pressure on food supply and food security. Increased urbanisation in emerging countries has contributed meaningfully to the growing middle class. Locally, the 'black middle class' continues to grow. This leads to the beginning of new market segments and growth in others as well as changes in consumer profiles (Oosthuisen, 2013:101). Branded products perform better in the current economic environment resulting to a growing demand for quality (Power, 2012:19).

Food production at all levels around the world has been growing and evolving at a remarkable rate to meet the basic requirements of an increasing world population. On the other hand, the number

of people working in farms in recent years has been decreasing, most workers shifting to other economic sectors because of industrialisation and urbanisation (Müller, Vermeulen & Glasbergen 2012:310). To meet the challenge, food experts and technologists in partnership with food processing industry equipment manufacturers have been working closely to develop cost-effective ways of processing, storage and distribution of food to reach the growing population of consumers in sound and safe product, which will serve various markets' niche, even Muslim consumers who are more positive buyers with the halal range of products (Power 2012:18).

Despite available advanced technologies around the world, most of food manufacturers (especially small and medium enterprises) in the country still use poor and labour intensive technologies with low production capacities accompanied with low skilled and inexperienced personnel (Rangasamy 2011:432). As the supply chain of food products include wholesalers and retailers, performance of these participants has a direct impact on the manufacturers. It is always positive to the vendor when the business of wholesalers and retailers grow. Regarding the fact that most wholesalers and retailers in the food processing industry have been doing business for many years, the level of knowledge in basic business skills are low and their business grows (Lee, Whan & Severance 2013:444). Some businessmen are now able to differentiate between revenue and profit and sometimes end up spending their own working capital, which leads to the creation by the government of institutions and non-government companies (NGOs) of educational programmes to develop their business skills.

Food products require a primary package, characterised by barrier properties to oxygen and water vapour, to limit the phenomena of oxidation and water activity, which would generate a rapid delay of the shelf life and trigger phenomena of bacteria growth that significantly affects food safety (Akkerman, Farahani & Grunow 2010:864). The return flow of materials involves the collection activity of products/packages at collection centres or retail outlets, the transfer and consolidation at centralise distribution centres and finally the recovery of returned products/packages (Manzini, *et al*., 2011:291). The primary packaging represents a fundamental asset and its functional properties are integrated into the system of secondary and tertiary packaging solutions. The South African Departmental Health Service focus its current research in primary packaging development, which is now oriented towards new types of environmentally friendly solutions (biodegradable packaging in various acceptations), active packaging (controlled release of molecules and traditional modified atmosphere packaging) and functional packaging such as packaging used for cooking in the microwave ready-to-cook products (Bottani, *et al.,* 2011:128-129). Safety in

packaging design for food products are now the concern of the South African food processing industry. These are generally referring both to the preservation of a high-quality level and to the prevention of damage to package itself and its content during handling, transportation and other logistic processes (Mahalik & Nambiar 2010:117).

Nowadays, excluding manufacturing technologies, food supply chain technologies mainly refer to traceability issues with a special concentration on perishable food products subject to quick deterioration. An operational food traceability system is an important instrument, not only to manage food quality and safety risks, but also to promote the development of effective management. There are two main categories of traceability technologies and devices: identification tags (barcode, label, tag), which address a product or a general item with a specific code and data loggers (sometimes called ''black boxes''), whose purpose is to trace and record the environmental conditions and profiles experienced by a product throughout supply chain processes (Van der Vorst, Tromp & Van Der Zee 2012:6611). The development and implementation of such traceability systems for the South African food processing industry is an effective way to preserve specific features of food products, especially perishable and fresh products, in agreement with safety and quality standards and regulations and customer satisfaction. In this regard, it could be advantageous to monitor all environmental restrictions, which could influence quality of products.

The food chain monitoring, through proper black box devices, enables to reproduce and simulate actual environmental conditions experienced by products and packaging during logistic processes, such as purchasing, manufacturing, handling, warehousing (storage and retrieval), transportation, to assess their impacts on food quality and safety. Basically, food deterioration depends on intrinsic and extrinsic factors such as storage temperature, concentration of oxygen, relative humidity, solar radiation, acidity, microbial growth, endogenous enzyme activities. (Zhang, *et al.,* 2009:30). In addition, many South African companies have formed associations of various types with overseas companies, which give the former access to the latest technology and expertise in their industries. Examples of these are Simba with Frito-Lay of the USA in the snack food processing industry, Robertsons with Best Foods in the USA, thus cementing a longstanding association in the savoury foods/soup industry and Clover with Danone of France in dairy products (Fedderke & Hill, 2012:43). The benefit for the overseas companies is penetration of the South African market, but also a penetration into other African countries, particularly those south of the Sahara (Crush & Frayne, 2011:522). As is the case in most foreign markets, the help and knowledge of locals well

versed in the special requirements of the markets are invaluable and overseas companies seeking to develop African markets should explore this possibility (Candel, 2014:587).

The food processing industry workforce is disposed to train and develop their skills. Rather than have the food processing industry workers seek out sources of education and training, the International Union of Food Science and Technology approach is to bring such opportunities to the workers in a non-academic environment. In order to avoid the impression of a formalised process, the term "student" has been replaced with "participant". To address these training needs within the intended target audience of food processing industry workers, Coates (2013:188) proposed five subject modules, namely: (1) Food Safety Quality Assurance (2); Dehydration / Drying Food Laws and regulations; (3) Thermal Processing shelf life of foods; (4) Food Freezing Minimally Processed Foods; and (5) Food Packaging Practical Human Nutrition to ensure that the workers know more about the benefits and risks occurring during the manufacturing process and to ensure that all the safety measures are implemented.

This section discusses the contribution that the food processing industry has on the South African economy. Besides the increase of profit and revenues, it participates in job creation, which leads to decreases in the level of criminality in the country. The research and innovation department also sees a major improvement with the constant aim of providing unique products made in South Africa to satisfy constant changing needs of customers.

2.9 CONCLUSION

The purpose of this chapter is to review literature on the South African food processing industry in terms of its composition, challenges and benefits. The most dominant theme emerging is the challenges any company must be able to discern the problems they face to turn these into capabilities or advantages. It has emerged that the South African food processing industry is a very dynamic one which faces constant changes in customer demands. This calls for the ability to quickly adapt strategies and reconfigure resources to meet customer demands. In the modern food processing industry in South Africa, processes have become industrialised, characterised by mass production. Furthermore, production, financing and marketing have become internationally integrated to form effective food supply chains. These developments have attracted widespread challenges that still exist within the food supply chain. Currently, only small and closed supply chains in the country seem capable to implement chain-wide information exchange supported by matching chain-wide governance mechanisms and quality and safety standards. The next chapter

discusses literature on supply chain management in greater detail, highlighting the challenges, improvements and the supply chain implications in the food processing industry in South Africa.

CHAPTER 3
SUPPLY CHAIN MANAGEMENT AND BUSINESS PERFORMANCE

3.1 INTRODUCTION

The purpose of this chapter is to discuss literature on the concept of SCM and business performance. It begins by discussing the definitions of supply chain management. Recent developments on supply chain management in various industries are then discussed, followed by an analysis of different theories of supply chain management such as the theory of constraints, the total quality management as well as Just in Time. Thereafter, the chapter throws spotlight on the challenges experienced in the management of a supply chains. A discussion on the concept of business performance follows, before a conclusion is provided. The chapter uses literature from both the international and South African environments, mainly obtained from peer-reviewed academic journals and textbooks.

3.2 DELINEATING SUPPLY CHAIN MANAGEMENT

The concept of SCM has received significant attention in the dominant business media as well as in academic literature. Chow, Madu, Kuei and Tseng (2010:667) define a supply chain as a network consisting of all parties involved directly or indirectly in producing and delivering products or services to its ultimate customers both upstream and downstream. Boyer and Hult (2005:640) identify manufacturers, suppliers, retailers and customers as the key stakeholders of a supply chain who are involved in the physical distribution, flow of information and finances. SCM can be defined as the systematic and strategic coordination of the traditional business functions within a particular company and across businesses within the supply chain, with the aim of improving the long-term performance of individual companies and the supply chain as a whole (Groenmeyer, 2013:169).

Chopra and Meindl (2011:118) argue that SCM practices encompasses sets of approaches and practices that effectively integrate with suppliers, manufacturers, distributors and customers to improve the long-term business performance and the performance of their supply chain. Hence, SCM is a holistic approach to demand, sourcing and procurement, production and logistics process management (Mentzer, *et al.,* 2012:23). SCM includes the purchasing of materials, transforming them into intermediate goods and final products and delivering a product or service to the final customers (Swink, Melnyk, Cooper & Hartley, 2011:42). As SCM is undergoing a major

transformation (Melnyk, Stewart & Swink :2009:212) and evolving rapidly; modern SCM concepts in the new economy incorporate strategic differentiation, value enhancement, operational efficiency improvement, cost reduction (Bidgoli, 2010:30), supply chain integration and collaboration, operational excellence and virtual supply chains (Chow, *et al.*, 2010:45; (Fantazy, & Kumar 2010:685-691).

Hong and Jeong (2012:286) suggest that SCM is made up of approaches applied to efficiently integrate suppliers, manufacturers, warehouses and stores. This is done so that goods can be produced and distributed at the right quantities, to the right locations and at the right time, which minimises a company's extensive costs while satisfying service level requirements. This implies that supply chain management takes into consideration every facility that has an impact on cost and plays a role in making the product conform to customer requirements: from supplier and manufacturing facilities through warehouses and distribution centres to retailers and stores (Tseng, 2010:560). An example of a basic supply chain is indicated in Figure 3.
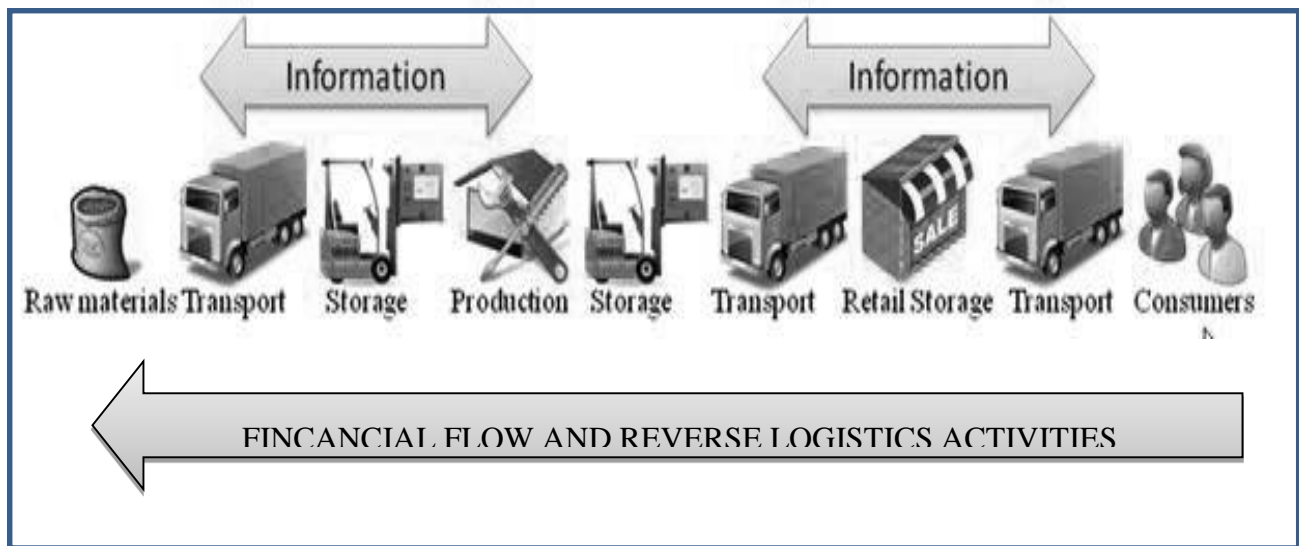
Figure 3.1: A Basic Supply Chain

Source: Chow *et al.* (2010:669)

Figure 3.1 shows a brief description of a supply chain. The starting point is the source of raw materials where all the necessary resources are gathered to enable the manufacturing process. These raw materials are then stored before various processes take place to engage with the production stage. The products will be stored once again and then transported to the markets where they can be accessed by various consumers. Throughout this chain, there is the flow of information,

which facilitates the transaction between each stage. Financial flows will also take part as well as reverse logistics in cases of non-compliance of the expected products.

The objective of SCM is to be efficient and cost-effective across the entire system; total system wide costs, from transportation and distribution to inventories of raw materials, work in process and finished goods, are to be minimised (Koh, *et al.,*2011: 110). The emphasis is not on only to reduce transportation cost or reduce inventories but adopt a company approach to become an effective SCM. Finally, because SCM revolves around efficient integration of suppliers, manufacturers, warehouses and stores, it encompasses the company's activities at many levels, from the strategic level through the tactical to the operational level (Hong, *et al.,* 2012:295).

This section discusses the definitions of supply chain management. It has emerged that supply chain management is considered to be the most important level of activity in any institution. Many entities are involved when the success of the company relies on how well the supply chain is managed. The next section discusses the development of SCM.

3.3 THE DEVELOPMENT OF SUPPLY CHAIN MANAGEMENT

The earliest appearance of the term "supply chain management" as we know it today, published in recognisable media and literature, can be traces back to the early 1980s. More precisely, it first appeared in a financial times article written by Oliver and Webber in 1982 describing the range of acts performed by a company in procuring and managing supplies (Li, *et al*., 2015:110). However, the early publication of SCM in the 1980s was mainly focused on purchasing and cost reduction related activities. Its major development and significant increase of publication in the areas of supply chain integration and supplier-buyer relationship came in 1990s when the concept as we know it today was gradually established (Zhou & Benton 2010:1350).

The forces of globalisation and technology of the present are changing supply chains. In many cases, they are literally disintegrating. Product designers, marketers and manufacturers that were previously housed in a single facility are now spread over several continents in companies with different cultures, languages and business objectives (Manuj & Mentzer, 2008:136). According to the research conducted by Burgess *et al.* (2006:710), if one takes the view that supply chain management is what SCM people do, then it has a strong influence on all aspects of physical distribution and materials management with the following department functions:

- Inventory management, which deals with the control of the ordering, storage and use of materials and products that a company uses in the manufacturing of the items it sells.

- Transportation service procurement, dealing with the physical move of raw materials, semi-finished and finished products made by the company and transported either to the work in progress level or to where the demand of the products exist (end user).

- Materials' handling, dealing with the work in progress of materials inside the manufacture.

- Warehousing management, which focuses on the storage of materials or final products.

Furthermore, the SCM sector is expected to increase its range of responsibilities, most often in line with the thinking that sees the order fulfilment process as one coordinated set of activities (Yusuf *et al.,* 2014:381). Lambert (2012:190) states that even though most of the functions often cited always refer to planning, some other functions must also be considered in the supply chain management strategies such as:

- customer service performance monitoring, which is more focused on how positive or even negative the expectation level is observed in customer preferences and satisfaction on company products or services;

- order processing, which related to different elements and procedures that must be taken into consideration during the placement of orders from the manufacturing side to the supply side as well as the customer delivery side; and

- supply chain management budget forecasting, an important financial aspect to project future expenses that are needed during the overall supply activities.

Today, SCM considers the supply chain and the companies in it as a single entity. It brings a systems' approach to understand and manage the different activities needed to coordinate the flow of products and services to best serve the ultimate customer (Lee Hau & Billington, 2011:50).

In this section the development of SCM is discussed. We can therefore see that SCM is not a new theory. It has been in existence for a decade but its evolvement was necessary because of the adoption of new technologies and new theories that are discussed in the next section.

3.4 THEORIES OF SUPPLY CHAIN MANAGEMENT

SCM theories encompasses a set of approaches and practices that effectively integrate with suppliers, manufactures, distributors and customers to improve the long-term business performance and their supply chain (Linhares, 2011:121). There are several theories governing the

application of SCM in companies. Examples include Just in Time (JIT), the theory of constraints (TOC), total quality management (TQM), lean manufacturing, and green supply chain management. These theories are now discussed.

3.4.1 Just in Time

The Just-in-Time (JIT) concept is a Japanese management philosophy applied in manufacturing, which involves having the right items of the right quality and quantity in the right place and the right time (Kumar, 2015:42). It is a manufacturing philosophy, which eliminates waste associated with time, labour and storage space (Cheng, *et al.,* 2013:15). Basics of the concept are that the company produces only what is needed, when it is needed and in the quantity needed. The company produces only what the customer requests, to actual orders, not to forecast. The JIT principle can also be defined as producing the necessary units, with the required quality, in the necessary quantities, at the last safe moment (Odendaal, 2013:35). It means that a company can manage with its own resources and allocate them very easily. The concept of Just in Time is illustrated in Figure 3.2.
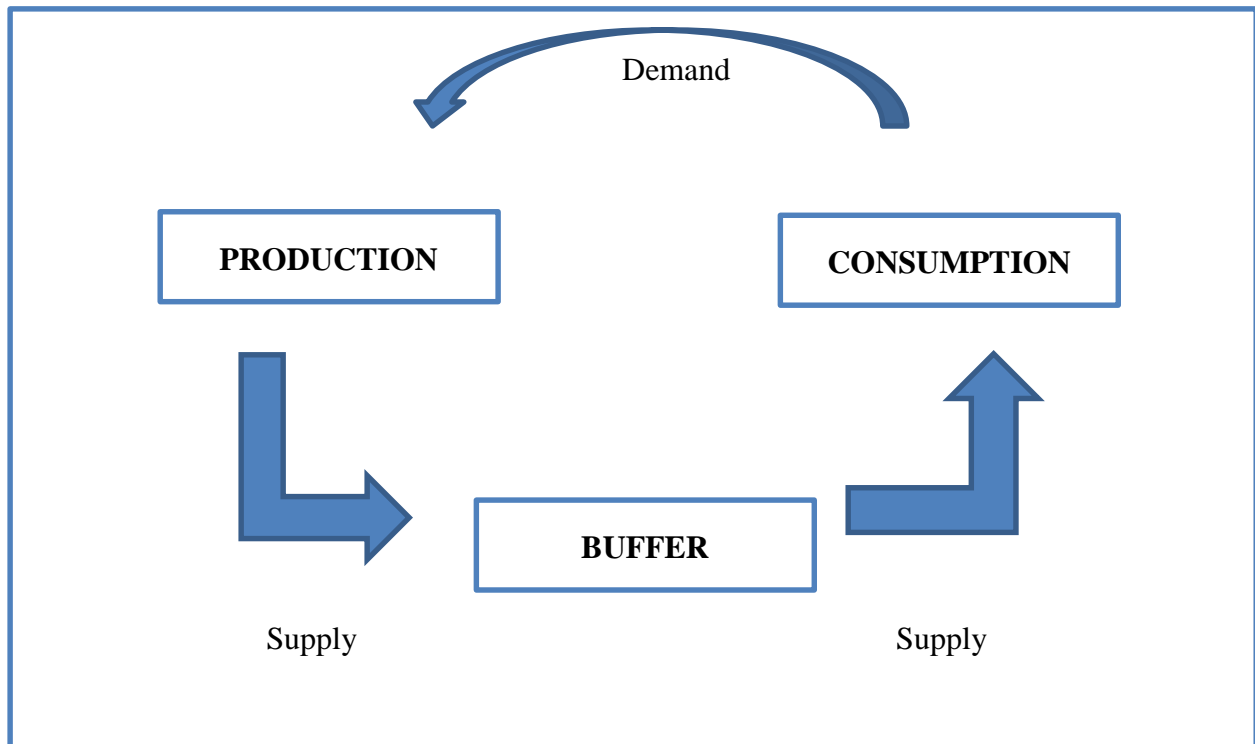
Figure 3.2: The Just in Time Concept

Source: Kumar (2010:43)

Figure 3.2 shows that JIT systems aim to reduce set-up times in warehouses. The company produces only what the consumer demands. The supply system is designed in a way that production scrap and manufacturing cycle times are reduced with less work in process time. Lambert (2012:15) states that the JIT production system identifies the hidden problems in the value chain and reduces the production waste of the system while increasing the throughout (Sales-Raw Material Cost). Even though the JIT system seems to be interesting and less complicated it requires lot of synchronisation with the supply chain to avoid delays in the production programme. Problems in the JIT system are always relying on the fact that companies cannot properly calculate their material flows (Blackstone, 2011:1053). Because of these problems, it has been difficult for engineers and managers to deal with logistics. Thus, the JIT inventory systems are not just a simple method that a company has to buy into, but has a whole philosophy that the company must follow (Caldwell 2008:276).

The ideas underpinning the JIT philosophy come from many different disciplines including inventory management, industrial engineering, production management and behavioural science

(Blackstone, 2011:1054). In the JIT inventory philosophy, there are views with respect to how the inventory is looked upon, what it says about the management within the company and the main principle behind JIT (Adagala, 2014:45). Firstly, an inventory is seen as incurring costs instead of adding value, contrary to traditional thinking. Under this philosophy, businesses are encouraged to eliminate an inventory that doesn't add value to the product. Secondly, it sees inventory as a sign of poor management as it is simply there to hide problems within the production system. These include backlogs at the work centre, lack of flexibility for employees and equipment and inadequate capacity, among other things. In short, the just-in-time inventory system is all about having "the right material, at the right time, at the right place and in the exact amount" (Cheng, *et al.,* 2013:19).

Callen, Facher and Krinsky (2014:108) elaborated on the benefits that JIT concept can provide to the company are huge and very diverse. The main benefits of JIT are listed below:

- Reduced set-up times in the warehouse - the company in this case can focuses on other processes that might need improvement.

- Improved flows of goods in/through/out warehouse - employees will be able to process goods faster; JIT allows a reduction in raw material, work-in-process and finished goods inventories. This frees up a greater amount of space and time between operations within plants. The corresponding cultural characteristic is concern for space due to a very dense population.

- Employees who possess multi-skills are utilised more efficiently, which means the company can use workers in situations where they are needed when there is a shortage of workers and a high demand for a particular product; JIT production requires that the plant be clean, i.e. there should be no wastes present, which may hinder production.

- Better consistency of scheduling and consistency of employee work hours - if there is no demand for a product at the time, workers don't have to be working. This can save the company money by not having to pay workers for a job not completed or could have them focus on other jobs around the warehouse that would not necessarily be done on a normal day.

- Increased emphasis on supplier relationships - having a trusting supplier relationship is important for the company because it is possible to rely on goods being there when they are needed.

- Supplies continue around the clock, keeping workers productive and businesses focused on turnover - employees will work hard to meet the company goals.

In addition, the benefits of JIT include better quality products, higher productivity and lower production costs. It is obvious then that the JIT concept can improve business performance and efficiency (Moss, 2013:11). Employee self-esteem is likely increased, which is one of the most important benefits that comes from using this concept. Of course, we must not forget that companies are allowed to remain competitive (Klarman & Klapholtz, 2011:879). The JIT concept is only one part in the value chain that brings the satisfaction to the customers through increases in quality, productivity and efficiency, improved communication and decreases in costs and wastes. (Voss & Robinson, 2012:47). It means that it cannot solve existing problems in other company processes. Everything in enterprises is expected to be healthy through the hierarchy of employees and all workflow processes. Synergy is the only thing that can improve business results (Callen, *et al.,* 2014:109). Furthermore, the JIT concept is just one link in the whole chain, but nonetheless very important.

3.4.1.1. Limitations of Just in Time

Although the benefits of using JIT are numerous and cited more frequently than any potential limitations, Kumar (2015:43) identified several of its shortcomings, identified as follows:

- Cultural differences have been cited as a possible limitation of JIT. There exist many cultural differences which may be intrinsically tied to JIT's success. These will be problems that may be difficult to overcome or work around without changes in attitudes and worker philosophy. The magnitude of their impact may be difficult to measure because of their nature.
- The traditional approach to manufacturing involves the use of large inventories with safety stocks. Safety stocks can act as a buffer for companies to fall back on to offset inaccurate demand forecasts. This has the potential to cause problems for the company, which relies heavily on safety stocks to absorb any increases in demand.
- The benefits associated with increased employee involvement and participation resulting from the use of quality circles may be evident in other companies. However, new ideas of participation involve largely 'empowering' the workforce with respect to decision making. This suggests that the level of involvement established within developed companies using JIT is not compatible with the degree of employee participation required to satisfy African workers.

- Loss of individual autonomy has been suggested as another possible short-coming of JIT. Loss of autonomy has largely been attributed to limited cycle times or the time between recurring activities. Buffers are significantly reduced, resulting in greater amounts of stress and pressure placed upon the worker to perform. The time which would otherwise be present would allow the worker more freedom to perform 'vertical tasks', which constitute administrative tasks or team meeting. In addition, reduced cycle times force workers to adjust immediately to changes in demand without taking their needs into consideration.

- Loss of team autonomy is a possible result of reducing or eliminating buffer inventories. This serves to reduce the flexibility of workers to discuss possible solutions to problems. This is a function of quality circles, which are an important part of JIT.

- Reduced buffer inventories and workers' flexibility.

- Loss of autonomy over methods involves the idea that, under JIT, employees must adhere to strict methods of production to maintain the system. This idea diminishes the 'entrepreneurial spirit' which many workers may have previously enjoyed prior to JIT implementation.

- The JIT success may be industry specific, i.e. craft-oriented businesses are considered better candidates for a JIT programme than companies producing commodity-type products.

In addition to the above limitations, resistance to change may be experienced since JIT involves a company level of change, which will affect almost every member of the company. Employees may resist the change based on two different levels: emotional and rational resistance (Mentzer, *et al.,* 2012:15). Rational resistance occurs when an individual is deficient of the necessary information and facts pertaining to the degree to which the change will affect them (Woods, 2014:19). Emotional resistance refers to the psychological processes of fear, anxiety and suspicion which arise from inducing change and causing resistance (Watson, *et al.,* 2011:389).

3.4.2 Theory of constraints

The Theory of Constraints, known as TOC is a procedure for managing factors, production processes, company decisions and situations in which there are constraints in the present state (Widodo*, et al.,* 2012:40). It is a business management instrument that links all the manufacturing procedures. It is a scientific approach that makes it possible to relate the solutions to a company's critical problems (regardless of its size), to ensure that its ongoing improvement process remains

unchanged. The essential premise of the TOC is that all companies have at least one critical constraint that limits their production capacity (Reimers, 2014:7). A constraint is any element whatsoever that occurs in a system and that prevents it from achieving optimal performance (Orlek, 2013:4). By using the TOC, management can control the contribution margin and the product's unit production cycle regarding its critical resources, i.e., its constraints (bottlenecks), thus raising production capacity. The theory of constraint concepts (Goldratt, 2010:230) were originally adapted to a manufacturing environment, but apply equally well to supply chains. As in any system, supply chains are haunted by constraints.

The purpose of supply chain constraint is to deal with these constraints and uplift supply chain performance level. The TOC introduced a five-step approach to deal with the system's constraints (Goldratt & Cox 2010:50). The fifth step of this approach is a return to step one, because whenever a constraint is lifted, a new constraint will appear somewhere else in the system. And all steps should be executed again. As such, the theory of constraints supports the continuous improvement philosophy and implies supply chain constraints is an ongoing process.

Goldratt *et al* (2011:45) stated that the TOC can be used at three levels:

- **Level 1:** production management – to solve bottlenecks, production scheduling and reduction of inventories problems;
- **Level 2:** process analysis - application based on the direct costing method, instead of traditional cost analysis, making it possible to base measures taken on the ongoing improvement of processes, system improvements and systems' constraints that, in statistical terms, determine protective capacities, critical points and their key elements;
- **Level 3:** general application of the theory of constraints aimed at tackling a variety of processing problems within the company by applying its logic to identify which factors prevent the company from achieving its targets, and developing a solution to the problem of ongoing improvement.

The Goldratt's TOC concentrates on the process that slows the speed of product through the system and consists of five steps which are (1) identifying the constraint (2) exploiting the constraint (3) subordinating other processes to the constraint (4) elevating the constraint and (5) repeating the cycle.

1. **Identifying the constraint**

The TOC emphasises on the importance of constraints over the importance of product costs, noting that growth comes from improving the flow of materials through productive processes rather than through piecemeal cost reduction efforts in any one area of the system. The constraint is identified through various methods. The amount of work in queuing ahead of a process operation is a classic indicator.

2. **Exploiting the constraint**

Exploiting the constraint is one way that its effects on the system can be lessened or eliminated. This can be done in any number of ways. Once the constraint is identified, the process is improved or otherwise supported to achieve its utmost capacity without major expensive upgrades or changes. In other words, the constraint is exploited.

3. **Subordinate other processes to the constraint**

When the constraining process is working at maximum capacity, the speeds of other subordinate processes are paced to the speed or capacity of the constraint. Some processes will sacrifice individual productivity for the benefit of the entire system.

Subordinate processes are usually found ahead of the constraint in the value stream. Processes after the constraint are not a major concern and are probably already producing under capacity because they must wait on the constraining process. At this point companies have a decision to make. Did the first three steps break the constraint (that is, the originally identified constraint no longer limits the system's performance?) Often, the exploitation and subordination steps are enough. If so, companies can go on to step five. If not, the next step must be to elevate the constraint.

4. **Elevating the constraint**

If the output of the overall system is not satisfactory, further improvement is required. The company may now contemplate major changes to the constraint. Changes can involve capital improvement or other major expenditures of time or money. This is called elevating the constraint or taking whatever action is necessary to eliminate it. Since the original constraint is still limiting system performance despite a company's best efforts to make it as efficient as possible, the only remaining course of action is to increase the capacity of the constrained part of the process and to continue doing so until the constraint is really broken. Elevating may mean buying another piece

of equipment (a capital investment) or contracting out part of the constraint's load. Or it might be as simple as instituting limited overtime or adding a second shift. The distinction between exploiting and elevating is simply that exploiting means changing how a company uses the constraint without spending more money, and elevating means investing more money to increase the constrained resource's capacity. If the idea involves spending more money than the company is currently spending to make money, then the company is elevating, not exploiting. But why spend money if a company does not have to? Clearly it doesn't make much sense for a company to elevate until it is sure that it is already exploiting the constraint to its fullest potential.

5. Repeating the cycle

Once the first constraint is broken, another part of the system or process chain becomes the new constraint. Now is the time to repeat the cycle of improvement. The performance of the entire system is re-evaluated by searching for the new constraint process, exploiting the process, subordinating and elevating. By focusing on constraints, this methodology produces positive effects on the flow time of the product or service through the system.

Reduction of waste in the constraint increases throughput and improves throughput time. When the constraint is improved, variation is reduced and quality is improved. Constraint focus does not require intimate knowledge of data analysis or that many people understand the elements of the system. Understanding by a few people with the power to change things is all that is necessary. The effort can be localised with minimum involvement of the workforce. The final step, which entails returning to step one of the focusing process, is designed to build the concept of continuous improvement into the theory of constraints.

Without this last step, a company might stop its efforts once the constraints have been optimised. Klein and DeBruine (2011:31) stated that in the TOC, the journey toward superior system performance never ends. As one bottleneck is managed, attention turns to finding the next activity or problem that inhibits the company's ability to make money by creating value for its customers. Three types of constraints may be encountered: physical constraints, market constraints and policy constraints (Kee, 2012:31). Physical constraints are tangible, like resource capacities, people or machines. Physical constraints are also known as capacity constraints or resource constraints.

Elevating a physical constraint practically comes down to accumulation capacity, either by buying additional capacity or by outsourcing production or services (Kee, 2012:32). Market constraints are easier to identify but more difficult to lift. Obviously, a market constraint implies the size and

complexity of the market, i.e. demand is lower than available capacities (Kee, 2012:35). Elevating a market constraint affects other departments as well, like marketing, product development, etc. (Womack & Flowers, 2012:398). Policy constraints are intangible and, therefore, difficult to identify for management. Policies are rules to coordinate and control systems. Incorrect policies may arise in situations where the business environment has been changed but the old policies remain (Kee, 2012:32).

Moreover, incorrect policies can perform well locally but have negative impacts on the entire system. Elevating a policy constraint comes down to removing the old rules and introducing new ones that are consistent with the supply chain strategy (Womack, *et al.,* 2012:399). Changing policies and the cultural attitude of employees is hard to do and may take years in large companies.

3.4.2.1 Supply chain management and the theory of constraints

The TOC can be applied outside of the boundaries of the company, reaching backward and forward in the supply chain to reduce inventories, improve throughput and increase responsiveness to changing customer needs (Watson, *et al.,* 2011:400). Leveraging the concept of the primary constraint across the supply chain creates priorities and schedules that ensure that the system-wide limiting factors serve as the basis for the development of integrated scheduling and logistics planning and execution (Andersen & Ras, 2013:84). The goal here is to increase the profitability of the entire system by ensuring that the system's constraint is used to control the entire flow of materials and price from the beginning to the end of the production cycle.

The drum-buffer rope scheduling, in other words, is applied across company boundaries to ensure that the constrained resources are used effectively (Carter, *et al.,* 2011:50). Carr (2012:497) indicated that cross-company, intermediate to long-term relationships are rapidly becoming a major point of improvements in value creation. The development of trading alliances is focusing on the belief that leveraging the resources available throughout the supply chain is the key to superior performance (Badenhorst-Weiss *et al.,* 2014:283). Though often stated in terms of maximising the core competencies of the supply chain, it is just as critical that the process used to deliver the product/service package also be managed to ensure optimisation (Naicker, *et al.,* 2015:269). As company boundaries become increasingly more transparent and permeable, the relationship between both physical flows and management approaches will be critical.

Andersen *et al* (2013:84) cited some benefits that can be expected from extending the theory of constraints concepts to the supply chain, which include:

- reductions in supply chain inventories;
- increased responsiveness and flexibility as inventories and wasteful obstacles and barriers to effective production are removed;
- improved on-time delivery performance to the final customer;
- enhanced value creation for customers;
- improved profitability/throughput for the supply chain;
- reductions in total assets invested in the system as only essential increments to available capacity are added;
- simplification of relationships as objectives are clarified;
- reductions in cost across the supply chain; and
- improved competitive position.

To optimise the benefits of integrated SCM, the separate companies have come to operate as one synchronous whole that follows the same "drummer" (Mudgal *et al.,* 2010:85). The similarity to the drum-buffer rope element of the theory of constraints is not accidental. Just as the internal flow cannot move any faster than the bottleneck allows, the entire supply chain cannot deliver more throughput than the slowest operation in the system, no matter where that constraint is located (Womack, *et al*., 2012:401).

3.4.3 Total quality management

The total quality management (TQM) involves management, workforce, suppliers and even customers to meet or exceed customer expectations (Blackstone, 2011:1053). The common TQM practices are: cross-functional product design, process management, supplier quality management, customer involvement, information and feedback, committed leadership, strategic planning, cross-functional training, and employee involvement (Swink, *et al.,* 2011:625). Everyone has had experiences of poor quality when dealing with business companies. These experiences might involve an airline that has lost a passenger's luggage, a dry cleaner that has left clothes wrinkled or stained, poor course offerings and scheduling at your college, a purchased od supplied product that is damaged, lost or broken (Medori & Steeple, 2010:521).

Successful companies understand the dominant impact that quality can have on business. For this reason, many competitive companies continually increase their quality standards. In the food service industry, the use of quality control tools is important in identifying quality problems. Quality tools can be used to evaluate the acceptability of product quality and to monitor product

quality from individual suppliers (Li, *et al.,* 2012:108). They can also be used to evaluate causes of quality problems, such as long transit time or poor refrigeration. Similarly, restaurants use quality control tools to evaluate and monitor the quality of delivered goods, such as meats, produce, or baked goods. According to the TQM, a quality product comes from a quality process. This means that quality should be built into the process (Medori & Steeple, 2010: 523).

Quality at the source is the belief that it is far better to uncover the source of quality problems and correct it than to discard defective items after production (Medori, *et al.,* 2010: 536). If the source of the problem is not corrected, the problem will continue.The TQM extends the concept of quality to a company's suppliers. Traditionally, companies tended to have numerous suppliers that engaged in competitive price bidding (Swink, *et al.,* 2011:628). When materials arrived, an inspection is performed to check their quality. The TQM perceive this stage as contributing to poor quality and wasted time and cost. The philosophy of the TQM extends the concept of quality to suppliers and ensures that they engage in the same quality practices (Medori, *et al*., 2010:522). If suppliers meet present quality standards, materials do not have to be inspected when delivered. Today, many companies have a representative residing at their supplier's location, thereby involving the supplier in every stage from product design to final production. Purchasing must locate sources of supply, ensure that the parts and materials needed are of sufficiently high quality and negotiate a purchase price that meets the company's budget as identified by finance (Dumitrascu, Nedelcu & Lepadatescu, 2010:267). Implementing TQM requires extensive and important changes throughout a company. It also affects all other decisions within operations management. The decision to implement TQM concepts throughout the company is strategic in nature. It sets the direction for the company and the level of commitment (Mentzer, *et al.,* 2012:17).

Some companies may choose to directly compete on quality, whereas others may just want to be as good as the competition. It is operations strategy that then dictates how all other areas of operations management will support this commitment (Mangino, 2011:7). The decision to implement the TQM affects areas such as product design, which needs to incorporate customer-defined quality. Processes are then redesigned to produce products with higher quality standards (Naylor, Naim & Berry, 2009:108). Job design is affected, as workers need to be trained in quality tools and become responsible for rooting out quality problems (Dumitrascu *et al.,* 2010:267). Also, supply chain management is affected as a company's competence relies on how the quality translates into partnering with suppliers.

3.4.4. Lean Manufacturing

The theory of lean thinking has progressed with time. The term lean production is the process of minimisation of waste during production processes (Womack *et al.,* 2012:231). Jones, Hines and Rich (2007:22) state that lean thinking has a natural starting point with value for the customer looking at the whole rather than the individual processes.

However, leanness means developing a value stream to eliminate all waste, including time and to ensure a level schedule (Naylor, Naim & Berry, 2009:107). More recently, Holweg and Rich (2014:994), stated that lean exists at two levels: strategic and operational. The customer value-creation strategic thinking applies everywhere; shop-floor techniques do not, but value creation is only equal to quality, cost and delivery. However, lean thinking is not a supply chain strategy that can be adapted to all sorts of products. Developing a supply chain strategy consists of matching market characteristics (products attributes and demand variability) with supply with two sorts of products, fashionable and commodities (Fischer, et *al.,* 2009:541). Therefore commodities can be adapted to the lean environment since there is high predictability of demand and consequently the process can control the lean-thinking level schedule requirements (Van Der Vorst & Beulens 2013:409).

Numerous benefits associated with the adoption of lean manufacturing in companies were identified. By implementing lean manufacturing practices, companies can reduce labour costs and lead times. They can also reduce the level of wastage and defects as the main purpose of this philosophy is to be able to produce products that do not cause any harm to the user and the environment. Lean manufacturing also leads to increases in customer satisfaction and reinforces the company's relationships with their customers through the ability to provide what the customer wants by producing top quality products and services.

3.4.5. Green Supply Chain Management

Green supply chain management (GSCM) is defined as the process of using environmentally friendly raw materials and transforming them into products that can be re-used at the end of their cycle life while creating a sustainable and clean supply chain (Fortes, 2009:52). It involves traditional SCM practices, which integrate environmental criteria, or concerns, into company purchasing decisions and long-term relationships with suppliers (Olugu, Wong & Shaharoun 2010:871). Mugdal, Shankar, Talib and Raj (2010:81) stated that a GSCM aims at confining the waste within the industrial system to conserve energy and prevent the dissipation of dangerous

materials into the environment. It recognises the disproportionate environmental impact of supply chain processes within a company. As such, GSCM is the summing up of green purchasing, green manufacturing, green packing, green distribution and marketing. The primary focus of GSCM is the elimination or minimisation of waste in the form of energy, emission, hazardous, chemical and solid waste (Olugu *et al*., 2010:876).

GSCM integrates environmental processes into SCM. This fusion is beneficial to companies that realise that they do not operate in an empty environment and therefore manage to conduct their activities in a safe way, which is to reduce the use of energy, decrease the waste and use biodegradable packaging. According to Sarkis, Zhu and Lai (2011:16), implementing GSCM is an efficient way to control the emission of gas leading to air pollution, reduce wastages, and improve quality of products via green sourcing, transportation and manufacturing, green warehousing and packaging.

South Africa's supply chain sector has much to contribute as the country focuses more intently on issues of sustainability. Supply chains hold substantial potential to contribute to the achievement of "vision 2025", which aims to improve South Africa's energy mix by having 30 percent of clean energy by 2025 (Odendaal 2013:34). By tackling the problem of carbon emission and environmental pollution, companies not only limit carbon footprint and waste, but optimise supply chain performance. Therefore, supply chains become leaner and greener through making the right procurement decisions, and working closely with customers, business partners and employees.

This section examines five supply chain management theories, namely, the JIT, TOC, TQM, lean manufacturing and green supply chain. It emerges that the application of JIT minimises the process time leading to reduce the wastage affecting the cost structure companies. The TOC deals with the identification of any constraints faced by companies as an asset to optimise the overall company performance.

The TQM leads to the proper control of the quality of products (raw material, work in progress, finished products and reverse products) to ensure that the manufacturing stage is safely managed and the final product is safe to use. Lean manufacturing in intended to reduce during production processes while green supply chain management ensures that supply chain management does not harm either the labour force the environment in general.

3.5 IMPORTANCE OF SUPPLY CHAIN MANAGEMENT

Effective SCM requires careful consideration of multiple tiers of partners, especially with respect to sustainability issues (The Supply Chain Foresight 2014:44). Companies increasingly approach their sub-suppliers to drive compliance with social and environmental efforts (Qinghu, *et al.,* 2010:390). Suppliers must fill out numerous forms, often many times, which costs time and money and is a problem for small businesses with little or no administrative capacity or support. It is government's responsibility to support the growth of small businesses and the jobs they create (Revilla, 2014:1125). Proper SCM ensures the stability of supplies and smooth operations that enhance the level of profitability of the company. Green, Whitten and Inman (2013:317) state that effective SCM facilitates competitive procurement and eliminates the need of placement of rush orders that may entails higher prices.

With a proper SCM, the five rights are easily met (right time, right delivery place, right price, right source and right quality). Effective SCM enables companies to build a strong competitive advantage in the market place and help to mitigate all the risks that may be occurring during the acquisition of raw materials till the delivery of the final required products (Koh, *et al.,* 2011:118). Businesses are now able to reduce wastage, overhead costs and shipping delays through SCM. SCM enables the companies to manage their inventories in a way that minimises holding costs while providing enough flexibility to meet customer demands and expectations (Svensson, 2013:262).

According to Li and Lin (2012:642), effective SCM leads to more accurate information, along with the ability to carry out better operations' forecasting, which also leads to build stronger partnerships and supplier networks, balance out supply and demand volume and improve strategies to help predict transportation requirements and planning of daily operations. It is therefore important to state that variables such as the size of the company and the characteristics of the products manufactured affect the SCM components. In terms of cost reduction, SCM involves identifying the processes that generally increase the cost without increasing the value of the final product. A company that uses supply chain services as well as packages of products delivered to the end user in a supply chain enables the fulfilment of the demands and requirements of the customers; it ensures the effective flow of raw materials, parts to be assembled, finished goods, storage, planning and scheduling of production cycles, inventory, warehousing, customer service, return management, flow of fund and information sharing (Sufian, 2010:26-27).

This section briefly elaborates on the importance of SCM. The flow of essential materials and relevant information determines how successful the supply chain will be operated. However, this task is not always easy to perform as challenges arise at any level of activity. These challenges are discussed in the next section.

3.6 CHALLENGES IN SUPPLY CHAIN MANAGEMENT

Supply chain management executives face unique challenges, with respect to integrating supply chain specific strategies with the overall corporate business strategy; seamless coordination is, therefore, rarely achieved in practice (Hussain & Nassar, 2010:21). Most supply chain related problems emanate, either from uncertainties or an inability to co-ordinate several activities and partners (Otchere, Annan & Anin, 2013:132). Simultaneously, customers have become more discerning and are demanding better quality products, higher levels of service and reduced prices, (Sweeney, *et al.,* 2011:585). In this study, major supply chain challenges were found in areas such as human resources, technology, facilities, supplier relationship management, customer relationship management, regulatory factors as well as logistics and transportation.

3.6.1 Human resources management

Human resources management (HRM) is a business function that encompasses the duties and tasks related to the people, their acquisition, selection, training and other activities that ensure the development of employees (Jackson & Mathis, 2012:63). The aim of HRM is to help the company reach its strategic goals. The basic assumption of HRM is that people are not machines and therefore we need an interdisciplinary approach to observe people in their work environment (Sweeney, *et al.,* 2011:586). It is requested from a manager to possess essential characteristics: trust, decentralisation and distribution of information and knowledge, education, clear roles and responsibilities, freedom of action, feedback, motivation and resources necessary for action. Managers are the connection between employee and company and exercise their functions to achieve the integrity of the system and satisfaction of the people and the aim of the company.

Training and career development is the most important key element in the human resource management (Caldwell 2008:275). Employers indicate that technical development courses are essential for supply chain personnel to stay current. The most common means of employee development are on-the-job training and external courses. For the most part, employees indicate that they are satisfied with the training they have received and that it has met their needs (Horwitz, 2010:38). Generally, effective training investments are made across the food and beverage sector.

In South Africa, the most common forms of support provided to employees are tuition reimbursement, time off for external courses and the provision of in-house training although work and study programmes for supply chain employees are not widely used (Caldwell, 2008:280). Internal training tends to be focused on technical supply chain and logistics development, interpersonal and people management skills (e.g., supervisory skills, team building, negotiations, leadership and coaching) and health and safety.

In addition, HRM includes the activities, company procedures and plans that affect the behaviour, attitudes, company culture and achievements of staff in the business system to increase the productivity of workers, their flexibility and capacity for creating competitive advantages that are difficult to duplicate in the short term (Jackson, *et al.,* 2012:63). Many theorists are exploring the phenomenon of the Japanese food processing industry success and competitiveness and highlight the importance of company policies and good practice in HRM. Li and Lin (2012:650) identified the following as results of satisfactory HRM:

- recruitment and promotion based on knowledge, skills and competencies;
- high level of investment in training and training of employees at work;
- high level of team work and team culture;
- development of multiple skills of employees;
- better communication of managers and employees and better working relations;
- commitment to quality;
- stimulation of initiatives and suggestions of employees; and
- creation of company status symbols: company restaurant, coffee shop, uniform, sports facilities and club officers.

The application of the above policies results in higher employee job dedication, higher motivation, lower total cost of operations, greater productivity and better overall results of operations (Bews & Martins 2011:43). Increasing international competition for physical and human resources also suggests that the more innovative approaches to supply chain management will acquire a greater share of global trade. Supply Chain Foresight (2014:13) indicated that a shortage of skills in South Africa is the fourth highest supply chain constraint. A general shortage of a skilled workforce in South Africa, not only in the logistics and supply chain areas, hampers economic growth. The world economic forum (2014) identified an inadequately educated workforce as the most problematic factor for doing business in South Africa.

The world economic forum indicated that in South Africa, the quality of the education system is very poor (ranked 146th of 148 countries), the labour market efficiency is poor (116th), hiring and firing practices are extremely rigid (147th), wage determination is inflexible (144th) and significant tension in labour-employer relations exists (148th), which is detrimental to HRM. There are also major concerns regarding the need for up-skilling of people through education, encouraging companies to comply with, or adhere to, the transferring of skills, collaboration and exchange programmes with international institutions and companies. Transferring of skills and the mentorship of employees should be ingrained in the fibres of all corporate culture (Supply Chain Foresight 2014:42). Employers should be determined to retain employees who have received education and training and been up-skilled and in a particular position with a company for several years to obtain the relevant benefits.

3.6.2 Technology

While process and production technology change has been profound, information management systems and related technology have evolved at a more rapid pace and have had a more profound impact on products, job design and skill requirements (Zhu, Sarkis & Lai 2012:169). Technology is most commonly employed for inventory and warehousing management (Ahlgren, Gustafsson & Hall 2010:162). Looking forward, employers are considering employing technology for transportation, CRM and SRM (Costa, Schoolmeester, Dekker & Jongen 2012:18). Not surprisingly, larger companies have implemented more supply chain-related information and technology systems than smaller ones (Marsh & Bugusu 2014:40). Interestingly, despite the number of South African companies that indicate that technology is applied in their operations, few indicate they currently have the requisite skills to fully employ technology. In China, companies are continually updating their technology to improve efficiency and indicate that their ability to keep pace with technological change is a challenge.

Poor skills and low technology usage are also key hindrances in achieving supply chain efficiencies, and South Africa is woefully under-skilled when it comes to technology (Supply Chain Foresight 2013:30). Companies tend to develop a resistance when it comes to change. The adoption of various advancement in technology constitute a great competitive advantage for a company competing in a large market niche. Any type of resistance will impact the company's overall performance and productivity and will send the customers to the competitors. Such a gap in the technology skills of supply chain managers creates a barrier in achieving higher maturity in supply chains in South Africa (Mackenzie 2014:23). An efficient information and technology

system is very necessary for supporting the green supply chain management during various stages of product life cycle (Mackenzie 2014:33). It can be very useful for product development programmes encompassing the design for the environment, recovery and reuse. Efficient information systems are needed for tracking and tracing the returns of products, linked with previous sales (Ravi & Shankar 2015:1011). In order to compete in the global business world, South African supply chains require the necessary levels of skilled, experienced and productive supply chain staff who have the knowledge of advanced technologies and procedures.

3.6.3 Facilities and regulatory factors

The efficient and effective movement of goods from raw material sites to processing facilities, component fabrication plants, finished goods assembly plants, distribution centres, retailers and customers is critical in today's competitive environment (Hoq & Ha, 2010:100). Approximately 10 percent of the gross domestic product is devoted to supply-related activities (Simchi-Levi, Kaminsky & Simchi-Levi, 2014:5). Johnson and Mena (2008:39) stated that supply chain management entails not only the movement of goods but also decisions about where to produce, what to produce and how much to produce at each site, what quantity of goods to hold in inventory at each stage of the process, how to share information among parties in the process and finally, where to locate plants and distribution centres.

Facilities and regulatory environmental factors such as air quality, water quality and temperature are influencing product quality. This is especially true in the life science industries such as pharmaceutical manufacturing and in the food and beverage industry where compliance to stringent governmental regulations is mandated (Li *et al.,* 2011:332). In such industries, information monitoring, collection and classification are critical to the delivery of a product that meets industry and government requirements. The ability to access a combined process and facilities data in one system for review, analysis and reporting not only helps ensure product quality but also cost control (Johnson *et al.,* 2008:37). Even in food and beverage manufacturing processes where strict regulation exists, the ability to control the facilities as a factor of the manufacturing process can have a direct impact on product quality (Li *et al*., 2011:333).

By adopting facilities for management and manufacturing structures, manufacturers can determine if product quality can be affected by environmental factors inside the facility. However, Grimshaw (2011:16), stated that with this new awareness, manufacturers are realising that accessing facilities systems and data brings its own set of opportunities and challenges. These include;

- Monitoring and control of facilities systems can have a significant impact on operations, product quality and costs.

- Inability of manufacturing systems to access facilities data and systems leads to lost opportunities to coordinate all aspects of manufacturing.

- Proprietary vendor-specific solutions for facilities management leads to additional integration issues.

- Engineering and manufacturing staff have little or no domain knowledge of the facilities applications, leading to inability to control these variables.

- Uncontrolled and often unmonitored environmental systems introduce costs related to the manufacturing facility or the manufacturing process.

The inability to track and analyse facilities and manufacturing data as combined and inter-dependent elements creates problems in the whole operation. In addition to the direct manufacturing considerations of facilities management, there are indirect implications. While not directly related to a specific manufacturing process, there are general facilities-related issues with cost implications that can be controlled and monitored by a facilities management system (Zsidisin *et al* 2004:130). These include lighting control, emissions monitoring, waste-water and hazardous waste management, as well as security. Governmental agencies at both the federal and local level are progressively requiring not only management of waste and emissions from manufacturing operations, but reporting and data retention (Mackenzie, 2014:45).

3.6.4 Supplier relationship management

Supplier Relationship Management (SRM) is an approach used for engaging with suppliers on a level that reflects the priorities of the customer company and how best these needs can be achieved (Hoffman, 2014:40). It is a differentiation process that recognises that not all suppliers are the same and therefore not all customer-supplier relationships should be dealt with by using a single strategy (Lippmann, 2011:178). As with many procurement activities, SRM can be used to reduce both prices paid and costs to the company. By developing suitable styles of collaboration, it is possible to save money. Suppliers have expectations as to how the customer will act and are often positioned to respond in kind (Hoffman 2014:41). Key to developing a supplier relationship management approach is a good understanding of the supply chain.

When people talk about SRM, as has already been stated, they think about partnerships. To those same people, 'partnerships' can mean being softer on suppliers, becoming overly dependent on them or given things away without getting more back (Johnson, 2012:36).

It is quite possible that this does happen, but good programmes are very different. The issue of perception being described here highlights the need for companies (customer and supplier) to be trained and developed in terms of both the expectations they should have and the ways in which they should engage with each other (Hoffman, 2014:55).Boyer and Hult (2005:642) stated that any function that directly interacts with suppliers will need to understand their role in supporting the relationship management programme and how these roles will vary for each supplier depending on the type of engagement that is being nurtured. Effective SRM requires a clear understanding of which suppliers are the most strategic to the company and which are less important. Rather than viewing the suppliers on which the company spends the most resources as the most important, Bew, *et al.* (2011:44) determines that additional factors that should be considered such as risk, operational criticality, technical integration, total value, long-term fit with the company, profitability, distributor services, performance and loyalty. A study by Carr (2012:500) suggests that strategic SRM practices enable companies to achieve the following:

- optimise resource allocation across a broad supplier base;
- establish and manage relationship expectations by suppliers;
- provide strategic and operational groups with consistent partnering strategies within their supply bases; and
- provide strategic and operational groups with a strategic view of their supplier portfolios based on relationship value;

SRM is therefore intended to enable improved decisions on further supplier consolidation which leads to further strategic sourcing opportunities and motivate suppliers to strive for advancement across supplier tiers.

3.6.5 Customer relationship management

Customer relationship management (CRM) has the potential for achieving success and growth for companies in today's environment of extensive competition and rapid technological development (Payne & Frow, 2010:137). It enables companies to know their customers better and to build sustainable relationships with them. According to Goldenberg (2010:27), it encompasses activities and processes intended to help a company understand, communicate with and service the needs of

customers and prospects. It is a customer-focused business strategy that aims to increase customer satisfaction and customer loyalty by offering a more responsive and customised services to each customer. CRM is intended to help a business understand who their customers are, how they like to interact with the company, how profitable they are and what their future value might be. In this way, it helps a company make critical decisions about how to do business, such as what new products or services they should be developing and what sales and marketing channels they should invest in or discard (Christopher, 2011:587). CRM is considered one of the most important targets in about 60 percent of the projects around the world (Adebanjo, 2011:230). Great advance in technology has helped better divide market territories, enhance communications with customers, and provide an environment rich with information to contribute in improving efficient strategies to deal with customers (Pedron & Saccol, 2013:37).

Injazz and Karen (2012:37) stated that it is possible to say that CRM systems would only have more future realisation and understanding on the part of the beneficiaries if they were easy to use and implement. Pedron, *et al.* (2013:39) stated that CRM technology applications link front office (e.g. sales, marketing and customer service) and back office (e.g. financial, operations, logistics and human resources) functions with the company's customer touch points (Fickel, 2011:23). Companies that can implement CRM successfully are those that have information relating to the customer and where there are distinguished needs among the customers (Kotler, 2012:56). Customers are the life blood of all businesses, so all businesses need to take CRM seriously, even if they don't know it. On the other hand, that does not mean that all businesses need a CRM system.

3.6.6 Logistics and transportation

The operation of transportation determines the efficiency of moving products. The progress in techniques and management principles improves the moving load, delivery speed, service quality, operation costs, the usage of facilities and energy saving (Klein*, et al.,* 2011:77). Transportation is a crucial part of logistics management. Reviewing its current condition, a strong system needs a clear frame of logistics and proper transport implementation to link the procedures (Taniguchi & Thompson, 2014:914). Since logistics has advanced from the 1950s, there have been extensive research focused on this area (Lee, *et al.,* 2013:450). Due to the trend of nationalisation and globalisation in recent decades the importance of logistics management has been growing in various areas.

Logistics helps optimise existing production and distribution processes based on the same resources through management techniques, and promotes the efficiency and competitiveness of enterprises (Krumwiede & Sheu 2013:327). Transportation occupies one-third of the amount in logistics costs, which hugely influence the performance of logistics systems (Krumwiede, *et al.,* 2012:335). Transportation is required in the whole production procedure, from manufacturing to delivery to final consumers and returns (reverse logistics). Only a good management between each component would bring the benefits to a maximum by both private companies and government (Garcia-Morales, *et al.,* 2012:299). Zsidisin, *et al.*, (2004:129) further identify the main characteristics of future logistics developments, which are the role of government, growth of international goods transportation, improvement of services, shorter product life cycle, improvement of logistics facilities and channel cooperation between companies, specialised logistics delivery, logistics centres and freight transport.

3.6.6.1 The role of government

To keep industries competitive, government must lead the way to assist logistics industries. For instance, the idea of a freight village of city logistics would promote logistics productivity and cut operation costs. However, it involves large investment and various problems that involve laws and national policies. Without the lead and support of government, achieving this plan is challenging.

3.6.6.2 Growth of international goods transport

Several factors contribute to the up-growth of international freight transport. Firstly, the blossoming of e-commerce pushes ahead international business activities. Secondly, the change of production strategy needs international cooperation, e.g. importing the semi-finished products from countries with cheaper human resources to those with higher technology to assemble the final goods. Thirdly, the pressure of a globalised market, such as World Trade Company (WTO), pushes local industries to promote themselves to reach an international standard and face worldwide competition.

3.6.6.3 Improvement of services

Providing a good customer service becomes a necessary requirement of business operation with the intense competition of global market. The quality of services is the main factor to affect consuming behaviour among enterprises with high similarity. The service systems involve several developed techniques in current use, such as Efficient Consumer Response and Quick Response. More new techniques would then be applied to provide better services for customers.

3.6.6.4 Shorter product life cycle

With the current trend, the merchandise design is changing day by day and therefore the product life cycle is shorter and shorter, especially in computer science. To confront the impacts, a logistics system must improve its efficiency and reliability of goods' delivery. Otherwise, an inappropriate logistics system would hinder the competitiveness of new products and business profits.

3.6.6.5 Improvement of logistics facilities

The advancement and development of logistics are based on several techniques and complete theories. High-tech facilities and systems could bring more possibilities and advantages to logistics. For example, the improvement of related facilities, e.g. Forklift Trucks, is necessary for transport efficiency. In future, factory automation is the main target for the whole supply-chain procedure. It could help improve efficiency and reduce the operation costs.

3.6.6.6 Channel cooperation between companies

In order to save the logistics costs, a key concept is to maximise the usage of available transport capacity. Integrating logistics' demands between numerous departments helps achieve this purpose. In practice, a conglomerate could develop its own logistics service for company branches. For some medium size companies, they could cooperate transport channels with others.

3.6.6.7 Specialised logistics delivery

One of the notable trends of logistics industries is a specialised delivery service. For instance, delivering fresh food from the place of origin needs low-temperature containers. Computer chips, gases and petroleum need conveyances to carry products. These demands are rising since products become increasingly fragile.

3.6.6.8 Logistics centres

The development of logistics centres would promote industry and develop a national economic system. Logistics centres could successfully shorten the distance between production and marketing vertically and integrate various industries horizontally and thus decrease the costs. Governments could propose special areas for storehouses and logistics to reduce land acquisition. The future logistics will cooperate with e-commerce, the internet and the newly door-to-door service to create new business prospects.

3.6.6.9 Freight transport

The alliance between middle-to-small size delivery companies is an important trend in the future. This strategy could help expand service areas and increase service quality and meanwhile raise the loads of single trips to reduce delivery costs.

According to Supply Chain Foresight (2014:25), the following challenges are encountered by supply chain management activity:

i.   Poor bid specifications and conflict of interest

According to Cheng, Lai and Singh (2013:66), information is used to conduct business transactions, share information and facilitate collaboration as the main determinants of a supply chain's effectiveness and the allocation of bids to the most compliant candidates (Piderit, Flowerday & Von Solms, 2011:12). All potential bidders must have access to the same tender information. Information in the bid documents should include details of the product or service to be procured, specifications, quantities, the timeframe for delivery, realistic closing dates and times, where to obtain documentation, where to submit tenders with a clear, complete and non-discriminatory description of the selection and award criteria (Van Gruenen & Van Niekerk, 2010:3655). There are weaknesses in the appointment of supply chain management bids controls over information technology, human resource management, capital assets and performance reporting (Bac & Erkan, 2011: 4263).

Most government companies do not have clean audits for bids allocations, which cannot be altered after the closing date (Marucheck, Greis, Mena & Cai, 2011:717). Public sector institutions must have clear procedures for opening the tender box. To avoid manipulation of the bids received, this must be done before a public audience and its basic information should be revealed and recorded in a register. Companies and institutions must also ensure that members of their bid evaluation and bid adjudication committees are familiar with and adhere to National Treasury norms and standards when evaluating and adjudicating bids. This is to ensure that there are no tendering violations. In the supply chain management process, all parties must comply with ethical standards. Actors of supply chain management should deal with each other on a basis of mutual trust and respect, and conduct their business in a fair and reasonable manner with integrity. According to a research conducted by Ambe and Badenhorst-Weiss (2011:1100), actors associated with procurement, particularly those dealing directly with suppliers or potential suppliers, are required to do the following: recognise and deal with conflicts of interest or the potential for such conflict; deal with

suppliers even-handedly; ensure they do not compromise the standing of the state through acceptance of gifts or hospitality; be scrupulous in their use of public property and to provide all assistance in the elimination of fraud, corruption and supply chain disruption.

ii. Supply chain disruption

Supply chain disruptions and related issues are considered the most pressing concerns facing companies competing in today's global marketplace (Craighead, *et al.,* 2011:131). A disruption can be defined as an unplanned and unanticipated situation in comparison with normal supply–demand coordination risks (Hendricks & Singhal, 2009:510). Academics and practitioners argue that in the last few years supply chains have become more vulnerable to disruption (Craighead, *et al.,* 2011:132), which is supported by findings coming from company scientists (Wilson, 2011:295) who indicate that accidents become inevitable or even normal in complex and tightly coupled technological systems. Given this theory, it is not surprising that lengthy and complex supply chains, working with faster speeds, have become more prone to disruptions. Wright (2010:699) analysed the effects of supply chain disruptions and empirically showed that these events have a significant negative impact on shareholder value and on operating performance (i.e., sales, operating income, return on assets).

iii. Poor contract management

Contracts must contain sufficient information to enable the suppliers to deliver goods or services of the correct description, quality and quantity within the specified time (Erdem & Thomas, 2012:520). The transparency of information and knowledge, the formation of suitable relationships and the design and use of correct contract management. If supplier performance is not monitored, a variety of post tender violations may occur; for example, the purchasing authority may expand or vary orders against the original contract to the benefit of suppliers (Hendricks, *et al.,* 2009:520).

In South Africa, contracts may be expanded or varied by not more than 20 percent of the original value of the contract and for all other goods and services by not more than 15 percent (Naudé, *et al.,* 2011:83). Monitoring and evaluation is an important aspect of supply chain management implementation. Inadequate monitoring and evaluation is linked to the absence or the poor presence of a control environment and the government entities are placed in a difficult position to give effect to or implement it as required by the policy (Bac & Erkan, 2011:4264). Hence deviations or noncompliance goes undetected or is identified after the fact.

According to Business Day reports (2011:34), procurement actors in government have spent millions of rand in ways that have contravened laws and regulations. The national and provincial governments and their entities have notched irregular, unauthorised, fruitless and wasteful expenditure that contravene laws and regulations. Company structures and systems within which supply chain management takes place are in too many cases not ideal, with inexperienced or under-skilled leadership, high staff turnover and lack of motivation (Vogt & Pienaar, 2011:198). There may also be a lack of suitable equipment, such as computers with dependable internet connections, or information, such as databases that give up-to-date details of available products and services.

iv. Increased risk of fraud, corruption and losses

The lack of clarity about the roles and responsibilities of technical staff and political officer bearers creates scope for interference, which gives rise to allegations or instances of corruption.

In South Africa, the Broad-Based Black Economic Empowerment (BBBEE) Act 53 of 2003 was promulgated to ensure that procurement in the public and private sectors supports the economic empowerment of previously politically disadvantaged individuals through its suppliers. Government has mandated various business sectors to collaborate in developing their own sector-specific charters that outline the sector's plans for transformation and the implementation of the BBBEE Act (Pillay & Phillips, 2010:30). This regulation is not always followed as it should be and corruption is a very important issue here. The procurement sector is facing fraud problems. Practitioners tend to bribe to win contracts as it has been difficult to comply and meet BBBEE targets (Alfaro *et al.,* 2012:24). Sanctions and enforcement against fraud and corruption need to become part of the regulations.

v. Use of unqualified suppliers

The supply chain manager has the role of coordinating the activities of several actors along the supply chain to realise a production and distribution plan that fulfils market requirements. This role requires a profound knowledge of capabilities and resources of the involved actors. Should this kind of knowledge be available at the front-end, it might dramatically help to unlock new product development opportunities and avoid risks of selecting non-viable options (Hussain, *et al.,* 2010:34). The skills' shortage thus appears to be a global problem, both in developed and developing markets. In a worldwide survey done by Manpower Group polling approximately 39 000 employers in 33 countries across the globe, a massive 30 percent reported having difficulties in recruiting appropriate staff due to a lack of suitable talent (Wright, 2010:698). The employees

and their capabilities are assets of the company. People are the only active force in caring and serving the customer. The change in any company performance is almost entirely dependent on the changes of people's understanding, knowledge, capabilities and attitude (Odendaal, 2013:35).

Therefore, the quality of the products and services as well as the level of customer satisfaction rely on the skills and quality of the workforce, which, in turn, determines the company supply chain's competencies to deliver its products and services (Reimers, 2014:7). Supply chain management practitioners frequently do not have the skills, knowledge and experience that they need. While the system contains many excellent people, competency assessments show significant gaps in supply chain management skill and knowledge (Odendaal, 2013:35).

vi. Poor infrastructure

Main trunk roads joining major cities of the country are in good condition, according to National Transport policy 2006, with only 5 percent of the road networks are bituminised. However, bad roads, which reach different districts in South Africa are located away from the main regional roads and contribute greatly on poor delivery of products to these areas. Road density is low in South Africa at approximately 9.9 to 52 kilometres per 1000 kilometre 2 of land area used for roads. The lead time of export via road is 30 days, while it is 13 days in other developing nations (Barnes & Morris, 2008:52). The road transport is also limited by other difficulties such as the E-toll and the increase in fuel cost. The situation becomes worse during the rainy season; transportation cost goes up if the processor wishes to deliver the products to these areas, other-wise great scarcity of the products occurs. A recent study has shown that improving road conditions would significantly lower vehicle operating cost thus increasing the manufacturers' margin profit (Simpson & Havenga, 2011:32).

Poor infrastructure limits the size of the market and blocks inter-regional trade between the districts, which might provide a viable opportunity for the processors to open new market segments (Linneman, *et al.,* 2012:185). Transit time is a factor that is increasingly being considered since it strongly influences inventory carrying costs and inventory cycle time in supply chain management. For cargo that has a higher value or is perishable the routing option that is the fastest and/or shortest will be preferred (Barnes, *et al*., 2008:50). Transit time is also an important aspect in the estimation of transport costs, particularly since logistics concomitantly involves cost and time management. Cities have the advantage of being highly accessibly for global and regional freight flows and thus provide among the best long distance time performance (Pillay, *et al.,* 2010:31).

However, they are the most challenging environments for local freight distribution where congestion impairs, often in an unpredictable fashion, the timeliness of freight distribution (Linneman, *et al.,* 2012:189). Reliable electricity and water supply have been a long-time problem facing the country. The use of generators during power rationing or load shedding lead to an increase on the production cost along with decreasing profit margin. Consistent availability of water, an important resource in the food processing industry, from the municipal supply system has not been guaranteed. Companies with stable financial flow, drilling boreholes and installation of purification plants have been their best solutions. Infrastructure plays an important role in the social and economic development of countries. Areas without access to reliable infrastructure are always considered as poor areas. Improved planning and management of infrastructure projects are critical to ensure economic growth and development in a country.

This section analyses literature on the main challenges facing SCM. These include seven dimensions: HRM, technology, facilities, SRM, CRM, regulatory factors and logistics, and transportation. It has emerged that unless actions are taken to control each of these challenges, the performance of the supply chain will be limited, with obvious negative consequences on the organisation. The next section discusses literature on business performance.

3.7 BUSINESS PERFORMANCE

The business environment is constantly valuing its procedures to find business practices that are more efficient in terms of cost and the achievement of company goals. The creation to measure company performance is just one of the ways that business owners and managers try to get a better return on investment for their business processes. Business performance management is a way of monitoring the methods a company uses to reach its goals and use data to find better methods.

This section defines what business performance entails and discusses the importance of accessing company business performance. It elaborates on how to measure business performance using tools such as balance scorecards and provides an analysis of the impact of business performance in a company.

3.7.1 Definition

Business performance is defined as the ability of an enterprise to meet its predetermined goals (Benligiray, 2013:141). It reflects the level of a fulfilled task of the business's aim or target according to its obtained results at the end of a business period (Yıldız, 2010:180). Paiva

(2010:379) defines business performance as the evaluation of all the efforts made for the realisation of business goals. Therefore for a business to be successful, every business owner or manager needs to ensure that their business operates as efficiently and effectively as possible improving the efficiency and effectiveness of the business requires a perfect comprehension of the most important drivers within the business and a concrete approach to apply procedures that will optimise these key elements. Mishra (2012:146) states that business performance is a key business initiative that enables companies to align strategic and operational objectives with business activities to fully manage performance through better informed decision making and action. Effective business performance requires a company to model and monitor not only its tactics but also its strategies and the assumption on which these strategies are built (Yildiz, 2010:178).

3.7.2 Importance of business performance

Business performance is a significant element in all areas and activities in a company. It is easy to determine the performance of certain activities, but it can be more difficult in others (Kisperska-Moron & Haan: 2011:132). Measuring and analysing business performance aims to clarify where the strengths and weaknesses of the company lie and as part of the "Plan – Do – Check – Act" cycle, measurement plays a key role in quality and productivity improvement activities (Otley 2009:363). According to Newbert (2008:746), it is important to conduct regular business performance measurement for the following reasons:

- to ensure customer requirements have been met;
- to set sensible objectives and comply with them;
- to provide standards for establishing comparisons;
- to provide visibility and a scoreboard for people to monitor their own performance level;
- to highlight quality problems and determine areas for priority attention; and
- to provide feedback for driving the improvement effort.

Business performance is increasingly used in SCM. Improving supply chain performance has become a continuous process that requires an analytical performance measurement system (Yıldız, 2010:186). Assessing business performance levels must be a continuous and repetitive activity that is done by any company. According to Shafritz, *et al*. (2012), management of business performance has the effect of increasing productivity. Munzhedzi (2011) noted that business performance helps to communicate the company's vision and objectives that are set to ensure that the company will make profits. By properly managing business performance, managers are likely to rapidly identify

problems and implement organisational tasks that will solve them and in future avoid the same crises (DeNisi & Smith, 2014:130). The management of business performance creates a close integration of operatives and corporate spaces that aim to monitor daily: operations and strategies and conduct the alignment of individual capabilities to maximise performance levels and ensure that employees use their time and knowledge on the things that matter the most (Aguinis, Joo & Gottfredson, 2011:505).

3.7.3 Measurement of business performance

Measurement of business performance is one of the cornerstones of business excellence and help companies align with their goals (Reimers, 2014:9). Initially, companies used to rely on financial variables to assess their overall performances. Recent findings show that companies are no longer focusing on the financial means but also consider the non-financial variables such as customer service, social responsibility, employee stewardship markets and overheads to determine how well or not they are operating (Richard, 2011:25). In the current business world, companies are no longer competing between themselves but among supply chain (Greenberg. 2013:142). Effective supply chain management has therefore become a potentially valuable way of measuring and securing business overall performance level (Liu, Li & Zhao 2010:202). Business performance management relies on a set of approaches, company procedures and tools used in combination with relevant information to predict and measure future constraints (Cai, Liu & Xiao 2010:520). Moreover, the use of business performance measurement tools helps promote efficiency within a company to minimise costs and accurately forecast market changes. Companies that offer a good measure of how they conduct their business gain maturity in their supply chain capabilities, which thus reduces their costs faster and achieves higher profit margin than their less mature peers (Liu *et al.*,2011:210).

A typical performance measurement helps businesses to periodically set business goals and provide feedback to managers on progress towards those goals. Following Munzhedzi (2011:33), measures can be objective or subjective. Objective measures can be independently measured and verified. Subjective ones cannot. Measures are also typically classified as financial or non-financial. Financial measures are typically derived from or directly related to an account chart found in a company's profit and loss statement or balance sheet, such as inventory levels or cash on hand. Non-financial measures are measures not found in the chart of accounts, such as customer satisfaction scores or product quality measures. Companies rely on tools such as balanced

scorecard customer, innovation and internal business perspective as well as customer satisfaction to assess how good their performance is.

Kellermans, Walter, Floyd, Veiga and Matherne (2013:304) state that most performance measures can be grouped into one of the following six general categories.

i.   **Effectiveness:** A process characteristic indicating the degree to which the process output (work product) conforms to requirements. (Are we doing the right things?)

ii. **Efficiency:** A process characteristic indicating the degree to which the process produces the required output at minimum resource cost. (Are we doing things right?)

iii. **Quality:** The degree to which a product or service meets customer requirements and expectations.

iv. **Timeliness:** Measures whether a unit of work was done correctly and on time. Criteria must be established to define what constitutes timeliness for a given unit of work. The criterion is usually based on customer requirements.

v.   **Productivity:** The value added by the process divided by the value of the labour and capital consumed.

vi. **Safety:** Measures the overall health of the company and the working environment of its employees.

In addition to the above, certain companies may develop their own categories depending on the company's mission. It is therefore important for companies to closely analyse how they perform as they all operate in a competitive environment. Being able to trace how effective their operations are as well as the quality they provide will play a definite role on their productivity and profit levels. Quality, safety and effectiveness are elements that depend on each other and are crucial at the operational stage. Every company strives to create good products which will be safe to use at a fair cost.

3.7.3.1 The balanced scorecard

This scorecard, created by Robert Kaplan and David Norton in the early 1990s, is a management system that enables companies to translate the vision and strategy into action. It was originally created to supplement "traditional financial measures with criteria that measured performance from three additional perspectives, those of customers, internal business processes and learning and growth" (Kaplan & Norton, 2010:75). The theory of the balanced scorecard suggested that rather than the focus, financial performance is the natural outcome of balancing other important goals.

These other company goals interact to support excellent overall company performance. If any individual goal is out of balance with other goals, the performance of the entire company will suffer. The balanced scorecard system also emphasises articulation of strategic targets in support of goals. In addition, measurement systems are developed to provide data necessary to know when targets are being achieved or when performance is out of balance or being negatively affected.

The Balanced Scorecard can be understood as a management system structured according to the logic of the management circle ("plan-do-check-act"). It resembles a typical management fashion. For instance, Bala and Kumar (2011:6) wrote that a self-respecting company apparently can no longer do without the balanced scorecard. The starting point of it is the vision and strategy of a company, which it takes as a given and should *translate a business unit's mission and strategy into tangible objectives and measures (*Ioppolo, *et al.,* 2013:363).

The measurement focus of the balanced scorecard is used to accomplish the following management processes:

- clarifying and translating vision and strategy;
- communicating and linking strategic objectives and measures;
- planning, setting targets and aligning strategic initiatives; and
- enhancing strategic feedback and learning.

The measures function as a link between the strategy and operative action. The core question is the selection of goals and measures to monitor the implementation of the vision and strategy.

Kaplan and Norton (2010:36) recommend a nine-step process to create and implement the balanced scorecard in a company.

- Perform an overall company assessment.
- Identify strategic themes.
- Define perspectives and strategic objectives.
- Develop a strategy map.
- Drive performance metrics.
- Refine and prioritise strategic initiatives
- Automate and communicate.
- Implement the balanced scorecard throughout the company.
- Collect data, evaluate and revise.

There are many benefits and challenges to the balanced scorecard. The primary benefit is that it helps companies translate strategy into action. By defining and communicating performance metrics related to the overall strategy of the company, the balanced scorecard brings the strategy to life. It also enables employees at all levels of the company to focus on important business drivers (Sancha, Gimenez, Sierra & Kazeminia, 2015: 390). "Does implementing social supplier development practices pay off?" Supply Chain Management: An International Journal, 20/4: 389 – 403). The main challenge of this system is that it can be difficult and time-consuming to implement. Kaplan and Norton originally estimated that it would take a company a little more than two years to fully implement the system throughout the company. Some companies implement it quicker, for some it takes longer. The bottom line is that the balanced scorecard requires a sustained, long-term commitment at all levels in the company for it to be effective (Rompho, 2011:39).

The balanced scorecard helps companies translate strategy into action. By defining and communicating performance metrics related to the overall strategy of the company, the balanced scorecard makes the strategy come alive. It also enables employees at all levels of the company to focus on important business drivers (Kong 2010:286).
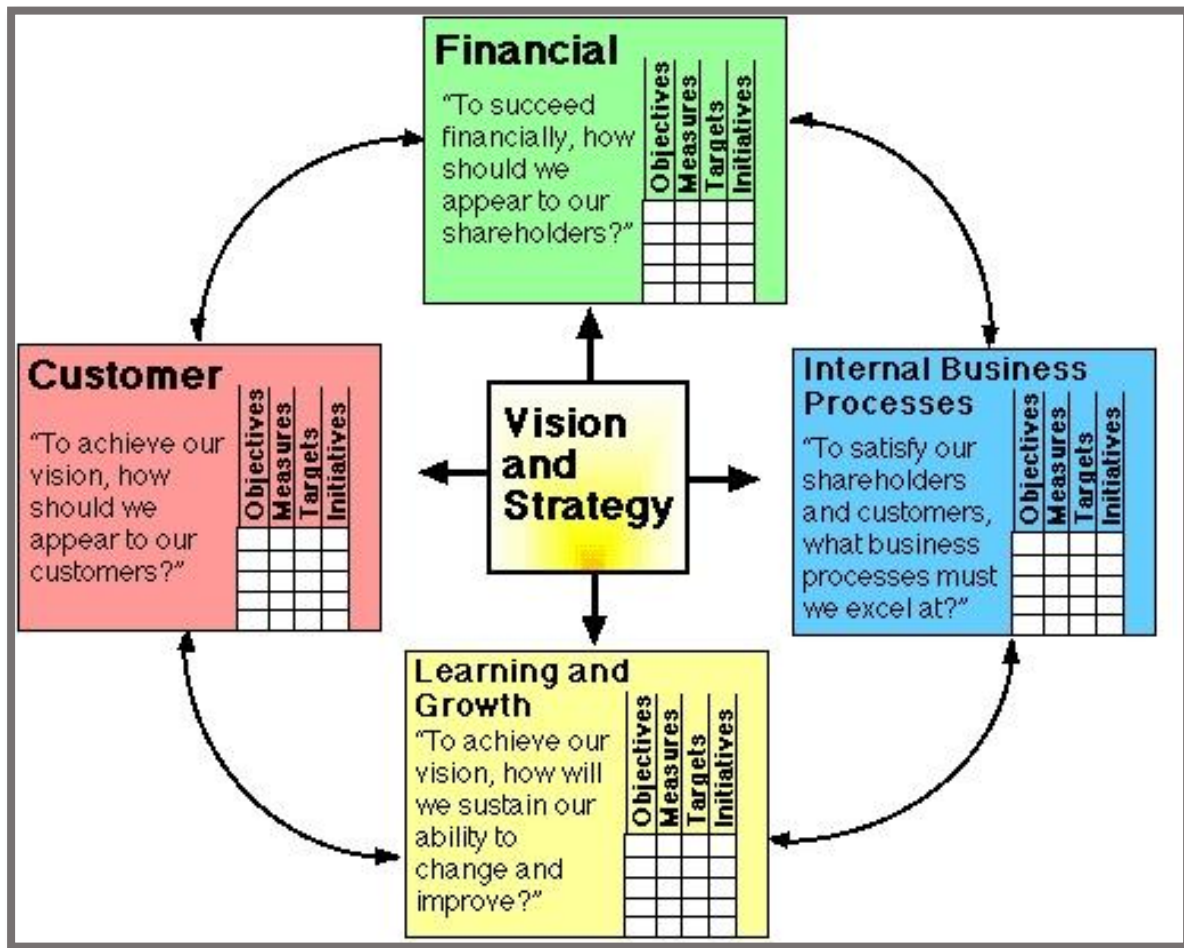
Figure 3.3: The Balanced Scorecard

Source: (Kaptlan & Norton, 2010:35)

3.7.3.2 Measuring the performance through customer satisfaction perspective

Many companies develop strategies to increase their customer satisfaction levels as customers are the main drivers of any strategy; without customers there are no sales therefore no money for the company. Customers' concerns tend to be divided into four categories, namely, time, quality, performance and service (Malina & Selto, 2011:47). The lead time can be measured from the time the company receives an order and the time for it to be delivered to the final user (Cook, Heiser, & Sengupta, 2011:107). The moderating effect of supply chain role on the relationship between supply chain practices and performance: An empirical analysis. International Journal of Physical Distribution & Logistics Management, 41(2), 104 – 134). Quality measures the level of how good the product is that the company produced and how the company's products or services contribute

to creating value for its customers (Kong, 2010:289). Depending on customers' evaluation to measure company performance, come companies hire third parties to perform anonymous customer surveys, resulting on a customer-driven report card *(Price, et al., 2011:283).* Beside time, quality, performance and services, companies must remain sensitive to the costs of their products as customers see prices as the only one component of the cost they occur when dealing with their suppliers (Rompho, 2011:45).

3.7.3.3 Measuring the company performance through the innovation and learning perspective

Intense global competition requires companies to make continual improvement to their existing manufacturing procedures and processes (Cook, Heiser, & Sengupta, 2011:130). A company's ability to innovate, improve and learn points directly to the company's value, which has the ability to launch new products, create value for customers, improve operating efficiencies, penetrate new markets and increase revenues (Sancha, Gimenez, Sierra & Kazeminia, 2015:390). "Does implementing social supplier development practices pay off?" Supply Chain Management: An International Journal, 20/4: 389 – 403*).* Measuring company performance through an innovation and learning perspective focuses on the company's ability to develop and introduce new products standards and increase sales for new products (Price, *et al*., 2013:281). If sales of new products are not good, the manager can explore whether this failure has evolved due to new products' design or new product introduction.

3.7.3.4 Measuring company performance through financial perspective

Measuring a company's performance through the financial perspective helps to indicate whether the company's strategies, implementations and execution are contributing to its overall improvement (Kaplan, *et al.,* 2010:23). Financial survival measures the cash flow, sales growth and operating income of the company to determine whether or it is financially stable.

3.7.4 Impact of business performance

Companies now measure their performances based on the data collected from their financial department as well as other variables such as the staff, customer satisfaction, the market, environment and element such as overheads. Business performance is measured to make sure that the companies are working in full capacity in terms of staff to ensure that they are trained, capable and motivated.

According to Upadhaya, Munir and Blount (2014:34), measuring the business performance leads to:

- improve productivity due to a clear understanding of all the processes;
- increase efficiency;
- automate tasks;
- create new businesses;
- identify cost savings opportunity;
- inform the business manager about the company's position; and
- facilitate forecasting.

Business performance is often thought of as a business strategy that allows companies to collect, aggregate and analyse data proficiently from many sources to take the most suitable action. Bititci, Garengo, Dörflerand and Nudurupati (2012:322) list the following reasons why companies measure business performance:

- to monitor and control all the organisational activities to ensure that they comply with the company vision and mission for success;
- to drive improvement by integrating innovation and modern practice to remain competitive;
- to achieve alignment with company goals and objectives to meet the scope of the company existence; and
- to reward and to discipline employees that perform and strive for company success

Fuerst and McAllister (2011:49) argue that business performance is needed for two reasons. The first is that it would help a company theorist to understand the factors that induce sustainable practices. The second and perhaps the most important reason is that it would shed a clear view on all the procedures that foster sustainable companies. This would allow managers and policy makers to determine the efficacy of procedures controls and anticipate market fluctuations.

In South Africa, Vogt and Pienaar (2011:200) conducted a study on the Just in Time, total quality management and supply chain management to understand their linkages and impact on business performance in South Africa. The study argues that in recent years numerous approaches have been proposed to improve operations' performance. Three in particular were highlighted by the authors, namely, Just in Time, quality management and supply chain management and have received considerable attention throughout the study. While the three are sometimes viewed and implemented as if they were independent and distinct, they appear also to have been used as three

prongs of an integrated business strategy. The result of this empirical study demonstrates that at both strategic and operational levels linkages exist between how a company views Just in Time's total quality management and supply chain management as part of their business performance evaluation strategy and have the greatest effect on performance.

This section focuses on business performance and how it is measured and how it can impact on the wellbeing of a company. The measurement of this element differs from one industry to another as well as one company to another, depending on various capabilities. Generally, companies use the balanced scorecard to see where the performance needs to be more concentrated in case of failure but can also evaluate their performance based on the financial situation, the customer view, innovation and technologies as well as supply chain itself. Knowledge of business performance is very crucial because that is how a company will judge if the overall manufacturing or operation sector is generating a profit or net, which results in ranking and attributing the score card to every level. This can be in some cases time-consuming and expensive but nevertheless very important to be aware of, especially in the supply chain division, which constitutes the main and most important level in any company.

3.8 SUPPLY CHAIN MANAGEMENT IN SOUTH AFRICA

Considerable investigations have been conducted in South Africa with the aim of understanding the SCM processes and assess the various challenges and difficulties of this department. Researchers have dedicated their studies on the SCM in numerous dominant industries, conducted surveys and devised important recommendations aimed at the benefits of companies that face such difficulties but also to assist the overall economy in South Africa.

Ambe and Badenhorst Weiss (2011:5) investigated the trends and challenges in the SCM in the South African automotive sector. They debated on various challenges such as technological, infrastructural, market, skills, cost, and relationships challenges. Skills shortages were identified as a major challenge that was difficult and sometimes extremely difficult to fix. This is a national dilemma in South Africa, which cannot be resolved in the short-term by individual manufacturers. Labour issues were also acknowledged as difficult to sort out, owing to the politicisation of the labour market and strict labour laws. They also stated that most of the difficult challenges, such as road freight volumes, port delays, unreliability of rail transport, high fuel costs, high operating costs, high port charges and high prices of materials were actually beyond the control of the manufacturers and conclude that few of the challenges could provide opportunities for the

manufacturers to focus their efforts to become more competitive, such as replacing outdated assembly/manufacturing tools; finding new markets; dealing with the cancellation of customer orders; and improving service levels.

Havenga and Simpson (2013:65) elaborate on the costs involved in supply chains and how efficient those are allocated throughout the overall process. They acknowledged that South Africa's absolute supply chain and logistics costs, as a percentage of the transportable gross domestic product, are rising. They stated that supply chain costs can be broken down into three direct elements, namely, transport, storage, and handling costs. Additionally, there are management and administration costs and one indirect element, namely, inventory carrying costs (i.e. time-based working capital financing the cost of inventory in the logistics chain). South Africa's logistics cost model employs a bottom-up approach for the computation of logistics costs by modelling total surface freight flow data for 83 commodity groups between 372 geographical areas, and translating the tones produced and imported (i.e. total supply) of a specific commodity into total freight flows based on gravity-modelling and, subsequently, determining the costs of performing transport, storage and port handling functions with respect to that commodity.

Naudé and Badenhorst-Weiss (2010:29) reported on research to explore the concept of the bullwhip effect in supply chains and illustrate empirically the presence of its effect in automotive supply chains in South Africa. Their article investigates its presence, identified through an empirical study and its causes and implications for SCM in the South African automotive component industry. The results indicate that automotive component manufacturers are dependent on demand-forecasting information from their customers. They experience long lead times, fluctuating orders, cancellation of orders, excess and slow moving inventory and a lack of integration with suppliers and customers. There are also signs of relationship problems and a possible silo mentality. The mentioned results indicate the presence of the bullwhip effect in South African automotive supply chains. Since this can have a major impact on companies' costs, knowing where to invest effort and resources should be a high priority for supply chain managers. Ambe and Badenhorst-Weiss (2012:76) assessed the challenges of the SCM in the public sector in South Africa. The main objective of their article was to articulate the challenges that restrain SCM implementation in the South African public sector, which should occupy centre stage in the financial management reform process in the public sector in South Africa. The South African government has thus adopted integrated supply chain management in its public procurement policy.

SCM aims to add value at each stage of the process from demand of goods or services to their acquisition, managing the logistics process and finally, after use, in their disposal. The SCM process is guided by policies and legislations. The framework for the SCM system constitutes demand management, acquisition management, logistics management, disposal management, as well as risk and performance management (Ruhl, 2012:45).

According to a study by Hoffmann, Schiele and Krabbendam (2013:234), the supply chain is built upon ensuring value for money, open and effective competition, ethics and fair dealings, accountability and reporting, and equity. Their study employed a cross-case analysis of case studies drawn from a compulsory module for the Advanced Programme in Sourcing and SCM, University of South Africa (UNISA). Their findings reveal that there are enormous challenges of implementing SCM in the South African public sector. These challenges are not limited to municipalities, but extend to all spheres of government. They include, among other things, noncompliance with SCM policies and regulations, lack of appropriate bid committees; lack of strategic planning; lack of skills, capacity and knowledge of the workforce to be able to implement SCM fully. The findings of the study conform to the results of other studies conducted in the South African public sector. These include, among other things: SCM implementation in the Central District Municipality and its affiliated municipalities (Ambe 2006:165); strategic SCM by Matatiele Municipality (Stock,2009:150); the potential of internal audit to enhance supply chain management outcomes (Marucheck, Greis, Mena & Cai. 2011:707); and evaluation of the implementation of public sector supply chain management and challenges from a case study of the central district municipality, North West province, South Africa (Migiro & Ambe, 2008:235).

All these studies acknowledge that SCM implementation is still in its infancy. The article concludes by suggesting an implementation framework for SCM. Proper implementation and execution of the framework would enhance SCM. More recently (2014), Badenhorst-Weiss and Waugh talked about the influence in business environment in a supply chain. South Africa's logistics performance is deteriorating, which influences global competitiveness of the country's products. Supply chains in the country operate in a business environment that is not totally conducive for business. The purpose of this study is to identify and obtain insight into the main business environmental risk factors. SCM will only be able to mitigate risks and develop strategies to neutralise constraints if they have knowledge of these risks and constraints. The study is conducted in the logistics industry by means of a sequential mixed method study, consisting of a survey to

identify the most important risk factors and a qualitative study in the form of a focus group discussion to obtain richer data and insight into the problem areas.

This study finds that increasing transportation costs, the quality and service of infrastructure, lack of skilled and educated human resources and labour relations pose the biggest risks for supply chains and constrain their competitiveness. The shortcomings in infrastructure and services are not within the control of supply chains and possible delays of deliveries should be considered with scheduling. An increase in transportation costs and a lack of quality human resources can be solved by taking a long-term approach, such as investing in developing human resources and offering a working environment and culture to enhance their productivity and loyalty instead of trying to retain them with higher salaries or appoint more workers. Transportation costs can be limited by better management of routes and full loads, even if it means partnerships with competing logistics providers. To prevent labour unrest, supply chains should invest in the social well-being of the labour force.

3.9 CONCLUSION

The purpose of this chapter is to analyse literature on SCM and business performance. It sheds light on what supply chain management entails, its development, issues and benefits. The chapter reveals that SCM has become an important consideration of competitive advantage for business companies as it facilitates maximisation of the total value of the company through better use and distribution of resources across the entire company. The chapter defines the concept of business performance, how it is measured and how it impacts on the company. It cites other investigations that have been conducted in the SCM and business performance in South Africa. Major problems faced in these environments emerge, such as availability of competent skills, facilities, technology adoption, SRM, CRM, regulatory factors and logistics and transportation challenges. These challenges and more must be taken seriously by all companies as they influence the performance of business. The next chapter discusses the research methodology.

CHAPTER 4
RESEARCH METHODOLOGY

4.1 INTRODUCTION

All research is based on underlying different assumptions that constitute a valid research and which method is appropriate for the development of knowledge in each investigation. Following the literature on supply chain management, this chapter focuses on the research design, methodology and procedures used in this study. The chapter discusses the general research design methods considered and explains in detail the development of the structured questionnaire used in the primary data collection. The chapter provides details on the selection of the population for the study and the criteria used, describes the profiles of the survey respondents, discusses the sample selection and sampling procedures used, the quantitative instrumentation used during the study, data validity and data reliability, the data collection methods and the statistical techniques used during data analysis. This chapter is important because it sheds light on how the actual research was conducted and how authentic results are generated after the data collection part of the overall research.

4.2 RESEARCH PARADIGM

Research has been defined as the process of intellectual discovery which has the potential to transform people's knowledge and understanding of the world (Tang & Musa, 2011:27). According to Voss, Tsikriktsis and Frohlich (2012:195), a paradigm is a broad view or perspective of something. Additionally, Healy and Perry's (2010:118) definition of paradigm reveals how research could be affected and guided by a certain paradigm by stating that paradigms are patterns of beliefs and practices that regulate inquiry within a discipline by providing lenses, frames and processes through which investigation is accomplished. In general, a paradigm is best described as an entire system of thinking (Manuj & Mentzer, 2008:133). More specifically, a paradigm would include the accepted theories, traditions, approaches, models, frame of reference, body of research and methodologies; and could be a model or framework for observation and understanding (Babbie & Mouton, 2012:33).

There are two main types of research paradigms, which are positivism and phenomenological paradigms. Positivism emerged as a theoretical paradigm in the 19th century with Auguste Comte's rejection of metaphysics and his statement that only scientific information can expose the truth

about reality. It was later formally established as the dominant scientific method in the early part of the 20th century by members of the Vienna Circle, including Gustav Bergmann, Rudolf Carnap, Herbert Feigl, Philipp Frank, Karl Menger, Otto Neurath and Moritz Schlick. In contrast, phenomenology focuses on studying human phenomena within the everyday social contexts and the perspective of those who experience those (Hobson & Hill, 2010:218). It recommends that people's experience in social reality provides a basis to understand the meaning of that reality. Hence, the researcher should work towards having new meanings and increasing his understanding of the phenomena from the social world (Bala & Kumar, 2011:3).

This study followed the positivism research paradigm. This was deemed suitable because it applicable to quantifiable observations and large samples selected randomly lead to statistical analysis. It therefore involved the use of both quantifiable observations as well as large data samples, which made positivism appropriate.

4.3 RESEARCH APPROACH

The research approach focuses on the method used to conduct the study. Generally, the research approach is a strategy of enquiry, which moves from the underlying assumptions to research design and data collection (Myers, 2011:23). Although there are other distinctions in research approaches, the most common classification of research is into qualitative and quantitative approaches. Qualitative research is used to help understand how people feel and why they feel as they do. It deals with phenomena that are difficult if impossible to quantify mathematically such as beliefs, meanings, attributes and symbols and may involve content analysis (Babbie & Mouton, 2012:53). According to Domegan and Fleming (2012:24), qualitative research aims to explore and to discover issues about the problem in hand, because very little is known about it.

In contrast, quantitative research makes use of questionnaires, surveys and experiments to gather data that is revised and tabulated in numbers, which allows it to be characterised by using statistical analysis (Hittleman & Simon, 2010:31). Quantitative researchers measure variables on a sample of subjects and express the relationship between them by using effect statistics such as correlations, relative frequencies, or differences between means; focusing mainly on the testing of theory. This approach is based on the approach known as logical positivism, a common paradigm in the social sciences (Babbie & Mouton, 2012:29). In quantitative research, a deductive theory approach is used to guide the design of the study and the interpretation of the results (Field 2011:75)

The current study used the quantitative research approach. Since it required many respondents, a quantitative approach was deemed as the most appropriate, unlike the qualitative approach, which focuses on smaller sample sizes when examining any context. Furthermore, the quantitative was accepted because it is clearer, more reliable, less time consuming and objective (Babbie & Mouton, 2012:73). Its use, therefore, enabled the researcher to make reliable deductions from the primary data collected during the study.

4.4 RESEARCH DESIGN

A research design can be defined as the framework or structure of a research (Pallant, 2011:22). It refers to the blueprint or the way in which a study is structured to conduct it successfully (Babbie, *et al.,* 2012:74). It can also be described as the overall plan to which the respondents of a proposed study are selected, as well as the means of data collection or generation (Welman, 2010:46). Thus, research design aims to highlight the methods and tools that are used during the research process.

There are several quantitative research designs available, namely, cross sectional survey design, correlational design and experimental design, amongst others (Mellenbergh, 2008:238). The current study made use of the cross-sectional survey design. The cross-sectional survey design is one in which data are collected from a specific population or representative (Field, 2009:65). It involves the use of a structured survey document or questionnaire to collect the relevant information that is then analysed and interpreted (Babbie, *et al*., 2012:26). The cross-sectional design was chosen to conduct this study because it is less costly, less time consuming, makes data easier to interpret and produces reliable results (Manuj & Mentzer, 2008:134).

4.5 SAMPLING DESIGN

This section provides a clarification of the sampling design used here. It specifies the number, type and location (spatial and/or temporal) of sampling units to be selected for measurement of population (Pallant, 2011:25). Since the main purpose of sampling is to achieve representativeness, it should be assembled in such a way as to be representative of the population from which it is taken (Babbie & Mouton 2012:20), That is, from its target population, sampling frame, sample size and sampling method (Field, 2011:22).

4.5.1 Population

The population represents the universe of units from which the sample is selected (Bryman & Bell, 2013:17). The population which relates to this investigation comprised SCM professionals in companies which operate in the food processing industry in South Africa.

4.5.2 Target population

Polit and Hungler (2007:232) define a target population as the totality of all subjects that conform to a set of specifications, comprising the entire group of persons that the researcher is interested in and to whom the research results can be generalised. It is described as the entire set of units from which the survey data are to be used to make inferences (Mc Millan, 2010:157). The geographic and temporal characteristics of the target population need to be delineated, as well as the age, the gender and in some cases, race (Hussman, Mehran & Verma, 2010:36). This enables the researcher to determine what the preferences are that relate to each category. It is therefore important to state that the target population of a research survey can be human beings or even objects, depending on what the researcher is analysing or where the research topic is centralised.

The target population chosen for this investigation comprised of SCM professionals of companies operating in the food processing industry in Gauteng Province, South Africa. Gauteng province was selected because of its accessibility to the researcher. The food processing and beverages industry form a greater part of the Gauteng province's economy, where half of South Africa's agri-processing companies operate.

4.5.3 Sampling size

The sampling size determines the actual number of people or objects that are going to be involved in the research. Here there is no condition which is set to determine an exact number of people who must be needed, but it is important to state that the more consistent the size of the sample needed, the greater and more accurate are the results. It is preferable and even recommended to have a large sampling size to be able to have ideas on a large scale to conduct the research analysis.

In this case, this study sample ranged between 250 to 500 sample elements. Hopkins (2013:23) suggested that for any population of 10 000 (N) the recommended sample size is approximately 380. In addition, in some previous studies (for example, Haan, Kisperska-Moron & Placzek, 2013:43; Thakkar, Kanda & Deshmukh, 2012:971) sample sizes ranging between 250 and 550

were used in studies that focused on challenges encountered in supply chains. In line with these views, the sample size was pegged at N=500 respondents.

4.5.4 Sampling approach

Researchers collect information by a wide variety of methods, ranging from the experimental designs used in the physical sciences through to the surveys more common in the social sciences (Babbie & Mouton, 2012:8). Many of these methods of gathering information involve two choices of experimental subjects, namely, probability sampling and non-probability sampling. In this study, focus was directed to non-probability sampling since it is the approach used in selecting the respondents.

4.5.4.1 Non-probability sampling

Non-probability sampling is a sampling technique in which the samples are collected in a particular way that does not provide all the individuals in the target population equal chances of being selected (Leedy & Ormrod, 2010:33). Elements chosen in a non-probability sampling technique are usually selected based on their accessibility or by the purposive personal judgment of the researcher (Creswell, 2010:29). Despite several constraints and criticisms, Hussman *et al.* (2010:36) stated that non-probability sampling technique is cheaper to conduct, generally used when a particular sampling frame is not accessible, very useful when the target population is widely spread in a way that does not allow the efficiency of cluster sampling, is often used in exploratory studies, and is mainly considered when the researcher is not focused on working out what proportion of population gives a specific response but rather in obtaining a variety of reactions on ideas that people may have. For these reasons, non-probability sampling was adopted in this study.

There are various types of non-probability sampling techniques, which include convenience or availability sampling, quota sampling, snowball sampling, judgement or purposive sampling and self-selective sampling. In this study, the convenience or availability sampling, which is probably the most common of all sampling techniques, was chosen for selecting the respondents. With convenience sampling, the sampling elements are chosen because they are fairly accessible to the researcher (Walters 2010:246). Furthermore, they are easy to access and do not require expert judgment to select a specific representative population.

4.6 MEASUREMENT INSTRUMENT

The measurement instrument chosen for this study is a structured questionnaire (Refer to Appendix 2). According to Vockell and Asher (2005:124), a questionnaire is a device that enables respondents to answer questions. McMillan (2010:155) argues that questionnaires are used extensively because they provide the best way of obtaining information from a wide range or research problem, from surveys of a large population to reactions of students to different instrumental methods. In view of this, this study used a structural questionnaire consisting of nine sections with closed-ended questions. A closed-ended question asks a question and gives the respondent fixed responses from which to choose (Manuj & Mentzer, 2008:1). Section A requested respondents to provide their demographic details. Sections B to H contained questions on the seven supply chain management challenges (discussed in chapter three), which are: human resources, technology, facilities, SRM, CRM, regulatory factors and logistics and transportation. Questions in Sections B to H of the questionnaire were presented in five-option Likert scales with 1 representing strongly disagree and 5 representing strongly agree. Section I of the questionnaire contained questions measuring business performance. These were also presented on a five-option Likert scale where 1 represents 'much worse' and five represents 'much better'. Questions in sections B to I were adapted from previous studies. The sources of these questions are provided in Table 4.1.

Table 4.1: Sources for Measurement Scales

Section	Scale	Number of questions*	Sources of Questions
B	Human resources	6	Bharthvajan (2014:10165) McAfee, Glassman and Honeycutt (200214)
C	Technology	4	Choi and Harley (1996:336) Lee and Pennings, (2001:615)
D	Facilities	5	Grover, Chopra and Mosher (2016:246) Thakur and Hurburgh (2009:621)
E	Supplier Relationship Management	8	Thatte (2007: 135) Chang Hwan Lee (2007:307)

Section	Scale	Number of questions*	Sources of Questions
F	Customer Relationship Management	5	Bonner and Calantone (2005:53-62)
G	Regulatory Factors	5	Tsoulfas and Pappis (2006:1602)
H	Logistics and Transport	8	Steyn *et al.* (2012:17)
I	Business Performance	5	Brik *et al.* (2011:321) Maletic e*t al*. (2015:16)
*This number represents the initial number of questions adapted. However, for some of the scales, this number later declined as some items were removed to improve the scale reliabilities after the pilot test			

Table 4.1 shows that the human resources scale contained six questions adapted from previous studies by Bharthvajan (2014:10165) and McAfee, Glassman and Honeycutt (200214). The technology scale contained four questions adapted from previous studies by Choi and Harley (1996:336) as well as Lee and Pennings (2001:615). Facilities followed with a set of five questions, all adapted from studies conducted by Grover, Chopra and Mosher (2016:246) and Thakur and Hurburgh (2009:621). The SRM scale was adapted from the studies by Thatte (2007:135) and Chang Hwan Lee (2007:307) and contained eight questions. CRM and regulatory factors scales both contained five questions each, sourced from the studies by Bonner and Calantone (2005:53-62) for CRM and Tsoulfas and Pappis (2006:1602) for regulatory factors, respectively. Logistics and transport scale had eight questions adapted from a study by Steyn *et al.* (2012:17). Finally, the business performance scale was adapted from studies by Brik *et al.* (2011:321) and Maletic e*t al*. (2015:16).

4.7 DATA COLLECTION METHODS AND PROCEDURES

Data gathering is the precise, systematic gathering of information relevant to the research sub-problems, using methods such as interviews, participant observation, focus group discussion, narratives and case histories (Burns & Grove, 2013:373). The empirical phase, which involves the actual collection of data, is followed by preparation for data analysis (Polit & Hungler, 2012:51). Data collection begins with the researcher deciding from where and from whom data will be collected.

The data collection process involved selected companies that are involved in the food processing industry and operated within Gauteng Province. Due to the nature of the research, the targeted respondents were SCM professionals. This was done to ensure the relevance of the data in evaluating the companies' implementation of SCM and business performance. Structured questionnaires were administered in both a hard copy and electronic format, from June 2015 to August 2015. A total of 420 questionnaires were transmitted both electronically and physically to the selected respondents and then followed up for any feedback by the researcher. The chosen companies were contacted through email or telephone to set appointments before administration of the questionnaire. This was challenging at times, as some terms are purely technical and the researcher was forced to explain deeply what the study entailed, which was time-consuming in certain cases.

4.8 STATISTICAL ANALYSIS

In this study, data were analysed using descriptive statistics, correlation analyses and regression analysis.

4.8.1 Descriptive statistics

Generally speaking, there are two types of research strategies: exploratory and descriptive. In statistical analysis, descriptive research is the type of exploration used to acquire a broader view of the data and the repartition of the variables by diagrams, tables and other basic statistics (Babbie & Mouton, 2012:24). Descriptive statistics involve the collection of quantitative data that generally falls into two areas: studies that describe events and studies like this current study that aims at discovering predictive relationships (Watkins 2007:22). Descriptive statistics deal with the presentation of numerical facts or data, in either tables or graphs forms with the aim of analysing the data collected (Leedy & Ormrod 2010:33). They provide a numerical and graphic procedure to summarise what data collection is in a clear way. In this study, descriptive statistics included graphs, frequency tables, percentages and mean scores were used in the analyses of the response rate, demographic details of respondents as well as the perceptions of respondents towards each of the challenges investigated, as well as business performance. These results are provided in Section 5.3 and 5.4.

4.8.2 Correlation analysis

Bless and Khathura (2007:23) describe the correlation coefficient as the degree of relationship between two variables that are not manipulated by the researcher. According to Gratton and Jones (2010:92), the correlation measures the strength and direction of the linear relationship between numerical variables. It measures the extent of correspondence between the ordering of two random variables. The correlation is one of the most common and most useful statistics (Corbin & Strauss 2013:89). It is a single number that describes the degree of relationship between two variables. The correlation coefficient "r" is a summary measure that describes the extent of the statistical relationship between two intervals or ratio level variables (Bless *et al* 2007:26). The correlation coefficient is scaled so that it is always between -1 and +1. When r is close to 0 this means that there is little relationship between the variables and the farther away from 0 r is, in either the positive or negative direction, the greater the relationship between the two variables. Correlation analysis shows the extent to which two quantitative variables vary together (Salkind,2012:110). In this study, the Pearson correlation coefficient was used to assess the association between the challenges faced by the supply chain in the food processing industry and their influence on business performance. The results of this analysis are provided in Section 5.6.

4.8.3 Regression analysis

Regression analysis is a statistical technique used to determine the linear relationship between two or more variables, and is primarily used for prediction and causal inference (Muijs 2011:61). It is a statistical technique that facilitates to predict someone's score on one variable based on their scores observed in several other variables (Collis, 2011:62). Regression analysis is fundamentally different from defining the correlations among different variables. Correlation determines the strength and direction of the relationship between variables, while regression aims to describe the extent to which theses variables are related in more detail. In this study, regression analysis was applied to further refine the results obtained in the correlation tests by ascertaining whether any predictive relationships existed between the dependent and independent variables. Regression analysis was performed to identify the variables that predict or provide the best explanation for the portion of the total variance in the scores of the dependent variables. Challenges to supply chain management were the independent variables while business performance was the dependant variable. The results of the regression analysis are reported in Section 5.7.

4.9 SCALE ACCURACY

In this study, the accuracy of the scale was determined by using measures of reliability and validity.

4.9.1 Reliability

Reliability refers to the extent to which test scores are free of measurement error (Salkind 2012:106). It is the degree to which a test or procedure produces similar results under constant conditions (Delport & Roestenburg 2011:177). Tabachnik and Fidell (2011:65) state that reliability focuses on the ability of an instrument to measure consistently. In this study, reliability was measured using the Cronbach's alpha (α) coefficient, which determines how all the items on an instrument relate to all other instrument items and to the total instrument as well. The Cronbach's alpha coefficient demonstrate the degree to which all the variables in the questionnaire measure the same element (Welman, *et al.,* 2010:147). A considerable alpha coefficient should range between 0 and 1 of the instrument (Field, 2009:677). However, instruments with fewer items tend to have smaller reliability coefficients. In such cases, a coefficient of 0.70 or to some extent lower would be considered reliable for the study (Bryman & Bell, 2012:4500). In order to conduct a reliable factor analysis, the sample size needs to be big enough (Costello & Osborne 2011:36). The smaller the sample, the bigger the chance that the correlation coefficients between items differ from the correlation coefficients between items in other samples (Field 2009:32). In this study, all measurement scales had Cronbach alpha values greater than 0.7, which implies that there was satisfactory reliability in this study. This is reported in Section 5.4.

4.9.2 Validity

Validity is the degree to which evidence and theory support the interpretations of test scores or simply the degree to which an instrument measures what it is supposed to measure (Root *et al.,* 2013:40). In this study, four types of validity, namely, face, content, convergent and predictive validities are measured. Face validity is a measure of how representative a research project is 'at face value,' and whether it appears to be a good project (Zikmund & Babin, 2010:23). Face validity was measured through an assessment of the questionnaire by the research supervisors to ensure that all scales measured exactly the elements stated in the problem statement and therefore lead to accurate results. Content validity of a measurement instrument refers to the degree to which the content of the items reflects the content domain of interest (Collis & Hussey 2011:64). In this study, content validity was established through pilot testing of the questionnaire. A pilot test was conducted, using 50 respondents who were selected conveniently. These respondents did not

participate in the main study. The feedback obtained from the promoters and the pilot sample was used to make improvements which made the final questionnaire clearer and more useful. For instance, after pilot testing the questionnaire, several items were removed from it to increase the reliability of the scales. On the human resources scale, two items were excluded while in the SRM and regulatory factors scales, three items were excluded. Four items were removed from the logistics and transport scale. The result of these exclusions is that the reliability of these respective scales improved, leading to more accurate results in the data analysis.

Convergent validity refers to the ability of a scale to correlate with other scales that purport to measure the same concept (Hair, 2010:18)). In convergent validity, two or more measurements of the same concept using different scales should agree unanimously. In this study, convergent validity was measured using Pearson correlation coefficients, indicated in Section 5.6. There were significant correlations existing between the different constructs, thereby implying that convergent validity was within acceptable levels.

Predictive validity may be perceived as the effectiveness of one set of test or research results as a predictor of the outcome of future experiments or tests (Thornhill, 2011:23). A high correlation between the constructs provides evidence of predictive validity since it shows that the measure used can correctly predict something that it should theoretically be able to predict (Saunders, 2013:36). In this study, predictive validity was established through regression analysis, which showed significant relationships between dependent and independent variables. This confirms that predictive validity was adequate in this study.

4.10 ETHICAL CONSIDERATIONS

Several ethical considerations were applied during the study. It was made clear to respondents that participation was voluntary and discrimination would not take place against those who did not intend to participate. The nature and purpose was discussed with the respondents and an information sheet was handed out for each questionnaire. Only the position was requested (no name or telephone number were requested) and respondents were requested to sign a consent form to indicate their voluntary participation in the study. Before data were collected, companies were given a copy of a letter written by the faculty which confirmed that the study was duly authorised by Vaal University of Technology. Respondents were not pressured to participate were given adequate time (two weeks) to complete the questionnaire. They were also assured that the results

would be made available to them once the study was completed. Throughout the study, the identities of respondents were safeguarded and remained anonymous.

4.11 CONCLUSION

The purpose of this chapter is to discuss the research methodology, which forms the foundation of any research study. The chapter shows that the study belongs to the positivist paradigm in which a quantitative approach was selected, since it intends to collect numeric data. A cross sectional survey design is followed in which a questionnaire was used as the data collection instrument. It further discusses the sampling design, in which the intended sample comprises SCM professionals, managers and owners of food processing and retail companies in Gauteng Province. Data was collected through an eight-section questionnaire in which questions used for the measurement scales were adapted from previous studies. It discusses how the measurement scale was tested for accuracy in terms of its reliability and validity. As indicated, data analyses methods used include descriptive statistics, correlation analyses and regression. Finally, the chapter discusses various ethical considerations followed in this study. The next chapter discusses the analysis of data and the interpretation of results

CHAPTER 5

DATA ANALYSIS AND INTERPRETATION OF THE RESULTS

5.1 INTRODUCTION

The previous chapter, as stated, gives a deep description of what the research methodology entails. The purpose of the current chapter is to analyse the data collected during the survey and provide interpretations of the results. The data analysed in this chapter were collected from SCM professionals, managers and owners of companies in the food processing industry in Gauteng province. It begins by indicating the response rate and provides demographic details of respondents. Thereafter, it discusses the reliabilities of measurement scales followed by the application of mean scores to show the perceptions of respondents towards each research construct. A discussion of the results of the correlation analysis between the constructs is given to show the associations between the research constructs. Lastly, the results of regression analysis are presented in which the existence of predictive relationships between independent variables and the dependent variables is determined. Most of the discussions of the results are linked to previous literature.

5.2 RESPONSE RATE

The response rate in research represents the number of respondents who participate in the survey divided by the actual sample respondents (Holbrook 2013:23). Represented in percentage form, it provides a clear indication on how many respondents are involved in the study and their percentage against the overall target population. The response rate in this study is presented in Table 5.1.

Table 5.1: Response Rate

Total number of questionnaires distributed	420
Valid questionnaires retained	303
Unusable responses	117
Usable response rate	72%

As presented in the Table 5.1, the total number of respondents who participated in this survey by completing the questionnaire is 420. Out of this number, 303 questionnaires were returned and

classified as useable while 117 had errors and were excluded in the final data analysis. In percentage terms, the 303 questionnaires used in the final data analysis represent a response rate of 72 percent. This was acceptable because, as mentioned by Punch (2013:2), high response rates of above 50 percent ensure that the results obtained are representative of the population and useful in data analysis.

5.3 DEMOGRAPHIC DETAILS OF RESPONDENTS

This section discusses the demographic profile of respondents. Five parameters namely gender, age, racial group, academic qualification and employment period were used in the analyses.

5.3.1 Gender

The gender distribution of respondents is provided in Table 5.2.

Table 5.2: Gender of the Respondents

Variables	Categories	N	n	%
	Male	303	190	62.8
Gender	Female	303	113	37.2

The gender of the respondents, as illustrated in the Table 5.2, indicates that 62.8 percent (n=190) were male and 37.2 percent (n=113) were female. This leads to the view that more males than females were willing to participate in this study. It could also imply that there could be more male SCM professionals, managers and owners in the food processing industry in Gauteng Province. This presents the need to develop and empower women to take up these roles within that industry.

5.3.2 Respondent's age

This section reveals the age group the respondents. The respondents' age categories are reported in Table 5.3.

Table 5.3: Age Categories of the Respondents

Age categories	N	N	%
18-25	303	34	11.2
26-35	303	147	48.5

36-45	303	99	32.7
46-55	303	20	6.6
56 +	303	3	1.0

These statistics reported on the Table 5.3 are graphically illustrated on the Figure 5.1
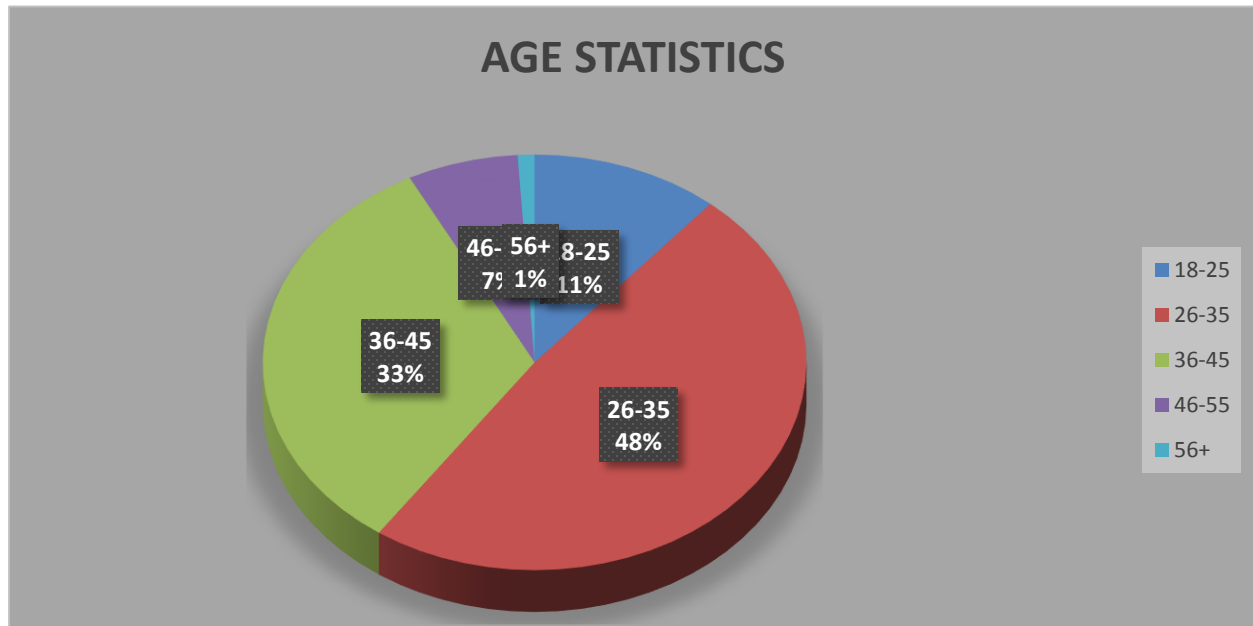
Figure 5.11: Age statistics

As illustrated in the Table 5.3 and Figure 5.1, the respondents' ages are between 18 and over 56 years. The largest number of the respondents are aged between 26 to 35 years.

It can further be observed that 11.2 percent (n=34) are aged between 18 and 25 years, which represent the younger respondents; 32.7 percent (n=99) aged between 36 and 45 years; 6.6 percent (n=20) aged between 46 and 55 years and 1 percent (n=3) are either 56 years or older. These statistics demonstrate that younger people are more willing to participate in this study than older ones. It could also mean than there are younger SCM practitioners, managers and owners of food companies in Gauteng province than older ones.

5.3.3 Race

The racial classification of respondents is presented in Table 5.4.

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Table 5.4: Racial Classification of the Respondents

Racial classification	N	n	%
Black	303	173	57.1
White	303	64	21.1
Indian	303	35	11.6
Mixed race	303	31	10.2

These results are further presented in Figure 5.2.
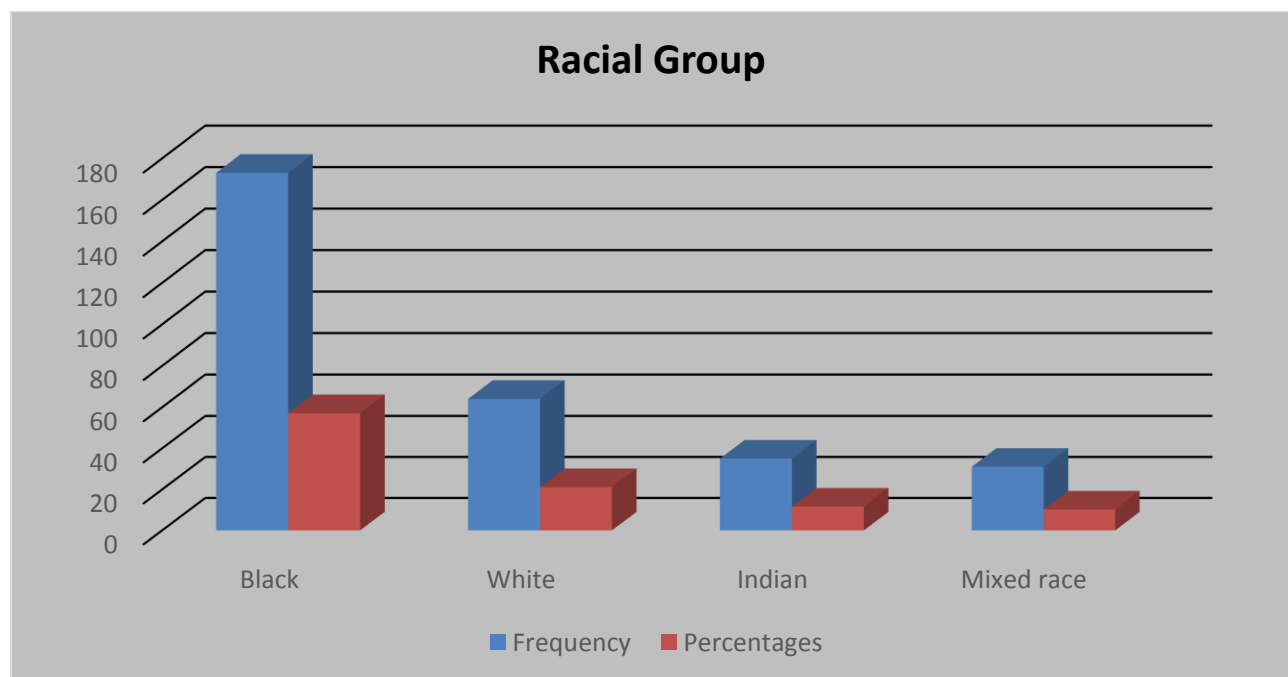
Figure 5.2: Racial Group

According to Table 5.4 and Figure 5.2, the black respondents represent 57.1 percent (n=173) of the respondents while whites represent 21.1 percent (n=64). Indians represent 11.6percent (n=35) and the mixed race represent 10.2 percent (n=31) of the respondents.

These results depict that the different racial groups in South Africa were adequately represented in the study. The dominance of blacks and whites demonstrates that both racial groups are the prevailing race of people in the in the food processing industry in Gauteng province.

5.3.4 Academic qualification

The academic qualifications of the respondents were classified between the certificate level and postgraduate degree. Statistics for the academic qualifications held by respondents are presented in Table 5.5.

Table 5.5: Academic Qualifications of the Respondents

Variables	Qualifications	N	n	%
Academic qualifications of the respondents	Certificate	303	76	25.1
	Diploma	303	100	33.0
	Degree	303	114	37.6
	Postgraduate	303	13	4.3

In terms of qualifications, the data collected reveals that 37.6 percent (n=114) of the respondents were in possession of a degree, followed by respondents in possession of a diploma 33% (n=100). Holders of certificates represented 25.1 percent (n=76) of the respondents, followed holders of postgraduate degrees (4.3%; n=13) who were the smallest number. These statistics show that the levels of education amongst the respondents in the food processing industry is satisfactory.

5.3.5 Employment period

The statistics collected regarding the employment period are presented in Table 5.6.

Table 5.6: Employment Period

Employment period	Frequencies	Percentages
Under 2 years	15	5
2-5 years	110	36.3
6-10 years	116	38.3
10 years +	62	20.4

These statistics are also presented in Figure 5.3.
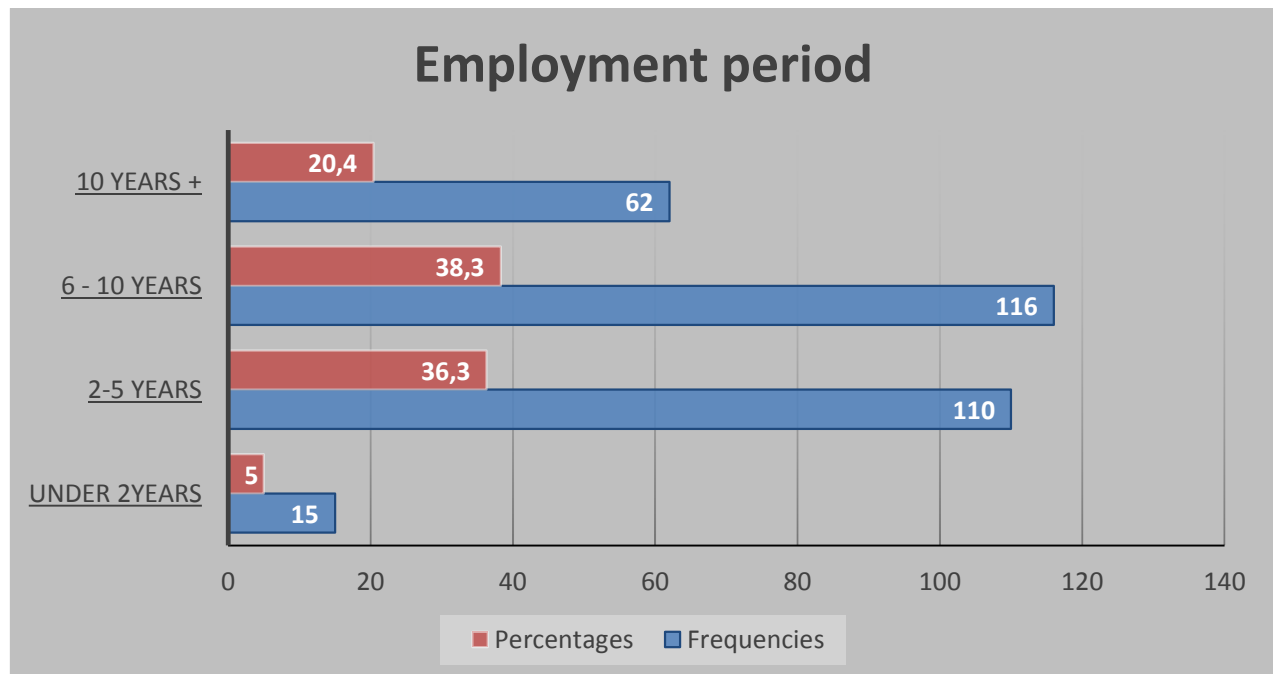
Figure 5.3: Employment Period

With regard to the length of employment, most respondents (38.2%; n=116) had been employed for six to 10 years in the food processing industry. This were closely followed by those employed between two and five years (36.3%; n=110). Five (5) percent (=15) of the respondents had less than two years' work experience. Respondents with over 10 years' work experience represented 20.4 percent (n=62) of the respondents. These statistics mean that people between two and 10 years' work experience were the most willing to participate in this study.

5.3.6 Positions occupied by the respondents

The details of the positions held by the respondents are presented in Table 5.7

Table 5.7: Positions Occupied by Respondents

Positions	Frequencies	Percentages	Positions	Frequencies	Percentages
Quality Controller	16	5.2%	Logistics Manager	25	8.2%
Stock Controller	5	1.7%	Production planner	8	3%
Operation manager	4	1.2%	Export supervisor	7	2.3%
Import controller	1	0.33%	Packaging supervisor	2	0.66%

Positions	Frequencies	Percentages	Positions	Frequencies	Percentages
Product supply manager	1	0.33%	Perishables products supervisor	5	1.7%
Buyer	5	1.7%	Planning manager	14	5%
Supply chain coordinator	18	6%	Fleet manager	28	9.2%
Warehouse supervisor	24	8%	Transport manager	12	4%
Supply chain manager	21	7%	Expeditor	2	0.66%
Supervisor	45	15%	Food technologists	9	3%
Distribution manager	9	3%	Factory manager	4	1.3%
Owner	2	0.66%	Procurement officer	17	5.7%
Logistics clerk	10	3.3%			

The statistics shown in Figure 5.7 show that most of the respondents (15%; n=45) are supervisors in the food processing industry supply chain in Gauteng Province.

Owners, product supply managers, buyers, import controllers and expeditors represent some of the positions occupied by respondents but had very negligible numbers.

5.4 RELIABILITY ANALYSIS

Many researchers attempt to create reliable and valid tests and questionnaires to enhance the accuracy of their assessments and evaluations (Saunders 2013:15). Reliability is one of the fundamental elements in the evaluation of a measurement instrument, the latter of which can be for conventional knowledge, skill or attitude tests or surveys (Field, 2009:25). It should be noted that the reliability of an instrument is closely associated with its validity, since an instrument cannot be valid unless it is reliable (Pallant, 2011:54). However, its reliability does not depend on its validity. To evaluate how reliable the measurement instrument is, the Cronbach's Alpha coefficient was used. The results are presented in Table 5.8.

Table 5.8: Reliability of Measurement Scales

Questionnaire Section	Scale	Number of Items	Reliability (α)
B	HRM	4	0.697
C	Technology	4	0.884
D	Facilities	5	0.788
E	SRM	5	0.763
F	CRM	5	0.811
G	Regulatory factors	3	0.652
H	Logistics and Transportation	4	0.673
I	Business Performance	5	0.770
Overall Scale		35	0.752

The results provided in Table 5.7 above show that Cronbach alpha values for the scale ranged between 0.673 and 0.884. These values were acceptable since they were above the recommended limits. This is because Cronbach's Alpha of most of them are above the required value of 0.6. According to the University of Virginia (nd.), although the standards for what makes a "good" alpha coefficient are entirely arbitrary and depend on theoretical knowledge of the scale in question, many methodologists recommend a minimum Cronbach alpha coefficient between 0.65 and 0.8 (or higher in many cases). Alpha coefficients less than 0.5 are usually unacceptable, especially for scales purporting to be unidimensional. Based on these views, even the human resource, regulatory factors and logistics and transportation scales which had Cronbach alpha values between 0.6 and 0.7 were accepted in this study. Thus, measurement scales used were deemed reliable or internally consistent because they satisfied the recommended parameters.

5.5 PERCEPTIONS OF RESPONDENTS TOWARDS SUPPLY CHAIN MANAGEMENT CHALLENGES AND BUSINESS PERFORMANCE.

This section discusses the perceptions of respondents towards the challenges to SCM and business performance. The analysis of mean scores was used to achieve this. A higher mean score was taken to point out agreement with the question, whereas a lower mean score meant that respondents disagree with the statement.

5.5.1 Mean score analysis for human resources

The results of the mean score analysis for the human resources are reported in Table 5.9

Table 5.9: Mean Scores and Standard Deviations for the Human Resources Scale

Item	Description	N	Mean $\bar{x}$	Std. Deviation SD
B1	Staff in your company are well paid and motivated at work	303	3.95	1.075
B2	Turnover of skilled personnel is low in your company	303	3.54	1.161
B3	There is high utilisation of employee skills and abilities in your company	303	4.03	1.275
B4	Staff in your company are fully trained in supply chain concepts and management	303	3.80	1.096
Overall scale		303	**3.829**	1.152
Likert Scale: 1= strongly disagree; 2=agree; 3=neutral; 4=agree; 5=strongly agree				

An analysis of the Table 5.9 reveals that most of the respondents agreed that human resource factor has an impact on the supply chain management in the food processing industry as shown by the overall mean score ($\bar{x}$=3.829; SD=±1.152). Most of the respondents ($\bar{x}$=3.95; SD=±1.075) agreed that staff in their companies are well paid. Respondents also agreed that turnover in their companies is low ($\bar{x}$=3.54; SD=±1.161) and that there is a high utilisation of employee skills and abilities ($\bar{x}$=4.03; SD=±1.275) in their companies. It was also makes clear that staff members are fully trained in supply chain management ($\bar{x}$=3.80; SD=±1.096). Most respondents agreed with the statements on the human resources scale, which indicates that human resource policies and practices in food companies are satisfactory.

5.5.2 Mean score analysis for technology

The results for the mean score analysis for the technology scale are reported in Table 5.10.

Table 5.10: Mean Scores and Standard Deviations for the Technology Scale

Item	Description	N	Mean $\bar{x}$	Std. Deviation SD
C1	Your company is fast on adopting new technologies	303	3.88	1.207
C2	Your company has managed to integrate technology with suppliers and customers	303	4.01	1.020
C3	Your company conducts regular technology forecasts to understand the trends in the environment	303	3.75	1.257
C4	Your company has recent technology that links it to internal and external stakeholders	303	3.97	1.042
Overall scale		**303**	**3.902**	1.132
Likert Scale: 1= strongly disagree; 2=agree; 3=neutral; 4=agree; 5=strongly agree				

An analysis of the Table 5.10 which focuses on the analysis for the technology scale, shows that most respondents agreed that technological innovations play a crucial role for companies on the food processing industry, shown by the overall mean score ($\bar{x}$=3.902; SD=±1.132) obtained for the scale. Most of the respondents ($\bar{x}$=3.88; SD=±1.207) agreed that their companies were fast to adopt new technologies. They also agreed that their companies successfully integrate new technology trends to their daily activities ($\bar{x}$=4.01; SD=±1.020). Most of the respondents ($\bar{x}$=3.75; SD=±1.257) agreed that there is a constant forecasting of new technologies' trends in their environment. The respondents finally confirmed that their companies are all up to date with new technologies that are successfully linked to internal and external stakeholders ($\bar{x}$=3.97; SD=±1.042). Therefore, most of the respondents agreed with the statements on the technology scale and acknowledge that technology is an important element for success in the food processing industry.

5.5.3 Mean score analysis for facilities

The results for the mean score analysis for the facilities scale are reported in Table 5.11.

Table 5.11: Mean Scores and Standard Deviations for the Facilities Scale

Item	Description	N	Mean $\bar{x}$	Std. Deviation SD
D1	The facilities at your company are managed professionally through tracking resource consumption and conducting on-site audits	303	4.31	1.129
D2	The facilities at your company are adequate for packaging reduction, reuse and recycling of materials	303	3.52	1.588
D3	Your company has a written corporate social responsibility policy or statement of commitments that define the labour, health and safety standards	303	4.54	0.783
D4	Your company has sufficient facility capacity which enables it to deal with customer order fluctuations	303	3.76	1.425
D5	The storage facilities in your company are adequate	303	3.93	1.330
Overall scale		303	**4.013**	1.251
Likert Scale: 1= strongly disagree; 2=agree; 3=neutral; 4=agree; 5=strongly agree				

Table 5.11 indicates that respondents are positive about the influence of facilities on SCM in the food processing industry shown by the overall mean score ($\bar{x}$=4.013; SD=±1.251). The participants ($\bar{x}$=4.31; SD=±1.129) agreed that their companies' facilities are well managed with regular audits and regular tracking. They also agreed that GSCM practices are implemented through waste reduction, re-use and recycling of materials ($\bar{x}$=3.52; SD=±1.588). The majority agreed that there

are effective health and security policies supported by corporate and social statements and labour regulations ($\bar{x}$=4.54; SD=±0.783). Respondents further concurred that their companies have sufficient facilities to meet order fluctuations ($\bar{x}$=3.76; SD=±1.425). They confirmed that their companies' facilities are adequate to conduct their activities ($\bar{x}$=3.93; SD=±1.330). These results make it clear that respondents agreed with the statements on the facilities scale and confirm that they are a crucial element for success in food companies.

5.5.4 Mean score analysis for supplier relationship management

The results for the mean score analysis for the SRM scale are reported in Table 5.12.

Table 5.12: Mean Scores and Standard Deviations for the Supplier Relationship Management Scale

Item	Description	N	Mean $\bar{x}$	Std. Deviation SD
E1	Suppliers to your company charge the right price for their products	303	3.96	0.870
E2	Suppliers to your company have ISO 9001 certification	303	4.39	0.907
E3	Suppliers to your company have the capacity to provide the right quantity of material	303	4.38	0.745
E4	Information flow between your company and its suppliers is very free and effective	303	4.19	0.910
E5	Suppliers to your company are able to deliver materials on time	303	4.10	0.994
Overall scale		303	**4.205**	0.885
Likert Scale: 1= strongly disagree; 2=agree; 3=neutral; 4=agree; 5=strongly agree				

Based on the results observed on the Table 5.12, the respondents agreed that SRM has a great influence on SCM in the food processing industry. The main role here turns on supply, sourcing and procurement or buying, which relies more on how good suppliers perform their role in the

whole chain, shown by the overall mean score ($\bar{x}$=4.205; SD=±0.0885). Most ($\bar{x}$=3.96; SD=±0.870) agreed that their suppliers are fair in terms of pricing. Respondents further agreed that their suppliers comply with the international standard regulations for safety and quality purposes ($\bar{x}$=4.39; SD=±0.907) and that they provide the right quantities of material expected to perform everyday operations ($\bar{x}$=4.38; SD=±0.745) in their companies. It was also made clear that communication channels are well managed between the supplier and the management team ($\bar{x}$=4.19; SD=±0.910). Respondents agreed that their supplier always meets targets with delivery time ($\bar{x}$=4.10; SD=±0.994).

5.5.5 Mean score analysis for customer relationship management

The results for the mean score analysis for the CRM scale are reported in Table 5.13.

Table 5.13: Mean Scores and Standard Deviations for the Customer Relationship Management Scale

Item	Description	N	Mean $\bar{x}$	Std. Deviation SD
F1	There are high levels of trust between your company and its customers	303	4.49	0.784
F2	Information flow between your company and its customers is very free and effective	303	4.34	0.895
F3	Your company is very effective at meeting customer needs	303	4.42	0.857
F4	Your company rapidly accommodates special or non-routine customer requests	303	4.02	1.219
F5	The level of your company's brand reputation among customers is very high	303	4.46	0.867
Overall mean		**303**	**4.345**	**0.964**
Likert Scale: 1= strongly disagree; 2=agree; 3=neutral; 4=agree; 5=strongly agree				

The results show in Table 5.13 that CRM is another important element to consider when analysing SCM, shown by the overall mean score ($\bar{x}$=4.345; SD=±0.964). Respondents confirmed that information flow was effective between their companies and their customers ($\bar{x}$=4.34; SD=±0.895). Respondents also agreed that they can meet the needs of customers ($\bar{x}$=4.42; SD=±0.857), and that most companies can attend to customers' urgent orders ($\bar{x}$=4.02; SD=±1.219). It was also made clear that companies had a good reputation from the customers' point of view ($\bar{x}$=4.46; SD=±0.867). Overall, these responses show that CRM is critical for the success of the company, since customers are the main reason for the existence of company.

5.5.6 Mean score analysis for regulatory factors

The results for the mean score analysis for the regulatory factors scale are reported in Table 5.14.

Table 5.14: Mean Scores and Standard Deviations for the Regulatory Factors Scale

Item	Description	N	Mean $\bar{x}$	Std. Deviation SD
G1	Your company is experiencing uncertainties in meeting government supply chain management policies	303	4.03	1.252
G2	Your company faces challenges in meeting the prescribed health and safety regulations	303	4.08	1.272
G3	Your company has adopted effective environment practices	303	4.26	0.733
Overall scale		303	**4.124**	1.086
Likert Scale: 1= strongly disagree; 2=agree; 3=neutral; 4=agree; 5=strongly agree				

An analysis of the Table 5.14 shows that most of respondents in the food processing industry in Gauteng agree that regulatory factors remain an important element in SCM, acknowledged by the overall mean score ($\bar{x}$=4.124; SD=±1.086). Respondents agreed that they face challenges in meeting SCM regulations set by the government ($\bar{x}$=4.03; SD=±1.252). Respondents also agreed there are great challenges when it comes to health and security regulations ($\bar{x}$=4.08; SD=±1.272). Companies have effective environment security practices ($\bar{x}$=4.26; SD=±0.733). These results

indicate that regulatory factors are perceived to be an important factor in the food processing industry. Thus, companies need to comply with regulations stated by the government to ensure that the products are safe to use and in order not to harm the environment and the end user.

5.5.7 Mean score analysis for logistics and transportation

The results for the mean score analysis for the logistics and transportation scale are reported in Table 5.15.

Table 5.15: Mean Scores and Standard Deviations for the Logistics and Transportation Scale

Item	Description	N	Mean $\bar{x}$	Std. Deviation SD
H1	Your company has a greater responsiveness in meeting the lead time and point of delivery	303	4.50	0.801
H2	Your company has modern and state of the art transportation equipment and machinery	303	4.05	1.265
H3	Your company encounters problems with packaging material while in transit	303	3.98	1.158
H4	The distribution channels used by your company are very effective	303	4.43	0.810
Overall mean		303	**4.241**	1.009
Likert Scale: 1= strongly disagree; 2=agree; 3=neutral; 4=agree; 5=strongly agree				

A close analysis of the Table 5.15 shows that respondents agree that transportation and logistics is an important factor in the food processing industry supply chain, shown by the overall mean score of ($\bar{x}$=4.241; SD=±1.009). Respondents agreed that their companies have a greater responsiveness in meeting the lead time and point of delivery ($\bar{x}$=4.50; SD=±0.801). They also agreed that their companies are well equipped ($\bar{x}$=4.05; SD=±1.265) but encounter problems with packaging while in transit ($\bar{x}$=3.98; SD=±1.158). It was affirmed that the companies' distribution channels are very effective ($\bar{x}$=4.43; SD=±0.810). Logistics and transportation represent a crucial stage in the SCM of all industries. Goods are designed to be transported where the demand exists. Even before the end products are produced, production and manufacturing stages require flow of material raw

products and work in progress items to ensure that the product is well managed during the operational processes. Hence, it is important to maintain an optimum transport and logistics function within the food processing industry.

5.5.8 Mean score analysis for business performance

The results for the mean score analysis for the business performance scale are reported in Table 5.16.

Table 5.16: Mean Scores and Standard Deviations for the Business Performance Scale

Items	Description	N	Mean $\bar{x}$	Std. Deviation SD
BP1	Return on investment	303	3.68	0.889
BP2	Sales growth	303	3.46	0.843
BP3	Profit growth	303	3.41	0.867
BP4	Customer satisfaction	303	3.30	0.989
BP5	Employee satisfaction	303	3.06	1.011
Overall mean		303	**3.384**	0.920
Likert Scale: 1=much worse; 2=worse; 3=neutral; 4=better; 5=much better				

An analysis of the Table 5.16 with regard of the business performance scale reveals that most of the respondents agreed that business performance is an important factor in the food processing industry supply chain, shown by the overall mean score ($\bar{x}$=3.384; SD=±10.920). Most of the respondents agreed that there were improvements in the return on investment in their companies ($\bar{x}$=3.68; SD=±0.889). They also agreed that the level of sales is constantly growing ($\bar{x}$=3.46; SD=±0.843) and that that profit margins were growing ($\bar{x}$=3.41; SD=±0.867) in their companies. They perceive positively customer and employee satisfaction, as supported by the respective following values ($\bar{x}$=3.30; SD=±0.989) and ($\bar{x}$=3.06; SD=±1.011). Therefore, most respondents agreed with the statements on the business performance scale, which indicates its importance of food in the food processing industry.

5.6 CORRELATION ANALYSIS

Correlations are intended to study the degree and direction of association occurring between the variables (Nikolic, Muresan, Feng & Singer 2012:69). It represents the interdependency amongst variables for correlating two phenomena (Pallant, 2011:37). In this study, The Pearson's correlation coefficient, which assesses the degree that quantitative variables, are linearly related in a sample (Maxwell & Moore, 2011:179) and used to determine the association between challenges to SCM and business performance. Pearson's coefficient of correlation represented by "r". The coefficient of correlation "r" measures the degree of linear relationship between two variables such as *x* and *y* (Nikolic *et al* 2012: 65). Pearson's coefficient of correlation are indicated by -r-1≤ r ≥ +1 where the degree of correlation is expressed by a value of coefficient (Holtan, 2010:23). The results are presented in Table 5.17.

Table 5.17: Correlations: Supply Chain Management challenges and Business Performance

Factors	HRM	Tech	Facilities	SRM	CRM	RF	L & T	Bus Performance
HRM	1.000							
Technology	.545**	1.000						
Facilities	.374**	.423**	1.000					
SRM	.404**	.421**	.417**	1.000				
CRM	.512**	.546**	.549**	.601**	1.000			
Regulatory Factors	.453**	.368**	.283**	.388**	.445**	1.000		
Logistics and Transport	.537**	.424**	.389**	.541**	.594**	.491**	1.000	
Bus Performance	-.497	-.572	.-296	-.253	-.564	-.106	-.332	1.000

N=303 ** Correlation is significant at the 0.01 level (2-tailed). *Correl**ation is significant at the 0.01** level (2-tailed) *small *r* .10-.29; ** medium r = .30-.49; *** large r = .50-1.0

Inter-factor correlations show the associations amongst the variables. The idea is to elaborate on how a relationship may occur between the variables chosen for this study *(*Mahdavi, 2012:369).

Positive inter-factor correlations are observed between the seven independent variables. The strongest correlation occurs between SRM and CRM (r = 0.601; p < 0.01) while the weakest correlation is between facilities and regulatory factors (r = 0.283; p < 0.01). This indicates that improvements in one of the independent variables leads to the strengthening of the other variables as well.

5.6.1 Correlation between human resource management and business performance

Table 5.16 reveals that there is a moderate negative correlation relationship between HRM challenges and business performance (r = -0.497; p <0.01) in the food supply chain in South Africa. This result implies that if the HRM related challenges increase in the food supply chain, the business performance of companies in that supply chain will decrease. If HRM challenges decrease, business performance will increase. Similar results were also obtained in a study by Toby, Wall and Stephen (2013:26), which investigated the influence of human resource performance and business performance in companies in England. Their study concluded that although most HRM consultants act in good faith, challenges in HRM systems can negatively affect business performance.

Human resources is a term that defines company practices that deals with the recruitment, empowerment, training and management of its workforce (Wood & Wall, 2005:89). The main focus here is to identify how HRM collectively benefits the company business performance. Companies have progressively recognised the importance for their people to be a source of competitive advantage towards the competitors in their industries. (Pfeffer, 2014:48). Creating competitive advantage through the human resources factor requires cautious attention to the practices that best influence these assets (Guthrie 2011:36). Various authors such as Bartel (2014:32), Cascio (2011:25) and Huselid (2015:8) have demonstrated a significant relationship that occurs between the HRM practices and overall performance of business. These studies demonstrated the value created through human resource and highlighted the fact that competitors can duplicate another company's innovations or adopted technologies but will not be able to copy the company's human resources capabilities. This means that challenges in HRM can be detrimental to the success of the business. Therefore, measures must be taken to ensure that companies in the food supply chain reduce the effects of these on business performance.

5.6.2 Correlation between technology and business performance

Table 5.16 shows that there a strong negative correlation occurred between technology challenges and business performance (r = -0.572; p < 0.01) in the food supply chain in South Africa. As we are dealing with challenges in this study, the results show a strong downhill relationship occurring between the variables, which means that the behaviour of the variables must be a contrast evolution (Tavitiyaman, Zhang & Qu, 2012:140). Contrast evolution in this case implies that if technology related challenges increase, business performance must also decrease. In support, a study by Forsman and Temel (2011:355) concluded that companies must be aware of technological changes within their industry to be effectively involved in the new process, product and service improvements. This enables such companies to subsist in a consistently changing market environment to achieve better business performance.

Technology has been broadly regarded as specific or general to companies and enables them to try new ideas, seize the opportunity, essential during market access, and gain competitive advantage (Mahmoud, 2011:97). New technological developments present new demands to companies, or provide new possibilities for developing or improving market activities as well as products (Deeter-Schmelz, 2012:63). The ability to adopt new technologies has direct consequences on the capability to compete in an industry. The values created by technology management are often manifested in new ways of doing things or in creating new products and processes that contribute to business success (2013:644). A crucial activity to enhance the development of companies is market development through innovation, which has been noted as important in improving and offering their product and service (Hausman, 2011:202). When a company has as a package of resources, skills and capabilities, the effect of technology is to transform its internal capabilities by making it more adaptive, aligned with current or future innovation and ready to exploit new ideas to increase market conditions and increase the company' competitiveness (Bisson, 2010:87). It is therefore important to develop a business environment that supports and promotes technology if success is to be achieved (Schroeder, 2013:9).

5.6.3 Correlation between facilities and business performance

Table 5.16 reveals a small negative correlation (r= -0.296 (p<0.01) between facilities management challenges and business performance in the food supply chain in South Africa. This result implies that as challenges in facilities management increase, there will be a decline in business performance. Conversely, a decline in these challenges will lead to an increase in business

performance. Facilities refer to the physical structures that allow businesses to run smoothly (Horby, 2013:45). In a manufacturing concern, for example, facilities consist of the factory, equipment and warehousing facilities (Gramlich, 2014:23). They are used from the manufacturing stage until the delivery of the final products to the customers and enhance economic growth (Delmon, 2011:89). According to Easterly (2012:56), facilities have been viewed as the basic structures from physical and company that provide support to generate company success and therefore build the economy. Facilities have been considered as one of the crucial linkages between a company and its markets, which has potential to impact on its revenues and overall effectiveness (Price, Stoica & Boncella, 2013:63).

Poor facilities are harmful to the success of a business. According to White, O'Connor and Rowe (2014:39), the absence of suitable infrastructure could lead to extreme resource investments. On the one hand, the lack of state of the art facilities contributes to poor business performance and could hamper the sourcing and supply processes of a company (Kruger, 2011:23). On the other hand, improved facilities and economic development are positively correlated whereas lack of adequate infrastructure or facilities has a negative impact on the economy as a whole (Izquierdo and Vasallo's 2014:12). Research has demonstrated that improvements in national facilities such as roads, electricity service, railroads, telecommunication services, or in water and sewage systems support business operations (Price, Stoica & Boncella, 2011:96). Delmon (2008:90) further states that well-developed facilities reduce the impact of distances, integrate the confined markets as well as link them effectively to markets in other countries and regions. Hence, facilities are crucial as there could be a set of distinctive issues involved that may obviously affect business performance.

5.6.4 Correlation between supplier relationship management and business performance

Table 5.16 shows a small negative correlation occurring between the SRM challenges and business performance (r= 0-.293; p<0.01) in the food supply chain in South Africa. This result means that when challenges related to SRM increase, business performance will decrease. However, business performance is likely to increase when these challenges decrease. According to Herrmann and Hodgson (2011:97), SRM is a process involved in managing preferred suppliers and finding new ones while reducing costs, making procurement predictable and repeatable. It is the discipline of tactically planning and managing all collaborations with the suppliers that provide goods and /or services to a company to increase the significance of those collaborations (Zyl, 2013:89). It entails creating closer, more collaborative relationships with key suppliers to reduce risk and increase performance. This shows that ineffective SRM will result in low business performance levels.

In the background of dynamic global markets, competition and supply chains' fast changing industry practices, companies are now confronting new challenges. Supply chains are becoming increasingly complex and dynamic; distribution channels are expanding with an increasing dependence on outsourced manufacturing and logistics (Smith, 2014:89). The need to improve supplier-buyer relationships has become more apparent in the quest to achieve operational excellence (Izquierdo, *et al.,* 2014:26). Partners (2011:80) stated that the understanding of SRM leads to the development of procurement strategies that reduce costs, make procurement predictable and repeatable, clarify supplier partnership decisions and provide control over suppliers in negotiations. Moiwand and Shahin (2012:68) state that companies cannot just rely on their internal resources and capabilities to achieve performance. They recommend the need for manufacturing companies to develop clear supplier development programmes which allow companies to engage in activities that improve the performance of suppliers and result in better performance. Thus, the management of suppliers represents one of the fundamental pillars for improving competitive performance that leads to attain high business performance.

5.6.5 Correlation between customer relationship management and business performance

Table 5.16 shows that there was a strong negative correlation between CRM challenges and business performance (r=-0.564; p<0.01) in the food supply chain in South Africa. This result implies that when challenges related to CRM increase, there will be a decrease in business performance. On the contrary, when challenges related to CRM decrease, business performance will in increase. The term CRM refers to a company's practices to thoroughly manage its customers to create and increase value across the supply chain (Moinwand, *et al*., 2012:98). It is a comprehensive strategy and process that enable a company to identify, acquire, retain and nurture profitable customers (Sin, 2015:14). CRM is important to companies as it aims to improve their profits through stable relationships with customers and create value for both the company and its customers using appropriate technology, data and customer knowledge (Payne & Frow, 2010:87).

Effective management of customer relationships is one of the most important challenges in business competition. Companies require some information about who are their customers, what their expectations and needs are and how to meet their requirements (Cheng. *et al.,* 2013:69). Understanding how companies can profit from their customer relationships is highly important for both marketing practitioners and academics (Boulding, 2011:9). According to Ata and Toker (2012:78), companies that have adopted customer relationship management as a core strategy are likely to grow at a faster speed than other companies of the same industry who have not adopted

CRM. Payne and Frow (2010:87) stated that effective CRM creates superior value for the company and the customer by incorporating marketing, sales, customer service and its supply-chain processes to achieve greater efficiencies. Zablah (2014:158) highlights that companies that focus on CRM exceed customer expectations and increase the level of customers' satisfaction, leading to customer loyalty, as shown through repeat sales. Shugan (2011:56) posits that CRM indirectly affects business performance by increasing efficiency and cutting costs but does not affect the overall business performance. This makes it important for companies in the food processing industry to focus on improving their CRM programme to realise these benefits.

5.6.6 Correlation between regulatory factors and business performance

Table 5.16 shows that there was a small negative correlation between challenges related to regulatory factors and business performance (r=-.106; p < 0.01) in the food supply chain in South Africa. This result means that if challenges related to regulatory factors increase, business performance decreases. However, business performance is likely to increase whenever there is a decrease in challenges related to regulation. Regulatory factors are defined as laws governing how business should behave (Messier, 1991:377). Examples of these regulatory factors include safety and health regulations, duties, labour laws, environmental policies and trade laws, amongst others (Adeoye, 2012:194). Regulatory factors affecting business are often given a lot of importance. For example, several aspects of government policy can affect business since all companies must comply with the law and trading regulations. Managers must find how to comply with the legislation that can affect their activities. Product legal actions, rules and regulations in the industry should be well controlled and set to allow companies to have good product market performance (Kurtulus, 2014:111).

According to Bell (2014:20), regulatory factors can impact business companies in many ways. It could add a risk factor and lead to a major loss; and companies should be ready to deal with the local and international outcomes of regulatory factors. Increases or decreases in tax could be an example of regulatory factors that impact almost all countries around the world (Moorthy, 2012:222). Some governments can increase taxes for some companies and lower it for others, which will have a direct effect on businesses (Venter, 2013:30). Corruption is a barrier to economic development for many countries since some companies survive and grow by offering bribes to government officials (Viljoen, 2011:9). Thus, there is legislation put in place to combat corruption and companies must comply with them. According to the State of Logistics Survey (2013:83), key external factors such as frequent change in tax policies and bureaucracy will also have a significant

positive affect on the output performance of business performance in South Africa, hence government policies and regulation factors. Accordingly, companies should understand that those factors have the power to change results and can also affect business performance.

5.6.7 Correlation between logistics and transportation and business performance

A moderate negative correlation (r=-0.332; p<0.01) emerged between logistics and transportation challenges and business performance in the food supply chain in South Africa. This result implies that when challenges related to logistics and transportation increase, business performance also increases. However, business performance will increase when such challenges are reduced in the food processing industry. Logistics and transportation are processes that effectively design, implement and control the circulation and storing of goods, services and data from origin to destination to satisfy needs of customers (Holtan and Boolean, 2012:23). Logistics and transportation are major components of supply chain management (Bielecki, 2012:186). The Specialty Council of SCM interprets logistics and transportation as a part of a supply chain dealing with the planning, implementation and control of goods flow and information between production and consumption to meet customer needs (Green, 2011:69). Different modes of transportation such as rail, road, water, air, pipeline, cable and space can be used to transmit the goods from one point to another (Chopra & Meindl 2011:53).

As Melnyk (2009:29) demonstrated, the performance of logistics and transportation processes has an impact on customer service, inventory levels and cost optimisation, leading to better business performance. Managing transportation and logistics has been a critical concern for manufacturers, distributors and third-party logistics industries in their search to achieve a lean, agile and efficient supply chain (Fawcett, Magnan & Ogden, 2011:66). Companies are looking at logistics to improve customer experiences and create differentiation as today's demanding customers require not just fulfilment of requirements, but also expect to receive their products or services when and where they require and at a good price (Holtan *et al*, 2012:36). Morash and Clinton (2013:27) proposed a schema for future supply chain research that included transportation and logistics capabilities as the link between business structure and performance. Logistics and transportation strategies support integration of business processes such as purchasing, manufacturing, selling and logistics throughout the chain to provide optimum value to the ultimate customer/consumer (Cohen & Roussel, 2009:97). Thus, efforts to improve the logistics and transportation function should lead to better business performance in the food processing industry.

The next section discusses the results of the regression analysis.

5.7 REGRESSION ANALYSIS

Regression analysis is a statistical technique to determine the linear relationship between two or more variables. As with correlation, regression is used to analyse the relation between two continuous (scale) variables (Bartel 2014:36). However, regression is better suited for determining prediction or causality based on the idea that correlation does not imply causality (Forsman *et al.,* 2011:356). The 'enter' method of regression analysis was used to ascertain whether any predictive relationships existed among the independent variables and business performance. Table 5.18 presents the regression model summary for challenges to SCM and business performance in the food processing industry in Gauteng province.

Table 5.18: Regression Model: Challenges to Supply Chain Management and Business Performance

Independent Variables:	Dependent Variable: Business Performance			Tol	VIF
SCM Challenges	Beta	T	Sig		
Human Resources	-0.464	-1.680	0.047[*]	0.702	1.641
Technology	-0.569	-2.197	0.014[*]	0.844	1.283
Facilities	-0.260	-2.685	0.003[*]	0.752	1.208
SRM	-0.201	-2.924	0.002[*]	0.722	1.375
CRM	-0.553	-1.711	0.044[*]	0.916	1.164
Regulatory factors	-0.041	-1.032	0.151	0.788	1.424
Logistics and Transport	-0.302	-1.654	0.049[*]	0.841	1.382
R=.568; R squared=.471; Adjusted R squared=.474; Sig. P<0.05; Tol=Tolerance; VIF-Variance inflation factor					

In the regression model (Table 5.18), SCM challenges (adjusted R^2=0.474) explained approximately 47% of the variance (challenges) that impact on the business performance of companies in the food processing industry in Gauteng Province. This means that 53% of the

variances is explained by other challenges that were not considered in this study. Tolerance and the variance inflation factor values were used to determine the effects of multicollinearity in this study.

Multicollinearity refers to a scenario in which two or more of the independent variables are correlated, which leads to inaccurate predictions between the independent and dependent variables. Tolerance values measure the strength of the relationship (influence) between one independent variable and the other independent variables and should be T> 0.5 (O'Brien, 2007:673). VIF is a measure of the impact of collinearity amongst the variables under consideration in a regression model and should ideally be: VIF<10 (O'Brien, 2007:673). In the current study, tolerance and VIF values for all independent variables were within recommended limits and did not indicate any serious multicollinearity threat. The results between each independent variable and business performance are discussed in the next section.

A comparison of the beta scores shows that technology scored the highest beta (β =-0.569). This indicates that technology-related challenges exert the strongest impact on business performance in the food supply chain. Regulatory challenges scored the smallest beta (β =-0.041), making them the least important SCM challenges affecting business performance.

5.7.1 Regression analysis: human resources management and business performance

In the regression analysis, HRM challenges were statistically significant in predicting business performance (β =-0.339; t= -1.680; p=0.047). The negative beta value implies that HRM challenges have the effect of reducing the business performance of companies in the food processing industry. The National Treasury (2010:32) supports these results, stating that since 1998, the South African government has shown great importance on the investment in education, allocating more funding than any other function in the economy with the aim of increasing the competency of the workforce. The lack of measures to improve the skills and knowledge of human resources, such as the level of education, compensation and training, represents major challenges to the development of the South African food processing industry (Kleynhans, 2010:23). In their study focusing on food security in South Africa, Dube, *et al.* (2013:35) observed that one of the worst bottlenecks on progress in South Africa has been the shortage of skilled personnel. They uphold that human resources are crucial for the performance of the food processing industry and

in any other business entity. An educated, informed and skilled human resource base is fundamental to ensure that business performance targets are met.

Therefore, the lack of skills in the food supply chain in South Africa negatively affects the performance level of companies operating in that sector and should be addressed.

5.7.2 Regression analysis: technology and business performance

Analysis of the regression model shows that technology-related challenges were statistically significant in predicting business performance (β =-0.469; t=-2.197; p=0.014). The negative beta implies that the existence of technology related challenges in the food supply chain has the effect of reducing the performance of businesses in that supply chain. These results find support in a study by Fedderke (2007:68) who investigated South African food safety and technology deficiencies. That study found that the South African food processing industry operates in a turbulent market, affected by global competition and fast fluctuating demands and fast innovation and technology changes that are not always easy to adopt due to the lack in the human resource sector. The study further found that competition in the food processing industry is more intense than it used to be and manufacturers must constantly be aware of the introduction of new technologies to remain competitive.

According to Wlokas (2008:19), it is evident that the South African food processing industry must adapt to these fast-changing environments and that innovation needs to boost the adoption of new technologies. However, new technology is becoming increasingly complex and often more expensive to implement, making it difficult for individual businesses to develop and introduce new products. Pamela and Pietro (2011:220) state that food and beverage manufacturers are struggling to prototype, encounter challenges in testing and launching new products that accommodate consumer trends and taste preferences. The fact is that companies should be equipped to adapt to new processes such baking, canning, freezing or packaging while producing healthy products to ensure that business performance generates revenue in the economy (Van der Meulen 2007:33). This can be achieved through the adoption of new technologies.

As mentioned by McCarl and Sands (2007:109), the improvements in the food sector must be a driving force for companies to adopt the new trends into their processes to compete in the market. Customers expect new experiences with the products they buy, which can be in the taste,

packaging, purchasing methods and transportation, services after purchase, thus forcing companies to improve. Lack of technological innovations will lead to impact negatively on business performance and financial success because of poor sales.

5.7.3 Regression analysis: facilities and business performance

Further analysis of the outcomes of regression analysis shows that facilities-related challenges were statistically significant in predicting business performance (β=-0.260; t=-2.685; p=0.003). The negative beta result demonstrates that challenges related to infrastructure exert a negative impact on the business performance of companies in the food supply chain. In support of this result, Naudé (2011:71) found that in most instances, roads, electricity service, railroads, telecommunication services, or water and sewage systems are not well designed to support economic development and enhance the performance of manufacturing supply chains. Simpson and Havenga (2011:98) noted the water shortages and unsatisfactory roads infrastructure that negatively affects the transportation of goods to where the demand exists, which further affects the financial stability of companies. National Treasury (2014:23) also identified vandalism of the rail infrastructure and introduction of E-toll systems as a great concern that adversely affects the pricing of transportation as well. This increases the need to improve facilities in companies and nationally to improve business performance.

5.7.4 Regression analysis: supplier relationship management and business performance

Regression analysis indicates that SRM challenges were statistically significant in predicting business performance (β=-0.201; t=-2.685; p=0.002). The negative beta shows that the existence of challenges in SRM leads to poor business performance. To ensure that a business' supply chain is performing in an effective and efficient way, it is crucial to have a clear and effective relationship with all the parties involved in the supply chain operations (Vasiliauskas & Bazaras 2006:232). Suppliers must have a good understanding of what the company expects and be willing to comply with agreed procedures (Rousseau & Cooke, 2014:34). Companies must always inform their suppliers on changes that may arise and make them aware of all their expectations. Failing to properly manage supplier relationships will lead to increased costs and frustrates the expectations of customers. The food sector is one of the most important customer groups for many suppliers and service providers, which is due to the size of the sector and its impact in the economy (Hugo & Badenhorst-Weiss, 2011:287).

The results of this study are parallel to Monczka, *et al.* (2011:111) who found that in the South African public sector, it is essential to set a stable relationship with suppliers to ensure that all the transactions comply with regulations and policies. The study also observed that corruption and conflict of interest affects business performance. This turned out to be a major SRM challenge since corruption and fraud has gained in terms of practice in almost every sector in South Africa. Kisperska-Moron (2011:132) states that those working in the supply chain need to understand the economic and social power of the overall decisions that they take. Translating budgets and strategic plans into deliverables requires an efficient and transparent SRM system which is well-resourced whose essential importance is easily recognisable.

5.7.5 Regression analysis: customer relationship management and business performance

In the regression analysis, CRM challenges emerged as statistically significant in predicting business performance (β =-0.553; t=-1.711; p=0.044). The negative beta result indicates that the existence of challenges in CRM causes a decline in business performance. Ryals (2015:256) stated that customer relationship management is a comprehensive approach and set of processes that focus on acquiring, retaining and partnering with selective customers to create value for the company and, of course, the customer. Homburg (2007:78) argues that CRM enables the company to obtain relevant information about its customers and therefore use this knowledge to adjust its offerings to meet the needs of its customers in an effective way compare to its competition.

Moiwand and Shahin (2012:98) state that elements of CRM such as the combination of marketing, sales, customer service and the supply-chain activities of the company are important issues in achieving superior efficiencies and effectiveness in delivering customer importance. Reinartz, Krafft and Hoyer (2014:58) stated that in South Africa, CRM improvements are slowly developing even though they are not yet well managed, which leads to decreases in business performance. Companies therefore need to work hand in hand with their customers as they are the ones who buy the products and generate profit.

5.7.6 Regression analysis: regulatory factors and business performance

The analysis of the outcomes of the regression model shows that regulatory challenges were not statistically significant in predicting business performance (β =-0.041; t=-1.032; p=0.151). This result indicates that business performance is not linked to regulatory challenges. The beta is very

small (almost zero), indicating that the impact of regulatory challenges on business performance is almost unimportant. The results showed that companies can still manage to make profit even if they are facing challenges in terms of complying with the regulation settled. Situations like corruptions and bribes also do not facilitate a strict obedience of the rules and regulation that are in place.

5.7.7 Regression analysis: logistics and transport and business performance

The final analysis shows that challenges associated with logistics and transportation are statistically significant in predicting business performance, and complementary analysis of the results shows that the logistics and transport management constraints are statistically important in predicting the behaviour of business performance (β=-0.302; t=-1.654; p=0.049). The negative beta indicates an inverse relationship between the two variables, that the stronger the logistics and transportation challenges, the lesser the business performance. Logistics and transport are key activities that facilitate the acquisition of necessary materials which serve to create the products expected in the market, to move commodities around the manufacturing process and, of course, facilitate the distribution of the final products and ensure after-sales service (Havenga, 2010:47).

A study conducted by Van Eeden and Havenga (2010:255) reveals that the transportation and logistics industries in Africa, and particularly in South Africa, is evolving rapidly, offering many new opportunities, but facing many challenges. In the tenth State of Logistics Survey for South Africa it was advised that the country needs to do more to improve transport logistics infrastructure, reduce the high costs of logistics' operations and address the lack of skilled workers in these industries and in SCM as a whole (De Bod & Havenga, 2010:90). Failure to solve these issues could cause major issues, not only in the logistics field, but in those industries which rely on logistics to perform their everyday business operations.

Rises in fuel costs and traffic congestion are other logistics and transportation problems that South African businesses are facing. Companies that cross the borders via road are also face the prospect of nationwide e-tolls, which affect the cost of living in general (Viljoen, 2011:26). Bogeti and Fedderke (2012:69) found that besides volatile fuel prices and toll costs, the industry in general is facing severe carbon requirements, lack of policies between the government departments and companies and delays at borders. Cross border facilities have not kept up with the rapid increase in fleet operations over the past years. Factors such as the lack of standardisation of documentation

between regional governments and authorities, lack of integrated documentation systems, non-skilled staff and an insufficient number of officials heavily impact on the efficiency of logistics in South Africa. Since these challenges also affect the food processing industry, interventions and improvements are necessary in these areas to increase business performance.

5.8 CONCLUSION

The purpose of this chapter is to analyse the information collected from the respondents using a structured questionnaire and to discuss these outcomes. The analysis of the demographic details of respondents show that all groups of respondents are sufficiently represented in this study. An analysis of the respondents' perceptions show that they are satisfied with their companies business performance as well as the seven SCM areas, namely, HRM, technology, facilities, SRM, CRM, regulatory factors and logistics and transportation. Correlation analysis show that these SCM challenges negatively affect business performance. In the regression analysis, six of the challenges, except regulatory challenges, predict business performance. The results show that all the seven challenges not only affect the supply chain of the food processing industry in South Africa, but also affect the overall South African economy. Companies encountering these challenges must be fully aware of the individual impact of the challenges and act accordingly to ensure that all business activities generate business growth through competitiveness and sustainability. The next chapter provides the conclusions and recommendations.

CHAPTER 6
CONCLUSIONS, RECOMMENDATIONS, LIMITATIONS AND IMPLICATIONS FOR FURTHER RESEARCH

6.1 INTRODUCTION

The purpose of this chapter is present the conclusions, recommendations limitations and implications for further research. It begins by conducting a review of the chapters in the study. Conclusions to both theoretical and empirical objectives are outlined and based on the objectives, and put forward various recommendations for each objective. Thereafter, the limitations are acknowledged, which expose shortcomings of the entire research. The chapter then concludes by outlining the implications for further research.

6.2 REVIEW OF THE STUDY

This study examines the SCM challenges as well as their impact on the business performance in the food processing industry in the Gauteng province. |It is divided into six chapters. The first chapter serves as the introductory chapter, which discusses the background to the study, the problem statement, the research objectives, the research design and ethical considerations. The second chapter discusses literature on the nature and composition of the food processing industry in South Africa and provides clear details about the context and industry in which the study was conducted. Chapter three discusses the literature on SCM and business performance to provide a glimpse of how these constructs are related to previous literature. The fourth chapter discusses the research methodology used in terms of the research paradigm, research design, sampling design, procedures for data collection research ethics and the different approaches selected for the data analysis. Chapter five discusses the analysis of data and the interpretation of the results. Chapter six concludes the study by discussing the conclusions, recommendations, research limitations and implications for further research.

6.3 REALISATION OF THE OBJECTIVES OF THE STUDY

The study intends to achieve both theoretical and empirical objectives. The following theoretical and empirical objectives were set:

- to review literature on the nature and composition of the South African food processing industry;

- to review literature on SCM and business performance;
- to review literature on the challenges associated with SCM;
- to review literature on the effect of SCM challenges on business performance;
- to establish perceptions of supply chain professionals, managers and owners of companies in the food processing industry in Gauteng Province regarding SCM challenges faced by their companies; and
- to analyse the effect of SCM challenges on business performance in the food processing industry in Gauteng Province.

The **first theoretical objective** is realised in Chapter two, which discusses the history of the South African food processing industry, the challenges faced in this industry from the industrial side to the household sector, the value added by this industry on the economy as well as the achievements accomplished in this industry.

The **second, third and fourth theoretical objectives** are realised in Chapter three, where previous literature on SCM and business performance is discussed. Definitions of SCM, recent developments in SCM in various industries, different theories of SCM, challenges linked with SCM and the concept of business performance are discussed in detail.

The **first empirical objective** is realised in Chapter five, Section 5.5. In this section, mean scores for items used for each of the seven dimensions of SCM challenges are analysed. The values of the mean scores represents the perceptions of respondents towards each of the challenges, which are based on the Likert scale.

The second empirical objective was realised in Chapter 5, Section 5.6 and 5.7, in which Pearson correlations and regression analysis are used to determine the effect of SCM challenges on business performance.

6.4 CONCLUSIONS BASED ON THE THEORETICAL OBJECTIVES

This part of the chapter discusses the conclusions based on the theoretical objectives of the study which are:

6.4.1 Conclusions on the literature review on the nature and composition of food processing industry

The first theoretical objective focuses on a literature review on the nature and composition of the food processing industry in South Africa, conducted in Chapter two of the study. It acknowledges that the food processing industry is a very vast sector in the South African economy with an estimated minimum of 4153 registered companies in the food and beverage industry. This industry is in constant development, which considers the diverse tastes and food preferences of the population. New concepts like green or low fat products are being introduced to suit those who are conscious about what they eat or drink. The food processing industry is characterised by constant changes in customer demands, leading to the fast adoption of new technology to remain competitive and to meet the expectations of customers.

6.4.2 Conclusions on the literature review on supply chain and business performance

The second theoretical objective focuses on reviewing literature on SCM and business performance, which is discussed in Chapter three. In this chapter, details on the importance of SCM are given, including the flow of all essential elements crucial in ensuring that companies meet their targets. It also points out that effective SCM practices lead to maximisation of the total value of the company through better use and distribution of resources across the entire company to boost the entire business performance. The chapter also discusses various supply chain theories such as JIT, TOC, TQM, lean manufacturing and GSCM. The challenges faced by the SCM are also identified and discussed, namely, human resources, technology, facilities management, SRM, CRM, regulatory factors and logistics and transport. It is therefore concluded that a proper SCM is essential in facilitating the well-being of any company and exert an impact on business performance.

6.4.3 Conclusions on the literature review literature on the challenges associated with supply chain management

The third theoretical objective focuses on conducting a literature review on the challenges associated with SCM. This is achieved in the second part of Chapter three. The reviewed literature clarifies the nature of all the challenges that may directly affect SCM and therefore impact on business performance levels in any company. Challenges such as fraud, corruption, bids' controversies, conflict of interest and poor infrastructure are emphasised as major problems encountered by the food processing industry supply chain. In most cases, these challenges have a

negative impact on business performance. Consequently, based on the literature review, it is concluded that these challenges must be closely monitored to ensure that business performance is optimised.

6.4.4 Conclusion on literature review on the impact of supply chain management challenges on business performance

The fourth theoretical objective focuses on conducting a literature review on the impact of the supply chain challenges on business performance, which is also achieved in the last part of chapter three. The literature reinforces the impact that SCM challenges have on business performance. It reveals that management in companies should closely analyse all challenges that may affect their operations and set processes that reduce or completely eradicate them from the supply chain. It is important, therefore, to understand SCM challenges to understand their origin and how they can be avoided.

6.5 CONCLUSIONS BASED ON EMPIRICAL OBJECTIVES

This section discusses conclusions drawn from the empirical objectives.

6.5.1 Conclusions on the perceptions of supply chain management professionals, managers and owners of companies in the food processing industry in Gauteng Province regarding SCM challenges faced by their companies

The first empirical objective focuses on the perceptions of SCM professionals, managers and owners of companies in the food processing industry in Gauteng Province regarding SCM challenges faced by their companies. Analyses of mean scores show favourable and positive responses towards the seven dimensions of SCM challenges, namely, HRM, technology, facilities, SRM, CRM, regulatory factors and logistics and transport. This leads to the conclusion that these seven dimensions are being optimised in the food processing industry in Gauteng province.

6.5.2 Conclusions regarding the effect of supply chain management challenges on business performance in the food processing industry in Gauteng Province

The second empirical objective focuses on investigating the effect of SCM **c**hallenges on business performance in the food processing industry in Gauteng Province. Pearson correlations and regression analyses are applied to realise this objective. Pearson correlations show that all seven SCM challenges, namely, HRM, technology, facilities, SRM, CRM, regulatory factors and logistics and transport are negatively correlated with business performance. In the regression

analyses, all these challenges, with the exception of regulatory challenges, negatively predict business performance. Technology-related challenges emerge as the strongest challenge influencing business performance. It is therefore concluded that SCM challenges negatively influence the business performance of companies in the food processing industry.

6.6 RECOMMENDATIONS

The results of the study are critical for companies that aim to succeed in the food processing industry. This section suggests various recommendations identified to address the effects of various SCM related challenges.

6.6.1 Recommendations regarding human resources management

The following recommendations are proposed to reduce the effects of HRM challenges on business performance:

- Training of SCM professionals to increase their knowledge, skills and overall competency within the food supply chain.
- Recruitment and development of capable managers that are competent and equipped with, among other things, leadership, awareness and appreciation of diversity and change in management skills.
- Adopt a reliable human resource planning system to improve the effectiveness of the development HRM function in the food processing industry system that is decentralised and has a good training facility facilitating the networking of competent trainers.

6.6.2 Recommendations regarding technology

The following recommendations are proposed to reduce the effects of technology-related challenges on business performance:

- Faster-adoption of disruptive technologies to remain competitive.
- Regular maintenance of key equipment and technologies.
- Integration of the fruits of technology into all business operations to maximise productivity level.
- Development training sessions to update technological competency of employees and train them on new technology trends.

- Incorporation of technological processes in formulating and implementing business strategies.

6.6.3 Recommendations regarding facilities

The following recommendations are proposed to reduce the effects of facility-related challenges on business performance:

- Adoption of the International Company for Standardisation (ISO) standards to ensure occupational safety during manufacturing processes. This must be compulsory to all companies operating in the food processing industry to maximise health and safety of the users as well as manufacturers.

- Government inspectors must ensure that all the facilities related to consumables are legitimate and that all raw materials are user-friendly due to the development of food-related diseases.

- Companies must define their facilities according to the type of products they manufacture. In the food processing industry, where work is in progress in some of the raw materials and finished products are perishable, cold supply chains and other appropriate food storage facilities are necessary.

- Adoption of sustainability or GSCM practices by companies in the food processing industry.

- Optimisation of storage facilities (warehousing) procedures to store, move and ship products more effectively.

6.6.4 Recommendations regarding Supplier Relationship Management

The following recommendations are proposed to reduce the effects of SRM-related challenges on business performance:

- Companies must be close as much as possible to their suppliers and have a closer look at how their suppliers conduct business.

- Regular meetings and even training sessions should be organised to discuss how buyer-supplier interactions can be improved and how changes can be handled.

- Companies must ensure that their suppliers are qualified (in term of standards such as ISO) to deliver certain products and that the packaging is well managed to avoid pollution.

- Companies should have Regular contact with their supplier to avoid late delivery of raw materials and to be inform if new products are required.
- Companies should launch supplier development programmes to assist strategic but underperforming suppliers.

6.6.5 Recommendations regarding Customer Relationship Management

The following recommendations are proposed to reduce the effects of CRM-related challenges on business performance:

- Companies should capture demographic data, such as gender, age, income and education and connect with purchasing information to categorise customers into profitability segments.

- Regular and consistent communication (for example, through social media, marketing campaigns, company websites, technical support call centers) with customers to know what they want and how to adapt the products to their needs.

- Companies must ensure that the speed of delivery is satisfactory and efficient

- Companies should providing after-sales service to assist less knowledgeable customers on how to use the products and how to behave if failure may occur.

- Companies should conducting customer satisfaction surveys and implement recommendations.

6.6.6 Recommendations regarding regulatory factors

The following recommendations are proposed to reduce the effects of regulatory challenges on business performance:

- Compliance with government legislation and policies regarding issues such as taxes, food safety standards, labour laws, environmental laws, company ownership, amongst others.

- Cooperation with government inspectors.

- Cooperation with industry professional bodies.

- Development and implementation of code of ethics to ensure that employees comply with regulation and policies.

- Training of managers and employees on legislation and policies.

6.6.7 Recommendations regarding logistics and transportation

The following recommendations are proposed to reduce the effects of logistics and transport-related challenges on business performance:

- Training of SCM professionals.

- Adoption of recent logistics and transportation technologies.

- Implementation of proper demand planning procedures.

- Consideration of the outsourcing of transportation to expert companies where this is regarded as a non-core function.

- Development of innovative packaging and shipping solutions for optimum size and weight.

- Proper load and delivery route planning.

- Implementation of effective security systems to prevent pilferage of goods in transit.

6.7 LIMITATIONS OF THE STUDY

The current study provides several useful insights on the SCM challenges and their linkage to business performance. However, there are some limitations that should be highlighted so that they can be addressed in future. The results of the study are restricted to a small sample size of 303 respondents who were based in Gauteng Province only. Also, the questionnaire was self-administered, which meant that respondents completed the questionnaire in the absence of the researcher. It is possible, therefore, that some of the respondents may not have provided truthful responses, which could have adversely affected the accuracy of the results. The measurement scales used were adapted from other studies that were not originally intended for the food processing industry. The use of the convenience sampling method could also have affected the study through sampling bias.

6.8 IMPLICATIONS FOR FURTHER RESEARCH

The study has several implications for future research. First, a similar study could be conducted in a different location or region in South Africa since the views of respondents differ in with context. It can also be replicated in other industry segments apart from the food processing industry. The portion that elicits perceptions of respondents could be conducted using qualitative research, which yields better results when investigating perceptions.

Future studies could employ exploratory factor analysis to identify the SCM challenges instead of relying on literature for this purpose. More robust statistical approaches such as structural equation modelling could also be used in future studies since the study is multifactorial in nature, involving numerous independent variables.

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APPENDIX 1

QUESTIONNAIRE COVER LETTER

Dear participant,

I am a postgraduate student at the Vaal University of Technology studying towards an MTECH degree in Logistics management. The title of my research project is: **SUPPLY CHAIN MANAGEMENT CHALLENGES AND BUSINESS PERFORMANCE IN THE FOOD PROCESSING INDUSTRY IN GAUTENG PROVINCE.**

You are invited to participate in this research study by completing the attached survey questionnaire. This questionnaire consists of nine sections. Before you complete the enclosed questionnaire, I wish to confirm that:

➤ Your employer has given me permission for this research to be carried out.

➤ Your participation in this study is voluntary and you are free to withdraw at any time.

➤ Your anonymity will be maintained and no comments will be ascribed to you by name in any written document or verbal presentation. Nor will any data be used from the questionnaire that might identify you to a third party. Please do not write your name anywhere on the questionnaire.

➤ On completion of the research a copy of the completed research report will be made available to you upon request.

➤ Completion of the questionnaire will take approximately 15 minutes.

If you have any query concerning the nature of this research or should you have any question/s please feel free to contact me at cathynguegan@yahoo.fr or 0787053592.

Your response and time is greatly appreciated. Thank you!

Yours sincerely,

_____

Mrs. Catherine Nguegan

APPENDIX 2: SURVEY QUESTIONNAIRE

SECTION A: DEMOGRAPHIC INFORMATION

In this section, we would like to find out a little more about yourself and the profile of your company. Please place a cross (x) in the appropriate block.

A1	**Your gender**	Male	Female

A2	**Your age group**	18-25 years	26-33 years	34-41 years	42-49 years	50 years and over

A3	**Highest Qualifications**	Matric	Diploma	Degree/honours	Masters	Other (Specify)..

A4	**Ethnicity**				
	African	White	Indian/Asian	Coloured	Other (Specify)...

A5	**Work experience**	Less than 1 year	Between 1 to 5 years	Between 5 to 10 years	Between 10 to 15 years	15 years and over

A6	**Position held in the company**	

SECTION B: HUMAN RESOURCES

We would like to find out a little more about your perceptions of human resources management practices in your company. Please indicate whether you agree with the statements by encircling the corresponding number between 1 and 5. A value of 3 points towards a moderate acceptance of the statement.

B1	Turnover of skilled personnel is low in your company	Strongly disagree	1	2	3	4	5	Strongly agree
B2	There is a high utilisation of employee skills and abilities in your company	Strongly disagree	1	2	3	4	5	Strongly agree
B3	Staff in your company are fully trained in supply chain concepts and management	Strongly disagree	1	2	3	4	5	Strongly agree
B4	Your company faces labour relations challenges such as industrial action, lock-outs and high absenteeism	Strongly disagree	1	2	3	4	5	Strongly agree

SECTION C: TECHNOLOGY

We would like to find out a little more about your perceptions of technology in your company. Please indicate whether you agree with the statements by encircling the corresponding number between 1 and 5. A value of 3 points towards a moderate acceptance of the statement.

C1	Your company is fast in adopting new technologies	Strongly disagree	1	2	3	4	5	Strongly agree
C2	Your company has managed to integrate technology with suppliers and customers	Strongly disagree	1	2	3	4	5	Strongly agree
C3	Your company conducts regular technology forecasts to understand the trends in the environment	Strongly disagree	1	2	3	4	5	Strongly agree
C4	Your company has recent technology that links it to internal and external stakeholders	Strongly disagree	1	2	3	4	5	Strongly agree

SECTION D: FACILITIES

We would like to find out a little more about your perceptions of facilities management in your company. Please indicate whether you agree with the statements by encircling the corresponding number between 1 and 5. A value of 3 point towards a moderate acceptance of the statement.

D1	The facilities at your company are managed professionally through tracking resource consumption and conducting on-site audits	Strongly disagree	1	2	3	4	5	Strongly agree
D2	The facilities at your company are adequate for packaging reduction, reuse and recycling of materials	Strongly disagree	1	2	3	4	5	Strongly agree
D3	Your company has a written corporate social responsibility policy or statement of commitments that defines the labour, health and safety standards	Strongly disagree	1	2	3	4	5	Strongly agree
D4	Your company has sufficient facility capacity which enables it to deal with customer order fluctuations	Strongly disagree	1	2	3	4	5	Strongly agree
D5	The storage facilities at your company are adequate	Strongly disagree	1	2	3	4	5	Strongly agree

SECTION E: SUPPLIER RELATIONSHIP MANAGEMENT

We would like to find out a little more about your perceptions regarding supplier relationship management in your company. Please indicate whether you agree with the statements by encircling the corresponding number between 1 and 5. A value of 3 points towards a moderate acceptance of the statement.

E1	Suppliers to your company charge the right price for their products	Strongly disagree	1	2	3	4	5	Strongly agree
E2	Suppliers to your company have ISO 9001 certification	Strongly disagree	1	2	3	4	5	Strongly agree

E3	Suppliers to your company have the capacity to provide the right quantity of materials	Strongly disagree	1	2	3	4	5	Strongly agree
E4	Information flow between your company and its suppliers is free and effective	Strongly disagree	1	2	3	4	5	Strongly agree
E5	Suppliers to your company are able to deliver materials on time	Strongly disagree	1	2	3	4	5	Strongly agree

SECTION F: CUSTOMER RELATIONSHIP MANAGEMENT

We would like to find out a little more about your perceptions regarding customer relationship management in your company. Please indicate whether you agree with the statements by encircling the corresponding number between 1 and 5. A value of 3 points towards a moderate acceptance of the statement.

F1	There are high levels of trust between your company and its customers	Strongly disagree	1	2	3	4	5	Strongly agree
F2	Information flow between your company and its customers is very free and effective	Strongly disagree	1	2	3	4	5	Strongly agree
F3	Your company is very effective at meeting customer needs	Strongly disagree	1	2	3	4	5	Strongly agree
F4	Your company rapidly accommodates special or non-routine customer requests	Strongly disagree	1	2	3	4	5	Strongly agree
F5	The level of your company's brand reputation among customers is very high	Strongly disagree	1	2	3	4	5	Strongly agree

SECTION G: REGULATORY FACTORS

We would like to find out a little more about your perceptions regarding regulatory factors in your company. Please indicate whether you agree with the statements by encircling the corresponding number between 1 and 5. A value of 3 points towards a moderate acceptance of the statement.

G1	Your company is experiencing uncertainties in meeting government supply chain management policies	Strongly disagree	1	2	3	4	5	Strongly agree
G2	Your company faces challenges in meeting the prescribed health and safety regulations	Strongly disagree	1	2	3	4	5	Strongly agree
G3	Your company has adopted effective environment practices	Strongly disagree						Strongly agree

SECTION H: LOGISTICS AND TRANSPORTATION

We would like to find out a little more about your perceptions regarding logistics and transportation in your company. Please indicate whether you agree with the statements by encircling the corresponding number between 1 and 5. A value of 3, point towards moderate acceptance of the statement.

H1	Your company has a greater responsiveness in meeting the lead time and point of delivery	Strongly disagree	1	2	3	4	5	Strongly agree
H2	Your company has modern and state of the art transportation equipment and machinery	Strongly disagree	1	2	3	4	5	Strongly agree
H3	Your company encounters problems with packaging material while in transit	Strongly disagree	1	2	3	4	5	Strongly agree
H4	The distribution channels used by your company are very effective	Strongly disagree	1	2	3	4	5	Strongly agree

SECTION I: BUSINESS PERFORMANCE

We would like to find out a little more about your perceptions regarding the business performance of your company. Please indicate whether you agree with the statements by encircling the corresponding number between 1 and 5. A value of 3 points towards a moderate acceptance of the statement.

BPE1	Return on investment	Much worse	1	2	3	4	5	Much better
BPE2	Sales growth	Much worse	1	2	3	4	5	Much better
BPE3	Profit growth	Much worse	1	2	3	4	5	Much better
BPE4	Customer satisfaction	Much worse	1	2	3	4	5	Much better
BPE5	Employee satisfaction	Much worse	1	2	3	4	5	Much better

Thank you for taking time to complete this. Your views are much appreciated

APPENDIX 3

DECLARATION FOR LANGUAGE EDITING

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Cape Town 8001

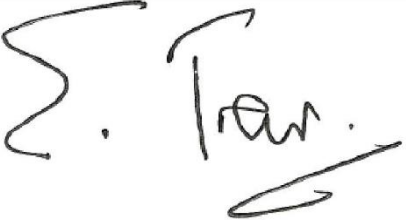Faculty of Management Sciences

Vaal University of Technology

Vanderbijlpark.

16 February 2017.

LANGUAGE EDITING

This is to certify that I language- and technically edited the dissertation "Supply chain management challenges and business performance in the food processing industry in Gauteng Province" by Catherine Nguegan, for her M Tech degree in the Faculty of Management Sciences.

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