GREEN SUPPLY CHAIN PRACTICES AND SUPPLY CHAIN PERFORMANCE IN THE BEVERAGE INDUSTRY OF SOUTH AFRICA

by

Michael Kgaisi Mahlatsi

Student number: 211042986

Dissertation submitted in fulfilment of the requirements for the degree

MAGISTER TECHNOLOGIAE

in the discipline of

LOGISTICS MANAGEMENT

in the

FACULTY OF MANAGEMENT SCIENCES

at the

VAAL UNIVERSITY OF TECHNOLOGY

Supervisor: Dr Elizabeth Chinomona

Co-Supervisor: Dr Osayuwamen Omoruyi

April 2020

DECLARATION

This work has not previously been accepted in substance for any degree and is not being concurrently submitted in candidature for any degree.

Signed……

Date……

STATEMENT 1

This dissertation is being submitted in partial fulfilment of the requirements for the degree of Magister Technologiae: Logistics

Signed……

Date……

STATEMENT 2

This dissertation is the result of my own independent work/investigation, except where otherwise stated. Other sources are acknowledged by giving explicit references. A list of references is appended.

Signed……

Date……

STATEMENT 3

I hereby give consent for my dissertation, if accepted, to be available for photocopying and for interlibrary loan, and for the title and summary to be made available to outside organisations.

Signed……..

Date…….

ACKNOWLEDGEMENTS

I would like to extend my sincere thanks and appreciation to the following people:

- Firstly, I would like to give praise and glory to God almighty.
- Special thanks to my mom Letia Mahlatsi, my dad Johaness Mahlatsi, my brothers Solomon and Vincent Mahlatsi for their support.
- My supervisor and co-supervisor, Dr Elizabeth Chinomona and Dr Osayuwamen Omoruyi, thank you for your ever constant guidance, commitment, wisdom and motivation. I would also like to thank my Logistics Head of Department (HOD), Professor Mafini for his enduring love and concern.
- Thanks to Katleho Mofokeng, Tafadwa Chivhungwa and Lerato Letsaba for your assistance in this study.

ABSTRACT

In South Africa, the beverage industry is perceived to be a major contributor to the economy. Internal and external stakeholders in this industry are engaged in environmental collaboration with each other to achieve better environmental and supply chain performance. The aim of this study was to investigate the influence of green supply chain management practices on environmental performance and supply chain performance in the beverage industry of South Africa. It considers four of these practices, namely, internal environment management, investment recovery, eco-design and green purchasing. A quantitative approach was adopted, with the use of a survey questionnaire to collect information from 373 supply chain management professionals from beverage companies in South Africa. The study used a probability simple random sampling method. The data gathered was analysed using the Statistical Package for the Social Sciences (SPSS) version 25.0 and Analysis of a Moment Structures (AMOS) version 25.0. A Confirmatory Factor Analysis (CFA) was used to validate the measurement scales while Structural Equation Modelling (SEM) was applied to test the relations between constructs. The results revealed that internal environment management, investment recovery, eco-design and green purchasing positively and significantly influence environmental performance. Moreover, the results also revealed that environmental performance exerted a strong, significant and positive influence on supply chain performance. Recommendations and implications for further research were made based on these results. The study presents supply chain management professionals, internal and external stakeholders within the beverage industry with useful insights on key factors that ought to be addressed in order to improve their organisational strategies. Therefore, the study is essential to internal and external stakeholders in the beverage industry who wish to improve environmental and supply chain performance.

Key words: internal environment management, investment recovery, eco-design, green purchasing, environmental performance, supply chain performance.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATIONS

ABBREVIATIONS	FULL ANNOTATION
AGFI	Augmented Goodness of Fit Index
AMOS	Analysis of Moment structures
AVE	Average Variance Extracted
CFA	Confirmatory Factor Analysis
CFI	Comparative Fit Index
CR	Composite Reliability
ED	Eco-Design
EP	Environment Performance
GDP	Gross domestic product
GFI	Goodness of Fit Index
GP	Green purchasing
GSCMP	Green supply chain management practices
IEM	Internal Environment Management
IFI	Increment Fit Index
IR	Investment Recovery
NFI	Normed Fit Index
RMSEA	Root Mean Square of Error Approximation
SCP	Supply Chain Performance
SEM	Structural Equation Modelling
SPSS	Statistical Package for Social Scientists
TLI	Tucker-Lewis Index

CHAPTER 1
BACKGROUND AND OVERVIEW OF THE STUDY

1.1 INTRODUCTION

In a developing country such as South Africa, the beverage industry plays a major role in expanding the economy. The South African beverage industry offers non-alcoholic and alcoholic beverages which are made available in the domestic and export market (Flanders 2015:13). Du Preez, Terblanche-Smit and Van Der Spuy (2014:1518) mention that alcoholic beverage products are categorised as spirits, beer, wine and ciders. On the other hand, non-alcoholic beverages consist of products such as carbonated drinks, energy drinks, iced tea and functional drinks (Flanders 2015:13). According to Econometrix (2013:1), the beverage industry contributes to job creation, taxation and the domestic output, which is the gross domestic product (GDP). The beverage industry in South Africa promotes entrepreneurship by working with well-established local suppliers that offer plants used to manufacture beverages and thus contributes to the economic development (Van Wyk 2011:854). Furthermore, beverage companies use local advertising campaigns to create awareness and increase their product availability by distributing products to informal and formal stores (Chola, Hofman, Labadarios, Manyema, Tugendhaft & Veerman 2015:2298).

According to Econex (2014:3), the South African government has imposed price regulations and taxation on beverage companies resulting in cost increase of manufactured products. On the other hand, Distell (2016:48) mentions that carbon tax and ISO 14001 standards are to be implemented to all South African beverage manufacturing facilities. The carbon tax will be determined based on the carbon emissions and waste disposal by the beverage companies. The major challenge the beverage industry in South Africa faces is climate change that results in water shortage, causing some delays within the supply chain. In addition, water shortage presents a significant risk to suppliers of raw materials to beverage companies and the supply chain since growing plants require a lot of water (Water Futures 2011:11). Water supply and usage efficiency is regulated by the South African Water Act, which ensures that water is firstly allocated for domestic consumption before industrial use (Fakoya 2014:253).

Green supply chain management practices were used to address the challenges within the South African beverage industry. According to Chen, Lee, Tsai and Wang (2013:263), green supply chain management has emerged as a vital organisational practice to achieve the company's revenue and market share objectives by reducing environmental risks and impacts, while

improving environmental efficiency of the organisation. Importantly, green supply chain management aims to restrain waste within the manufacturing of products to save water and prevent the discharge of destructive material into the environment (Bhardwaj, Chandna & Sharma 2016:1194). The green supply chain management practices have helped beverage companies to decrease water consumption and reuse water in their supply chain. Furthermore, the sustainability of environmental impact for the beverage companies in South Africa depends on the green supply chain management practices, which include internal environmental management, investment recovery, eco-design and green purchasing (Chen *et al.* 2013:264). Moreover, the use of green supply chain management practices will lead to environmental performance improvements (Kersten & Saeed 2019:1).

1.2 PROBLEM STATEMENT

Due to water scarcity in South Africa, the beverage industry supply chain has been affected by supply disruptions of water (World Wildlife Fund South Africa 2012:46). Water supply is not only an important component of alcoholic and non-alcoholic beverages, but it is also required for the development of crops required for the manufacturing process. Water Futures (2011:11) mention that water shortage presents a risk to suppliers of raw materials to beverage companies and the supply chain since growing plants requires a lot of water. Regulations by the South African government have shown several impacts on the beverage industry. One of the regulations is implementing carbon tax on all South African beverage manufacturing facilities based on their carbon dioxide emissions (Distell 2016:48). On the other hand, the imposed taxation on sugar sweetened beverages will result in reduction in beverage consumption, also affecting the sales of products (National Treasury 2016:10). There has been high competition in terms of large bottling companies merging with beverage companies leading to slow growth on independent, small beverage companies causing their product availability to be low on coolers and refrigerators in retail outlets (Holmes 2016:1). The South African economy has been performing poorly, thus putting a constraint on manufacturing companies and other enterprises across the country. The poor performance by the South African economy leads to inflation, export decline and price increase on products which affected the beverage industry (National Treasury 2016:20).

There have been several studies conducted within the beverage industry in South Africa. These include studies by Arizon (2010:10); Econex (2014:4) and Fakoya (2014:240); however, none of them directed attention to green supply chain management. There are several studies in the mining and construction industry in South Africa on green supply chain management practices

and some of those studies were conducted by Akinlabi, Mbohwa and Ojo (2013:6); Bvuma (2013:20) and Mhelembe and Pooe (2014:1), but few studies were conducted in the beverage industry. Moreover, previous studies have not considered the relationship between green supply chain management practices and environmental performance and supply chain performance as the outcome variable (Mapfaira, Monageng & Mutingi 2014:2). For this purpose, the study is intended to address the above research gap.

1.3 THEORETICAL FRAMEWORK AND LITERATURE REVIEW

For the purpose of this study, a literature review on the beverage industry was undertaken. This industry comprises alcoholic and non-alcoholic beverages. According to Econex and Quantec Research (2010:8), the alcoholic beverage companies manufacture liquor and have bottling plants, while the non-alcoholic beverage companies manufacture different kinds of soft drinks in their plants across South Africa. These manufacturing companies have been engaged in environmental awareness. The use of green supply chain management was essential for the beverage industry.

1.3.1 Institutional theory

To obtain suitable contextual understanding of this study, institutional theory was used. The institutional theory refers to how companies become comparable in wide ranging institutional environments due to the external sources of the company (Chen, Boudreau, Karahanna & Watson 2011:7). The institutional theory explains how a company adopts environmental management practices to address the environmental issues (Goktan 2014:99). According to Laosirihongthong and Somsuk (2016:178), institutional theory helps understand the external forces that pursue companies to adopt organisational practices and gain competitive advantage and sustainable development. The external forces that pursue companies to adopt organisational practices, according to institutional theory, include society, government and the public that impose pressure on the companies to justify their organisational strategic practices (Higgins & Yarahmadi 2012:403). Donghyun, Jin, Sang and Yonghwi (2013:1755) mention that the institutional theory is an important research framework for the study of green supply chain management practices. In addition, the institutional theory has been used by companies to address green issues and to clarify environmental-related practices such as green supply chain management (Lai, Sarkis & Zhu 2010:7). In this study, the institutional theory was adapted as it was linked to green supply chain management practices.

1.3.2 Green supply chain management practices

The concept of green supply chain management practices has a variety of activities which it performs to minimise the impacts on a natural environment supply chain (Abu-Rumman, Al-Bourini & Diab 2015:150). Green supply chain management integrates environmental concerns and issues into supply chain management to improve environmental impact of the activities of the supply chain while maintaining environmental and supply chain performance (Agi & Nishant 2016:352). In addition, Azevedo, Carvalho and Machado (2011:855) indicate that green supply chain management practices are aimed at the company, for it to be involved in environmentally green purchasing practices while reducing and eliminating product environmental impact. The integration of environmental into supply chain management includes the design of the product, supplier selection, manufacturing processes, packaging, delivery of the product and product recycle and reuse (Sundarakani, Vel & Younis 2015:217).

1.3.3 Internal environment management

Internal environmental management refers to a practice of developing green supply chain management as a planned managerial imperative through support and commitment from both strategic and tactical management levels (Bhadauria, Green, Meacham & Zelbst 2012:293). According to Carvalho, Esposto, Ignacio and Ometto (2016:124), internal environmental management consists of activities intended at improving the internal environmental support and commitment of middle and top management throughout the supply chain. Bai, Kusi-Sarpong, Sarkis and Wang (2014:90) mention that internal environmental management initially is required to implement the company's goal of achieving a cleaner production for manufacturing and bottle plants of the brewing and beverage companies.

1.3.4 Investment recovery

Investment recovery refers to selling of used resources and the fragmenting and selling of excess capital equipment by the company (Kamolkittiwon & Phruksaphanrat 2015:23). According to Dubey and Gunasekaran (2016:9), investment recovery consists of recovery or sales' options of excess inventories or materials, scraps, used materials and excess capital equipment. Furthermore, Ali, Bentley, Cao and Habib (2016:27) indicate that investment recovery can be seen as the deployment of inoperative materials for enhanced purposes for the company.

1.3.5 Eco-design

According to Akhtar, Doherty, Tse, Si and Zhang (2016:4), eco-design is an internally focused green supply chain management practice that enhances the environmental attributes of the products with modest assistance or interface with external organisations. It requires that manufacturers design products that lessen consumption of power and resources and ensure a possible recycle, reprocess and revival of parts and resources, while reducing harmful resources used in the manufacturing process (Khan & Qianli 2017:5). Moreover, eco-design seeks to integrate environmental aspects into product design thoroughly, while at the same time maintaining all well designed and safety requirements for users or consumers (Choi & Hwang 2015:72).

1.3.6 Green purchasing

Sundarakani *et al.* (2015:221) define green purchasing as an environmental purchasing plan that aims to make sure that purchased products and material meet with environmental objectives set by the purchasing company. Green purchasing prevents and reduces waste by considering environmental impacts when making decisions on product acquisition from the supplier (Govindan, Kadzinski & Sivakumar 2016:129). In addition, green purchasing means that supply chain managers ought to consider the environmental sustainability in their purchasing plan, while at the same time maintain the company's purchasing criteria of excellence and delivery (Esmaeili, Govindan, Rostamzadeh & Sabaghi 2014:192).

1.3.7 Environmental performance

Chitramani and Meera (2014:3) define environmental performance as the degree of decline of substances in the manufacturing process that reduces environmental impacts caused by companies. According to Aktas, Geng and Mansouri (2016:249), environmental performance is more often concerned with saving power and reducing emissions and waste. However, environmental performance relates to the capability of manufacturing plants to lessen air emissions and solid wastes and the capability to reduce consumption of harmful materials (Esfahbodi, Watson, Zhang & Zhang 2016:70).

1.3.8 Supply chain performance

Supply chain performance is defined as a systematic procedure of measuring the usefulness and efficiency of supply chain operations (Bhatti, Chandran & Sundram 2016:1448). According to Gaur, Mukherjee and Srinivasan (2011:260), supply chain performance refers to the

performance of different procedures involved within the company's supply chain function. Leonczuk (2016:104) indicates that supply chain performance is the ability of the supply chain to deliver the needed products manufactured by the brewing and beverage companies to the right location while delivering them at the appropriate time.

1.3.9 The conceptual model

For the purpose of this study, the research framework is illustrated in Figure 1.1. The framework is made up of four constructs, namely, internal environment management, investment recovery, eco-design, and green purchasing, and one mediator, which is environmental performance, with one outcome variable, which is supply chain performance.

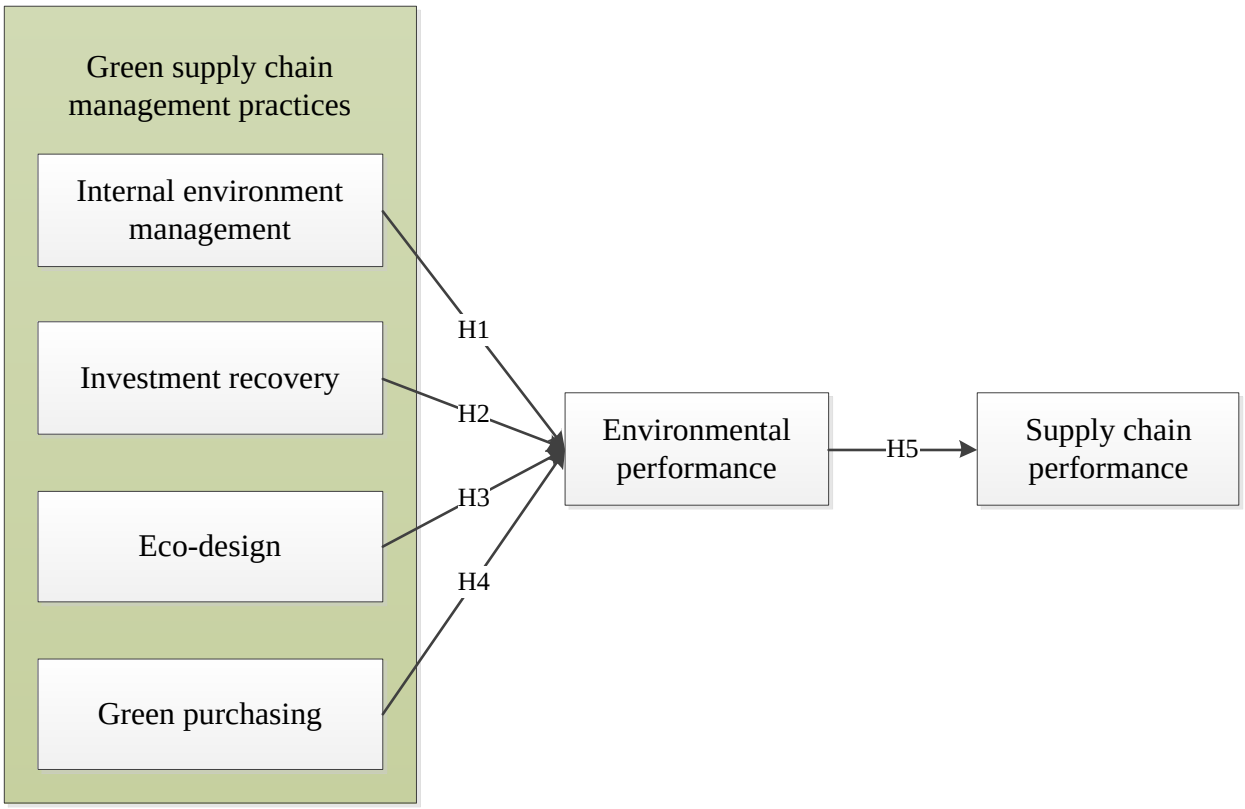


Figure 1.1: Conceptual model for the relationship between green supply chain management practices, environmental performance and supply chain performance

Source: Own Source

1.3.10 Hypothesis statements

Based on the above research model, the following hypotheses were stated:

H1: There is a positive relationship between internal environment management and environmental performance.

H2: There is a positive relationship between investment recovery and environmental performance.

H3: There is a positive relationship between eco-design and environmental performance.

H4: There is a positive relationship between green purchasing and environmental performance.

H5: There is a positive relationship between environmental performance and supply chain performance.

1.4 OBJECTIVES OF THE STUDY

1.4.1 Primary objectives

The primary objective of this study was to investigate the influence of green supply chain management practices and environmental performance on supply chain performance in a brewing and beverage company.

1.4.2 Theoretical objectives

In order to achieve the primary objective, the following theoretical objectives were formulated for the study:

- to conduct a literature review on internal environment management;
- to conduct a literature review on investment recovery;
- to conduct a literature review on eco-design;
- to conduct a literature review on green purchasing;
- to conduct a literature review on environmental performance; and
- to conduct a literature review on supply chain performance.

1.4.3 Empirical objectives

The following empirical objectives were set for the study:

- to determine the relationship between internal environment management and environmental performance;

- to explore the relationship between investment recovery and environmental performance;
- to investigate the relationship between eco-design and environmental performance;
- to evaluate the relationship between green purchasing and environmental performance; and
- to analyse the relationship between environmental performance and supply chain performance.

1.5 RESEARCH APPROACH

A research approach is a strategy and procedure for a study that cover the steps from extensive assumptions to comprehensive methods of data compilation, data examination, and interpretation (Creswell 2013:3). The study focused on a quantitative approach. Quantitative research is an experimental research where the information is in the form of numbers or statistics (Blaxter, Hughes & Malcolm 2012:65). The purpose for selecting a quantitative approach was to enable the researcher's results to be generalised to other industries.

1.5.1 Literature review

In this study, the literature review was drawn from various known sources of data, which are textbooks, electronic books, journal articles and Internet databases such as Science Direct, EBSCO A-Z, InformaWorld, Jstor and Emerald. The literature review consisted of detailed discussions of the different key variables, namely, internal environment management, investment recovery, eco-design, green purchasing, environmental performance and supply chain performance.

1.5.2 The empirical research design

Chawla and Sodhi (2011:48) define research design as the description of methods and measures for obtaining the information required. In the same light, Sahu (2013:25) states that a research design is the blueprint of the different steps to be undertaken starting with the formulation of the hypothesis to drawing inferences during a research process. A researcher can use various research methods when conducting a study. One of the research methods is the quantitative approach, which involves logical testing of statistical information used to confirm or challenge a hypothesis (Baden & Major 2013:525). Therefore, a quantitative research approach was used for the study. The quantitative research approach was adopted to collect data from respondents in order to test the proposed hypothesis in this study.

1.5.3 Sampling design

A sample design is a definite strategy for attaining a sample from a specified population (Kumar 2008:38). The sampling design for this study included target population, sample frame, sample method and sample size.

1.5.4 Target population

According to Wang (2014:400), target population is defined as a group of elements of which a sample will be taken. The target population is known to consist of organisations, groups and individuals (Quinlan 2011:206). For the purpose of the study, the target population is comprised of supply chain management professionals of beverage companies operating in South Africa. The beverage companies in this study were Kingsley Beverages, The South African Breweries, Tiger Brands, Little Green Beverages (Pty) Ltd and Amalgamated Beverages Industries. The population group comprised both female and male employees. Permission to conduct the study was obtained from the Beverage companies following the Higher Degree Committee of the Vaal University of Technology approving the proposal.

1.5.5 Sample frame

A sample frame refers to a well thought out list of the individuals in a population (Barber, Burt & Rigby 2009:258). In other words, a sample frame is a structured list, which represents the entire population. For this particular study, the sampling frame was made up of 80 beverage companies from Beverage Companies head office in Johannesburg. The questionnaires were handed to the supply chain management professionals from various beverage companies in South Africa, at least five questionnaires per each company. Supply chain management professionals are individuals who are certified professional purchasers in the company (Alberta Canada 2016:1).

1.5.6 Sampling method

There are two categories of sampling methods, namely, probability and non-probability samples. Berndt and Petzer (2011:173) refer to non-probability sampling as an instance whereby the researcher uses his or her biased opinion to conclude which samples should be used for insertion in the research. A probability sampling method gives a mainly consistent depiction of the whole population (Walliman 2011:96). However, the sampling method used for this study was a probability sampling method. Anson, DeFusco, McLeavey, Pinto and Runkle (2015:249) describe a simple random sample as a subdivision of a superior population created in such a way

that each component of the population has the same probability of being nominated to the subdivision. For this study, a random sampling method was used.

1.5.7 Sample size

Kumar (2011:194) states that a sample size refers to the quantity or degree of the sample from which the essential information is acquired. The sample size was chosen based on historical evidence. Previous studies conducted by Allen and Hsu (2010:586); Goh, Jee, Ng and Yeow (2014:510); Okello and Were (2014:107) and Ali *et al.* (2016:22) that examined various green supply chain management practices in the manufacturing sector used a sample size of 400. For this study, a sample size of 400 was used.

1.5.8 Data collection

In this study, data was collected using a self-administered questionnaire. The study made use of a closed-ended questionnaire. A measurement scale was used, which was defined by Hair, Reams, Ringle and Sarstedt (2014:106) as an instrument with a prearranged number of closed-ended responses that can be used to acquire an answer to a question. On the other hand, measurement is a fundamental perception in conducting social science study (Hair, Hult, Ringle & Sarstedt 2016:4).

1.5.9 Measurement instrument

The questionnaire for this study consisted of six sections. The respondents' selections in Section B to F was on a five-point Likert scale. This scale indicated 1=Strongly disagree, 2=Disagree, 3=Moderately agree, 4=Agree and 5=Strongly agree. Section A gathered biographical information on gender, age, marital status and qualifications. Section B was used to gather information on green purchasing. The questions in this section were adapted from previous studies conducted by Shaharudin, Tan, Tan and Zailani (2016:547). Section C was used to gather information on investment recovery. Questions in this section were adapted from studies conducted by Akhtar *et al.* (2016:12). Section D was used to gather information on eco-design. The questions used in this section were adapted from Sundarakani *et al.* (2015:233). Section E was used to gather information on internal environment management. Questions in this section were adapted from Lai, Sarkis, and Zhu (2013:115). Section F was used to gather information on environmental performance. Questions in this section were adapted from Choi and Hwang (2015:76). Section G was used to gather information on supply chain performance. Questions in this section were adapted from Qrunfleh and Tarafdar (2012:346).

1.6 STATISTICAL ANALYSIS

Factor analysis operates on the notion that reckonable and visible variables can be concentrated to less latent variables that share a broad variance and are unobservable, which is recognised as dropping dimensionality (Pearce & Yong 2013:80).

In this study, descriptive statistics were used to analyse the characteristics of the sample. According to Beaver, Beaver and Mendenhall (2012:4), descriptive statistics consist of measures used to sum up and illustrate the important characteristics of a set of dimensions. For this study, the researcher had to code the data collected in Microsoft Excel on a spreadsheet. The Statistical Package for Social Sciences (SPSS), version 25.0, was used for the analysis of the data. The study used Analysis of Moment Structures (AMOS 25.0) software, which assisted the researcher to ensure that the research work is more logical and consistent as statistical tools such as confirmatory factor analysis (CFA) and structural equation modelling (SEM) were applied on this study.

1.6.1 Confirmatory factor analysis

Confirmatory factor analysis is a specific case of structural equation modelling, which consists of collecting data in order to prove that a construct is distinct according to the theoretic approach the investigator uses as a preliminary point (Holgado-Tello & Morata-Ramirez 2013:54). For this study, the confirmatory factor analysis allowed the researcher to test the hypotheses on relationships between observed variables.

1.6.2 Structural equation modelling

Hair *et al.* (2014:105) indicate that structural equation modelling allows researchers instantaneously to examine a sequence of correlated dependency relationships between a set of concepts, represented by few variables while accounting for measurement fault. The structural equation modelling was used to analyse the structural relationship between latent constructs and measured variables in this study.

1.7 RELIABILITY AND VALIDITY

Reliability is concerned with the capability of an instrument to measure constantly (Dennick & Tavakol 2011:53). Reliability for each questionnaire used in this study was determined through the Cronbach alpha coefficient. Cronbach's alpha determines the internal consistency or average

correlation of objects in a survey instrument to measure its reliability and is an analysis reliability method that requires only single test supervision (Sharma 2016:271).

Dennick and Tavakol (2011:53) indicate that validity is concerned with the degree to which an instrument measures what it is planning to determine. In other words, any measuring piece of equipment or tool is thought to be valid when it measures what it is predicted to determine (Pandey & Pandey 2015:21). The study assessed three types of validity, namely, content, construct and convergent validity. Content validity is associated with a kind of validity in which diverse skills, fundamentals and behaviours are effectively and sufficiently measured (Zohrabi 2013:258). Content validity was assessed through pre-testing of the questionnaire in this study.

Pandey and Pandey (2015:22) refer to construct validity as a judgement-based type of validity on the gathering of evidence from frequent studies by means of a specific measuring instrument. In this study a pilot study was done to check and test the construct validity. Construct validity was used to indicate how well a test reflects the true theoretical construct of a concept. In convergent validity, where diverse measures of the same theory yield similar results, a researcher uses self-report against different measures (Bolarinwa 2015:197). The convergent validity was used to ensure constructs that are expected to be related are in fact related in this study.

1.8 ETHICAL ISSUES

Fouka and Mantzorou (2011:4) refer to ethical issues as a system of principles, which can importantly change prior considerations about choices and measures. The following ethical issues were important for this study.

- Participation in this study was voluntary. Respondents had the right to either participate or decline any involvement in the study.
- The study did not include sensitive issues or cause discomfort to the respondent.
- The questionnaires did not contain the identity or personal information linked to the respondents. Anonymity of respondents was maintained throughout this study.
- The privacy of respondents was respected.
- The study maintained a competent, careful design and worthwhile expected outcomes in the data collection analysis.

1.9 OUTLINE OF THE STUDY

Chapter 1: Background and overview of the study

This chapter covered the entire overview of the study. It highlighted the introduction, theoretical framework and problem statement. Furthermore, the research model, purpose of the study, research objectives and research approach were highlighted. Finally, the outline of the study and ethical issues were delineated.

Chapter 2: Literature review on the beverage industry

This chapter provided in-depth information and background on the Beverage industry in South Africa.

Chapter 3: Literature review on the research variables

This chapter examined in detail the theoretical and empirical reviews of the key variables of the study. It also examined the theoretical review of internal environment management, investment recovery, eco-design, green purchasing, environmental performance and supply chain performance.

Chapter 4: Research methodology and design

This chapter discussed the method and design used in the study. This included target population, sampling technique, sampling size, sampling frame and data collection methods.

Chapter 5: Data analysis and results

This chapter addressed the analysis, interpretation and the research results.

Chapter 6: Conclusion and recommendations

This chapter provided the conclusions, limitations, implications for further research and recommendations concerning the research results.

1.10 CHAPTER 1 CONCLUSION

This chapter comprised nine sections. The first section presented the background and overview of the study. The second section presented the problem statement. The third section highlighted the theoretical framework and literature review of this study. The fourth section explained the

objectives of the study. The fifth section described the research approach for this study. The sixth section provided the statistical analysis to be applied in this study. The seventh section discussed the reliability and validity tests. The eighth section highlighted the ethical issues to be adhered to. The last section provided the outline of the study. The next chapter presents the literature on beverage companies in South Africa.

CHAPTER 2
LITERATURE REVIEW ON THE BEVERAGE INDUSTRY

2.1 INTRODUCTION

In the previous chapter, green supply chain management practices, environmental performance and supply chain performance within the beverage industry in South Africa was introduced. The problem statement, theoretical framework, literature review, research objectives, research approach and statistical analysis were also introduced. This chapter examines the existing literature on the beverage industry in South Africa. The beverage industry is defined, followed by a discussion of the alcoholic and non-alcoholic beverage industry in South Africa. An outlook on the importance of the beverage industry to the economy is provided. This chapter also provides in-depth challenges faced by the beverage industry in South Africa. Furthermore, solutions towards the beverage industry challenges are stated. The relationship amongst the beverage industry and other economic sectors are discussed.

2.2 INTERNATIONAL DEFINITION OF BEVERAGE INDUSTRY

According to Value Line Research Department (2015:1), the beverage industry refers to a developed sector in the economy which includes companies that market alcoholic and non-alcoholic beverages. The beverage industry includes companies that develop, manufacture, promote and distribute alcoholic and non-alcoholic beverages, including beer, wine, soft drinks and spirits (Hongkong & Shanghai Banking Corporation 2012:5).

The beverage industry contributes to the economy and social development by providing employment opportunities (Bonituo 2014:9). It provides essential social amenities within the areas of environment, education and health, which include hospitals and clinics (Bonituo 2014:9). The increase in beverage manufacturing creates opportunities for other sectors such as agriculture, packaging, retailers and transportation. Beverage companies rely on transportation for delivery of raw agricultural products, supplies to the company and distribution of beverage products across the entire company's value chain (Beverage Industry Environmental Roundtable 2011:33).

Transportation used in the beverage industry throughout each point of the value chain includes passenger vehicles, locomotives, trucks and cargo ships. Large quantities of fresh water are

required by the beverage industry for beverage production, bottle washing, rinsing operations and reuse of glass bottles. The bottling plant uses fresh water for rinsing and cleansing reusable glass bottles before being refilled (Haroon, Mahmood & Waseem 2013:9). The beverage industry avoids transfer cost by having one or more plants closer to the place of demand (Almada-Lobo, Guimaraes & Klabjan 2011:230).

Globally, due to environmental sustainability, beverages are sold in bottles that are recyclable and that can be reused by the manufacturers as they are inexpensive compared to disposable bottles (Haroon *et al.* 2013:6). Beverages are available in a variety of retail outlets, which include convenience stores, specialty stores and grocery stores. Beverage companies signed agreements with retailers to place vending machines in offices, malls and theatres (Beverage Industry Environmental Roundtable 2010:38). The next section defines the South African beverage industry's background of the research.

2.3 SOUTH AFRICAN DEFINITION OF BEVERAGE INDUSTRY

The South African beverage industry consists of companies that produce non-alcoholic and alcoholic beverages, including fruit juices, bottled waters, sports drinks and energy drinks. Du Preez, Terblanche-Smit and Van Der Spuy (2014:1518) mention that alcoholic beverage products are categorised as spirits, beer, wine and ciders. On the other hand, non-alcoholic beverages consists of products such as juices, bottled water, energy drinks, ice tea, soft drinks, sports and energy drinks (Flanders 2015:13). However, carbonated drinks dominate the non-alcoholic industry (Baloyi 2016:1).

Beverage companies depend on various sectors of the economy in order to produce wine, juices, energy drinks, beer, flavoured alcoholic drinks and soft drinks. According to Econex and Quantec Research (2010:14), various sectors supply necessary production inputs to beverage companies that range from sugar, water, fuel, barley, glass bottles, power, as well as hops and malt to tin cans. These sectors are the food and beverages sector, agriculture, forestry and fishing, transport, wholesale, retail, rubber and plastics, machinery and equipment (Econex & Quantec Research 2010:13).

According to Danso (2007:14), the beverage industry in South Africa is dominated by multinationals which include SABMiller and Coca-Cola that operate in other countries. South Africa's beverage sector contributes approximately R59 billion to the gross value added, employs about 188,500 people and contributes a total of R17 billion indirect and direct taxes (Durban Chamber of Commerce and Industry 2016:1).

Wesgro (2016:1) indicates that the net exporters of beverages are the Western Cape, and the rest of South Africa's exporting beverages ranging from R13.27 billion and R20.24 billion in total. The Western Cape Province counts for 40 percent of the South African exports of beverage products to Africa (Wesgro 2016:1). The beverage company Ceres, which produces fresh juice plays a vital role in the beverage industry due to its participation in the export and local markets (Danso 2007:14). Furthermore, small independent beverage companies play a key role in developing the economy and expansion of the beverage sector. It is clear that the South African beverage industry is not only competing nationally with emerging companies but also globally for positions in the beverage industry. The alcoholic beverage industry is discussed in the next section.

2.3.1 Alcoholic beverage industry

According to Report Buyer (2017:1), the South African alcoholic beverage industry includes the manufacturing, wholesale and retailing of wine, spirits, flavoured alcoholic beverages and beer. The alcoholic industry is dominated by South African Breweries, Mitchell's Knysna Brewery, Distell, Brandhouse, Microbreweries and Douglas Green Bellingham (Pty) Ltd (Flanders 2015:14). At present, South African Breweries is the largest manufacturer and leading producer of alcoholic and non-alcoholic beverages in South Africa (Econex & Quantec Research 2010:7).

The alcoholic beverage industry is regarded as a stable industry, with an estimated contribution of about R93 billion to the economy in 2009 (Mrasi 2016:4). Additionally, the industry indicated a major growth of about R30 billion annually from manufacturing and retail (Jere, Mason & Mrasi 26:2018). South Africa is considered a net exporter of alcoholic beverages, due to widespread wine exports (Econometrix 2013:6). The largest export market for South African wine is Europe. However, beer exports by domestic breweries in South Africa are small compared to wine exports (Econometrix 2013:6). Moreover, the alcoholic beverage market is highly competitive in South Africa.

The largest supermarket retail chains in South Africa that dominate the liquor sector consist of Pick n Pay Liquor, Spar's TOPS, Woolworths Wine, Massmarts's Game Liquor and Checkers' Liquor Shop (Report Buyer 2017:1). These supermarkets are part of the beverage company's supply chain, where the final product is made available and sold. The beer sales dominated the alcoholic sector, which accounted for 56.1 percent of liquor sales in 2016 (Report Buyer 2017:1). The sale of liquor in the catering and accommodation, wholesale and retail sectors had

an estimate of 37 percent, which resulted in 548,000 employment opportunities in South Africa (Econex & Quantec Research 2010:13).

In October 2016, the merger between Anheuser-Busch Interbrew and SABMiller was completed. The two companies formed a new holding company called Newco (Report Buyer 2017:1). The merger is thought to benefit both companies and the economy in increasing the gross domestic products and creating jobs. However, the Competition Authorities intervened and imposed conditions to the newly formed merger between Anheuser-Busch Interbrew and SABMiller, which include investing R1 billion to support 800 farmers, funding entrepreneurs, supporting local social programmes and retaining 6000 current employees in the company (Report Buyer 2017:1). In addition, SABMiller, as part of the deal, has to dispose of its 26 percent stake to Distell, which is Africa's leading spirits, cider and wine maker (Mngadi 2017:1). The next section explores the non-alcoholic beverage industry.

2.3.2 Non-alcoholic beverage industry

The non-alcoholic industry in South Africa is dominated by companies such as Tiger Brands, Bromo Foods, Pioneer Foods, Ceres and Coca-Cola, which is manufactured through the amalgamated beverage industry, a division of SABMiller (Flanders 2015:13). The non-alcoholic beverages can be categorised as carbonated soft drinks, juices, still drinks, bottled waters, sports and energy drinks (Ally 2015:2).

According to Boodoo (2018:1), the non-alcoholic beverage industry still maintains growth in the market despite the depressed economy. The majority market share is held by soft drinks, while bottled water, as well as energy and sports drinks are growing in their respective segments (Boodoo 2018:1). The energy drink across the non-alcoholic beverage categories achieved the highest sales volume in South Africa (Hofman, Maboshe, Stacey, Tugendhaft & Van Walbeek 2017:32). The increase in branding and advertisements contributed to the widespread purchase of energy drinks in South Africa. For example, manufacturers of energy drinks targeted their potential consumers through television advertisements (Hofman *et al.* 2017:32).

The largest soft drink producer, Coca-Cola South Africa, accounts for 60 percent of the soft drinks market (Donnelly 2016:1). The soft drink industry supports about 79,000 direct jobs of which 11 percent are in the agricultural workforce (Donnelly 2016:1). Moreover, the industry focuses on domestic suppliers for procurement of goods and services (Beverage Association of South Africa 2016:4). The next section addresses the importance of the beverage industry in South Africa.

2.4 IMPORTANCE OF BEVERAGE INDUSTRY TO THE ECONOMY

According to Econometrix (2013:1), the beverage industry contributes to job creation, taxation and the domestic output, which is the gross domestic product (GDP). Beverage companies continue to provide learnerships, internships, bursaries and funding for entrepreneurs within South Africa. This reduces the unemployment rate and creates more job opportunities. The majority of the transportation and distribution in beverage companies is outsourced to small logistics businesses and transport companies. Danso (2007:14) mentions that over 8 percent of the South African Breweries beverage products' distributions are carried out by independent owner drivers in South Africa. Importantly, tax contributed by the beverage companies is spent by the government on electrifying households, funding schools and developing all health care clinics and hospitals in South Africa.

In the past 20 years, the wine industry has embarked on Black Economic Empowerment initiatives to empower previously disadvantaged people (Kirkman 2010:24). They encourage wine companies to provide skills development programmes, enterprise development and support black ownership of vineyards (Melck 2017:25). The government, together with the wine industry, aim to improve workers' standard of living and assist previously disadvantaged South Africans through the industry. In 2007, a minority of wine producers donated 30 percent of their wine production business and land to residents and workers (Oertle 2017:21). This contributes to the economy transformation of workers becoming independent wine business owners. The next section pays attention to the importance of the beverage industry to society.

2.4.1 Importance of beverage industry to the South African economy

The economy is reliant on industries such as the beverage industry to sustain economic growth and initiate social development programmes that will enable society to improve its standard of living. Support such as civil partnerships, donations and sponsorships help sustain these initiatives (Hunter 2017:47). The beverage industry continues to help eradicate poverty in society and sponsor education by improving school infrastructures in rural and disadvantaged areas. The wine industry established the South African Wine Industry Trust which focused on developing communities and instituting social responsibility programmes (Boshoff 2012:25).

Govender and Kaupa (2014:2) state that the alcoholic sector, which is part of the liquor industry employed half a million individuals and contributed value added tax to the economy. The alcoholic beverage sector is very competitive and has contributed significantly to the social and economic development in South Africa (Govender & Kaupa 2014:2). South African Breweries

invested in Black Economic Empowerment activities, responsible alcohol consumption campaigns and corporate social activities. Additionally, it established an initiative that focuses on entrepreneurship, job creation and skills development through the support of small businesses. These include supporting new logistics transportation businesses, soft drink retailers, women entrepreneurs, collaboration with World Wildlife Fund and black owned businesses in the tourism sector (Econex & Quantec Research 2010:13).

The alcoholic beverage industry keeps on contributing to the development and sponsorship of different sporting activities. According to Econometrix (2013:118), sponsorship forms part of the liquor industry's corporate social investments. The increase in sponsorship in sports benefits society, as consumers are able to participate in sporting activities within their community (Econometrix 2013:118).

According to the Beverage Association of South Africa (2016:2), the non-alcoholic beverage industry contributes more than R60 billion to the South African gross domestic product and contributes R18 billion in indirect and direct taxes. The non-alcoholic beverage industry supports about 294,000 jobs including small business owners, retail outlets, small farmers, entrepreneurs and black South Africans (Beverage Association of South Africa 2016:2). The importance of the beverage industry for job creation is discussed in the next section.

2.4.2 Importance of beverage industry for job creation

The beverage industry in South Africa promotes entrepreneurship by working with well-established local suppliers that offer agricultural products used to manufacture beverages and thus contributes to economic development (Van Wyk 2011:854). Furthermore, beverage companies use local advertising campaigns to create awareness and increase their product availability by distributing products to informal and formal stores (Chola, Hofman, Labadarios, Manyema, Tugendhaft & Veerman 2015:2298). The extensive use of small or large advertising companies by the beverage industry expands and creates job opportunities for new graduates who are passionate to work in the advertising industry.

The alcoholic beverage industry in South Africa contributes to direct and indirect job creation (Econometrix 2013:1). The direct employment opportunities by the alcoholic beverage companies can be traced back to the sale of alcohol in the catering and accommodation sector, wholesalers and retailers (Econometrix 2013:11). The industry's operations also have a direct employment impact on its suppliers. Its direct suppliers such as the forestry, fishing and

agriculture sector benefit in terms of employment opportunities when there is an increase in sales and manufacturing (Econex & Quantec Research 2010:5).

Due to poorly skilled workers in South Africa, the alcoholic beverage industry offered jobs to 88 percent of individuals from disadvantaged backgrounds (Econex & Quantec Research 2010:3). Most of the job opportunities created by the South African Breweries' value chain are in the informal sector and low skilled positions (Econex & Quantec Research 2010:3). Furthermore, about 72 percent of jobs sustained by the alcoholic beverage industry are filled by the majority of black employees (Econometrix 2013:11).

The South African wine industry, which is part of the alcoholic beverage industry, has contributed to the economy significantly by generating 300,000 indirect and direct job opportunities, including farm workers and those involved in retailing, packaging and wine tourism (Hunter 2017:10). Since South Africa became a democratic country in 1994, more black people have been involved in all aspects of the industry. According to Kirkman (2010:25), of the 566 existing wine cellars in South Africa, 2.3 percent are black owned.

On the other hand, the non-alcoholic beverage industry supports indirect employment to agriculture retail outlets that form part of the supply chain of the industry (Beverage Association of South Africa 2016:4). Small independent businesses, particularly farmers, benefit from the industry by supplying agricultural products. The next section covers the challenges experienced by the beverage industry.

2.5 CHALLENGES EXPERIENCED BY THE BEVERAGE INDUSTRY

The South African economy has been performing poorly, thus putting a constraint on manufacturing companies and other enterprises across the country. The poor performance by the South African economy has led to inflation, export decline and price increases on products which has affected the beverage industry (National Treasury 2016:20). Furthermore, the economy faced challenges during the year 2016, which implicated a downgrade on rating and high unemployment rate (Mohapi 2016:8). Recently, there has been high competition in terms of large bottling companies merging with beverage companies. This has led to slow growth in independent small beverage companies and low product availability on coolers and refrigerators in retail outlets (Holmes 2016:1). The next section discusses water scarcity'simpact on the beverage industry.

2.5.1 Water scarcity

Due to water scarcity in South Africa, the beverage industry supply chain has been affected by supply disruptions of water (World Wildlife Fund South Africa 2012:46). Water supply is not only an important component of alcoholic and non-alcoholic beverages, but it is also required for the development of crops required for the manufacturing process. Water Futures (2011:11) mention that water shortages present a risk to suppliers of raw materials to beverage companies, and the supply chain, since growing plants require a lot of water.

According to Fakoya (2014:253), lack of water supply and water disruptions from the municipality continue to slow down production within the beverage plants, resulting in supply chain deadlock. For example, the South African Breweries' plant in Polokwane incurred losses due to an unintended shutdown in manufacturing due to water disruption from the municipality (Fakoya 2014:253). Moreover, the decline in water quality and poor municipality administration of water has a possible financial detrimental impact on the company (Askham 2016:37).

The beverage industry continues to require large amounts of water, while the economy experiences water shortages (Ally 2015:2). Fresh water is the most important ingredient in the beverage industry (Askham 2016:21). Currently, South Africa is regarded as a water stressed country, while demand for water is rapidly increasing due to population growth. Industrial water usage by beverage companies results in water scarcity and high costs. The non-alcoholic beverage industry in South Africa is one of the industries which are major users of water (Ally 2015:2). The following section explores the lack of training within the beverage industry.

2.5.2 Lack of training

Industries in South Africa are facing skills shortages in their supply chain (Fraser 2013:15). Skills shortage within supply chain management hampers economic progress and development. Training programmes have not been doing well to equip low skilled workers. According to Durham (2013:1), many of the personnel involved in the critical supply chain phases are either unskilled or casual labour. Furthermore, skills' deficit such as lack of technical skills, industry specific qualifications and candidate experience continue to have a negative impact across industries (Steyn 2015:1). In addition, lack of trained or competent professionals result in a significant skills' gap for trainees or new employees (Muller 2018:1).

On the other hand, beverage companies are more focused on job creation and sustainability, rather than developing semi-skilled and unskilled employees. For example, the minority of

positions in the liquor industry are filled by highly skilled employees, while most sustained jobs are in low skilled positions (Econometrix 2013:11). Despite the increase in job creation in lower level positions, the need for training is not emphasised enough. Losses that occur during beverage production and bottle filling are a result of lack of training and staff negligence (Ally 2015:97).

The employment creation in the township market by the liquor industry contributes positively to the South African economy. However, entrepreneurs lack the ability to identify and manage growth opportunities in their liquor retail businesses. Most business owners in liquor retail, lack managerial skills such as finance, human resource and marketing skills. Furthermore, the involvement of black people into ownership positions and management remains a challenge in the wine industry (Oertle 2017:11). In the next section, tax and regulations imposed on the beverage industry are discussed.

2.5.3 Tax and regulations

The beverage industry has undergone scrutiny over its products that harm people and affect their livelihood. These include alcohol abuse and high intake of sugary drinks that lead to obesity. The South African government has taken steps to introduce a tax in an attempt to reduce alcoholic and non-alcoholic beverages. The government has proposed a tax on sugar-sweetened beverages (Beverage Association of South Africa 2016:3). The tax will be imposed on beverages such as ready to drink tea, regular sugar-sweetened carbonated soft drinks, 100 percent juice, sports and energy drinks.

The imposed tax could result in beverage companies retrenching employees and also a reduction in beverage consumption (National Treasury 2016:10). This could have a negative impact on the South African economy due to job losses and the reduction in tax contribution (Beverage Association of South Africa 2016:3). The agricultural sector will also be affected in terms of job losses, given that they supply sugar to the beverage industry. Furthermore, there will be a reduction in demand for sugarcane from the agricultural sector, forcing farmers to reduce their prices (Durban Chamber of Commerce and Industry 2016:1).

According to Econex (2014:3), the South African government has imposed price regulations and taxation on beverage companies, resulting in a cost increase of manufactured beverage products. Another regulation is implementing carbon tax on all South African beverage manufacturing facilities based on their carbon dioxide emissions (Distell 2016:48). The carbon tax will be

determined, based on the carbon emissions and waste disposal by the beverage companies during and after production. The next section discusses competition.

2.5.4 Competition

The South African beverage sector has attracted international companies in the process of increasing competition between international and local beverage companies (Govender & Kaupa 2014:2). According to Beukes, Prinsloo and Pelser (2013:1), the South African beverage market is highly competitive. The competitive environment has ensured that producers of alcoholic beverages use intensive advertising to compete for market share. Econometrix (2013:81) stated that advertising can result in brand switching, which causes the consumer to purchase from the rival company. Substitute alcoholic beverages pose a threat to companies in the industry. Competitors take these substitute opportunities to build brand loyalty while competing for the market share. As alcoholic beverages are seen as discretionary expenditure, they can be substituted by other beverages such as fruit juice, soft drinks and ready to drink tea (Econometrix 2013:124).

According to Econex and Quantec Research (2010:26), competitors in the liquor market include SABMiller, Douglas Green Bellingham (Pty) Ltd, Distell Group Ltd, Brandhouse, Pernod Ricard, Edward Snell & Co Ltd, United National Breweries, Tiger Brands and Awethu Breweries. These companies compete in different liquor market segments such as the sorghum beer market, wine, spirits and flavoured alcoholic beverages. The liquor retail, on the other hand, has a direct competition approach, as large retailers and liquor retailers place pressure on small independent retailers. Small independent liquor stores find it hard to secure licenses compared to larger retailers (Econometrix 2013:124).

In recent years, the non-alcoholic beverage industry has come under pressure due to new beverage companies such as MoFaya that brought new flavours into the market (Beverage Association of South Africa 2016:2). As a result, well established beverage companies in the market such as Little Green Beverages, Coca-Cola South Africa and Shorelines had to expand their product lines that make it difficult for rivals to maintain competition (Beverage Association of South Africa 2016:5). However, despite large beverage companies dominating in the market, small independent beverage companies have developed strategies to gain a certain percentage of market shares and be competitive at the same time. Business disruption is discussed in the next section.

2.5.5 Business disruption

As mentioned above, water scarcity leads to supply chain disruption since beverage companies rely on water. Other major business disruptions include transportation delays and strikes. Strikes can take place internally and externally. For example, employees in the wine industry embarked on a strike to show dissatisfaction in the company (Melck 2017:22). On the other hand, a community might engage in a protest demonstration of which theft is possible that can affect the transportation of beverages. There are a number of occasions where beverage trucks were looted by protesters and passersby during unrest in South Africa.

According to Folgore (2018:1), the South African beverage industry is dependent on transport and their logistics network. However, business disruptions such unforeseen events, accidents and theft lead to revenue loss and delays in delivery (Folgore 2018:1). This doesn't affect the beverage operations only, but also retail stores and fast food outlets that depend on selling food alongside beverages.

In recent years, South Africa has experienced an increasing trend of labour unrest, which resulted in protests and strikes (Melck 2017:22). Coca-Cola Beverage South Africa was faced with a strike of about 1,800 employees (Chirume 2017:1). The strike affected Coca-Cola operations in the Free State, Mpumalanga, Northern Cape, Limpopo and Eastern Cape (Chirume 2017:2). On the other hand, South African Breweries experienced a miniature strike from its workers over payment disputes (Wilmore 2013:1). The duration of a strike is always not certain and those who are willing to work fall victims of intimidation. The beverage industry bears the costs as key workers embark on a strike. The next section explores partnerships within the beverage industry.

2.6 BEVERAGE INDUSTRY PARTNERING WITH OTHER FIRMS

Danso (2007:14) mentions that the supply chain environment of the beverage industry includes bottling, storage and distribution of the finished products to consumers in various destinations. The supply chain of the beverage companies in South Africa has developed partnerships and created opportunities for other sectors of the economy. These sectors include transportation, packaging, wholesalers, tourism and retailers (Danso 2007:14).

The partnership and relationship amongst the industries and government has ensured an increase in beverage manufacturing and product availability. Wessels (2015:115) stated that the beverage manufacturing plants are supplied with electricity from Eskom. Also, the beverage companies in

South Africa have formed a relationship with the local municipality which supplies fresh water to the manufacturing plants (Wessels 2015:115).

In 2014, there was an agreement to combine the bottling operations of non-alcoholic beverage businesses in Southern and East Africa of Coca-Cola Company, SABMiller and Gutsche Family Investment (Wesgro 2015:5). Coca-cola Beverages Africa was established due to the Coca-Cola Company, SABMiller and Gutsche Family Investment merger and is the biggest Coca-Cola bottling company in the whole of Africa (Mohapi 2016:18). The beverage companies have partnered with the hotel and gaming industry through Tsogo Sun, which is the leading hotel and gaming group in South Africa (Arizon 2010:33). The wineries and their workers have embarked into a joint venture that will enable workers to become shareholders (Oertle 2017:14). The reason to embark on a joint venture is to transfer skills in farming, marketing, sales, education, management and wine production (Oertle 2017:11). Workers are able to understand the wine industry's processes while in pursuit of establishing their own wineries in future.

According to Wessels (2015:65), the beverage company delivery system is outsourced to transportation companies. Danso (2007:14) mentions that over 80 percent of the South African Breweries beverage products' distributions are carried out by independent owner-drivers in South Africa. Transportation logistics is vital as it is used for delivery of raw agricultural products and distribution of finished beverage products to various destinations, while the agriculture sector provides raw materials such as grain, agave, hops and sugarcane needed for the manufacturing of beverages. The next section concludes Chapter 2.

2.7 CHAPTER 2 CONCLUSION

In this chapter, the beverage industry was explained. Its definition indicated that the industry is divided into two parts, which are non-alcoholic and alcoholic beverages. A review of previous studies and relevant literature was examined on the beverage industry in South Africa. The literature and theory outlining the importance of the beverage industry to the economy of South Africa were examined. This was followed by a clear explanation on how the beverage industry contributes to the economy, society and job creation. The chapter also outlined the challenges within the beverage industry, as well as the solutions addressing those challenges. The beverage industry partnerships formed with other organisations, workers and economic sectors were discussed. The next chapter discusses the literature review on the research variables.

CHAPTER 3
LITERATURE REVIEW ON THE RESEARCH VARIABLES

3.1 INTRODUCTION

The purpose of this chapter is to examine in detail, the theoretical and empirical reviews of the key variables of the study. The chapter provides an in-depth description of the theoretical foundation, highlighting the linkage between the institutional theory and green supply chain management. It also summarises various definitions of green supply chain management from different academic perspectives. The practices of green supply chain management that include internal environment management, investment recovery, eco-design, green purchasing, environmental performance and supply chain performance are also discussed. Challenges of implementing green supply management practices are highlighted, and the chapter further covers the conceptual model and hypotheses statement development on the research variables.

In the past couple of decades, the integration of organisational performance and environmental initiatives has gained international attention (Mbohwa & Mutingi 2012:326). According to Arif, Jusoh, Seman, Shoki and Zakuan (2012:1), the environmental pollution and scarcity of natural resources are the main drivers of greening the organisation's entire supply chain. The implementation of green supply chain management in the supply chain activities is considered as an environmental innovation (Nduro, Opoku-Fofie & Peprah 2016:34). It is important to understand the benefits and challenges involved in implementing green supply chain management, mainly for a manufacturing industry that is aimed at reducing pollution and waste (Adamo, Kotze & Niemann 2016:978).

3.2 THEORETICAL FOUNDATION

To obtain suitable contextual understanding of this study, the institutional theory was used.

3.2.1 Institutional theory

The institutional theory originated in the 19th century, where it was introduced as foundation work that dealt with organisational practices and activities (David, Sine & Tolbert 2011:1333; Najeeb 2014:25). The theory focused more on external factors that companies should take into consideration in the entire supply chain (Brouthers, Ragland & Widmier 2014:539). The

institutional theory describes three forms of isomorphic drivers, namely, normative, coercive and mimetic (Boh, Luo, Xu & Zheng 2017:91).

Normative drivers involve addressing environmental issues through ecological thinking, ethical values and social awareness (Champion, Dainty, Daniels & Glover 2014:105). Coercive pressures are driven by government agencies that try to influence organisations coercively by means of governmental laws and regulations (Jongpaiboon, Laosirihongthong, Samaranayake & Thamsatitdej 2015:1589). The third isomorphic driver, namely, mimetic pressure, occurs due to environmental uncertainty that encourages the organisation to imitate its competitor (Kauppi 2013:1320). Morali and Searcy (2013:640) found that normative, coercive and mimetic isomorphic drivers act as encouragement for organisations to adopt processes and structures that will allow them to operate in a socially responsible way. Hence, these drivers through institutional theory promote socially responsible, corporate behaviour across the supply chain and influence the organisation to move towards sustainability (Dubey, Foropon, Gunasekaran, Gupta, Hazen, Roubaud & Shibin 2017:4).

According to Najeeb (2014:26), institutional theory refers to how companies become comparable in wide ranging institutional environments due to the external sources of the company. The institutional theory explains how a company adopts environmental management practices to address environmental issues (Goktan 2014:99). Laosirihongthong and Somsuk (2016:178) point out that institutional theory helps understand the external forces that pursue companies in adopting organisational practices to gain competitive advantage and sustainable development. These external forces, according to institutional theory, include society, government and the public that impose pressure on the companies to justify their organisational strategic practices (Mwirigi, Mwita & Namusonge 2016:357). The institutional theory is significant to the adoption of organisational practices to meet the legal and social expectations driven by external factors (Mwirigi 2016:17).

Engert (2013:24) conducted a study which suggested that the linkage between green supply chain management practices and the institutional theory provides a vital theoretical background on assessing how external factors impact an organisation’s decision to adopt green supply chain management practices. These supply chain practices, such as green purchasing, eco-design, internal environment management, investment recovery, are important to develop a sustainable environment due to institutional factors, which include governmental environmental and domestic environmental laws (Chien 2014:14).

According to Jongpaiboon *et al*. (2015:1589), institutional theory is used to explain the external factors on the implementation of green supply chain management. However, several researchers found that their implementation is not always driven by competence but rather by corporate endeavour to sustain business pressure and seek social legitimacy (Anand & Bag 2014:1058). Traditionally, institutional theory is concerned with how organisations secure their legitimacy and positions by conforming to the institutional environment norms and rules such as cultural practices, governmental agencies, professions and regulatory structures (Ahlstrom, Bruton & Li 2010:422; Champion *et al*. 2014:104). Brundin and Wigren-Kristoferson (2013:453) argue that adhering to the norms and rules provides security due to the organisation being legitimate and in command of crucial resources.

Donghyun *et al*. (2013:1755) mentions that institutional theory is an important research framework for the study of green supply chain management practices. Moreover, it has been used by companies to address green issues and clarify environmental related practices such as green supply chain management (Lai *et al*. 2010:7; Abdul-Rashid, Masoumik & Olugu 2015:4). Within the context of green supply chain management, Adebanjo, Laosirihongthong and Tan (2013:1090) and Dubey, Gunasekaran and Papadopoulos (2017:184) found that the adoption of institutional theory enhances competitive advantage, and is considered as a key driver in implementing green supply chain management practices in an organisation. Therefore, the study adopted the institutional theory as it is linked to green supply chain management practices. The next section addresses this concept.

3.3 THE CONCEPT OF GREEN SUPPLY CHAIN MANAGEMENT PRACTICES

This section defines the concept of green supply chain management practices in this study. It is followed by Section 3.3.2, which provides an in-depth discussion on the factors that lead to green supply chain management. Lastly, Section 3.3.3 discusses the benefits of implementing green supply chain management practices.

3.3.1 Green supply chain management defined

A supply chain is defined as a system that involves enterprise providers who deliver services or products to customers (Al-Aomar & Hussain 2018:554). The supply chain system consists of suppliers, producers, distributors, retail outlets and customers (Coulibaly, Yazdani, Zarate & Zavadskas 2017:377). The activities in the supply chain such as communication and flow of information are vital for order processing, transformation of raw materials into finished goods,

and the delivery of those final products to customers (Ahi 2014:2; Shahriarpour & Tabriz 2017:268; Giannoccaro 2018:59).

Albastroiu and Felea (2013:76) mention that a supply chain is a network of information, materials, transformation and services linked to supply chain functions. The supply chain functions include finance, new product development, operations, transportation, after sale services (Janvier-James 2012:195). Figure 3.1 illustrates the supply chain components in which a green supply chain can be implemented.

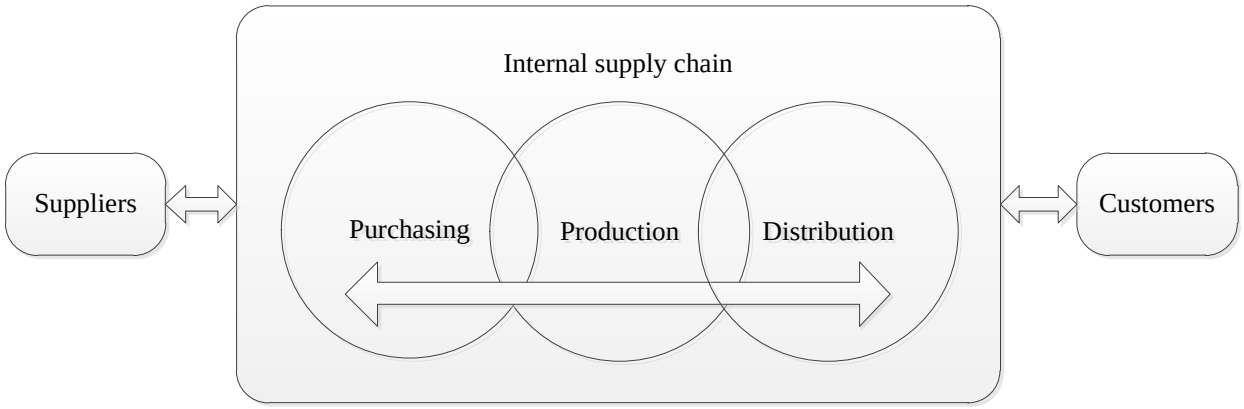


Figure 3.1: Supply chain illustration

Source: Albastroiu and Felea (2013:76)

To understand the study, the supply chain figure is used to demonstrate key components that must be greened. Supply chain integrates the production process where the raw materials are turned into final products and afterwards delivered to the customers (Apopa 2018:2). Based on Figure 3.1, the first component consists of suppliers of raw materials. The second component consists of internal supply chain, which involves purchasing, transformation of raw materials and distribution of finished products. The last component consists of final customers. In other words, Figure 3.1 illustrates how the internal supply chain links to the external components. According to Coves, Lusa and Taborga (2018:447), a supply chain has a strong link with stakeholders like suppliers, customers, government and society. Therefore, a well implemented green supply chain management will interact with all stakeholders to contribute to a sustainable supply chain.

Zahid (2016:26) highlights that the internal supply chain is a vital area for environmental improvements, clean production, supplier integration and staff involvement. Mapfaira, Monageng and Mutingi (2014:3) indicate that a supply chain acts as a guiding framework to

implement green practices. In this context, the green supply chain combines the suppliers, purchasing, production, distribution and customers (Islam, Karia, Lee & Tseng 2018:136). According to Bvuma (2013:38), the combination creates a more sustainable supply chain which now comprises green purchasing from suppliers, green production, green packaging and distribution. Mwirigi (2016:16) found that integrating the green supply chain management concept to the supply chain concept directly limits environmental impact. For that reason, the study adopts the concept of green supply chain management as it recognises the importance of environmental sustainability throughout the supply chain within the organisation.

Mbhele and Pillay (2015:64) describe supply chain management as all business activities and processes associated with managing the flow of information, goods and financial transactions between suppliers within the supply chain. According to Abdallah, Aqqad and Obeidat (2014:14), supply chain management refers to managing relationships within the organisation and business units that consist of logistics, material resourcing and selection, production facilities, marketing, services, finances and customer's satisfaction. It is crucial to understand the integration process as a key aspect in the supply chain management as organisations depend on all business processes in the supply chain (Ngcingwana 2012:2).

According to Chang, Kenzhekhanuly and Park (2013:200), green supply chain management is based on the concept of supply chain management. The idea is to add green components to supply chain management in addressing environmental concerns (Rana, Sanghavi, Shenoy & Yadav 2015:3697), which can be used to balance the relationship between the environment and supply chain management (Acín 2018:27). Mugabe (2013:8) points out that green supply chain management is integrated into the supply chain management due to environmental sustainability. Agi and Nishant (2016:352) agree that green supply chain management integrates environmental practices throughout the supply chain and improves the environmental performance of the organisation. In this sense, the integration can lead the organisation to confine its wastes within the supply chain management system to reduce environmental impact (Qazi 2016:9). Importantly, the combination of green supply chain management and supply chain management can provide opportunities for organisations to address environmental concerns and reduce costs simultaneously (Wang, Wang, Zhang & Zhao 2018:675).

As mentioned above, green supply chain management integrates environmental, economic and social factors to implement the green supply chain in the operations of the organisation (Fauzi, Islam, Karia & Soliman 2017:13). The concept of green supply chain management emerged due to environmental concerns and sustainability in the supply chain (Kulkami, Patil & Ravi

2017:50). Hence, it integrates environmental concerns and sustainability into the supply chain management in order to improve environmental performance throughout a product's life cycle (Rha 2010:5).

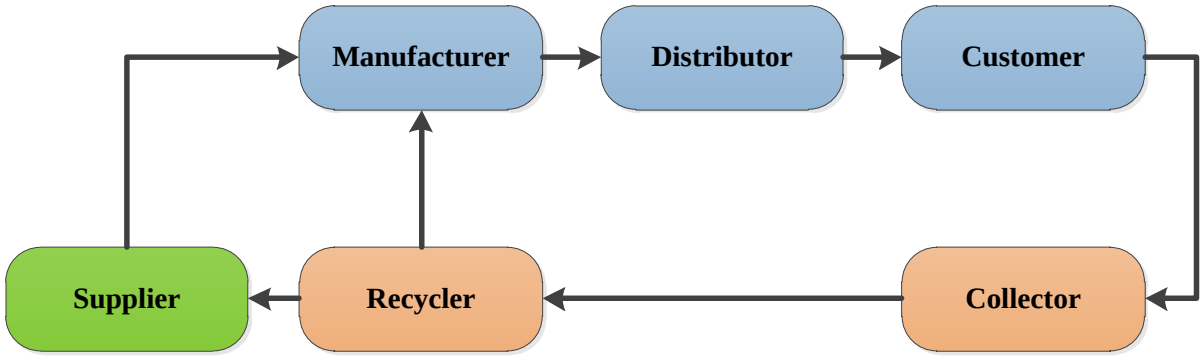


Figure 3.2: Green supply chain

Source: Jenks (2017:1)

Manohar and Kumar (2015:289) define green supply chain as a concept which combines environmental management of manufacturing components, marketing, green procurement, green design, reverse logistics and environmental circulation. Green supply chain minimises the environmental impact such as reducing harmful materials, environmental waste and green design of a manufactured product throughout its cycle (Niyomyat, Ramingwong, Sopadang & Tippayawong 2016:1). It therefore encompasses different environmental management practices created to integrate environmental considerations at each stage of the organisation's decision-making (Huang & Li 2017:291).

The key role of green supply chain management is to ensure eco-efficiency, recycling technology, environmental management systems, cleaner production and safe delivery of manufactured goods throughout the supply chain (Abu-Rumman *et al.* 2015:149; Ali, De Felice, Mumtaz & Petrillo 2018:145). Furthermore, it aims to manage supply chain operations, funds, information and resources efficiently (Colicchia & Strozzi 195:2015).

The concept of green supply chain management practice has a variety of activities, which it performs to minimise the impacts on a natural environment supply chain (Draghici, Ivascu, Mocan, Rus & Turi 2015:705). These range from environmental supply chain management, green purchasing, eco-design and cooperation with customers. According to Shaharudin, Tan, Tan and Zailani (2016:544), suppliers are selected based on their green raw materials through

green purchasing while customers' expectations are taken into consideration in efforts to minimise impact on the environment.

Governmental regulations and international market demand pressures are pushing organisations to become environmentally conscious while becoming more sustainable (Akinlabi, Mbohwa & Ojo 2015:583). Green supply chain management has transformed the traditional supply chain to achieve best practice through remanufacturing processes and eco-efficiency (Ochiri & Onyinkwa 2016:17). Moreover, given the importance of green supply chain management in the organisation, environmental awareness and responsibility should be promoted in the entire supply chain (Mbaabu 2016:76).

According to Reddy (2016:2), the South African government has shown interest in the implementation of green supply chain management to keep up with trends globally. Mbhele and Pillay (2015:65) state that the government has increased investment in research and development on eco-friendly technologies and advance technology to be implemented as green initiatives on companies. The private sector has also engaged in the implementation of green supply chain management to improve their environmental sustainability in South Africa (Reddy 2016:2). Moreover, government legislation on carbon emission has forced several South African companies to consider greening their supply chain to reduce carbon emissions and environmental impacts (Coetzee 2016:1; Bean & Coetzee 2016:2). This study considers the four green supply chain management practices that Elahmady, Elsayed and Hamdy (2018:120) utilised: green purchasing, eco-design, internal environment management, and investment recovery. The next section turns to the factors that lead to green supply chain management.

3.3.2 Factors that lead to green supply chain management

3.3.2.1 Corporate social responsibility

Corporate social responsibility is defined as principles of corporate governance that entail a wide range of issues such as environmental issues, social issues, government and stakeholder interests (Nyawuyanga 2015:9). According to Esinah (2014:15), corporate social responsibility is one of the important drivers of an organisation related to environmental management. Ardakani and Soltanmohammadi (2018:2) demonstrate that social corporate responsibility contributes to the organisation's value and sustainable development towards the environment. Corporate social responsibility takes and assesses responsibility based on the organisation's impact on social well-being as well as environmental concerns (Gupta, Kant & Malviya 2017:477; Taylor, Vithayathil & Yim 2018:972).

Bailey, Jia, Rueda and Zuluaga-Cardona (2018:272) found that implementation of green supply chain management creates additional capabilities in the organisation, which gives it a competitive advantage over its competitors in terms of social responsibility and initiatives. Das (2018:179) argues that both green supply chain management and corporate social responsibility help the organisation achieve its environmental goals, societal goals and economic goals, which ultimately improve the performance of the organisation. Finally, socially responsible practices can improve labour conditions, standard of living, customer satisfaction and well-being of the surrounding community, and thus, attract other segments of the market (Nguyen & Sarker 2018:2).

3.3.2.2 Customer pressure

Lins, Sunyaev and Teigeler (2018:5679) define customer pressure as pressure perceived from customers to organisations to adopt innovative concepts to fulfil their needs. Kinyanjui (2014:11) notes that customers have a direct impact on the organisation's environmental purchasing activities. In addition, the environmental purchasing and management can be influenced by the customers' priorities (Aekyati, Piriyakul & Khantanapha 2016:2).

Customers as external key stakeholders can influence organisations to adopt a green supply chain to set green standards when purchasing raw materials (Wang *et al.* 2018:674). Lately, organisations have been pressured by customers to adopt green initiatives while at the same time requesting legislators and political actors to address the issue of environmental sustainability (Duffy, Rentizelas & Tuni 2018:3). Khan and Qianli (2017:16834) mention that customer pressure has a positive role for organisations that are adopting green supply chain management, which leads to enhanced environmental and supply chain performance.

3.3.2.3 Regulations

Brito and Dudley (2012:1) describe regulations as a set of laws and rules that the government implements concerning what businesses, individuals and other organisations can or cannot do. Due to the enforcement of regulations, organisations and society are obliged to adhere to rules set by government legislations (Adamo *et al.* 2016:982), which have increased awareness of environmental impacts caused by organisations (Ogunlela 2018:168).

According to Kamolkittiwong and Phruksaphanrat (2015:865), government legislation and environmental regulations are the major drivers for organisations' environmental efforts to implement green supply chain management. Nadarajah and Sabri (2016:40) point out that

government regulatory restriction on organisations, harmful activities towards the environment contribute to green organisation initiatives and environmental practices. Reddy (2016:32) indicates that regulations put pressure on organisations to adopt green supply chain management in their supply chain and operations to reduce environmental sustainability issues.

The South African government has a number of regulations under the constitution that protect the environment. Godfrey and Oelofse (2017:2) point out that regulations such as the Waste Act 59 of 2008 and the Waste Amendment Act 26 of 2014 help the government to monitor environmental impact and waste disposal by organisations. Pooe and Mhelembe (2014:4) indicate that the National Environment Management Act 107 of 1998, National Water Act 36 of 1998 and the Minerals Act of 1991 are some of the regulations that organisations should take into consideration. According to Bvuma (2013:54), other regulations that minimise the environmental impact include Environmental Conservation Act 73 of 1989, Promotion of Access to Information Act 2 of 2000 and Atmospheric Pollution Prevention Act 45 of 1965. These regulations restrict companies from harming the environment and also encourage them to integrate environmental policies throughout the supply chain.

3.3.2.4 Competitiveness

According to Arslan and Tathdil (2012:32), competitiveness is the ability of an organisation or country to manufacture goods and provide services that meet the international market standards and increase competition. Begu, Dima, Maassen and Vasilescu (2018:3) refer to competitiveness as the ability of organisations, regions, industries and nations for enhancing innovation, sustainability and remaining exposed to international competition.

Gandhi, Kumar, Kumar and Mangla (2015:98) mention that competition can be sustained in the market through the implementation of green initiatives and practices in organisational activities. In this view, capabilities that differentiate the organisation from its competitors are critical to management decisions and improve the competitiveness of the business (Das 2017:1349). Chen, Xiao, Zeng and Zhou (2016:58) indicate that organisations have developed a strategy to mimic green practices among competitors to remain competitive. As a result, organisations are forced to change their approach and adopt their competitors' green strategies to be successful (Yang 2017:249). The following section identifies the benefits of implementing green supply chain management practices in the beverage industry.

3.3.3 Benefits of implementing green supply chain management practices

Iraldo and Testa (2010:956) claim that implementing green supply chain management practices generates business benefits, competitive and environmental benefits. These entail maintaining product quality, reducing carbon emissions and encouraging stakeholders within the supply chain to adopt green supply chain management practices (Li, Sheu, Yang & Ye 2018:925). According to Gupta *et al.* (2017:477), implementing green supply chain management practices can help supply chain members participate and deal with environmental issues. Organisations that voluntarily engage in these practices have experienced reduction in costs, continuous improvements and sustainable competitive advantage (Shah & Swami 2012:336). They also aim to maintain a long-term relationship between the organisation and supply chain partners (Akinlabi *et al.* 2015:315). Mbohwa and Mutingi (2012:325) highlight that a strong relationship with the supplier can result in lowering costs on materials purchased and reducing inventory levels. Chien (2014:14) points out that green supply chain management practices motivate organisations to comply with governmental environmental policies and achieve sustainable development, thus they can reduce waste and promote recycling to avoid being penalised for violating environmental regulations (Kinyanjui 2014:11). Accordingly, by working together with stakeholders, a positive outcome can be achieved such as improved environmental performance, better customer satisfaction and increased competitiveness (Feng, Wang, Wong, Xiao, Xu & Yu 2017:3).

The implementation of green supply chain management practices can enhance the company's image, reduce operational costs and create more market opportunities while satisfying customers (Javaid & Shoeb 2015:129). Younis (2016:5) argues that they can improve employee job satisfaction. Coetzee (2016:17) notes that adopting green supply chain management practices reduces supply chain costs, environmental impact and improves sales. In addition, Anholon, Novaski and Ordonez (2017:61) mention that they can reduce the environmental impact of an industrial activity without compromising the efficiency of energy use, quality, cost and reliability. For instance, Fang and Zhang (2018:1065) point out that green supply chain practices are involved throughout the product life cycle, enabling the company to continuously manufacture products and be competitive. Moreover, greening of the supply chain is essential as it encourages recycling and environmentally friendly practices due to resource scarcity (Qazi 2016:19).

Besides reducing costs and eliminating risks, the green supply chain presents competitive advantages for the organisation such as improved integration with suppliers, greener products

and lower prices (Ibarra, Neramballi, Rydell, Sequeira & Vestin 2017:4). In addition, the implementation of green supply chain management prevents an organisation from facing environmental penalties (Yang 2017:249). Shahriarpour and Tabriz (2017:268) highlight that by producing greener products, the demand for scarce resources is minimised.

Green supply chain initiatives attract investors and transform companies into market leaders while differentiating themselves from rivals (Bhattacharjee 2015:16). The initiatives furthermore create a competitive advantage for the companies by creating brand name recognition and distinction (Bhattacharjee 2015:16; Nguyen & Sarker 2018:2). The application of green practices also helps the organisation to maximise environmental performance and increase profit through cost savings (Gandhi *et al.* 2015:98). Practices of green supply chain management are explored in the next section.

3.4 PRACTICES OF GREEN SUPPLY CHAIN MANAGEMENT

3.4.1 Internal environment management

Kamolkittiwong and Phruksaphanrat (2015:866) describe internal environment management as a key driver that outlines policies and strategies to be used for implementing green supply chain management across the organisation. Abu-Rumman *et al.* (2015:149) define internal environment management as an organisational strategic approach to develop environmental sustainability through the support of top management. Internal environment management is defined as a major factor that helps implement green supply chain management through top management (Bhadauria *et al.* 2012:293).

Bai *et al*. (2014:90) asserts that internal environment management enables top management to integrate the organisation's objectives into environmental approaches. For success of internal environmental management, there must be communication between environmental professionals and business managers to encompass green supply chain management (Kyalo 2015:11).

Abdul-Rashid, Masoumik and Olugu (2014:52) note that support from top and mid-level managers have a significant influence on continuously improving the environmental performance. Anne, Bula, Gicuruand and Nicholas (2017:4) indicate that management is the key driver and motivator of the adoption of green supply chain management practices across the organisation. Anh, Trang and Vinh (2014:323) state that pressure from customers encourages management in the organisation to consider manufacturing green products, which in return stimulate environmental commitments. Abu-Rumman, Al Khattab and Massad (2015:82) found

that pressure from employees is one of most important factors used to convince management in adopting green supply chain management practices.

Internal green supply chain management practices can influence top management to be committed to sustainability (Burki, Dahlstrom & Ersoy 2018:1308). Jamali and Rasti-Barzoki (2017:1030) mention that supported management decisions from top management can help identify strategies to implement green supply chain management throughout the organisation's supply chain. Foo, Lee, Ooi and Tan (2018:4) argue that highly committed management can design and develop organisational policies aimed at implementing green practices. This study finds internal environment management crucial, due to the fact that management can influence all departments in the supply chain to adopt green initiatives and share information about environmental practices within the organisation. More importantly, the sole driver for implementing green supply chain management practices is management. Investment recovery is discussed in the next section.

3.4.2 Investment recovery

Mei (2013:12) defines investment recovery as the ability to recycle, resell unwanted assets and excess materials to gain revenue. Dubey and Gunasekaran (2016:9) describe investment recovery as a method used to dispose of unwanted items in a friendly manner. Ali *et al.* (2016:27) refer to investment recovery as an environmental approach used to eliminate waste and enhance the organisation's performance.

Kyalo (2015:13) points out that government regulations or legislation pressures companies to consider green supply chain management practices for products to reduce waste and costs. For that reason, companies are considering investment recovery as a strategy to tackle environmental impact. For example, companies are forming an alliance with recycling sites, selling scrap and setting up a reverse logistics system (Carvalho *et al.* 2016:125).

According to Huang, Liu, Zhang and Zhao (2016:1086), remanufacture and reverse logistics are some of the factors that lead to investment recovery. Huang and Li (2017:292) highlight that government regulations force organisations to adopt investment recovery, which encourages them to sell idle assets to avoid waste and environmental impacts. Karimi and Rahim (2015:29) argue that internal environmental and sustainable approaches lead to investment recovery, resulting in the sale of overloading scrap, inventories and capital equipment.

In practice, investment recovery promotes waste reduction, reuse and recycling of used products and at the same time minimises manufacturing costs and maximises profit (Huang *et al.* 2016:1086). In addition, investment recovery can convert idle assets such as equipment or machinery into revenue when sold and also bring about significant cost savings for the organisation (Enyinna 2017:20). Furthermore, inventory is decreased and related costs such as maintenance costs, taxes and storage costs are reduced to sustain the business operations (Hajikhani, Idris & Wahat 2012:256). It is through reverse recovery that excess assets can be converted into revenue. In addition, the organisation can benefit from the recycled materials and selling of unused assets, which saves cost and generates revenue in the process. The next section discusses the eco-design.

3.4.3 Eco-design

A study conducted by Alshura and Awawdeh (2016:170) described eco-design as a key factor that integrates environmental-friendly materials into product design in order to reduce environmental impact. According to Khan and Qianli (2017:5), eco-design can enable an organisation to minimise raw materials throughout the manufacturing process. Eco-design refers to the internal environmental approach aimed at reducing raw material and enabling products to be recycled (Akhtar *et al.* 2016:211).

Eco-design is initiated due to environmental impact at each stage of the product design to determine the energy to be consumed, waste generated and the type of materials to be used (Khan & Qianli 2017:5). The product design integrates the environmental aspects throughout production, distribution, consumption and disposal of the product (Sisodiya 2017:16). Through eco-design, companies aim to manufacture goods at a low cost whilst staying competitive and maintaining quality (Reddy 2016:37).

Acín (2018:43) indicates that factors such as recyclability and product remanufacturing leads to the adoption of eco-design due to the ability of the product to be recycled or reused by the organisation. Singhal (2013:65) argues that environmental regulations influence the organisation to consider eco-design in order to manufacture products that are less harmful to the environment. Furthermore, supplier collaboration can influence organisations to implement eco-design to respond to environmental concerns (Sisodiya 2017:16). Key factors, identified by Boon-itt, Laosirihongthong, Samaranayake, Thamsatitdej and Wannakarn (2017:329) include legislation, competitors, a customer's demand and environmental pressures that drive the organisation to implement eco-design with sustainable practices.

Eco-design enables an organisation to remanufacture products from recycled or returned products minimising raw material costs (Govindan, Khodaverdi & Vafadarnikjoo 2015:7209). It can also provide organisations with the opportunity to minimise environmental impact and improve product quality at a low cost (Kwon & Pourhejazy 2016:157). Furthermore, it offers long term benefits such as continuous upgrade of products and the use of biodegradable raw materials that are environmentally friendly (Amemba, Mburu, Nyaboke & Osoro 2013:56). This study includes eco-design due to the fact that it combines environmental aspects into the design development of products. In this context, eco-design plays a vital role in the manufacturing process to ensure that products contain used or recycled materials. Green purchasing is discussed in the next section.

3.4.4 Green purchasing

Ying (2014:12) refers to green purchasing as the action taken to purchase eco-friendly materials to attain the environmental goals set by the organisation. Jemutai (2014:3) defines green purchasing as a practice aimed at purchasing environmentally friendly materials. Govindan *et al.* (2016:129) indicate that green purchasing is aimed at eliminating waste by selecting raw materials from suppliers that are not harmful.

Green purchasing aims to procure components or materials that meet the organisation's eco-friendly goals and environmental objectives such as recycling, recovery and reuse materials. (Fauzi *et al.* 2017:21). Green purchasing has encouraged companies to consider evaluating suppliers based on their environmental performance prior to taking any procurement decisions (Ghatari & Shekari 2013:313). Essentially, by integrating the green standards into purchasing, organisations can provide design specifications to suppliers for parts, materials and equipment that support environmental requirements (Hu & Hsu 2010:591). Green purchasing principles entail that a company gathers environmental information on suppliers to assess their environmental activities (Mapfaira *et al.* 2014:7).

According to Chen, Lim, Tseng, Wong and Zhan (2016:363), factors that lead to green purchasing involve environmental performance, corporate social responsibility promotions and supplier selection. These contribute to the decision making of the organisation to eliminate and reuse waste (Amemba *et al.* 2013:56). At the purchasing stage, suppliers can be considered due to their environmental aspects and raw materials or products with green attributes (Eltayeb, Ramayah & Zailani 2010:497).

Kwon and Pourhejazy (2016:157) indicate that organisations can improve the environment by purchasing eco-labelled or friendly materials from suppliers that follow their green purchasing policies. Bui, Lim, Tan and Tseng (2017:809) argue that green purchasing can determine the type of suppliers to select that meet the environmental criteria set by policy makers, which involves environmental-friendly and eco-labelled materials. In this context, Asrawi (2016:23) indicates that green purchasing is a key factor in purchasing materials that are either reusable or recyclable. This study, therefore, considers the importance of green purchasing in the supply chain. It is through green purchasing that the organisation can eliminate waste and reduce costs with the cooperation of suppliers. Importantly, environmental impact can be minimised in an inbound supply chain, which includes environmentally friendly raw materials. Section 3.4.5 looks at environmental performance.

3.4.5 Environmental performance

Chattopadhyaya, Kumar and Sharma (2012:278) refer to environmental performance as the measurement of reducing waste materials that have an impact on the environment. Esfahbodi *et al.* (2016:70) mention that environmental performance is measured through materials usage, solid waste, harmful materials and energy consumption. Avittathur and Jayaram (2015:237) reveal that environmental performance is associated with a supplier's relationship with the organisation on the basis of sustaining the environment through the purchase and use of green materials.

Abu-Rumman *et al.* (2015:151) mention that environmental performance decreases the occurrence for environmental accidents, consumption for harmful materials and improves the organisation's environmental state. Environmental performance is achieved due to initiating green supply chain management from the beginning to the end of product life cycle (Kamolkittiwon & Phruksaphanrat 2015:23). Initiating green supply chain management helps improve efficiency among the organisation and suppliers to minimise waste, achieve cost savings and enhance environmental presence (Chitramani & Meera 2014:3).

Kazancoglu, Kazancoglu and Sagnak (2018:1288) mention that factors such as regulation compliance, processes and consumption of resources help evaluate the environmental performance of the organisation towards the environment. Green supply chain and green manufacturing has a positive impact on environmental performance due to increased environmental responsiveness (Dubey, Gunasakaran & Shibin 2017:107). Collaborating with customers and suppliers to align environmental objectives with them plays a significant role in

the success of environmental performance and improving environmental standards (Huo, Yu & Zhang 2017:4).

Das (2018:185) highlights that environmental performance leads to improved organisational performance, increased competitiveness and better relationships with stakeholders to solve environmental issues. In addition, it benefits the organisation by improving quality, productivity and efficiency, and reduces costs (Baresel-Bofinger 2016:39). Its importance to the study is its link to green supply chain management practices. Similarly, environmental performance aims to enhance an organisation's performance, image, reduce waste and supply chain costs, and thus, contributes to the study. The next section explores supply chain performance.

3.4.6 Supply chain performance

Supply chain performance refers to the operational measurement that creates supply chain improvement and supply chain members cooperation (Gagalyuk, Hanf & Hingley 2013:67). A study conducted by Anand and Grover (2015:144) revealed that supply chain performance is able to endorse cooperation amongst supply chain members and ensure constant improvement of useful processes. Lynch, Nyaga and Whipple (2010:516) define supply chain performance as a systematic process that measures supply chain operations regularly.

According to Wachira (2016:3), supply chain performance contains supply chain activities aimed at enhancing product availability, productivity and profitability. It is therefore measured through supply chain activities, which consist of strategic planning, sourcing processes, assembly procedures and delivery schedules (Wachira 2016:3). Furthermore, supply chain performance improves delivery performance, responsiveness, efficiency, time, quality and cost (Abdallah *et al.* 2014:16).

Cross and Dissanayake (2018:103) indicate that stakeholders' input in the organisation helps evaluate measures to better the supply chain performance. According to Kozarević and Puška (2018:151), other factors that can lead to supply chain performance include cost reduction, improved speed and time, partnership relationship, and a supplier's performance and quality, which contribute to the measurement and sustainability of supply chain performance (Chege 2012:3).

Barua, Katiyar, Kumar, Meena and Tibrewala (2017:307) found that collaborating with trading partners such as customers, suppliers and distributors improves the supply chain performance. Also, the implementation of green supply chain management increases the supply chain

performance by reducing environmental impacts and meeting environmental regulations (Chege 2012:2). Supply chain performance improves supplier relations, product quality and reduces environmental impact. For that reason, the study adopted supply chain performance as it is linked to the green supply chain management practices. The next section explores more closely the challenges experienced in implementing green supply chain management practices.

3.5 CHALLENGES IN IMPLEMENTING GREEN SUPPLY CHAIN MANAGEMENT PRACTICES

3.5.1 High investment

According to Younis (2016:5), the implementation of green supply chain management practices requires a lot of investment that might start earning returns in the long term. Adamo *et al.* (2016:986) agree that green supply chain management practices have a low return on investment but require high investment. The investment required will have to cover the increase in training costs, operational cost and costs of procuring eco-friendly materials (Mazumder, Rhaman & Shah 2013:2684). In addition, adopting green supply chain management practices leads to financial pressure, which forces the organisation to lower prices (Jabbour, Nejati & Rabiei 2017:165). However, financial constraints lead organisations to resist implementing green supply chain management practices. New technology also requires significant investment to maintain the green practices (Baresel-Bofinger 2016:25). Many organisations that attempt to adopt green initiatives in the supply chain realise that direct costs are unavoidable and higher (Pooe & Mhelembe 2014:4). On the other hand, companies with a limited budget will find it difficult to initiate environmental training programmes for employees (Barve & Muduli 2011:487). In the next section, lack of experience and knowledge based on green supply chain management is discussed.

3.5.2 Lack of experience and knowledge

The lack of knowledge on green supply chain management by stakeholders in the supply chain is seen as one of the challenges in implementing green supply chain management (Da Silva, Da Silva, De Oliveira, Espindola & Rocha 2018:541). Stakeholders who lack experience find it too complex to implement green supply chain management (Fernando, Rahim & Saad 2016:149). Awasthi, Chauhan, Goyal, Kaur and Sidhu (2017:316) found that there is a lack of professionals exposed to green supply chain management. Esinah (2014:15) mentions that lack of information about green initiatives hinders the implementation of green supply chain management practices. To understand the green implementations, training is required, seeing that specific knowledge

and advanced new technology is involved (Bailey *et al.* 2018:365). The implementation of green supply chain management practices would be successful due to training that imparts knowledge and skills to staff (Jemutai 2014:3). However, a study by Tchaikovsky (2017:35) discovered that lack of training still exists and acts as a barrier to implement green supply chain management practices. Nadarajah and Sabri (2016:40) highlight that a lack of understanding towards green supply chain objectives can lead to confusion, disputes and disagreement among supply chain stakeholders. The next section explores the lack of managerial support in implementing green practices.

3.5.3 Lack of managerial support

The lack of managerial support is among the main challenges in the success of green supply chain management implementation (Adzanyo, Agyemang, Antarciuc, Zhao & Zhu 2018:211). Despite these challenges, managerial support is crucial for the success of implementing green supply chain management (Adamo *et al.* 2016:987). Hu and Hsu (2010:591) argue that managerial support is fundamental to help organisations implement green supply chain management and deal with the environmental issues. Bailey *et al.* (2018:270) discovered that employees experience absence of direction in relation to green approaches and compliance with environmental standards. It would therefore be impossible for employees to implement green supply chain management without receiving top management support and commitment (Hwang & Kang 2017:693). The next section illustrates the conceptual model of the study.

3.6 THE CONCEPTUAL MODEL

For this study, the research framework is illustrated in Figure 3.3. The framework is made up of four constructs, namely, internal environment management, investment recovery, eco-design, and green purchasing, and one mediator, environmental performance, with one outcome variable, supply chain performance. Figure 3.3 indicates the relationships existing among the variables.

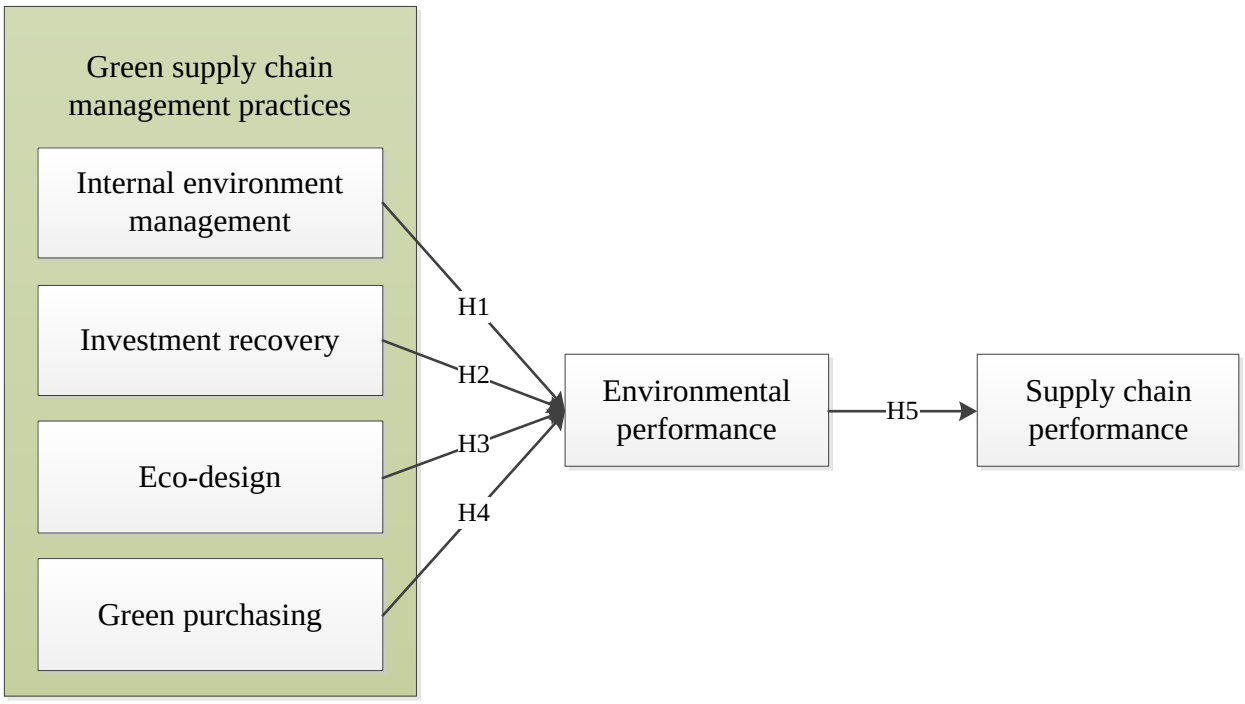


Figure 3.3: Conceptual model for the relationship between green supply chain management practices, environmental performance and supply chain performance

Source: Own source

3.7 HYPOTHESES STATEMENT DEVELOPMENT

This section provides the hypotheses as depicted in Figure 3.3. Furthermore, the development of hypotheses indicates the relationships that exist between the research variables, which are internal environment management, investment recovery, eco-design, green purchasing, environmental performance and supply chain performance.

3.7.1 Relationship between internal environment management and environmental performance

According to Chu, Lee, Park and Yang (2017:6), top management commitment is one of the important driving forces for the organisation to implement green supply chain management and improve environmental performance. Internal environment management allows the top and mid-level management to cooperate effectively with employees and internal stakeholders to address environmental issues (Boon-itt, Wong & Wong 2018:379). Importantly, the scope of internal environment management is to encourage managers to support environmental practices, environmental management systems and inter-departmental cooperation to adopt green activities

(Çankaya & Sezen 2018:5). Burki *et al.* (2018:1309) found that management commitment improves environmental performance and an organisation's commitment to sustainability. Anh *et al.* (2014:323) state that internal environment management is more significant in emphasising green supply chain management practices across the organisation. Bee, Fernando, Jabbourand and Thomé (2018:421) argue that management commitment can inspire other internal stakeholders in the supply chain to adopt green practices in order to move towards sustainability and improve environmental performance. Abdul-Rashid *et al.* (2014:52) demonstrate the positive influence of internal environment management on environmental performance based on top management implementation and monitoring of green supply chain practices. This leads to the following hypothesis:

H1: There is a positive relationship between internal environment management and environmental performance.

3.7.2 Relationship between investment recovery and environmental performance

Investment recovery is considered as a green practice that can allow products to be recycled, redeployed and resold (Parasayu, Santoso, Sari & Susanty 2017:3). The handling and controlling of inventory through investment recovery is meant to reduce costs and minimise idle materials and products (Abu-Rumman *et al.* 2015:83). Investment recovery aims to maximise the organisation's return on idle assets through recycling or selling them (Hajikhani *et al.* 2012:256). In addition to cost savings and profit maximisation, investment recovery helps the organisation deploy surplus assets to other departments or locations of the organisation to avoid the disposition of these surplus assets to scrap yards and landfills (Enyinna 2017:20). According to Karimi and Rahim (2015:29), investment recovery can decrease waste and internal environmental concerns across the supply chain by selling overload scrap, capital equipment and inventories. Kummer, Maditati, Munim and Schramm (2018:157) investigated the impact of green supply chain management practices on organisational performance and found that investment recovery can positively affect environmental performance. Mei (2013:13) claims that investment recovery can reduce environmental impact and improve profit. The selling of assets and unwanted items can generate revenue for the organisation and minimise storage costs (Bahrin, Munir, Othman & Sundram 2017:90). Therefore, the following hypothesis is put forward:

H2 There is a positive relationship between investment recovery and environmental performance.

3.7.3 Relationship between eco-design and environmental performance

Eco-design emphasises the enhancement of the product design, processes and quality to reduce its impact on the environment (Foo *et al.* 2018:4; Fang & Zhang 2018:1066). According to Ghatari and Shekari (2013:313), eco-design aims to design products that encourage environmental awareness and waste management. Barbosa and Scur (2016:1295) state that eco-design acts as an environmental management system that integrates environmental issues into the procurement processes. Eco-design adoption provides an opportunity for the organisation to improve efficiency of resource use and minimise waste through modifying product sizes and enabling product recycling (Asrawi 2016:22). According to Gábriel (2016:38), modification of the product size and enabling the product to be recyclable doesn't compromise the essential product criteria such as cost and performance. Boon-itt *et al*. (2017:329) found that eco-design allows the organisation to integrate the concept of sustainability throughout the supply chain, which leads to improved environmental performance. Eltayeb *et al*. (2010:500) found that eco-design has a positive relationship with environmental performance. On the other hand, Bhadauria *et al*. (2012:293) emphasise that reducing a product's environmental impact positively influences environmental performance. Overall, eco-design is necessary for creating new markets and contributing to product innovation that result in positive outputs (Chai & Kim 2017:4). Therefore, this study proposes the following hypothesis:

H3: There is a positive relationship between eco-design and environmental performance.

3.7.4 Relationship between green purchasing and environmental performance

Purchasing activities include supplier selection, inventory selection, negotiation, outsourcing, procurement, distribution and inventory management (Matwere, Muma, Nyambega & Nyaoga 2014:271). Green purchasing is defined as an organisational process that involves the procurement of raw materials to be used in the production process, as well as taking into consideration the aspects concerning the environmental criteria (Purnomo 2013:53). According to Goh, Haron and Ramakrishman (2015:42), organisations implementing green purchasing can carefully select products and services from the supplier that are less harmful to the environment. Saridogan (2012:133) mentions that it is crucial to involve potential suppliers at the first stage of purchasing of raw materials. By involving the supplier at an early stage, the organisation can avoid purchasing harmful materials that can impact the environment (Choomrit, Kiatcharoenpol, Sirisawat & Wangphanich 2016:383). According to Esinah (2014:12), collaborating with suppliers can lower environmental impact by purchasing green and recyclable materials from

them. Huo *et al.* (2017:4) argue that collaborating with suppliers can also help solve environmental issues and improve environmental performance. Alshura and Awawdeh (2016:169) investigated the impact of green supply chain practices on green performance and reveal that green purchasing is positively related to environmental performance. Finally, De Sousa Jabbour, Jabbour, Latan and Vazquez-Brust (2017:14) highlight that green purchasing and environmental performance are related. Therefore, the following hypothesis is postulated:

H4: There is a positive relationship between green purchasing and environmental performance.

3.7.5 Relationship between environmental performance and supply chain performance

Sinnandavar, Soh and Wong (2018:538) define environmental performance as the ability of the organisation to minimise effluent waste, air emissions, solid waste and decrease the consumption of toxic materials. The environmental performance measurements such as regulatory compliance, environmental management system and performance measures help improve the supply chain performance (Alexopoulos, Kounetas & Tzelepis 2018:1277). Laari, Ojala and Töyli (2017:3) highlight that environmental performance could improve the organisation's image and performance, stakeholder relationships, cost saving and offer better quality products and service to customers. Consequently, the implementation of green supply chain management practices can reduce operational costs and prevent the organisation from being penalised for not following environmental regulations (Singhal 2013:68). A study by Kazancoglu *et al*. (2018:1289) found that environmental performance and supply chain performance are interlinked or related, based on their environmental sustainability throughout the supply chain. According to Ying (2014:10), supply chain performance can be enhanced through green practices, which ultimately increases sales and reduces operational costs. In short, supply chain performance outcomes signify the positive effects of green supply chain management practices by organisations (Dragomir 2018:1125). Accordingly, the following hypothesis is presumed:

H5: There is a positive relationship between environmental performance and supply chain performance.

3.8 CHAPTER 3 CONCLUSION

The concept of green supply chain management has received increasing attention in the past two decades with the start of green initiatives in the supply chain. Since then the concept of a green supply chain has evolved through new definitions and interpretation. The literature review

presented the theoretical approach, which is the institutional theory for the study. This chapter has considered various green supply chain management definitions. The main practices of green supply chain management, namely, internal environmental management, investment recovery, eco-design, green purchasing, environmental performance and supply chain performance were discussed. The benefits of implementing green supply chain management practices were explored briefly. The challenges experienced in implementing green supply chain management practices were discussed. The conceptual model depicted the research variables in the form of a figure while the hypotheses statement development explained the relationship amongst them. The next chapter addresses the research methodology, design and discusses various methods used to gather information and appropriate data.

CHAPTER 4
RESEARCH METHODOLOGY AND DESIGN

4.1 INTRODUCTION

The previous chapter discussed the literature review and illustrated the conceptual model used in this study. This chapter discusses the research paradigm, research methodology and design adopted. It includes an in-depth discussion of the research process, target population, sample, data collection, statistical analysis, reliability and validity. Various definitions are discussed as well as an in-depth review of ethical issues.

4.2 RESEARCH PARADIGMS

The concept paradigm is commonly used in social science literature (Ghiara 2019:2). Jonker and Pennink (2010:69) define a paradigm as a thinking framework of methods, values and beliefs that guides the research project. Additionally, a paradigm is a set of methods or practices used to explore phenomena examined and questions asked of a particular research (Christensen & Johnson 2012:31). According to O'Neil (2016:3), a research paradigm is a system that encompasses interrelated thinking and practices to describe the nature of an investigation. A research paradigm guides the researcher in the selection of participants, methods and instruments as well as establishing a conceptual framework to be used in the study (Walther 2014:117). The list of recognised paradigms consists of interpretivism, positivism, realism and critical theory (Collins 2010:39).

4.2.1 Interpretivism

According to Wahyuni (2012:71), interpretivism focuses on a subjective belief that individuals imply to create the reality and their perception of the world. Interpretivism is based on providing an insight of the unpredictable future, rather than prediction (Melnikovas 2018:37; Ghiara 2019:9). The interpretivist paradigm focuses on uncovering and describing perceived meaning of realities (Nieuwenhuis 2016:37). In interpretivism, the researcher seeks to reveal hidden meaning from participants by means of collaborative understanding and discussion on the subject matter (Medina & Taylor 2014:5). In this view, the researcher can discover the deeper meaning through cooperative discussions with participants (Caton 2013:130).

4.2.2 Realism

Tabassum (2014:33) refers to realism as a philosophy that relates to scientific states and objectivism that uncover the truth. Realism presents reality as it is, to provide understanding, facts, credibility and accuracy of data collected (Håkansson 2013:4). A realism paradigm allows researchers to uncover facts and truth from participants in the field as well as disapproving any falsification of data. The realism paradigm is associated with positivism and the aim of uncovering facts (O'Neil 2016:3). Realism assumes that reality doesn't depend on the minds of individuals but rather on objective perception (Creswell 2014:121).

4.2.3 Pragmatism

Pragmatism, according to Arisha and Ragad (2018:5), is a research philosophy that mainly focuses on achieving the research objectives and addressing the research questions. Al-Zefeitiand Mohamad (2015:5) suggests that researchers should consider using all appropriate approaches to understand the research problem and objectives, rather than focus on methods such as quantitative, qualitative and mixed methods. On the other hand, Held (2019:3) points out that pragmatism merges quantitative and qualitative methods to answer the research question. The pragmatism paradigm relates to data collection methods, analysis and results of a study (Tabassum 2014:33). Therefore, it is advisable that the researcher uses a well-structured research design that supports the credibility, reliability and relevancy of the data to be obtained (O'Neil 2016:4).

4.2.4 Positivism

According to Dainty, Sunindijo and Zou (2014:318), a positivist paradigm is designed for the application or use of scientific methodologies to explore social issues or problems. A positivist paradigm is concerned with human behaviour, exploring reality and presenting the truth by experimental means (Bryman 2012:28). Consequently, positivism ensures that the research is truly objective and unbiased (Wilson 2010:10; Kamal 2019:1390). A study conducted by Kivunja and Kuyini (2017:31) under the positivist paradigm exhibited the following five principles:

- the principle that the researcher can use theory to predict the results;
- the principle that the results can be measured;
- the principle that positivism searches for facts;

- the principle that positivism has the ability to observe the truth or knowledge; and
- the principle that positivism can formulate and test hypotheses.

Positivism is a philosophy that attains knowledge through the use of scientific methods to conduct research (Denscombe 2010:237). In this study, the positivist paradigm was adopted based on its ability to test hypotheses to make conclusions. This is primarily due to its direct link with quantitative research that this study used.

4.3 RESEARCH APPROACHES

4.3.1 Inductive

In an inductive approach, theories are formulated based on images, patterns and observations (Benitez-Correa, Gonzalez-Torres, Ochoa-Cueva & Vargas-Saritama 2019:230). Lee and Lo (2014:48) suggest that theory formulation should establish a common relationship between variables within a specific framework. An inductive procedure allows the researcher to approach the field and conduct his or her study without a hypothesis to understand the research phenomenon (Arisha & Ragad 2018:5). Kuosa (2011:330) asserts that an inductive approach starts with collecting data and then the approaches to theory of development as an outcome of the data analysis. Unlike a deductive approach, an inductive approach does not generalise conclusions in a study (Creswell 2013:18).

4.3.2 Abductive

Kousa (2011:331) claims that an abductive approach establishes what is true and draws its conclusion by using both inductive and deductive approaches. According to Lewis, Saunders and Thornhill (2016:38), an abductive approach is a form of inference, aimed to identify contexts, structures, constraints and connections to conclude a research project. The abductive approach is linked with an interpretivism paradigm that focuses on understanding the experience of participants (Ahvenainen & Patokorpi 2009:129). This approach focuses on drawing conclusions based on available knowledge (Ahmed-Kristensen, Christensen & Cramer-Petersen 2019:41).

4.3.3 Deductive

There are three research approaches to theory development, namely, the inductive, deductive and abductive approach (Bernard 2011:5). This study adopted a deductive approach. A deductive approach means that the researcher can approach the field with a hypothesis framework (Collins 2010:43). Kim, Kim and Lee (2014:46), as well as Benitez-Correa *et al.* (2019:230) posit that a

deductive approach puts theories into practice to find experiential evidence. In this context, a theory is verified or tested by the researcher to define and examine a hypothesis (Creswell 2014:99). According to Wilson (2010:9), a deductive approach emphasises the following:

- shifts from theory to data;
- is a well-structured approach;
- explains causal relationship between variables;
- collects quantitative data;
- ensures validity of data; and
- selects a suitable or sufficient sample size to generalise conclusions.

In this study, a deductive approach was adopted due to its association with the quantitative research approach that the researcher used. Boncz (2015:22) asserts that quantitative research approaches tend to be deductive due to the fact that researchers collect data on a large sample to prove their theoretical statements or hypotheses. The following section explores the research methodology and design of the study.

4.4 RESEARCH METHODOLOGY AND DESIGN

Kamal (2019:1391) defines methodology as the method adopted in order to conduct a study. The research methodology for this study comprises the research design, research approach, sampling method, data collection, measurement instruments, data analysis and ethical issues. Håkansson (2013:1) defines research methodology as a process that guarantees the quality of outcomes of the research study or project. According to Daniel (2018:1), research methodology enables the researcher to utilise systematic procedures and approaches to solve and explore various problems. Jonker and Pennink (2010:25) refer to research methodology as the method designed to conduct and approach the research project. Mohajan (2018:4) found that the research methodology generates theory within the procedural framework of the research conducted. The research methodology was considered in this study in order to achieve appropriate, accurate and well-founded outcomes.

4.4.1 Research design

Leavy (2017:8) defines research as an organised and systematic effort to explore a particular challenge and provide a solution to it. Accordingly, the research objective is to develop theories and add new knowledge (Schwartz-Shea & Yanow 2013:19). Chawla and Sodhi (2011:48)

define research design as the description of methods and measures for obtaining the information required. Sahu (2013:25) states that a research design is the blueprint of the different steps to be undertaken, starting with the formulation of the hypothesis to drawing inferences during a research process. Toshkov (2016:1) suggests that in research design, a study should specify the procedures or methods necessary to solve the research problems. Bairagi and Munot (2019:10) argue that the research design should state how data will be tested and which methods will be applied for the study. A research design includes selecting a sample, collecting and facilitating the data, and testing the hypotheses (Aguinis, Bailey & Hill 2019:3).

The research design for this study includes random selection of participants and facilitating data collected. A cross-sectional survey design is used for this study. According to Panneerselvam (2014:12), a cross-sectional survey design entails collecting data for a specific study project, at a specific period of time through a structured interview or questionnaire. Ruzungunde (2014:53) states that the cross-sectional survey design embraces the gathering of information on multiple items relating to two or more constructs in order to determine their relationships. The following section explores the research process of the study.

4.5 RESEARCH PROCESS

Research process is defined as the stepwise description of various activities aimed at accomplishing the objective of a research project (Sahu 2013:15). A research process guides the researcher to properly conduct his or her study to get optimised results (Bairagi & Munot 2019:10). The research process onion of Lewis, Saunders and Thornhill (2009:80) is chosen in order to give direction to this study. This research process onion illustrates the research philosophy, paradigms, approaches, methods, strategies and data collection methods followed by researchers (Collins 2010:48).

According to Lewis *et al*. (2016:38), the research methodology can be constructed based on the theoretical concept of the research process onion in Figure 4.1. In other words, the research process onion provides ways for researchers to formulate an effective research methodology for their study (Raithatha 2017:50). Melnikovas (2018:33) asserts that the research methodology construction starts with delineating the main philosophy, selecting approaches, methodological choices, strategies and time horizons as well as defining the main procedures used to collect and analyse data.

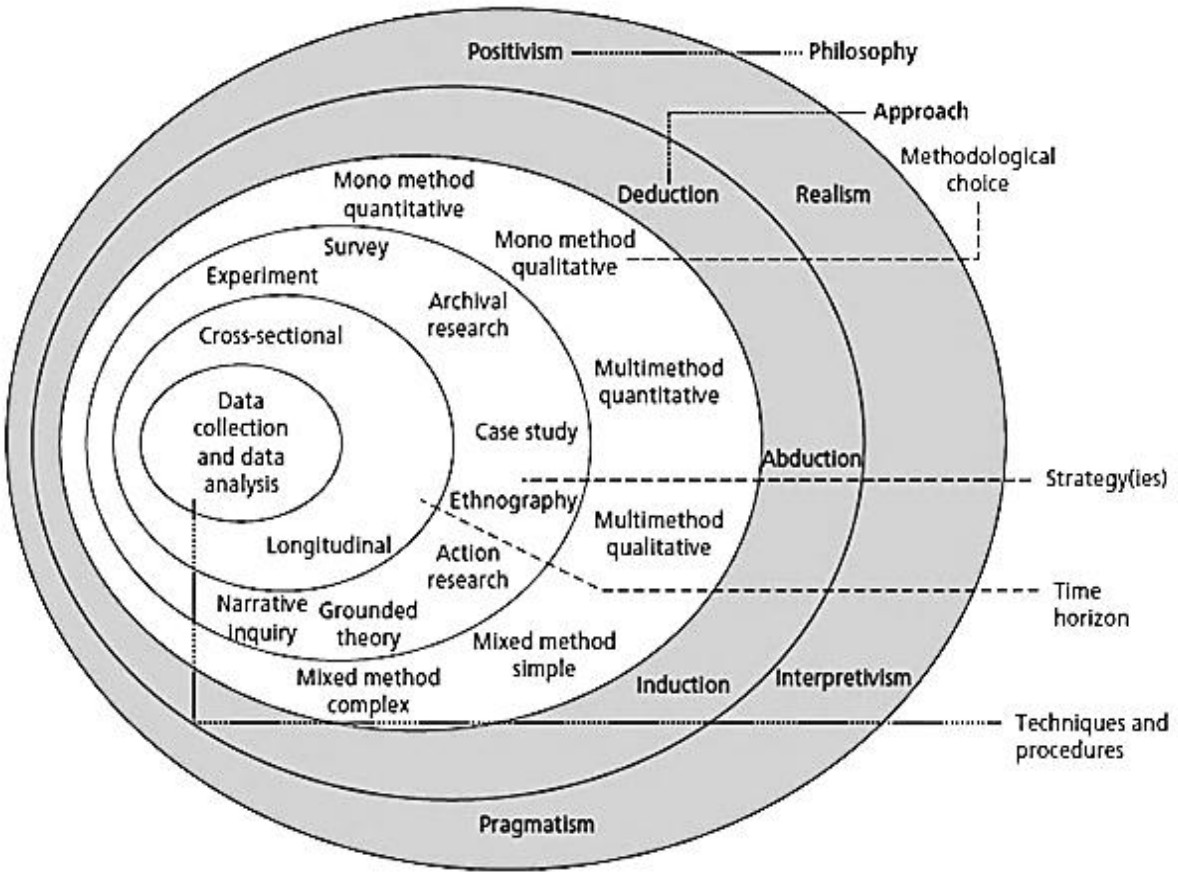


Figure 4.1: The research process onion

Source: Lewis *et al*. (2009:81)

The above figure shows important issues considered in this study. According to Al-Zefeiti and Mohamad (2015:2), several layers and techniques of the research process onion are employed when conducting a research project. A brief summary of each layer of the research process onion is given below:

- **Philosophy** – forms the foundation of the study by means of delineating ontology - nature of facts, axiology, - reality, epistemology - ethics, beliefs and values of the research.
- **Approaches to theory development** – are employed based on the philosophy and typically include: a deduction approach that begins with an existing theory and develops a hypothesis in order to prove or reject it; an abduction approach observes the empirical phenomena and facts; an induction approach forms a theory through observation, collecting information and analysis.
- **Methodological choices** – quantitative, qualitative and mixed methods may be selected as methodological choice.

- **Strategies** – involves research strategies used to gather and analyse data. The strategy layer comprises survey, case study, action research, experiment, narrative inquiry, archival research, grounded theory and ethnography.
- **Time horizons** – states the time frame for a study. Cross-sectional involves collecting information at a specific period of time, while longitudinal involves collecting information frequently over a long period of time.
- **Techniques and procedures** – research tools used to collect and analyse data. For example, preparing interviews, using primary or secondary data, questionnaire construction and selecting sample group.

Source: Lewis *et al*. (2016:39)

Using the different layers of the research process onion in Figure 4.1, this study adopted the positivism paradigm, deduction approach, the quantitative research approach, survey, cross-sectional and statistical analysis. The following section describes the research approach of the study.

4.6 RESEARCH APPROACH

A research approach is a strategy or a procedure for a study, which helps cover the steps from extensive assumptions to comprehensive methods of data compilation, data examination, and interpretation (Creswell 2013:3). Dainty *et al*. (2014:318) indicate three key approaches to research, which are qualitative, quantitative and mixed method approaches. Quantitative research is viewed by Neuman (2014:11) as a method that uses measurement to transform collected data into statistics to develop a scientific model. On the other hand, a qualitative approach refers to the collection of data, analysis and interpretation in order to describe and understand patterns, relationships, and themes (Tracy 2013:36). According to Beasley, Dopp, Eisenberg, Mundey and Silovsky (2019:3), a mixed method approach involves a research strategy that combines quantitative and qualitative methods drawn from different research paradigms or traditions. The following section discusses the quantitative research approach, implemented in this current study.

4.6.1 Quantitative research

A quantitative research is an experimental research where information is in a form of numbers or statistics (Leavy 2017:9). Quantitative research, according to Okello and Were (2014:11), is a

research method intended to determine facts, test theories, predict outcomes and demonstrate the relationships between variables. These variables can be measured through instruments by analysing the data using statistical procedures (Creswell 2014:42). Quantitative research emphasises the measurement of variables and presents results in an analytical manner as well as generalising the conclusions (Kumar 2019:16). Quantitative research supports testing and experiments by measuring variables to confirm hypotheses and theories (Christensen & Johnson 2012:33). This study adopted the quantitative research approach to test relationships between variables, which are internal environment management, investment recovery, eco-design, green purchasing, environmental performance and supply chain performance. The quantitative approach involves logical testing of statistical information used to confirm or challenge a hypothesis (Cataldo, Kielmann & Seeley 2012:19; Baden & Major 2013:525).

According to Daniel (2016:94), advantages of using a quantitative research approach in a study are:

- This research approach can reduce the researcher's time and energy when analysing data by using a Statistical Package for Social Science to provide accurate numeric data.
- The research results can be generalised.
- This research approach can validate and test a previously constructed hypothesis to find out how phenomena occurred.
- This research approach is relatively suitable for a large sample size.
- The researcher doesn't interfere with the research results since they are independent.
- This research approach assures anonymity of respondents and conceals their identity.

Furthermore, this study examined the relations between variables; for this, Al-Zefeiti and Mohamad (2015:4) argue that a design such as a correlation quantitative study is suitable to examine the relations between variables. The purpose for selecting a quantitative approach was to enable the researcher's results to be generalised to other industries. Sampling design is discussed in the next section.

4.7 SAMPLING DESIGN

Boncz (2015:24) refers to sampling design as the procedure or technique used to obtain a sample from the target population. According to Grafström (2010:85), a well-structured and organised sampling design can lead to the acquisition of accurate and consistent results of the research. The

study by Christensen and Johnson (2014:343) suggests that the target population, sample frame, sample size and method should be considered in designing the sample.

4.7.1 Target population

According to Wang (2014:400), target population is defined as a group of elements of which a sample will be taken. Depoy and Gitlin (2013:71) refer to target population as the total number of elements from which the researcher is able to select a sample. Couper and Groves (2011:37) define target population as a group of individuals of a specific population that is applicable to the research study or project. The target population is known to consist of organisations, groups and individuals (Quinlan 2011:206).

In this study, the target population was restricted to supply chain management professionals of beverage companies, which are registered, such as Kingsley Beverages, The South African Breweries, Tiger Brands, Little Green Beverages (Pty) Ltd and Amalgamated Beverages Industries in Gauteng. The population group comprised both female and male employees. Permission to conduct the study was obtained from the Beverage Industries after the Higher Degree Committee of the Vaal University of Technology approved the research proposal. The following section explores the sample frame.

4.7.2 Sample frame

A sample frame refers to a well thought out list of the individuals in a population (Barber *et al.* 2009:258). According to Newby (2013:165), a sample frame, also known as a population frame, is a list of members of the target population that is used to draw or create the sample. In other words, a sample frame is a structured or ordered list, which represents the whole population (Bonituo 2014:38; Faul, Lawson & Verbist 2019:128).

For this particular study, the sampling frame was made up of 80 beverage companies from Beverage Companies' head office in Johannesburg. The questionnaires were handed to the supply chain management professionals from various beverage companies in Gauteng, at least five questionnaires per each company. Supply chain management professionals are individuals who are certified professional purchasers in the company (Alberta Canada 2016:1). The next section explores the sample size of the study.

4.7.3 Sample size

Kumar (2011:194) states that a sample size refers to the quantity or degree of the sample from which the essential information is acquired. Quinlan (2011:208) defines sample size as the number of individuals that participate in a survey. Couper and Groves (2011:40) refer to sample size as a statistical concept that involves the number of people and information collected in a survey. The sample size was chosen based on historical evidence. Previous studies conducted by Allen and Hsu (2010:586); Goh *et al.* (2014:510); Okello and Were (2014:107) and Ali *et al.* (2016:22) that examined various green supply chain management practices in the manufacturing sector used a sample size of 400. For this study, a sample size of 400 was used. The following section explains the sampling method used in this study.

4.7.4 Sampling technique

Sahu (2013:26) defines sampling technique as the procedure for selecting a sample group from a population. Sampling technique involves a selection of individuals and drawing samples from a population (Wang 2014:412). There are two categories of sampling techniques, namely, probability and non-probability samples (Aguinis & Solarino 2019:30). Berndt and Petzer (2011:173) refer to non-probability sampling as an instance whereby the researcher's biased opinion concludes which samples should be used for insertion in the research. Typical examples of non-probability techniques are purposive sampling, quota sampling, convenience sampling, snowball sampling as well as judgement sampling (Babin, Carr, Griffin & Zikmund 2010:395).

On the other hand, a probability sampling technique gives a mainly consistent depiction of the whole population (Walliman 2011:96). A probability sampling technique was selected for the purpose of this study. It was thought to be significant as it allows the researcher to obtain positive results from the large sample frame. There are five approaches used in probability sampling, namely, simple random, stratified, multi-stage sampling, systematic, and cluster sampling (Kaliyadan & Kulkarni 2019:85). In this study, the simple random approach was used specifically in the extraction of the sample size. The next section discusses the simple probability random sampling approach used in this study.

4.7.4.1 Simple probability random sampling

A simple random sampling approach allows participants of the target population to be equally selected (Al-Zefeiti & Mohamad 2015:5; Kaliyadan & Kulkarni 2019:85). According to Anson, DeFusco, McLeavey, Pinto and Runkle (2015:249), a simple random sample is a subdivision of

a superior population created in such a way that each component of the population has the same probability of being nominated to the subdivision. This sampling method can provide an unbiased view and estimate well the parameters of interest if the population is similar (Walliman 2011:97). For that reason, the researcher has identified specific sampling units to be included in the sample. The sampling units in this study were supply chain management professionals that had an equal chance to be included in the sample. For this study, a simple random sampling technique was used. The following section focuses on the data collection.

4.8 DATA COLLECTION

When preparing to collect data for a study, it is important for the researcher to obtain reliable information using an appropriate data collection method (Aguinis *et al*. 2019:5). Berndt and Petzer (2011:202) assert that a data collection method is primarily used to extract responses from the sample population. These methods used to collect data include telephone surveys, drop and collect, online interviews, group administered questionnaires and mail surveys (Quinlan 2011:221). In this study, data were collected using a self-administered questionnaire. In this context, the researcher made use of a drop and collect method, since the self-administered questionnaires can be completed without the researcher being present.

Bhengu (2011:23) defines a self-administered questionnaire as a survey that allows participants to complete the survey or answer questions without the researcher's interaction. The study made use of a closed-ended questionnaire. According to Creswell (2013:5), a closed-ended questionnaire is easier to administer and can accommodate a large sample size. A measurement scale was used, which is defined by Hair *et al.* (2014:106) as an instrument with a prearranged number of closed-ended responses that can be used to acquire an answer to a question. On the other hand, measurement is a fundamental principle in conducting social science study (Hair *et al*. 2016:4).

4.8.1 Data preparation

In this study, the researcher employed cleansing, editing and coding as data preparation stages to ensure that data collected are complete for analysis. Stangor (2014:346) defines data preparation as a process that involves analysing data for accuracy and completeness before it is uploaded into an applicable system. Moreover, the data collected through the self-administered questionnaire must be assessed before the researcher can analyse it (Gupta, Keshri, Mishra, Pandey, Sahu & Singh 2019:67). Data preparation phases for this study are explained as follows:

- Data cleansing: Arthur and Sarpong (2013:14) define data cleansing as a process that involves detecting errors in data and possibly correcting them. In this view, data cleansing has helped the researcher to detect and uncover errors such as non-response error, measurement error, item non-response error and process errors found in this study.
- Data editing: Sam and Sam (2011:178) refer to data editing as a process that evaluates and corrects data collected through questionnaires to detect incompleteness, discrepancies and errors in order to rectify them prior to tabulation. In this study, the researcher has thoroughly examined the completed questionnaires to determine whether they are satisfactory for use and, if not, the unsatisfactory questionnaires were discarded.
- Data coding: According to Bryman (2012:710), data coding is a process whereby raw data is transformed and coded using numbers or letters. Coding makes it easier for researchers to understand and analyse the data collected (Mgiba 2015:54). Data coding for this study involved assigning numeric codes to respondents' answers enabling the researcher to analyse them.

The next section explores the measurement instruments of the study.

4.9 PILOT TEST AND MEASUREMENT INSTRUMENTS

Lewis, Saunders and Thornhill (2012:145) define pilot testing as an activity that allows the researcher to test the research methods and the data collection instruments in preparation for a large study. Kiarie and Mogeni (2016:44) state that the pilot testing can help determine the reliability of the data collection instruments, that is, the questionnaires. In this study, the pilot testing was conducted using the adapted data collection instruments. The researcher used the pilot testing to check the validity and reliability of the adapted instruments prior to the mian study. In addition, this study undertook a pilot survey test with a view to illustrate that the adapted instruments are understandable, appropriate and practical. Based on the outcome, the pilot survey test results confirmed that the adapted data collection instruments did not contain any confusing items and the respondents found it easy to complete. However, the pilot survey test results were not included in the final analysis.

Pearce and Yong (2013:80) refer to a measurement instrument as a method that involves the observation, questionnaire and interview used to generate or collect the survey data. A questionnaire was used to obtain the primary data. The questionnaire for this study consisted of six sections. The respondents' selections in Section B to F was on a five-point Likert scale. This scale indicated 1=Strongly disagree, 2=Disagree, 3=Moderately agree, 4=Agree and 5=Strongly

agree. Section A gathered biographical information on gender, age, marital status and qualifications. Section B was used to gather information on green purchasing. The questions in this section were adapted from previous studies conducted by Shaharudin, Tan, Tan and Zailani (2016:547). Section C was used to gather information on investment recovery. Questions in this section were adapted from studies conducted by Akhtar *et al.* (2016:12). Section D was used to gather information on eco-design. The questions to be used in this section were adapted from Sundarakani *et al.* (2015:233). Section E was used to gather information on internal environment management. Questions in this section were adapted from Lai, Sarkis, and Zhu (2013:115). Section F was used to gather information on environmental performance. Questions in this section were adapted from Choi and Hwang (2015:76). Section G was used to gather information on supply chain performance. Questions in this section were adapted from Qrunfleh and Tarafdar (2012:346). The measurement items are shown in Table 4.1

Table 4.1: Measurement items

VARIABLE	MEASUREMENT ITEM	SOURCE
Internal environment management	IEM1: Our senior managers are committed to green supply chain management implementation. IEM2: Our mid-level managers support the implementation of green supply chain management. IEM3: Our company has special training for workers on environmental issues. IEM4: Our company has a Pollution Prevention Program.	(Lai *et al.* 2013:115)
Investment recovery	IR1: We aim to sell the excess inventories or materials. IR2: We aim to sell the scrap and used materials. IR3: We aim to sell the excess capital equipment. IR4: We aim to sell the refurbished products.	(Akhtar *et al.* 2016:12)
Eco-design	ED1: Our products are designed to reduce consumption of material or energy. ED2: Our products are designed for reuse, recycle, recovery of material, component parts. ED3: Our design processes avoid or reduce the use of hazardous products. ED4: Our design processes minimise waste.	(Sundarakani *et al.* 2015:233)

Table 4.1: Measurement items (continued…)

VARIABLE	MEASUREMENT ITEM	SOURCE
Green purchasing	GP1: My organisation selects their supplier based on environmental criteria. GP2: My organisation uses a questionnaire to collect information about its suppliers' environmental aspects, activities, and/or management system. GP3: My organisation makes sure that its purchased products must contain green attributes such as recycled or reusable items. GP4: My organisation makes sure that its purchased products must not contain green environmental undesirable items such as lead or other hazardous or toxic materials. GP5: My organisation evaluates the environmental aspects of its second-tier suppliers.	(Shaharudin *et al.* 2016:547)
Environmental performance	EP1: Our carbon dioxide emission has been reduced after the introduction of green management. EP2: Our waste water has been reduced after the introduction of green management. EP3: Our solid waste has been reduced after the introduction of green management. EP4: Our energy consumption has been reduced after the introduction of green management.	(Choi & Hwang 2015:76).
Supply chain performance	SCP1: Our supply chain is able to meet special customer specification requirements. SCP2: Our supply chain is characterised by a high level of integration of information systems in our firm. SCP3: Our supply chain is able to rapidly introduce large numbers of product improvements/variation. SCP4: Our supply chain is able to handle rapid introduction of new products. SCP5: Our supply chain has short order-to-delivery cycle time.	(Qrunfleh & Tarafdar 2012:346)

The next section discusses the data and statistical analysis.

4.10 DATA AND STATISTICAL ANALYSIS

Leedy and Ornrod (2013:97) assert that a data analysis defines, gathers and interprets all the data collected for a study to answer the research questions. Leedy and Ornrod (2010:2) argue that

researchers have to understand the interpretation, consistency and legitimacy of data provided in order to consider what these data represent.

Since the data collected are quantitative in nature, exploratory factor analysis was used for the pilot study. Younis (2016:67) refers to factor analysis as an interdependent method aimed at summarising data or items of each variable in the analysis. It operates on the notion that reckonable and visible variables can be concentrated to less latent variables that share a broad variance and are unobservable, which is recognised as dropping dimensionality (Akcay & Benek 2019:38). There are two main factor analysis methods, namely, confirmatory factor analysis and exploratory factor analysis (Christensen & Johnson 2014:252). However, this study usedboth exploratory and the confirmatory factor analysis. Descriptive statistics are discussed in the next section.

4.10.1 Descriptive statistics

In this study, descriptive statistics were used to analyse the characteristics of the sample. Sharma (2016:271) refers to descriptive statistics as the transformation of raw data by means of analysing and interpretation. Descriptive statistics describes the data collected in a statistical form (Brown & Opie, 2019:17). According to Beaver *et al*. (2012:4), descriptive statistics consist of measures used to sum up and illustrate the important characteristics of a set of dimensions. A study by Panneerselvam (2014:39), indicates that descriptive statistics consists of six elements: median, variance, mean, range, standard deviation, and mode. This study made use of the Statistical Package for Social Sciences (SPSS) version 25.0 to define means, standard deviation and frequencies which were described below:

- Mean, as a measure of central tendency, has the ability to add up and divide values of the characteristics with the same total number of characteristics (Garner, Kawulich & Wagner 2012:177).
- Standard deviation is defined as an instrument that measures the variability of the data score calculation to observe the mean (Babin & Zikmund 2013:343).
- Frequencies permit a researcher to summarise data through frequency graphs and tables (Cuff 2011:96).

For this study, the researcher has coded the data collected in Microsoft Excel on a spreadsheet. The Statistical Package for Social Sciences (SPSS), version 25.0, was used for the analysis of the data. The study used Analysis of Moment Structures (AMOS 25.0) software, which assisted the

researcher to ensure that the research work is logical and consistent, as statistical tools such as confirmatory factor analysis (CFA) and structural equation modelling (SEM) were applied in this study.

4.10.1.1 Confirmatory factor analysis

Confirmatory factor analysis is a specific case of structural equation modelling, which consists of collecting data in order to prove that a construct is distinct according to the theoretic approach the investigator uses as a preliminary point (Morata-Ramirez & Holgado-Tello 2013:54; Craven, Dicke, Gou, Marsh & Parker 2019:9). Brown and Moore (2013:362) describe CFA as a measurement model that provides a feasible understanding about the co-variation between observed indicators. In particular, the measurement model is intended to create factors which account for the co-variation and variation among observed indicators (Holtzman 2014:1651).

For this study, the confirmatory factor analysis allowed the researcher to test the hypotheses on relationships between observed variables. This study made use of the model fit indicators, which comprises chi-square/degrees of freedom and goodness of fit index (GFI), normed fit index (NFI), augmented goodness of fit index (AGFI), composite fit index (CFI), incremental fit index (IFI), Tucker-Lewis index (TLI) and the random measure of standard error approximation (RMSEA). Table 4.2 summarises the model fit indices adapted in this study.

Table 4.2: The model fit indices criteria

Model fit indices criteria	Value acceptance threshold
Chi-square (CMIN/DF)	Chi-square value smaller or equal to 3
Normed fit index (NFI)	Value greater than or equal to 0.90
Increment fit index (IFI)	Values greater than or equal to 0.90
Tucker-Lewis index (TLI)	Values greater than or equal to 0.90
Comparative fit index (CFI)	Values greater than or equal to 0.90
Goodness-of-fit index (GFI)	Values greater than or equal to 0.90
Adjusted goodness-of-fit index (AGFI)	Values greater than or equal to 0.90
Root mean square error of approximation (RMSEA)	Value Less than or equal to 0.80

Source: Bagozzi and Yi (2012:15)

4.10.1.2 Structural equation modelling

In this study, the researcher used the structural equation model to analyse the structural relationships between hypotheses and measured variables in this study. Gai, He, Wan and Wu (2012:853) refer to structural equation modelling as a statistical method that has the ability to examine the casaul relationships between constructs. Zohrabi (2013:232) suggested that the structural equation model should be employed in order to test theories and hypotheses. Hair *et al.* (2014:105) indicate that the structural equation model allows researchers to examine instantaneously a sequence of correlated dependency relationships between a set of concepts, represented by few variables, while accounting for measurement fault. Gu, Hu, Li, Xi and Zhang (2019:4) assert that researchers use the structural equation model to test relations between measured variables by using actual data collected. Additionally, the structural equation model is used to test statistical models of a study which involve relations between constructs (Ismail 2014:27).

For the purpose of the study, a path analysis was used. Path analysis, also known as path modelling, defines relations between theoretical constructs and unobserved variables (Duffield, Roche & White 2011:1480). According to Hua and Nusair (2010:314), path analysis assesses the correlation among observed and unobserved variables. The actual research results and analysis were articulated in Chapter Five. Section 4.10 explains the reliability and validity of the study.

4.11 RELIABILITY AND VALIDITY

4.11.1 Reliability

Abib, Hayashi and Hoppen (2019:99) refer to reliability as the degree to which research instruments produce results that are consistent and accurate. According to Bhengu (2011:23), reliability is the repeatability and consistency of the researcher's measurement. In this regard, reliability is concerned with the capability of an instrument to measure constantly (Dennick & Tavakol 2011:53). Through reliability, researchers can minimise biases and errors while achieving reliable results (Tabassum 2014:49). Reliability for each questionnaire used in this study was determined through the Cronbach's alpha coefficient. Gu *et al.* (2019:7) indicate that the Cronbach's alpha coefficient level of items should be 0.7 and above to be accepted.

4.11.1.1 Cronbach's Alpha

Cronbach's alpha determines the internal consistency or average correlation of objects in a survey instrument to measure its reliability and is an analysis reliability method that requires

only single test supervision (Sharma 2016:271). The threshold of Cronbach's Alpha should be 0.7 and above (Malhotra 2010:733). In this study, the Cronbach's alpha was used to ensure reliability of instruments. Chapter Five presents the Cronbach alpha results for this study.

4.11.2 Validity

Dennick and Tavakol (2011:53) indicate that validity is concerned with the degree to which an instrument measures what it is planned to determine. Validity refers to the precision and accuracy of the collected data (Denscombe 2010:298). Validity is concerned with whether concepts are measured correctly or not (Bajpai & Bajpai 2014:112). In other words, any measuring piece of equipment or tool is thought to be valid when it measures what it is expected to determine (Pandey & Pandey 2015:21). The current study assessed three types of validity, namely, content, construct, and convergent validity.

4.11.2.1 Content validity

Content validity is associated with a kind of validity in which diverse skills, fundamentals and behaviours are effectively and sufficiently measured (Zohrabi 2013:258). Content validity determines the significance of items of the measurement instruments and measured constructs (Bolarinwa 2015:195). In addition, the content validity ensures that items in the scale are measured correctly in terms of quality (Akcay & Benek 2019:38). Content validity was assessed through pre-testing of the questionnaire in this study.

4.11.2.2 Construct validity

Pandey and Pandey (2015:22) refer to construct validity as a judgment-based type of validity on the gathering of evidence from frequent studies by means of a specific measuring instrument. Kumar (2011:170) defines construct validity as the degree to which decisions are made based on theoretical constructs of a study. Construct validity was used to indicate how well a test reflects the true theoretical construct of a concept.

4.11.2.3 Convergent validity

In convergent validity, where diverse measures of the same theory yield similar results, a researcher self-reports against different measures (Bajpai & Bajpai 2014:144; Bolarinwa 2015:197). Convergent validity examines items that relate with other tested items of instruments that measure the same theoretical construct (Bryman 2012:46). The convergent validity was used to ensure constructs that are expected to be related are in fact related in this study. Convergent

validity, according to Shau (2017:226), is measured through the item-to-total correlation, average variance extracted (AVE) and standardised regression weights to which the threshold should be above >0.7 to be acceptable or to indicate a high convergent validity. Factor loadings, on the other hand, require a threshold of >0.5 and above for each item of the construct (Babin, Back, Hair & Rolph 2010:132). The next section identifies the ethical issues for the study.

4.12 ETHICAL ISSUES

Fouka and Mantzorou (2011:4) refer to ethical issues as a system of principles which can importantly change prior considerations about choices and measures. Ethical issues form an important part of the study to ensure that a specific code of ethics of an organisation or a training body are adhered to when conducting the research project (Speirs 2014:40). According to Zschirnt (2019:2), its core principles consist of voluntary participation and informed consent. The following ethical issues were important for this study.

- Participation in this study was voluntary. Respondents had the right to either participate or decline any involvement in the study. The researcher ensured that respondents are informed about the purpose of the survey. Thereafter, respondents volunteered and agreed to fill in the self-administered questionnaires for this study.
- The study did not include sensitive issues or cause discomfort to the respondent. The researcher ensured that the study did not victimise or harm respondents. The self-administered questionnaires provided clear and understandable questions that did not cause psychological harm to respondents in this study.
- The questionnaires did not contain the identity or personal information linked to the respondents. Anonymity of respondents was maintained throughout this study.
- The privacy of respondent was respected. In this study, the researcher ensured effective discretion of the information provided by the respondents by not disclosing their names and organisations they are associated with. The respondents' rights to privacy were adhered to throughout this study.
- The study maintained a competent, careful design and worthwhile expected outcomes in the data collection analysis. Moreover, the researcher ensured that the data analysed did not link to any respondents who participated.

4.13 CHAPTER 4 CONCLUSION

This chapter examined the research paradigm, research methodology and design that support this study. A compilation of various definitions was taken from previous literature for this chapter. Detailed information concerning the research process, approach and sampling design was explored in this study. This chapter identified the target population for the study. The sample frame was also discussed. The sample size showed the number of participants for the study. It explored the sampling techniques to be adopted in order to collect data in a proper manner. The measurement instruments showed how data were obtained, and included the survey method used to obtain data. The reliability and validity were explained, and the ethical issues outlined. The following chapter addresses the analysis, interpretation and the research results of this study.

CHAPTER 5
DATA ANALYSIS AND INTERPRETATION OF RESULTS

5.1 INTRODUCTION

This study aimed to determine the influence of green supply chain management practices on environmental performance and supply chain performance in the beverage industry. In this chapter the results of the study are discussed. The data gathered were analysed using the Statistical Package for the Social Sciences version 25.0 and Analysis of a Moment Structures version 25.0. The model fit assessment for this study was determined through the chi-square/degree of freedom (CMIN/DF), root mean square error of approximation (RMSEA), augmented goodness of fit index (AGFI), normed fit index (NFI), goodness-of-fit (GFI), Tucker-Lewis index (TLI), increment fit index (IFI) and comparative fit index (CFI). Moreover, the results are presented in frequencies, percentages, standard deviation and mean. The confirmatory factor analysis (CFA) and structural equation modelling (SEM) were utilised to test the hypotheses of this study. The next section discusses the response rate.

5.2 PILOT SURVEY RESULTS

Prior to pilot testing, the questionnaire used in this study was initially pre-tested by the research supervisors together with the researcher in order to ascertain face and content validity. Following the pre-test and prior to conducting the main study, pilot testing was undertaken with 45 participants who did not form part of the main survey, with a view to assess the reliability of the scales within the questionnaire, as suggested by Iacobucci and Churchill (2010:224). Table 5.1 reports on the pilot test results.

Table 5.1: Summary pilot reliability statistics

Construct	Cronbach's Alpha	No. of Items
Section B (Internal Environment Management)	0.712	4
Section C (Investment Recovery)	0.738	4
Section D (Eco-Design)	0.710	4
Section E (Green Purchasing)	0.801	5
Section F (Environmental Performance)	0.810	4

Table 5.2: Summary pilot reliability statistics (continued…)

Construct	Cronbach's Alpha	No. of Items
Section G (Supply Chain Performance)	0.710	5
Overall reliability for the scale	0.810	26

A questionnaire made use of a five-point Likert scale ranging from 1=strongly disagree, 3=neither disagree nor agree and 5=strongly agree, was administered at the pilot study. The results obtained give a satisfactory indication of reliability for all the four sections of the questionnaire, as reported on Table 5.1. The reliability indicators exceed the suggested level of 0.70 (Nunnally 1978:245).

5.3 RESPONSE RATE

The study made use of a self-administered questionnaire and targeted 450 respondents. Out of 450 distributed questionnaires, 373 questionnaires were returned and completed. The study's response rate was 83 percent, which indicated a reliable and excellent response rate for analysis. Esinah (2014:22) found that a response rate of 50 percent and over was considered adequate for analysis and interpretation.

Table 5.3: Response rate

Respondents	Distributed questionnaires	Returned questionnaires	Response rate %
Supply chain management professionals	450	373	83

5.4 DEMOGRAPHIC INFORMATION OF THE RESPONDENTS

The demographic information of respondents for this study included gender, race, ethnic group, age, educational level and marital status. The following sections (5.3.1-5.3.6) discuss the demographic information of respondents.

5.4.1 Gender of the respondents

Table 5.3 and Figure 5.1 illustrate the frequencies and percentages of the respondents' gender.

Table 5.4: Frequencies and percentages of respondents' gender

Category	N	N	Percentage
Male Female	373	228 145	61.1 38.9

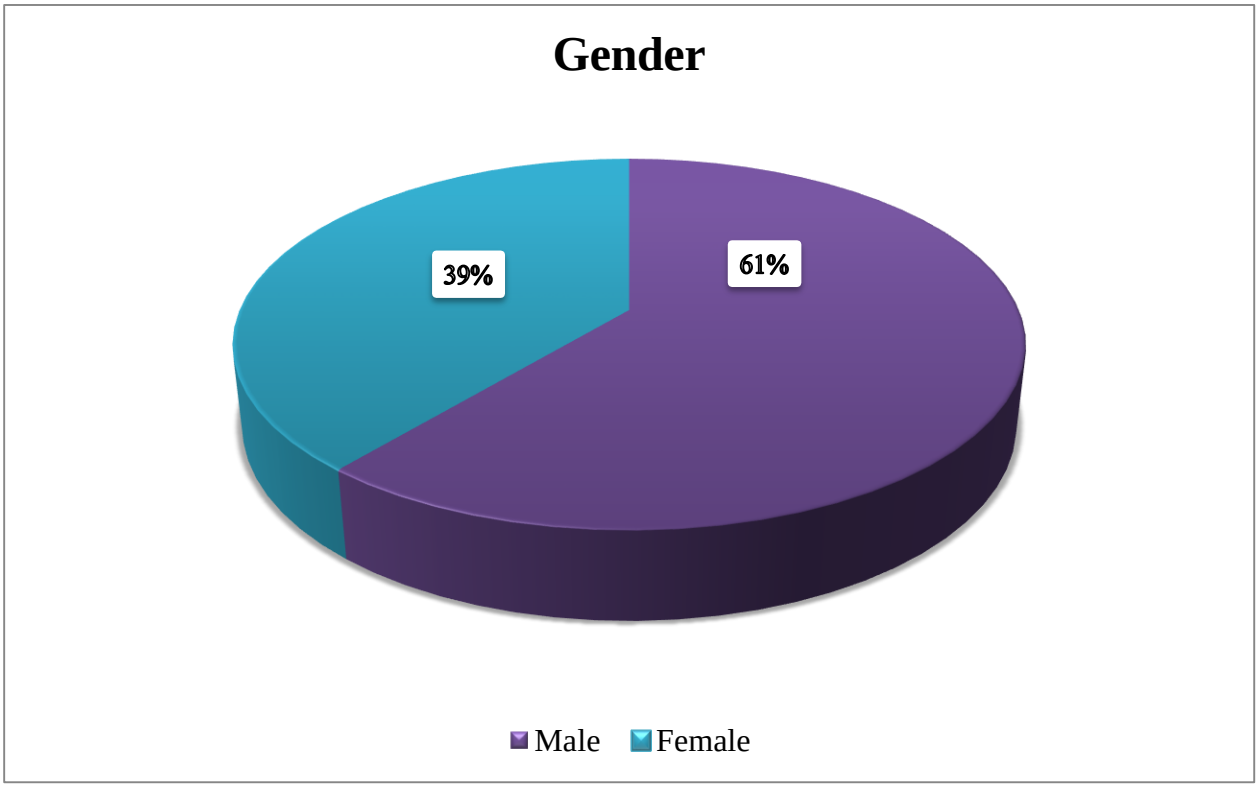


Figure 5.1: Respondents' gender

According to the results, 38.87 percent (n=145) of respondents were female and 61.13 percent (n=228) were male, as depicted in Table 5.3 and Figure 5.1. These results indicate that the males dominated the gender category of the respondents working in the beverage industry. Furthermore, the results show that more males than females were prepared to partake in this study. This could denote that there could be more male managers and supply chain management professionals in the beverage industry in South Africa.

5.4.2 Race of respondents

Table 5.4 and Figure 5.2 represent the frequencies and percentages of the respondents' race.

Table 5.5: Frequencies and percentages of the respondents' race

Category	Sample size	Frequency	Percentage
Black	373	188	50.4
Coloured		41	11.0
White		82	22.0
Indian		37	9.9
Other		25	6.7

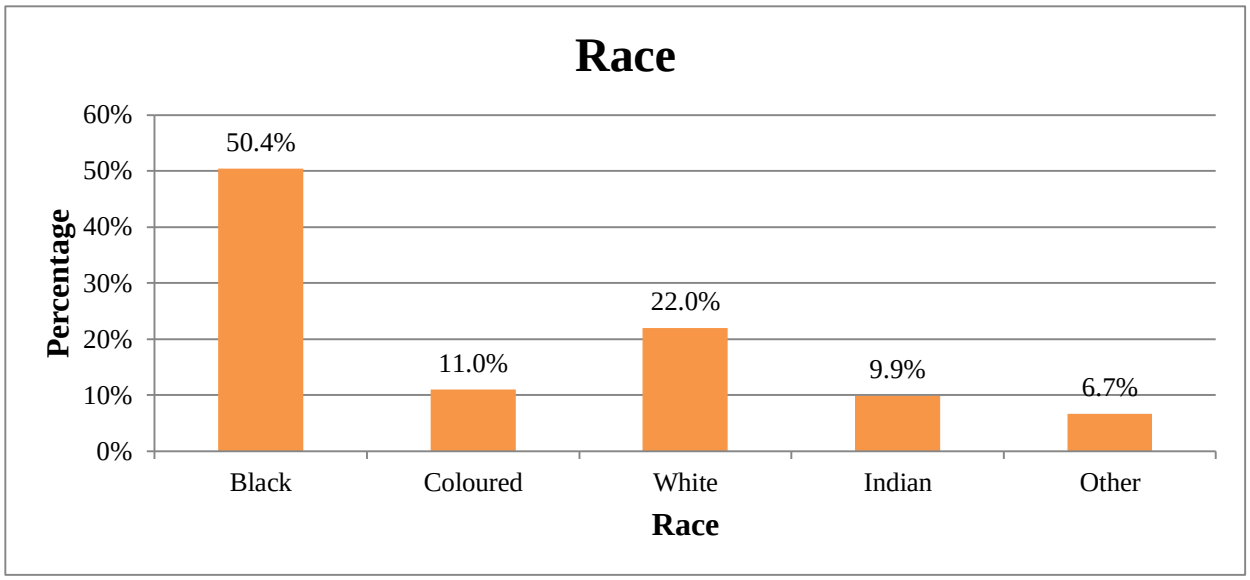


Figure 5.2: Respondents' race

The race group of the respondents of the self-administered questionnaires provided important insights, as shown in Table 5.4 and Figure 5.2. According to the results, the majority of the respondents were Black: 50.4 percent (n=188); followed by White: 22.0 percent (n=82); Coloured: 11.0 percent (n=41); Indian: 9.9 percent (n=37) and Other: 6.7 percent (n=25) respectively. The results indicate that the Black group dominated the race category, followed by the White group. It could be concluded that black supply chain management practitioners were more willing to partake in this study.

5.4.3 Ethnic group of respondents

Table 5.5 and Figure 5.3 provide the frequencies and percentages of the respondents' ethnic group.

Table 5.6: Frequencies and percentages of the respondents' ethnic group

Category	Sample size	Frequency	Percentage
Zulu	373	47	12.6
Xhosa		31	8.3
Tswana		22	5.9
Sotho		24	6.4
Afrikaner		30	8.0
Other		219	58.7

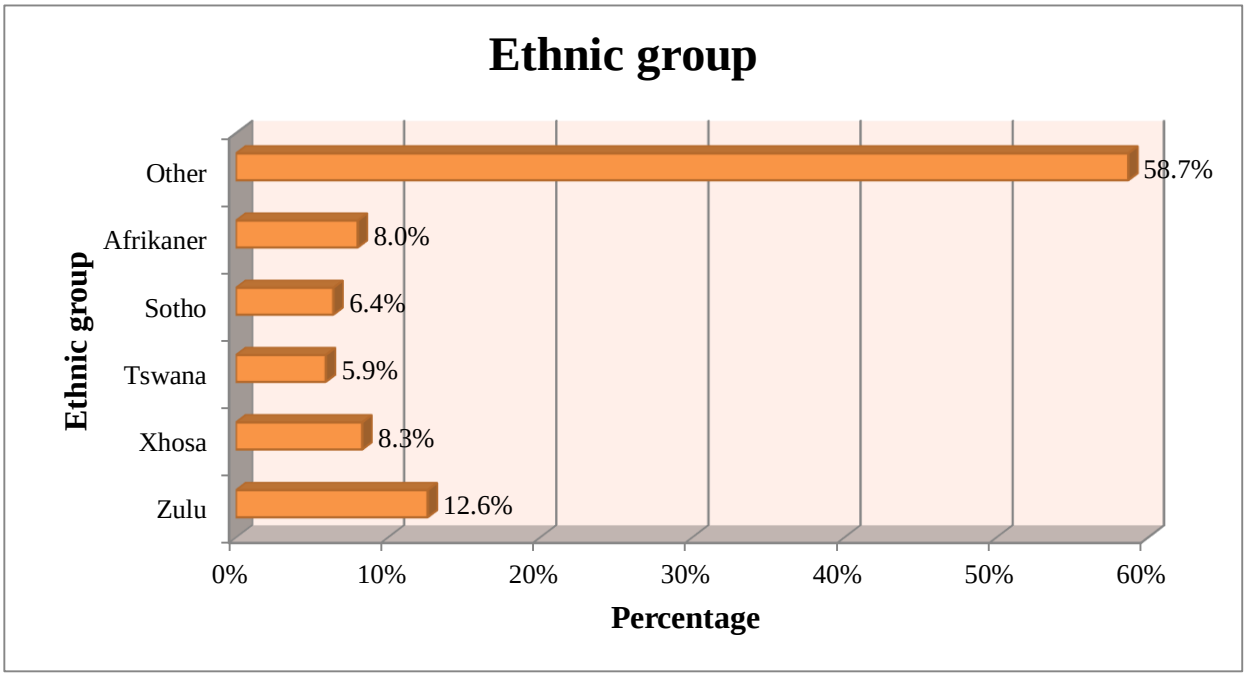


Figure 5.3: Respondents' ethnic group

The ethnic group category of the respondents of the self-administered questionnaires provided important insights, as shown in Table 5.5 and Figure 5.3. In terms of ethnic groups, the information collected showed that from the majority of the respondents, 58.7 percent (n=219) were in the Other group, followed by 12.6 percent (n=47) in the Zulu group, 8.3 percent (n=31) in the Xhosa group, 8.0 percent (n=30) in the Afrikaner group, 6.4 percent (n=24) in the Sotho group and 5.9 percent (n=22) in the Tswana group. In view of these results, it can be observed that respondents from various ethnic groups were more willing to participate in this study. Therefore, it could be concluded that the Other group was the dominant category among the supply chain management professionals working in the beverage industry due to the fact that it included other ethnic groups not listed in this study.

5.4.4 Age of respondents

Table 5.6 and Figure 5.4 represent the frequencies and percentages of the respondents' age.

Table 5.7: Frequencies and percentages regarding the respondents' age

Category	Sample size	Frequency	Percentage
26-30 years	373	3	0.8
31-45 years		260	69.7
46-50 years		74	19.8
51 & over		36	9.7

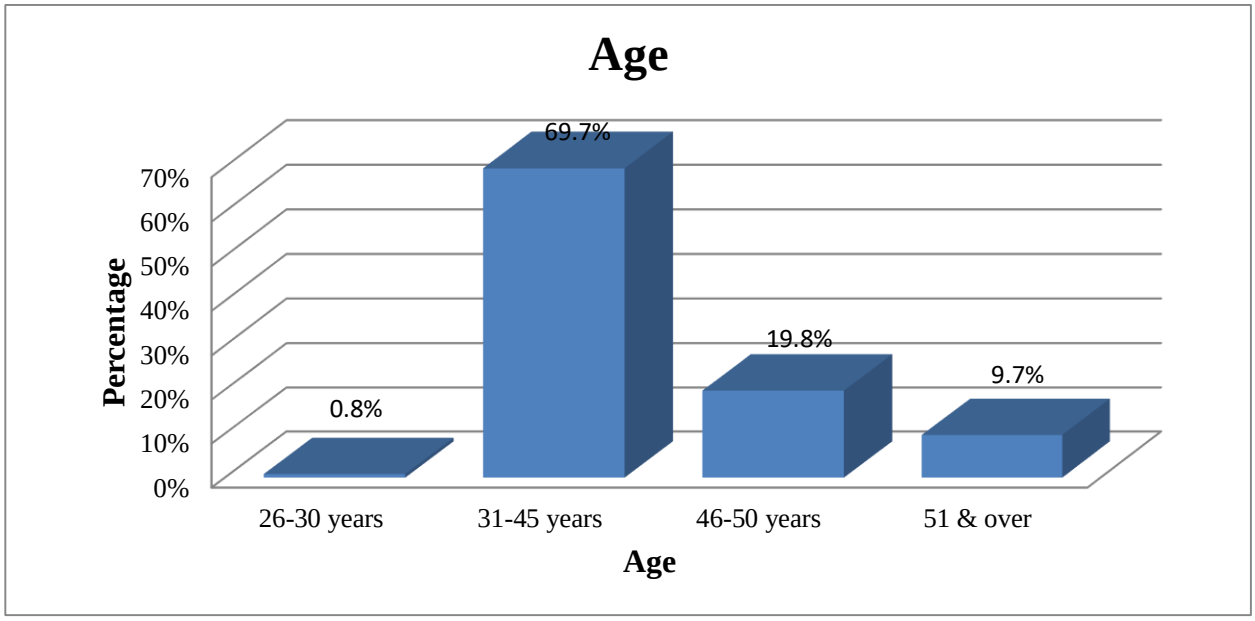


Figure 5.4: Respondents' age

The study found that the majority of respondents were between 31-45 years (69.7%; n=260) followed by (19.8%; n=74) of the age group between 46-50 years. Moreover, (9.7%; n=36) of the respondents were aged 51 and over while (0.8%; n=3) were between 26-30 years. These results reveal that middle-aged people are more prepared to partake in this study than older ones. Therefore, it can be concluded that there are more middle-aged managers and supply chain management professionals of beverage companies in South Africa than older ones.

5.4.5 Educational level of respondents

Table 5.7 and Figure 5.5 represent the frequencies and percentages of the respondents' educational level.

Table 5.8: Frequencies and percentages regarding educational level

Category	Sample size	Frequency	Percentage
Diploma	373	9	2.4
Degree		206	55.2
Honours degree		41	11.0
Masters		20	5.4
Other		97	26.0

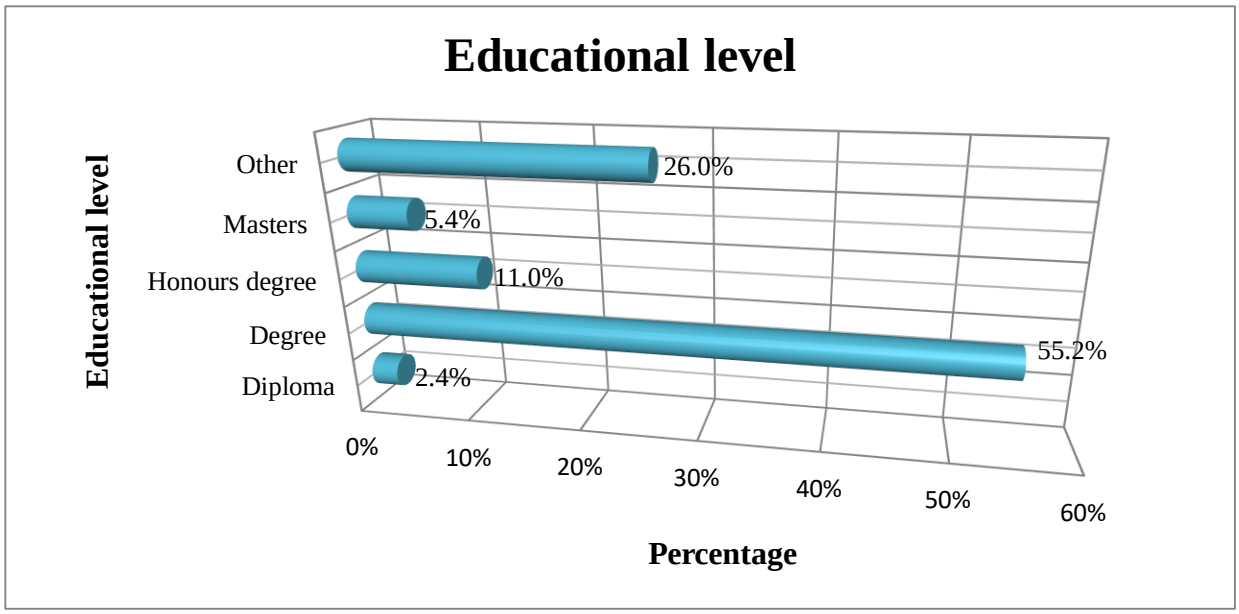


Figure 5.5: Respondents' educational level

The results presented in Table 5.6 and Figure 5.5 show that 55.2 percent (n=206) of the respondents are holders of a degree. Approximately 26.0 percent (n=97) of respondents are holders of other qualifications while 11.0 percent (n=41) of respondents are holders of an honours degree. Moreover, 2.4 percent (n=9) of respondents are holders of a diploma. The results revealed that the majority of managers and supply chain management professionals in the beverage industry are mostly holders of a degree and an honours degree.

5.4.6 Marital status of respondents

Table 5.8 and Figure 5.6 represent the frequencies and percentages of the respondents' marital status.

Table 5.9: Frequencies and percentages regarding marital status

Category	Sample size	Frequency	Percentage
Single	373	171	45.8
Married		126	33.8
Divorced		21	5.6
Separated		30	8.0
Widowed		25	6.7

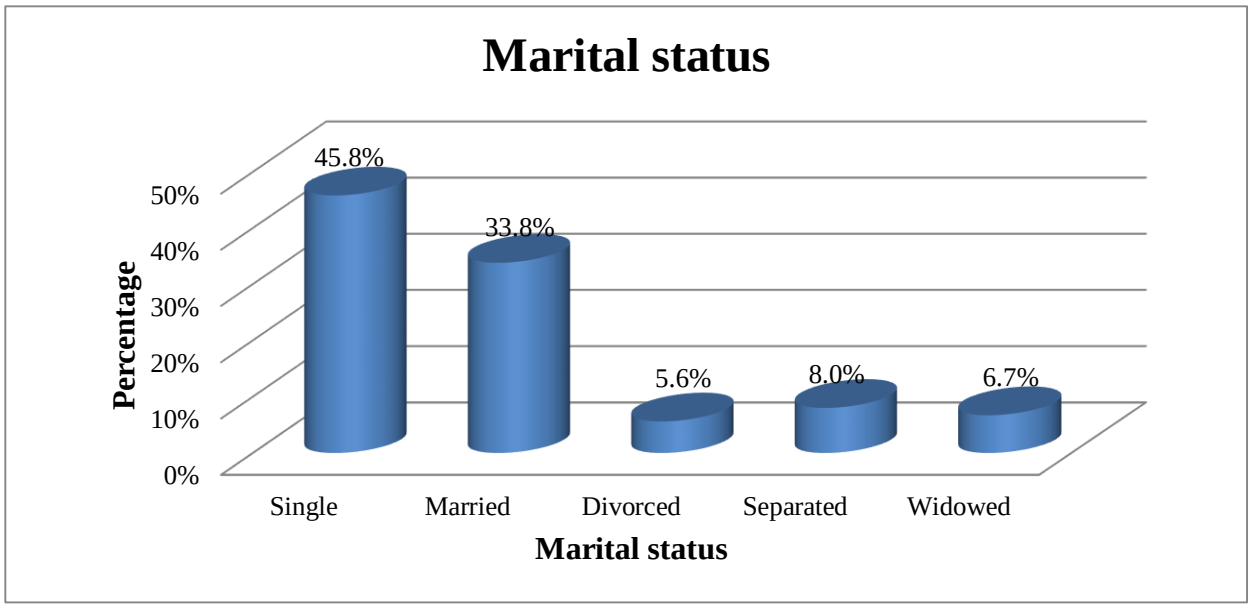


Figure 5.6: Respondents' marital status

Table 5.7 and Figure 5.6 represent results regarding the marital status of the respondents. About 45.8 percent (n=171) of the respondents are single, 33.8 percent (n=126) of the respondents are married, 8.0 percent (n=30) of the respondents are separated, 6.7 percent (n=25) of the respondents are widowed and 5.6 percent (n=21) are divorced. It can be concluded that the marital status of the respondents in the beverage industry is dominated by single managers and supply chain management professionals. In the next section the respondents' perception about the research constructs are discussed.

5.5 RESPONDENTS' PERCEPTION ABOUT THE RESEARCH CONSTRUCTS

Respondents' perception towards green supply chain management practices, environmental performance and supply chain performance in the beverage industry is analysed in the following sections.

5.5.1 Frequencies and percentages towards internal environment management

Table 5.9 presents the perceptions of respondents towards internal environment management.

Table 5.10: Frequencies and percentages of internal environment management

Items	Questions	Strongly disagree	Disagree	Moderately agree	Agree	Strongly agree
IEM1	Our senior managers are committed to green supply chain management implementation	3 (0.8%)	8 (2.1%)	128 (34.3%)	124 (33.2%)	110 (29.5%)
IEM2	Our mid-level managers support the implementation of green supply chain management	2 (0.5%)	6 (1.6%)	123 (33.0%)	96 (25.7%)	146 (39.1%)
IEM3	Our company has a special training for workers on environmental issues	3 (0.8%)	5 (1.3%)	153 (41.0%)	99 (26.5%)	113 (30.3%)
IEM4	Our company has Pollution Prevention Programs	2 (0.5%)	5 (1.3%)	140 (37.5%)	119 (31.9%)	107 (28.7%)

The results in Table 5.9 reveal that most of the respondents (62.7%; n=234) were in agreement with the statement that "our senior managers are committed to green supply chain management implementation". While 34.3 percent (n=128) of the respondents moderately agreed and 2.9 percent (n=11) of the respondents disagreed with the statement.

Item IEM2 stated, "our mid-level managers support the implementation of green supply chain management". Most respondents (64.8%; n=242) agreed with the statement, followed by 33.0 percent (n=123) of the respondents who moderately agreed, while 2.1 percent (n=8) of the respondents disagreed. In item IEM3, most of the respondents (56.8%; n=212) were in agreement with the statement that "our company has a special training for workers on environmental issues*"* while 41.0 percent (n=153) of the respondents moderately agreed and 2.1 percent (n=8) disagreed.

With regards to item IEM4, "our company has a Pollution Prevention Program", most of the respondents (60.6%; n=226) agreed, while 37.5 percent (n=140) of the respondents moderately agreed and 1.8 percent (n=7) of the respondents disagreed.

The supply chain management professionals were asked if internal environment management as well as management support was indeed effective in their company. Looking at the results, it is clear that management and the company supports the implementation of green supply chain

management practices within the beverage industry. A study conducted by Foo *et al.* (2018:3) supports that commitment from top and mid-level management contributes to the implementation of green supply chain management. Moreover, in support of the results, Abdul-Rashid *et al*. (2014:53) assert that top and mid-level management in the company make it possible for environmental programmes as well as green supply chain practices to be implemented and maintained. Therefore, internal environment management is necessary for implementing green supply chain management practices that enhance performance throughout the supply chain (Parasayu *et al*. 2017:3).

5.5.2 Frequencies and percentages towards investment recovery

Table 5.10 presents the perceptions of respondents towards investment recovery.

Table 5.11: Frequencies and percentages of investment recovery

Items	Questions	Strongly disagree	Disagree	Moderately agree	Agree	Strongly agree
IR1	We aim to sell the excess inventories or materials	6 (1.6%)	17 (4.6%)	118 (31.6%)	149 (39.9%)	83 (22.3%)
IR2	We aim to sell the scrap and used materials	2 (0.5%)	3 (0.8%)	145 (38.9%)	140 (37.5%)	83 (22.3%)
IR3	We aim to sell the excess capital equipment	7 (1.9%)	12 (3.2%)	118 (31.6%)	161 (43.2%)	75 (20.1%)
IR4	We aim to sell the refurbished products	4 (1.1%)	10 (2.7%)	136 (36.5%)	141 (37.8%)	82 (22.0%)

According to Table 5.10, most of the respondents (62.2%; n=232) were in agreement with the statement: “we aim to sell the excess inventories or materials”, followed by 31.6 percent (n=118) of the respondents who moderately agreed while 62 percent (n=23) disagreed.

With regards to item IR2, 59.8 percent (n=223) of the respondents agreed with the assertion that “we aim to sell the scrap and used materials”, while 38.9 percent (n=145) moderately agreed and 1.3 percent (n=5) disagreed. Furthermore, on the assertion, “we aim to sell the excess capital equipment”, most of the respondents (63.3%; n=236) were in agreement, while 31.6 percent (n=118) moderately agreed and 5.1 percent (n=19) of the respondents disagreed.

In item IR4, "we aim to sell the refurbished products", 59.8 percent (n=223) of the respondents agreed with the statement, whereas 36.5 percent (n=136) moderately agreed, and 3.8 percent (n=14) disagreed.

The results indicate that investment recovery is vastly exercised in the beverage industry. In support of the results, Bahrin *et al.* (2017:90) mention that investment recovery to some degree is a decisive factor in most manufacturing companies to decrease environmental impact by reducing waste, selling surplus assets and used materials. In addition, investment recovery could also be exercised in an environment where there is high waste material and idle assets that are valuable. A study conducted by Mei (2013:12) concludes that investment recovery improves the organisation's environmental performance by reducing landfill costs and surplus items.

5.5.3 Frequencies and percentages towards eco-design

Table 5.11 presents the perceptions of respondents towards eco-design.

Table 5.12: Frequencies and percentages of eco-design

Items	Questions	Strongly disagree	Disagree	Moderately agree	Agree	Strongly agree
ED1	Our products are designed to reduce consumption of material or energy	4 (1.1%)	10 (2.7%)	136 (36.5%)	142 (38.1%)	81 (21.7%)
ED2	Our products are designed for reuse, recycle, recovery of material, component parts	2 (0.5%)	3 (0.8%)	146 (39.1%)	139 (37.3%)	83 (22.3%)
ED3	Our design processes avoid or reduce the use of hazardous products	1 (0.3%)	2 (0.5%)	147 (39.4%)	139 (37.3%)	84 (22.5%)
ED4	Our design processes minimise waste	5 (1.3%)	5 (1.3%)	140 (37.5%)	130 (34.9%)	93 (24.9%)

From Table 5.11 above, most of the respondents (59.8%; n=223) agreed with the statement: "our products designed to reduce consumption of materials or energy", followed by 36.5 percent (n=136) of the respondents who moderately agreed while 3.8 percent (n=14) disagreed.

With regards to item ED2, 59.6 percent (n=222) of the respondents agreed with the statement that "our products are designed for reuse, recycle, recovery of materials, components parts", while 39.1 percent (n=146) moderately agreed and 1.3 percent (n=5) disagreed. In item ED3, "our design processes avoid or reduce the use of hazardous products", most of the respondents

(59.8%; n=223) agreed with the statement, whereas 39.4 percent (n=147) moderately agreed and 0.8 percent (n=3) of the respondents disagreed.

Item ED4 stated, "our design processes minimise waste", most of the respondents (59.8%; n=223) agreed with the statement, while 37.5 percent (n=140) moderately agreed and 2.6 percent (n=10) of the respondents disagreed.

These results indicate that eco-design is practised within the beverage industry. In support of the results, Khan and Qainli (2017:6) state that eco-design is implemented in each stage of the product design throughout the manufacturing process. Moreover, eco-design is about manufacturing eco-friendly products and minimising waste in the organisation (Boon-itt *et al.* 2017:328).

5.5.4 Frequencies and percentages towards green purchasing

Table 5.12 presents the perceptions of respondents towards green purchasing.

Table 5.13: Frequencies and percentages of green purchasing

Items	Questions	Strongly disagree	Disagree	Moderately agree	Agree	Strongly agree
GP1	My organisation selects their suppliers based on environmental criteria	4 (1.1%)	10 (2.7%)	133 (35.7%)	125 (33.5%)	101 (27.1%)
GP2	My organisation uses a questionnaire to collect information about its suppliers' environmental aspects, activities, and/or management system	7 (1.9%)	11 (2.9%)	136 (36.5%)	117 (31.4%)	102 (27.3%)
GP3	My organisation makes sure that its purchased products must contain green attributes such as recycled or reusable items	1 (0.3%)	4 (1.1%)	146 (39.1%)	123 (33.0%)	99 (26.5%)
GP4	My organisation makes sure that its purchased products must not contain green environmental undesirable item such as lead or other hazardous or toxic materials.	1 (0.3%)	2 (0.5%)	154 (41.3%)	122 (32.7%)	94 (25.2%)
GP5	My organisation evaluates the environmental aspects of its second-tier suppliers.	2 (0.5%)	4 (1.1%)	154 (41.3%)	120 (32.3%)	93 (24.9%)

From the results in Table 5.12, most of respondents (60.6%; n=226) were in agreement with the statement that "my organisation selects their supplier based on environmental criteria" while 35.7 percent (n=133) moderately agreed and 3.8 percent (n=14) of the respondents disagreed.

With regard to item GP2, “my organisation uses a questionnaire to collect information about its suppliers” environmental aspects, activities, and/or management system”, most respondents (58.7%; n=219) were in agreement with the statement, followed by 36.5 percent (n=136) who moderately agreed, while 4.8 percent (n=18) of the respondents disagreed. Furthermore, most of the respondents (59.5%; n=222) agreed with the assertion that “my organisation makes sure that its purchased products must contain green attributes such as recycled or reusable items” while 39.1 percent (n=146) of the respondents moderately agreed and only 1.4 percent (n=5) disagreed with the statement.

Item GP4 states, “my organisation makes sure that its purchased products must not contain green environmental undesirable items such as lead or other hazardous or toxic materials”, most of the respondents (57.9%; n=216) were in agreement, whereas 41.3 percent (n=154) moderately agreed with the statement and 0.8 percent (n=3) of the respondents disagreed. With regard to the assertion, “my organisation evaluates the environmental aspects of its second-tier suppliers”, 57.2 percent (n=213) of the respondents agreed, while 41.3 percent (n=154) of the respondents moderately agreed, followed by 1.6 percent (n=6) of the respondents who disagreed.

To support the above results, a study by Ghosh (2017:56) asserts that green purchasing decreases the source of waste by selecting suppliers that meet environmental criteria of the organisation. According to Matwere *et al.* (2014:272), organisations work together with suppliers throughout the purchasing process. The opportunity for green purchasing practices prompts supply chain management professionals to minimise waste and raw material usage to improve the environmental performance of the organisation. Furthermore, green purchasing practices have an effective outcome on the organisation’s overall performance, as found by Jemutai (2014:14) who revealed that green purchasing contributes to reduction of material cost, waste and carbon emissions.

5.5.5 Frequencies and percentages towards environmental performance

Table 5.13 presents the perceptions of respondents towards environmental performance.

Table 5.14: Frequencies and percentages of environmental performance

Items	Questions	Strongly disagree	Disagree	Moderately agree	Agree	Strongly agree
EP1	Our carbon dioxide emission has been reduced after the introduction of green management.	3 (0.8%)	4 (1.1%)	124 (33.2%)	136 (36.5%)	106 (28.4%)
EP2	Our waste water has been reduced after the introduction of green management	1 (0.3%)	6 (1.6%)	169 (45.3%)	93 (24.9%)	104 (27.9%)
EP3	Our solid waste has been reduced after the introduction of green management	2 (0.5%)	5 (1.3%)	152 (40.8%)	111 (29.8%)	103 (27.6%)
EP4	Our energy consumption has been reduced after the introduction of green management.	3 (0.8%)	5 (1.3%)	157 (42.1%)	115 (30.8%)	93 (24.9%)

According to Table 5.13, the majority of the respondents (64.9%; n=242) were in agreement with the statement that "our carbon dioxide emission has been reduced after the introduction of green management" while 33.2 percent (n=124) of the respondents moderately agreed and 1.9 percent (n=7) of the respondents disagreed. With regard to item EP2, "our waste water has been reduced after the introduction of green management", most of the respondents (52.8%; n=197) were in agreement with the statement, followed by 45.3 percent (n=169) of the respondents who moderately agreed while 1.9 percent (n=7) of the respondents disagreed.

In item EP3, "our solid waste has been reduced after the introduction of green management", most of the respondents (57.4%; n=214) agreed with the statement, while 40.8 percent (n=152) of the respondents moderately agreed, followed by 1.8 percent (n=7) of the respondents who disagreed. Furthermore, most of the respondents (55.7%; n=208) agreed with the statement that "our energy consumption has been reduced after the introduction of green management", while 42.1 percent (n=157) of the respondents moderately agreed and 2.1 percent (n=8) of the respondents disagreed.

From the results in Table 5.13, it is clear that green supply chain management practices have an impact on organisations' environmental performance. In agreement with the results, Younis (2016:19) maintains that green management and internal environment management are some of the key factors that contribute to environmental performance. These results are in line with a study conducted by De Giovanni and Esposito Vinzi (2012:910) who found that reduction in

waste, water consumption, emissions and energy improve environmental performance of the organisation.

5.5.6 Frequencies and percentages towards supply chain performance

Table 5.14 presents the perceptions of respondents towards supply chain performance.

Table 5.15: Frequencies and percentages of supply chain performance

Items	Questions	Strongly disagree	Disagree	Moderately agree	Agree	Strongly agree
SCP1	Our supply chain is able to meet special customer specification requirements	1 (0.3%)	2 (0.5%)	160 (42.9%)	119 (31.9%)	91 (24.4%)
SCP2	Our supply chain is characterised by a high level of integration of information systems in our firm	2 (0.5%)	4 (1.1%)	155 (41.6%)	114 (30.6%)	98 (26.3%)
SCP3	Our supply chain is able to rapidly introduce large numbers of product improvements/variation	1 (0.3%)	1 (0.3%)	140 (37.5%)	123 (33.0%)	108 (29.0%)
SCP4	Our supply chain is able to handle rapid introduction of new products	1 (0.3%)	2 (0.5%)	145 (38.9%)	119 (31.9%)	106 (28.4%)
SCP5	Our supply chain has short order-to-delivery cycle time	3 (0.8%)	3 (0.8%)	161 (43.2%)	107 (28.7%)	99 (26.5%)

Table 5.14 shows that the majority of respondents (56.3%; n=210) were in agreement with the statement that “our supply chain is able to meet special customer specification requirements”, while 42.9 percent (n=160) moderately agreed with the statement and 0.8 percent (n=3) of the respondents disagreed.

In the statement, “our supply chain is characterised by a high level of integration of information systems in our firm”, most of the respondents (56.9%; n=212) agreed with the statement, followed by 41.6 percent (n=155) of the respondents who moderately agreed and 1.6 percent (n=6) of the respondents disagreed. Regarding the statement “our supply chain is able to rapidly introduce large numbers of product improvements/variation”, 37.5 percent (n=140) of the respondents moderately agreed, whereas 62 percent (n=231) were in agreement and 0.6 percent (n=2) of the respondents disagreed.

In item SCP4, most of the respondents (60.3%; n=225) were in agreement with the assertion that "our supply chain is able to handle rapid introduction of new products", whereas 38.9 percent (n=145) of the respondents moderately agreed and 0.8 percent (n=3) of the respondents disagreed. Item SCP5 states, "our supply chain has short order-to-delivery cycle time" and 55.2 percent (n=206) agreed. In addition, 43.2 percent (n=161) moderately agreed, whereas 1.6 percent (n=6) of the respondents disagreed with the statement.

In support of the preceding results above, Esinah (2014:17) states that the implementation of green supply chain management practices has lowered costs, increased delivery reliability, increased efficiency, improved product quality and product differentiation throughout the supply chain. Based on the results in Table 5.13, it is evident that the beverage industry in South Africa has control over performance within the supply chain. It can be concluded that companies understand that a well-maintained supply chain performance improves delivery performance, competitive advantage and customer service (Abdallah *et al*. 2014:16).

5.6 RELIABILITY AND VALIDITY

In the current study, reliability was tested through Average Value Extracted (AVE), Cronbach's alpha (Cronbach's α) and Composite Reliability (CR). Table 5.15 presents the results of the reliability descriptive statistics, Composite Reliability, Average Value Extracted, Cronbach's test and factor loadings.

Table 5.16: Accuracy analysis statistics

Research constructs		Descriptive statistics		Cronbach's alpha		CR value	AVEvalue	Factor loading
		Means	Standard deviation	Item-total	αvalue			
Internal environment management	**IEM1**	3.902	3.279	0.875	0.938	0.938	0.793	0.906
	IEM2			0.798				0.820
	IEM3			0.862				0.906
	IEM4			0.879				0.929
Investment recovery	**IR1**	3.775	3.247	0.882	0.958	0.958	0.853	0.908
	IR2			0.907				0.929
	IR3			0.902				0.927
	IR4			0.903				0.932

Table 5.15: Accuracy analysis statistics (continued…)

Research constructs		Descriptive statistics		Cronbach's alpha		CR value	AVEvalue	Factor loading
		Means	Standard deviation	Item-total	αvalue			
Eco-design	**ED1**	3.796	3.144	0.889	0.959	0.958	0.853	0.916
	ED2			0.908				0.935
	ED3			0.915				0.939
	ED4			0.878				0.905
Green purchasing	**GP1**	3.817	4.189	0.938	0.980	0.980	0.911	0.949
	GP2			0.951				0.960
	GP3			0.955				0.968
	GP4			0.944				0.956
	GP5			0.931				0.941
Environmental performance	**EP1**	3.824	3.007	0.788	0.890	0.890	0.669	0.854
	EP2			0.753				0.827
	EP3			0.777				0.837
	EP4			0.714				0.753
Supply chain performance	**SCP1**	3.835	3.763	0.749	0.935	0.934	0.741	0.745
	SCP2			0.774				0.764
	SCP3			0.869				0.900
	SCP4			0.877				0.949
	SCP5			0.863				0.926

Note: IEM= Internal environment management; IR= Investment recovery; ED= Eco-design; GR= Green purchasing; EP= Environmental performance; SCP= Supply chain performance; CR= Composite Reliability; AVE= Average Variance Extracted

Scale: 1= Strongly disagree; 2= Disagree; 3= Moderately agree; 4= Agree; 5= Strongly Agree

5.6.1 Cronbach's alpha test

The internal reliability in this study was measured through the Cronbach's alpha. An analysis of the item-total column shows that values for the six constructs ranged between 0.714 and 0.955

and were above the required threshold of 0.5, as proposed in a study conducted by Dunn, Seaker and Walter (1994:145). In Table 5.15, the Cronbach's alpha column showed that the constructs ranged from 0.890 to 0.980. The results indicate that the Cronbach's α of each construct dimensions are greater than a 0.7 value, as proposed by Cheng, Jia, Ju and Wang (2019:7), indicating a high level of internal consistency of the scale used in this study.

5.6.2 Composite Reliability

In this study, the internal consistency of the constructs was examined using the composite reliability test. It applied the following formula to calculate composite reliability:

CRη= $\frac{(\Sigma\lambda yi)^2}{[(\Sigma\lambda yi)^2 + (\Sigma\varepsilon i)]}$

CR= (square of the summation of the factor loadings) / [(square of the summation of the factor loadings) + (summation of error variances)]

According to Boon-itt *et al*. (2018:382), values greater than 0.7 indicate a good internal reliability of the constructs. In this study, the Composite Reliability ranges from 0.890 to 0.980 in Table 5.14. As the table shows, the Composite Reliability results are above the acceptable threshold of 0.7; therefore, this shows a good consistency of the research constructs.

5.6.3 Average Variance Extracted

According to Hair *et al*. (2014:109), the average variance extracted values of the research construct should be above 0.5. The following formula was used to calculate the AVE:

Vη= $\frac{\Sigma\lambda yi^2}{(\Sigma\lambda yi^2 + \Sigma\varepsilon i)}$

AVE= [(square of the summation of the factor loadings) / [(square of the summation of the factor loadings) + (summation of error variances)]

Based on the results presented in Table 5.14, the average variance extracted values range between 0.669 and 0.911. These are well above the recommended threshold of 0.5 (Fraering & Minor 2006:284). Therefore, these results shown in Table 5.14 are adequate. In the following section the validity test results are discussed.

5.7 VALIDITY

In the current study, the validity tests were conducted by using convergent and discriminant validity. The convergent and discriminant validity tests as well as the results are discussed below.

5.7.1 Convergent validity

According to Alwi, Bakar, Ghadi and Talib (2012:140), convergent validity is defined as a method used to assess the construct validity. In this study, the item-total correlation and factor loadings were examined. As seen in Table 5.14, the item-total values are within the range of 0.714 to 0.955. As observed, all the values are above the required threshold of 0.5, which indicates that the item-total values are acceptable. Furthermore, factor loadings were examined in order to assess convergent validity in this study. Table 5.14 shows that the factor loading values ranged from 0.745 to 0.968; these values are above the 0.5 acceptable thresholds, as postulated by Wellner (2015:115).

5.7.2 Discriminant validity

In this study, the discriminant validity test was used to assess the correlations between the constructs. The correlation results are depicted in Table 5.16.

Table 5.16: Correlation results

Research construct	**Construct correlation**					
	IEM	**IR**	**ED**	**GP**	**EP**	**SCP**
IEM	1					
IR	0.550**	1				
ED	0.318**	0.345**	1			
GP	0.204**	0.541**	0.549**	1		
EP	0.108**	0.459**	0.555**	0.599**	1	
SCP	0.100**	0.209**	0.356**	0.388**	0.417**	1

** indicates significant at the 0.01 level (2-tailed)

Note: IEM= Internal environment management; IR= Investment recovery; ED= Eco-design; GP= Green purchasing; EP= Environmental performance; SCP= Supply chain performance

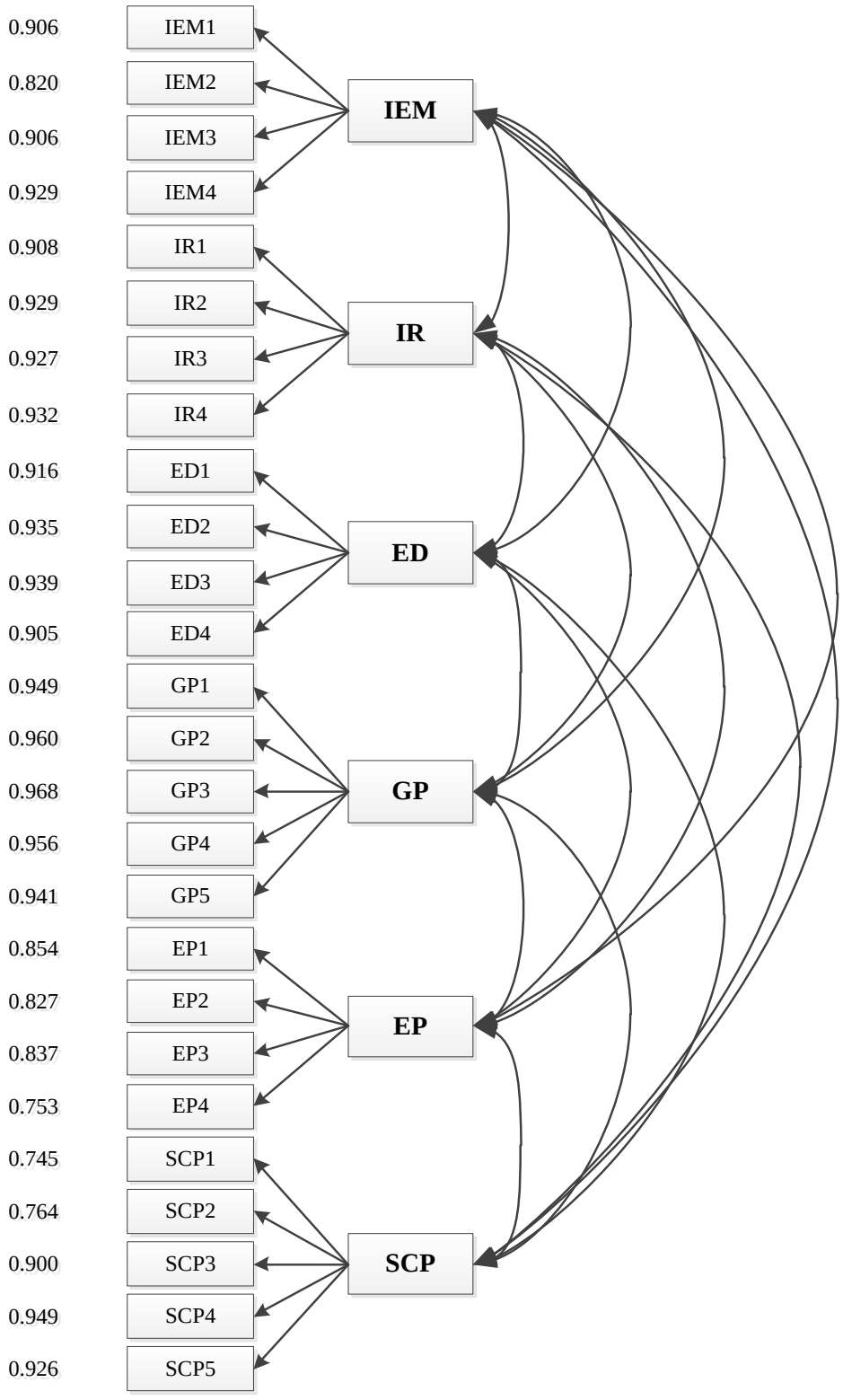
As shown in Table 5.16, the correlation between IR and IEM has a value of ($p=0.550$; $p<0.01$). The correlation between ED and IEM shows a positive relationship ($p=0.318$; $p<0.01$), followed by a correlation between ED and IR ($p=0.345$; $p<0.01$). Moreover, the inter-factor correlation values between GP and IEM were ($p=0.204$; $p<0.01$), GP and IR ($p=0.541$; $p<0.01$) as well as GP and ED ($p=0.549$; $p<0.01$). A significant relationship exists between EP and IEM ($p=0.108$; $p<0.01$), EP and IR ($p=0.459$; $p<0.01$), EP and ED ($p=0.555$; $p<0.01$) as well as EP and GP ($p=0.599$; $p<0.01$). Furthermore, the correlation between SCP and IEM has a value of ($p=0.100$; $p<0.01$), followed by a correlation between SCP and IR ($p=0.209$; $p<0.01$), SCP and ED ($p=0.356$; $p<0.01$), SCP and GP ($p=0.388$; $p<0.01$), as well as SCP and EP ($p=0.417$; $p<0.01$). Table 5.16 shows that the correlation values between constructs are all below the required threshold of 1.0, as recommended by Chinomona (2011:110). Therefore, these results indicate a significant correlation between constructs. The confirmatory factor analysis and model fit indices results are discussed in the following section.

5.8 CONFIRMATORY FACTOR ANALYSIS AND MODEL FIT ASSESSMENT

In this study, confirmatory factor analysis was implemented to examine and test the relationship between latent variables.

5.8.1 Confirmatory factor analysis model fit outcomes

Figure 5.7, is an illustrative representation of the confirmatory factor analysis model. Based on the figure below, the latent variables are connoted by the circular form whereas observed variables are signified by the rectangular forms. Furthermore, measurement errors are signified by circular forms which are located nearby the observed variables. Lastly, the relationship between latent variables is represented by the bi-directional indicators.



Note: IEM= Internal environment management IR= Investment recovery ED= Eco-design GP= Green purchasing EP= Environmental performance SCP= Supply chain performance e= Measurement error

Figure 5.7: Confirmatory factor analysis model

5.8.2 Model fit assessment

Table 5.17 illustrates the model fit results and the recommended levels for each fit in this study.

Table 5.17: Confirmatory factor analysis model fit indices outcomes

Model fit indices	CMIN/DF	GFI	AGFI	NFI	IFI	TLI	CFI	RMSEA
Indicators	2.709	0.864	0.832	0.938	0.960	0.954	0.960	0.068
Criteria	≤3	≥0.9	≥0.9	≥0.9	≥0.9	≥0.9	≥0.9	≤0.08

Note: (CMIN/DF)= Chi-square/degree-of-freedom GFI= Goodness-of-fit index AGFI= Adjusted goodness-of-fit index NFI= Normed fit index IFI= Increment fit index TLI= Tucker-Lewis index CFI= Comparative fit index RMSEA= Root mean square error of approximation.

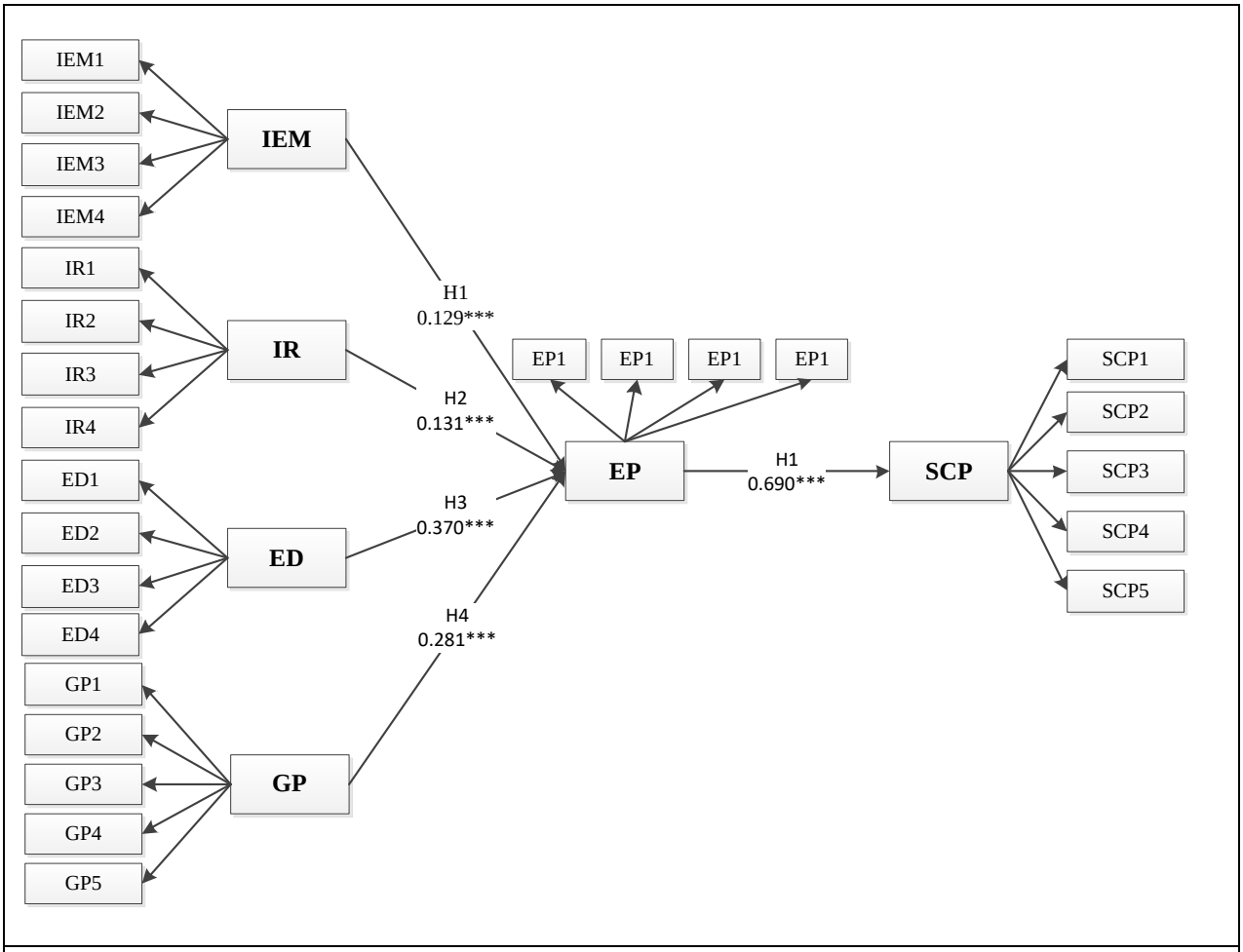
Table 5.17 shows that chi-square/degree of freedom is 2.709. Its value is less than the recommended threshold of ≤3 which therefore indicates acceptable model fit, as asserted by Chinomona (2011:118). Furthermore, Table 5.17 depicts that the values of NFI (0.938); IFI (0.960); TLI (0.954) and CFI (0.960) meet the recommended threshold of 0.9, which means the data fit the model. However, Table 5.16 indicates a GFI value of and AGFI value of (close to the acceptable threshold of 0.9); the adjusted GFI and AGFI are 0.900 which is equal to the recommended threshold of ≥0.9, as presented by De Pablos, Imber, Lytras, Maurer, Roulstone and Ziderman (2010:80). As a result, GFI (0.864) and AGFI (0.832) values fit the model. The value of RMSEA is 0.068 below the standard threshold of 0.08, as suggested by Bagozzi and Yi (2012:15). Therefore, the RMSEA value in Table 5.17 confirms an acceptable model fit. Section 5.8 discusses the structural equation modelling and model fit indices results.

5.9 STRUCTURAL EQUATION MODELLING AND MODEL FIT ASSESSMENT

In this section, relationships between the research constructs were assessed through structural equation modelling (SEM).

5.9.1 Structural equation modelling model fit outcomes

Figure 5.8 represents the structural equation modelling of this study.



Note: IEM= Internal environment management IR= Investment recovery ED= Eco-design
GP= Green purchasing EP= Environmental performance SCP= Supply chain performance

Figure 5.8: Structural equation modelling model

5.9.2 Model fit assessment

Table 5.18 presents the structural modelling model fit indices results for this study.

Table 5.18: Structural equation modelling model fit indices outcomes

Model fit indices	CMIN/ DF	GFI	AGFI	NFI	IFI	TLI	CFI	RMSEA
Indicators	2.712	0.869	0.834	0.932	0.950	0.951	0.959	0.069
Criteria	≤3	≥0.9	≥0.9	≥0.9	≥0.9	≥0.9	≥0.9	≤0.08

Note: (CMIN/DF)= Chi-square/degree-of-freedom GFI= Goodness-of-fit index
AGFI= Adjusted goodness-of-fit index NFI= Normed fit index
IFI= Increment fit index TLI= Tucker-lewis index CFI= Comparative fit index
RMSEA= Root mean square error of approximation

In the current study, the chi-square/degrees of freedom have a value of 2.712. The chi-square/degrees of freedom value is below the required threshold of 3.0 (Chen & Lin 2010:2087), therefore, it validates a satisfactory model fit. Moreover, the table shows a value of 0.869 for GFI and 0.834 for AGFI (close to the acceptable threshold of 0.9); the adjusted GFI and AGFI are 0.900 which is equal to the recommended threshold of ≥0.9, as proposed by Chang, Suki and Tam (2014:108), which means values fit the model. Furthermore, the NFI, IFI, TLI, CFI and RMSEA values were 0.932, 0.950, 0.951, 0.959 and 0.069 respectively. In view of these results, it could be concluded that all the model fit indices meet the recommended threshold of ≥0.9 for and ≤0.08 for RMSEA. Overall, the results show that the model has a good fit. The following section explains the hypothesis testing results of this study.

5.9.3 Hypothesis testing

Table 5.19 depicts the results of the hypothesis testing.

Table 5.19: Hypothesis testing outcome

Proposed hypothesis relationship	Hypothesis	Path coefficient estimates	P value	Decision
IEM→EP	H1	0.129	***	Significant
IR→EP	H2	0.131	***	Significant
ED→EP	H3	0.370	***	Significant
GP→EP	H4	0.281	***	Significant
EP→SCP	H5	0.690	***	Significant

IEM, internal environment management; IR, investment recovery; ED. Eco-design; GP, green purchasing; EP, environmental performance; SCP, supply chain performance; Significant at $p<0.001$.

As indicated in Table 5.19, the levels of all five hypotheses (H1-H5) are supported and significant at a level of $p<0.001$. Therefore, it can be concluded that all five hypotheses presumed in this study were accepted and supported, as illustrated in Figure 5.2. The following section discusses the results for each hypothesis proposed in this study.

5.9.4 Discussion of results

All path coefficient estimates are supported and significant at a level of $p<0.001$. As portrayed in Table 5.19, all five hypotheses (H1-H5) were supported. The following section discusses the results for each hypothesis depicted in Table 5.19.

5.9.4.1 Hypothesis 1 results

Hypothesis One stated that there is a positive relationship between internal environment management and environment performance. The path coefficient value for hypothesis One is at 0.129. This means that internal environment management has a positive influence on environmental performance. Furthermore, the results in Table 5.18 show that the relationship between internal environment management and environmental performance is significant at 99 percent ($p=0.001$). The results of this study correspond with the results of a study conducted by Fang and Zhang (2018:1076) whereby internal environment management is positively associated with environmental performance.

The results in Table 5.19 are consistent with studies by previous researchers who found that managerial commitment on green management improves environmental performance (Burki *et al*. 2018:1309), and with support from top management, an organisation is more likely to pursue environmental practices which in turn generate sales and profit (Mei 2013:51). In the same view, Çankaya and Sezen (2018:5) assert that internal environment management influences the implementation of green management, thus contributing to green practices and programmes across the organisation. Other studies by Chu *et al.* (2017:6) and Abu-Rumman *et al.* (2015:151) revealed that internal environment management is a key driver for implementing green supply chain management practices and improving environmental performance.

5.9.4.2 Hypothesis 2 results

Hypothesis Two stated that there is a positive relationship between investment recovery and environmental performance. Following the test of hypothesis Two, a path coefficient value of 0.131 with ($p<0.001$) was revealed. The results indicate that investment recovery is positively related to environmental performance. Furthermore, the results are supported and significant at 99 percent. In support of the results, a study conducted by Esfahbodi *et al.* (2016:75) found that investment recovery is positively related to environmental performance. As suggested by Fang and Zhang (2018:1076), investment recovery enhances environmental sustainability by reducing costs, waste and idle assets throughout the supply chain. The authors further found that the

organisation can generate revenue through selling and recycling idle assets. Thus, the results of this study reveal that perception of investment recovery has a positive effect on environmental performance beverage industry sector.

5.9.4.3 Hypothesis 3 results

Hypothesis Three stated that eco-design is positively related to environmental performance. After testing hypothesis Three, a coefficient value of (p=0.370) was obtained. This means that eco-design has a significant and positive influence on environmental performance. More so, the results indicated that the relationship between eco-design and environmental performance is significant at ($p<0.001$) 99 percent. The result confirms the existence of the relationship. These results are confirmed by Choi and Hwang (2015:80) that eco-design is positively related to environmental performance. Similarly, the results are consistent with past studies (Eltayeb *et al.* 2010:500; Adebanjo *et al.* 2013:1098). These authors went further by saying that minimising the consumption of raw materials within the manufacturing process will make the organisation utilise reused and recycled component materials. Parasayu *et al.* (2017:3) further add that eco-design improves environmental performance at the early stage of product design by reducing waste materials and improving efficiency of resource use.

5.9.4.4 Hypothesis 4 results

Hypothesis Four states that green purchasing is positively related to environmental performance. The results of hypothesis Four indicate that there is a significant relationship between green purchasing and environmental performance ($p= 0.281$; $p<0.001$). The results indicate that green purchasing is positively related to environmental performance. The results concur with Huo, Yu and Zhang (2017:10) who revealed that green purchasing has a positive relationship with environmental performance. For Parasayu *et al.* (2017:3), the implication of green purchasing results in better environmentally friendly materials from suppliers, and minimisation of harmful materials. These authors found that purchasing eco-friendly materials from suppliers lowers the environmental impact. Additionally, as stated by Bhadauria *et al.* (2012:294), partnerships developed through collaboration with suppliers in the manufacturing setting bring into being positive results, and improve environmental performance. This is because the buyer and supplier depend on a strong relationship.

5.9.4.5 Hypothesis 5 results

Hypothesis Five states that environmental performance is positively related to supply chain management. As depicted in Table 5.19, there was a strong significant relationship between

environmental performance and supply chain performance (p= 0.690; p<0.001). These results further confirm that environmental performance has a strong positive influence on supply chain performance. The results are in line with Epoh and Mafini (2018:9), who found that environmental performance positively influences supply chain performance. In addition, these results support research conducted by Kazancoglu *et al.* (2018:1289), by validating that environmental performance is positively related to supply chain performance. These authors go further by stating that investing in environmental sustainability leads to improved supply chain performance. From the results of this study, it can be concluded that environmental performance improvement has an influence on supply chain performance within the beverage industry sector.

Hypothesis Five indicated a high path coefficient estimate. This is due to the fact that environmental performance is one of the key factors to achieving and improving supply chain performance. The results affirm that the improvement of environmental performance by beverage companies has led to greater performance in the supply chain. Based on the results, it may be implied that beverage companies understand the importance of environmental performance, and sustaining it in order to create a positive effect that will enhance their supply chain performance. It is also evident that the improvement of environmental performance on supply chain performance is dependent on the integration of green supply chain management practices into organisational strategies. Hence, the two research constructs have a strong and positive relationship.

5.10 CHAPTER 5 CONCLUSION

Chapter Five presented and interpreted the results of the study. It started by providing an analysis of the demographic information of the respondents. This research was assessed through the reliability test, validity test, confirmatory factor analysis and structural equation modelling. Based on that, it reveals that the results of this study are significant and reliable. The confirmatory factor analysis was conducted through the model-fit assessment. Moreover, structural equation modelling was conducted to assess the correlation between the hypothetical constructs through path coefficients. Additionally, the results obtained confirm that the implementation of green supply chain management practices influences environmental performance and supply chain performance in the beverage industry. The next chapter provides in-depth information concerning conclusions, limitations, implications for further research and recommendations of this study.

CHAPTER 6
CONCLUSIONS AND RECOMMENDATIONS

6.1 INTRODUCTION

This chapter provides the conclusions from the results acquired from Chapter Five on the influence of green supply chain management practices and environmental performance on supply chain performance in the South African beverage industry. It first provides a summary of the results and describes the practical and theoretical implications of the study. This is followed by the conclusions with regard to the results obtained. It also gives recommendations to the beverage industry on how to improve green supply chain management practices, environmental performance and supply chain performance. Lastly, the limitations of the study are explained, including implications for future studies, based on the limitations.

6.2 SUMMARY OF THE CHAPTERS

The purpose of this study was to investigate the influence of green supply chain management practices, environmental performance and supply chain performance in the beverage industry of South Africa. The study was divided into six chapters. Chapter 1 introduced the research topic, discussed the background and the problem statement, highlighted the research objectives and hypotheses, delineated the research methodology and ethical issues. Chapter 2 provided in-depth information regarding the importance of the beverage industry in South Africa's economy and how beverage companies contribute to the society as a whole. Chapter 3 discussed the theoretical and empirical reviews of the key variables of the study, known as internal environment management, investment recovery, eco-design, green purchasing, environmental performance and supply chain performance. Chapter 3 also provided the conceptual framework of the study and examined the hypotheses. Chapter 4 discussed the research methodology and design used in this study. The research paradigms, research approaches, research process, sampling design, statistical methods and ethical issues were discussed. Furthermore, this chapter discussed the statistical methods, namely, confirmatory factor analysis and structural equation modelling. Chapter 5 presented the analysis and interpretation of the research results. Chapter 6, the last chapter, provided the conclusions, limitations, implications for further research and recommendations concerning the research results.

6.3 CONCLUSIONS BASED ON THEORETICAL OBJECTIVES

The following section discusses the conclusions based on the theoretical objectives set out in Chapter One of this study, which were:

- to conduct a literature review on internal environment management;
- to conduct a literature review on investment recovery;
- to conduct a literature review on eco-design;
- to conduct a literature review on green purchasing;
- to conduct a literature review on environmental performance; and
- to conduct a literature review on supply chain performance.

6.3.1 Conclusions based on literature review of internal environment management

The first theoretical objective was to conduct a literature review focusing on internal environment management. The important role played by internal environment management in contributing to the environmental sustainability across the supply chain has been explained in detail in Chapter Three of this study. In section 3.4.1, the literature revealed that internal environment management has a massive influence on the development of environmental sustainability in the organisation. In this study, various definitions of internal environment management were provided. The study made use of the definition by Bhadauria *et al*. (2012:293) provided in section 3.4.1, which defined internal environment management as a practice of developing green supply chain management as a planned managerial imperative through support and commitment from both strategic and tactical management levels. Moreover, management support has been regarded as a key driver that enables organisations to implement green management practices to achieve a cleaner production in their supply chain (Bai *et al*. 2014:90). This study highlights the importance of internal environment management in an organisation. Section 3.3.1 also points out that effective green supply chain management practices lead to superior environmental performance in the entire supply chain. When management is committed, employees and other stakeholders are encouraged to participate in the implementation of green management practices. It is therefore concluded that management support and commitment is essential in implementing green supply chain management practices throughout the supply chain.

6.3.2 Conclusions based on literature review of investment recovery

The second theoretical objective was to conduct a literature review focusing on investment recovery, which is detailed in Chapter Three of this study. This study provided various definitions of investment recovery. The definition of Mei (2013:12) provided in Section 3.4.2 suits this study. Details on the importance of investment recovery practices are given in this chapter. Section 3.3.1 in Chapter Three also points out that government regulations force organisations to adopt investment recovery practices to reduce waste and environmental impacts. Furthermore, in section 3.4.2, the literature review on investment recovery has shown that the investment recovery is led by remanufacture and reverse logistics. It is through investment recovery that beverage companies can sustain the environment and enhance the organisational performance, which is significant for the success of the environmental performance. The literature showed that investment recovery includes positive outcomes which are critical to the effectiveness of the whole organisational performance (Enyinna 2017:20). This study accentuates that investment recovery is vital to reduce environmental impact, because it sells idle assets and materials throughout the supply chain. Therefore, it can be concluded that investment recovery is essential in detecting unwanted items and reducing costs such as storage and maintenance costs.

6.3.3 Conclusions based on literature review of eco-design

The third theoretical objective was to conduct a literature review focusing on eco-design, as stated in Chapter Three. The reviewed literature presented various definitions and in a supply chain environment, eco-design is referred to as a design approach. Section 1.3.5 describes eco-design as an internally focused green supply chain management practice that enhances the environmental attributes of the products. In addition, Reddy (2016:37) explains that eco-design enables companies to manufacture goods at a low cost whilst staying competitive and maintaining quality. The literature on eco-design has clarified the importance of integrating environmental aspects into product design. Furthermore, the literature in section 3.4.3 revealed key factors that drive the organisation to implement eco-design, namely legislations, competitors, customer's demand and environmental pressures. These factors are essential for achieving positive outcomes for beverage companies. Moreover, the product design process has to be monitored. This allows beverage companies to design products that integrate environmental aspects throughout the manufacturing, distribution, consumption and disposal of the product.

6.3.4 Conclusions based on literature review of green purchasing

The fourth theoretical objective was to conduct a literature review focusing on green purchasing. A literature review on green purchasing provided various definitions in Chapter Three. However, the definition of Ying (2014:12) provided in section 3.4.4 best suits this study. The reviewed literature highlighted the impact green purchasing has on organisational performance in a beverage company. Section 3.4.4 of Chapter Three accentuates that green purchasing is vital to improve environmental performance, because it aims to procure components or materials that meet the organisation's eco-friendly goals and environmental objectives. Additionally, section 3.7.3 highlighted that green purchasing has encouraged organisations to consider evaluating suppliers based on their environmental performance prior to taking any procurement decisions. It is through green purchasing that the organisation can reduce costs and cooperate with suppliers in order to purchase environmentally friendly raw materials. The literature review also indicated that green purchasing has a positive influence on environmental performance. Based on the reviewed literature, it can therefore be concluded that supply chain managers ought to consider the environmental sustainability in their purchasing plan, while at the same time maintain the company's purchasing criteria of excellence and delivery.

6.3.5 Conclusions based on literature review of environmental performance

The fifth theoretical objective was to conduct a literature review focusing on environmental performance. In Chapter Three, details on the importance of environmental performance are presented. The chapter also discussed various definition of environmental performance. The definition of Chitramani and Meera (2014:3) provided in section 3.4.5 best suits this study. In section 3.7.5, the literature revealed that enhanced environmental performance leads to superior supply chain management. Drawing from previous literature (Baresel-Bofinger 2016:39: Sinnandavar *et al*. 2018:538), it has been found that environmental performance is important for the organisation because it offers some benefits. These include improved organisation of performance, increased competitiveness and a better relationship with stakeholders with regard to solving environmental issues (Adaku, Charles, Disraeli, Famiyeh & Kwasi 2018:595; Burki *et al*. 2018:1307; Das 2018:185). In most cases, they have a positive impact on organisational performance. It can be concluded that beverage companies must address environmental issues to reduce any impact on organisational performance.

6.3.6 Conclusions based on literature review of supply chain performance

The sixth theoretical objective was to conduct a literature review focusing on supply chain performance. Various definitions have been presented in Chapter Three regarding supply chain performance. However, the definition of Leonczuk (2016:104) provided in section 1.3.8 was applied to this study. The reviewed literature revealed the importance of supply chain performance in the beverage industry. Moreover, supply chain performance is important because it demonstrates the ability of an organisation to enhance product availability, productivity and profitability (Wachira 2016:3). In this study, environmental performance is one of the major drivers to achieving supply chain performance. The study revealed that stakeholders' input in the organisation helps evaluate measures to better the supply chain performance (Cross & Dissanayake 2018:103). Also, literature reviewed in section 3.4.2 indicated that collaborating with trading partners such as customers, suppliers and distributors improves the supply chain performance. For that reason, it is important for beverage companies to achieve supply chain performance through green supply chain management practices in order to improve their organisational performance.

6.4 CONCLUSIONS BASED ON THE EMPIRICAL OBJECTIVES

The following sections discuss the conclusions based on the results presented in Chapter Five of this study, which were:

- to determine the relationship between internal environment management and environmental performance;
- to explore the relationship between investment recovery and environmental performance;
- to investigate the relationship between eco-design and environmental performance;
- to evaluate the relationship between green purchasing and environmental performance; and
- to measure the relationship between environmental performance and supply chain performance.

6.4.1 Conclusions on the relationship between internal environment management and environmental performance

The first empirical objective was to determine the relationship between internal environment management and environmental performance. Results obtained indicated that internal environment management has a positive and significant relationship with environmental

performance, as demonstrated in Section 5.9.4.1. This study shows that top and mid-level management support has more influence on the implementation of green supply chain management practices across the supply chain, which leads to enhanced organisational performance. Based on that, it can therefore be concluded that supply chain management professionals have to engage with employees and other stakeholders in the implementation of green supply chain management practices in order to achieve better performance. In this study, top and mid-level management commitment pursues sustainability advantages by incorporating organisational policies and a green supply chain. Furthermore, this study has shown that when top and mid-level management realise the importance of implementing green supply chain management practices there is a possibility that the environmental performance can be improved. Therefore, it could be concluded that internal environment management in beverage companies leads to better environmental performance.

6.4.2 Conclusions on the relationship between investment recovery and environmental performance

The second empirical objective was to explore the relationship between investment recovery and environmental performance. A positive and significant relationship between investment recovery and environmental performance was demonstrated in section 5.9.4.2. The results show that when the supply chain management professionals in the beverage industry pursue sustainability, they are able to recover their investment across the supply chain in order to improve the environmental performance. This study shows that an attempt to reduce the environmental impact is likely to lead to the improvement of environmental performance as environmental strategies such as waste reduction and recycling contribute to the sustainability of environmental performance. Thus, the results validate this concept. It is therefore concluded that investment recovery in the beverage industry leads to improved environmental performance.

6.4.3 Conclusions on the relationship between eco-design and environmental performance

The third empirical objective was to investigate the relationship between eco-design and environmental performance. The results revealed that eco-design has a positive and significant relationship with environmental performance, as illustrated in section 5.9.4.3. This study has shown that eco-design allows supply chain management professionals in the beverage industry to collaborate with suppliers in order to obtain environmentally friendly materials to be used in the design process. In support of the results, it can be said that adopting eco-design at an early

stage of the manufacturing process can lead to the minimisation of environmental impact by improving efficiency of material use and reducing waste materials that build a setting conducive to the improvement of environmental performance. The results after analysis indicated that eco-design leads directly to the improvement of environmental performance, as postulated in section 3.7.3. The study shows that the involvement of suppliers in each stage of the product design can actually enhance the improvement of the environmental performance. Therefore, it could be concluded that the adoption of eco-design in the beverage industry leads to enhanced environmental performance in the supply chain.

6.4.4 Conclusions on the relationship between green purchasing and environmental performance

The fourth empirical objective was to evaluate the relationship between green purchasing and environmental performance. The results indicate that green purchasing has a positive and significant relationship with environmental performance, as demonstrated in section 5.9.4.4. In fact, the results have shown the positive impact of green purchasing on environmental performance in this study. It can therefore be accepted that green purchasing adoption is crucial for supply chain management professionals to achieve enviornmental performance. However, green purchasing adoption is likely to be challenging if suppliers are not involved in the manufacturing setting. Furthermore, this study has shown the importance of having supplier cooperation during the purchasing process in order to improve the environmental performance, as described in section 3.7.4. In addition, green purchasing act as the focal point where waste is reduced and the organisation is able to focus on lowering costs by reusing and recycling waste. This study concludes that green purchasing leads to greater environmental performance in the supply chain.

6.4.5 Conclusions on the relationship between environmental performance and supply chain performance

The fifth empirical objective was to measure the relationship between environmental performance and supply chain performance. Results acquired and presented in Chapter Three indicate that environmental performance has a positive and significant relationship with supply chain performance, as demonstrated in section 5.9.4.5. The results of this study show that it is important for beverage companies to implement green supply chain management practices in order to achieve supply chain performance. Moreover, this study indicates that integrating environmental sustainability into organisational policies and strategies can lead to better supply

chain performance. This means that organisational policies are the major drivers that influence organisations to have a superior supply chain performance. The study also shows that supply chain management professionals in the beverage industry have to sustain the environmental performance in order to enhance their supply chain performance. Therefore, it could be concluded that the sustainability of environmental performance in the beverage industry leads to superior supply chain performance.

6.5 RECOMMENDATIONS

The following recommendations are suggested for beverage companies:

6.5.1 Recommendations on the relationship between internal environment management and environmental performance

The results have revealed that internal environment management and environmental performance have a positive relationship. In order to improve internal environment management, beverage companies are encouraged to implement the following recommendations:

- Training should be offered annually to workers that are not familiar with green supply chain management.
- Management should also provide practical guidelines to supply chain staff and internal stakeholders as well as non-managerial staff. This will enable them to incorporate green management practices into their daily routine.
- Management should share knowledge and skills related to environmental management with stakeholders.
- Management should constantly monitor the implemented green supply chain management practices.
- Management should collaborate with stakeholders to address environmental concerns more efficiently.
- Lastly, management should consider adopting other green supply chain management practices such as green management and green human resource that would be more affective in their organisation.

6.5.2 Recommendations on the relationship between investment recovery and environmental performance

Investment recovery has been shown to have a positive influence on environmental performance. In order to manage investment recovery, beverage companies are encouraged to implement the following recommendations:

- The recycling process must be monitored to ensure that materials are recycled in a right way and at the right place.
- Management must be able to pin-point surplus assets that need to be sold or reused in order to reduce storage costs and other related costs.
- Equipment that is idling but still functions should be upgraded before being sold. This may save costs of purchasing new equipment.
- Inventory should be handled and controlled frequently. This can minimise idle materials.
- Valuable and operational idle assets should be deployed to other department within the organisation that can find use of them.
- The beverage companies should practice recycling and reuse approaches in order to improve performance in the supply chain.

6.5.3 Recommendations on the relationship between eco-design and environmental performance

The results further suggest that eco-design has a positive influence on environmental performance. In order to maintain eco-design, beverage companies are encouraged to implement the following recommendations:

- Suppliers should be provided with product design requirements in order for them to supply the organisation with green materials.
- Beverage companies should also try to improve environmental features of their products internally, with less interaction with external stakeholders such as customers and suppliers.
- All products designed should be reusable and recyclable.
- The designed products should contribute to the investment recovery approach. This will allow the organisation to reuse products and reduce waste.

- Beverage companies should invest more on green packaging. The green purchasing should be reusable or returnable.

6.5.4 Recommendations on the relationship between green purchasing and environmental performance

Green purchasing has been shown to have a strong and positive influence on environmental performance. In order to control green purchasing, beverage companies are encouraged to implement the following recommendations:

- Carefully selected suppliers should provide environmentally friendly materials.
- Green purchasing guidelines must be followed and adhered to.
- Beverage companies should provide design specification to potential suppliers when purchasing materials.
- Beverage companies should also work together with suppliers for environmental purposes.
- Beverage companies should constantly audit their suppliers to check if they still meet the environmental criteria.
- Importantly, beverage companies must evaluate suppliers to be certain that they are ISO 14001 certified.

6.5.5 Recommendations on the relationship between environmental performance and supply chain performance

The study's results furthermore suggest that environmental performance has a strong and positive influence on supply chain performance. In order to sustain environmental performance, beverage companies are encouraged to implement the following recommendations:

- Management must emphasise improving the environmental performance in order to enhance the organisation's performance in the supply chain.
- Internal and external stakeholders should cooperate with each other in order to enhance environmental performance and improve performance in their supply chain.
- Management should integrate other green management practices that can achieve cost savings and reduce waste.
- The beverage companies should continue incorporating environmental sustainability into their organisational policies and strategies in order to enhance supply chain performance.

6.5.6 Overall recommendations

The green supply chain management practices indicated in the study should be widely adopted in the beverage industry. This means that they should consider internal environment management, investment recovery, eco-design and green purchasing as practical guidelines that would enhance the performance of the supply chain. These recommendations may help organisations that are keen to sustain the environment, and thus improve their organisational performance. Furthermore, commitment and support from internal and external stakeholders will help beverage companies to continue greening the supply chain.

Employees should be encouraged to go for training to gain knowledge and practical guidelines regarding the implementation of green supply chain management practices. Also, managers and supply chain management professionals should be trained in order to adapt to newer green supply chain management practices in future. This would help managers and employees to adhere to new environmental policies in the beverage company. With regards to government, more regulations should be imposed on beverage companies that continue to pollute the environment. In addition, government policy makers and industry regulators should instil stricter regulations that will drive beverage companies to green their supply chain. Moreover, beverage companies must be monitored by government inspectors to ensure that final products are environmentally friendly.

6.6 LIMITATIONS OF THE STUDY

Due to strict access in beverage company depots and plants, questionnaires were dropped and collected at a later stage. This meant that the researcher could not monitor how respondents for the current study completed the questionnaires. Moreover, a number of beverage companies were located in remote areas with restricted accessibility. However, through persistence, access was granted to successfully compile this study. A total of 373 supply chain management professionals in the beverage industry completed the questionnaires from a target of 450. Although the study produced positive results, a sample size of 450 and above could have produced better results. Also, the study focused on six variables and did not include other variables such as waste management systems and reverse logistics. This study adopted a quantitative method, which limited respondents from providing detailed narrative experiences.

6.7 IMPLICATIONS FOR FUTURE RESEARCH

With regards to restricted access in beverage company depots and plants, future researchers should request access or permission to enter the premises in advance and also monitor the process. Since most beverage companies were located in distant areas, future researchers should try other methods of distributing questionnaires, such as electronic mailing which could save them time and travelling costs. When conducting research on beverage companies, a larger sample size should be considered as it will produce greater results. Additionally, future studies should also make use of a qualitative method in order to obtain in-depth information into the influence of green supply chain management practices in the beverage industry. This study focused entirely on the beverage industry to describe the green supply chain management practices; future researchers using the same topic could extend the exploration to other major industries, as well as neighbouring countries.

6.8 CHAPTER 6 CONCLUSION

This study examined the effect of green supply chain management practices and environmental performance on supply chain performance in the beverage industry in South Africa. This chapter presented the summary of the results, followed by the implications of the study. After analysis of all the proposed hypotheses, the results affirmed that there is a significant and positive correlation between IEM and EP; IR and EP; ED and EP; GP and EP; EP and SCP. Based on the results, environmental performance has been concluded as an important factor in enhancing supply chain performance. The conclusions based on empirical objectives were then made. Recommendations to be implemented by management and supply chain management professionals were provided. It is vital, therefore, for beverage companies to collaborate with suppliers throughout the supply chain since the study has shown that partnerships contribute to the organisation's performance. The chapter concludes by highlighting the limitations of the study and implications for future studies.

REFERENCES

ABDALLAH, A.B., AQQAD, N.O. & OBEIDAT, B.Y. 2014. The impact of supply chain management practices on supply chain performance in Jordan: the moderating effect of competitive intensity. *International Business Research*, 7(3):13-27.

ABDUL-RASHID, S.H., MASOUMIK, S.M. & OLUGU, E.U. 2014. Gaining competitive advantage through strategic green supply chain management: from a literature review towards a conceptual model. *International Journal of Supply Chain Management*, 3(3):49-58.

ABDUL-RASHID, S.H., MASOUMIK, S.M. & OLUGU, E.U. 2015. The development of a strategic prioritisation method for green supply chain initiatives. *Public Library of Science*, 10(11):1-33.

ABIB, G., HAYASHI, P. & HOPPEN, N. 2019. Validity in qualitative research: a processual approach. *The Qualitative Report*, 24(1):98-112.

ABU-RUMMAN, A.H., AL KHATTAB, S.A. & MASSAD, M.M. 2015. The impact of the green supply chain management on environmental – based marketing performance: case study Nugul group companies in Jordan. *Industrial Engineering Letters*, 5(8):80-88.

ABU-RUMMAN, A.H., AL-BOURINI, F.A. & DIAB, S.M. 2015. The impact of green supply chain management practices on organizational performance: a study of Jordanian food industries. *Journal of Management and Sustainability*, 5(1):149-157.

ACÍN, V.M.P. 2018. Sustainability in supply chains – reports, management practices and in leading Finnish companies. M.Tech Dissertation. Turku: Turku University of Applied Sciences.

ADAKU, E., CHARLES, T.A., DISRAELI, A.D., FAMIYEH, S. & KWASI, A.G. 2018. Environmental management practices, operational competitiveness and environmental performance: empirical evidence from a developing country. *Journal of Manufacturing Technology Management*, 29(3):588-607.

ADAMO, F., KOTZE, T. & NIEMANN, W. 2016. Drivers and barriers of green supply chain management in the Mozambican manufacturing industry. *Journal of Contemporary Management*, 13:977-1013.

ADEBANJO, D., LAOSIRIHONGTHONG, T. & TAN, K.C. 2013. Green supply chain management practices and performance. *Industrial Management and Data Systems*, 113(8):1088-1109.

ADZANYO, M., AGYEMANG, M., ANTARCIUC, E., ZHAO, S. & ZHU, Q. 2018. Evaluating barriers to green supply chain redesign and implementation of related practices in the West Africa cashew industry. *Resources, Conservation and Recycling*, 136:209-222.

AEKYATI, A., PIRIYAKUL, R. & KHANTANAPHA, N. 2016. Green supply chain management: procurement context. *International Journal of Economics and Management Sciences*, 5(6):1-4.

AGI, M.A.N. & NISHANT, R. 2016. Understanding influential factors on implementing green supply chain management practices: an interpretive structural modelling analysis. *Journal of Environmental Management*, 188:351-363.

AGUINIS, H. & SOLARINO, A. M. 2019. Transparency and replicability in qualitative research: the case of interviews with elite informants. *Strategic Management Journal*, 1-38.

AGUINIS, H., BAILEY, J.R. & HILL, N.S. 2019. Best practices in data collection and preparation: recommendations for reviewers, editors, and authors. *Organizational Research Methods*, 1-16.

AHI, P. 2014. Sustainability analysis and assessment in the supply chain. D. Tech Dissertation. Toronto: Ryerson University.

AHLSTROM, D., BRUTON, G.D. & LI, H-L. 2010. Institutional theory and entrepreneurship: where are we now and where do we need to move in the future? *Entrepreneurship Theory and Practice*, 34(3):421-440.

AHMED-KRISTENSEN, S., CHRISTENSEN, B.T. & CRAMER-PETERSEN, C.L. 2019. Empirically analysing design reasoning patterns: abductive-deductive reasoning patterns dominate design idea generation. *Design Studies*, 60:39-70.

AHVENAINEN, M. & PATOKORPI, E.2009. Developing an abduction-based method for futures research. *Futures*, 41(3):126-139.

AKCAY, B. & BENEK, I. 2019. Development of stem attitude scale for secondary school students: validity and reliability study. *International Journal of Education in Mathematics, Science and Technology*, 7(1):32-52.

AKHTAR, P., DOHERTY, B., TSE, Y.K., LI, S. & ZHANG, M. 2016. Sustainable supply chain management: confirmation of a higher-order model. *Resources, Conservation and Recycling*, 1:1-221.

AKINLABI, E., MBOHWA, C. & OJO, E.M. 2013. An analysis of green supply chain management in South Africa and Nigeria: a comparative study. International Conference on Integrated Waste Management and Green Energy Engineering, 15-16 April 2013, Johannesburg, 315-319.

AKINLABI, E.T., MBOHWA, C. & OJO, E.M. 2015. Greening the construction industry. Proceedings of the 2015 International Conference on Operations Excellence and Service Engineering, 10-11 September 2015, USA, 581-591.

AKTAS, E., GENG, R. & MANSOURI, S.A. 2016. The relationship between green supply chain management and performance: a meta-analysis of empirical evidences in Asian emerging economies. *International Journal of Production Economics,* 183:245-258.

AL-AOMAR, R. & HUSSAIN, M. 2018. An assessment of adopting lean techniques in the construct of hotel supply chain. *Tourism Management,* 69:553-565.

ALBASTROIU, I. & FELEA, M. 2013. Defining the concept of supply chain management and its relevance to Romanian academics and practitioners. *Amfiteatru Economic*, 4(33):74-88.

ALBERTA CANADA. 2016. Supply chain management professional: certification process. [Online]. Available at: <https://www.albertacanada.com/files/albertacanada/ Supply_Chain_Management_ Professional_rev_Feb_2016_FINAL.pdf>. Accessed: 11/10/2017.

ALEXOPOULOS, I., KOUNETAS, K. & TZELEPIS, D. 2018. Environmental and financial performance. Is there a win-win or a win-loss situation? Evidence from the Greek manufacturing. *Journal of Cleaner Production*, 197:1275-1283.

ALI, A., BENTLEY, Y., CAO, G. & HABIB, F. 2016. Green supply chain management-food for thought? *International Journal of Logistics: Research and Applications,* 20(1):22-38.

ALI, Y., DE FELICE, F., MUMTAZ, U. & PETRILLO, A. 2018. Identifying the critical factors of green supply chain management: environmental benefits in Pakistan. *Science of the Total Environment*, 144-152.

ALLEN, H.H. & HSU, C-W. 2010. Critical factors for implementing green supply chain management practice: An empirical study of electrical and electronics industries in Taiwan. *Management Research Review*, 33(6):586-608.

ALLY, Y. 2015. Reduction of the environmental impact of a soft drink manufacturing plant. M.Tech Dissertation. Durban: University of KwaZulu-Natal.

ALMADA-LOBO, B., GUIMARAES, L. & KLABJAN, D. 2011. Annual production budget in the beverage industry. *Engineering Applications of Artificial Intelligence*, 25:229-241.

ALSHURA, M.S.K. & AWAWDEH, H.Z.Y. 2016. Green supply chain practices as determents of achieving green performance of extractive industries in Jordan. *International Journal of Business and Social Science*, 7(7):166-177.

ALWI, N.H., BAKAR, K.A., GHADI, I. & TALIB, O. 2012. Construct validity examination of critical thinking dispositions for undergraduate students in University Putra Malaysia. *Higher Education Studies*, 2(2): 138-145.

AL-ZEFEITI, S.M.B. & MOHAMAD, N.A. 2015. Methodological considerations in studying transformational leadership and its outcomes. *International Journal of Engineering Business Management*, 7(10):1-11.

AMEMBA, C.S., MBURU, N., NYABOKE, P.G. & OSORO, A. 2013. Elements of green supply chain management. *European Journal of Business and Management*, 5(12):51-61.

ANAND, N. & BAG, S. 2014. Modeling green supply chain management framework using ism and Micmac analysis. *African Journal of Business Management*, 8(22):1053-1065.

ANAND, N. & GROVER, N. 2015. Measuring retail supply chain performance. *Benchmarking: An International Journal*, 22(1):135-166.

ANH, N.V., TRANG, T.V. & VINH. 2014. Willingness to apply the green supply chain management in hotel industry. *Global Journal of Advanced Research*, 2(1):321-334.

ANHOLON, R., NOVASKI, O. & ORDONEZ, R.E.C. 2017. Performance measurement of green supply chain management: a literature review and gaps for further research. *Brazilian Journal of Operations and Production Management*, 14:60-72.

ANNE, M., BULA, O., GICURU, I. & NICHOLAS, L. 2017. Factors influencing sustainability among food manufactures in Kenya. *International Journal of Sustainability Management and Information Technologies*, 3(1):1-9.

ANSON, M.J.P., DEFUSCO, R.A., MCLEAVEY, D.W., PINTO, J.E. & RUNKLE, D.E. 2015. *Quantitative investment analysis*. 3rd ed. New Jersey: Wiley.

APOPA, V.A. 2018. Influence of supply chain management practices on performance of government ministries in Kenya. D.Tech Dissertation. Juja: Jomo Kenyatta University of Agriculture and Technology.

ARDAKANI, D.A. & SOLTANMOHAMMADI, A. 2018. Investigating and analysing the factors affecting the development of sustainable supply chain model in the industrial sectors. *Corporate Social Responsibility and Environmental Management*, 1-14.

ARIF, M.D., JUSOH, A., SEMAN, N.A.A., SHOKI, M. & ZAKUAN, N.2012. Green supply chain management: a review and research direction. *International Journal of Managing Value and Supply Chains*, 3(1):1-18.

ARISHA, A. & RAGAD, M.A. 2018. Research methodology in business: a starter's guide. *Management and Organisational Studies*, 5(1):1-23.

ARIZON, V. 2010. Service quality delivery in the food and beverage industry in the Western Cape. M.Tech Dissertation. Cape Town: Cape Peninsula University of Technology.

ARSLAN, N. & TATHDIL, H. 2012. Defining and measuring competitiveness: a comparative analysis of Turkey with 11 potential rivals. *International Journal of Basic and Applied Science*, 12(2):31-43.

ARTHUR, J.K. & SARPONG, K.A.M.2013. Analysis of data cleansing approaches regarding dirty data-a comparative study. *International Journal of Computer Applications*, 76(7): 14-18.

ASKHAM, T. 2016. Water sustainability: measurement, management, engagement, and disclosure of selected water-intensive companies on the Johannesburg stock exchange. M.Tech Dissertation. Pretoria: University of South Africa.

ASRAWI, I. 2016. Optimization models in green supply chain management. M.Tech Dissertation. Nablus: An-Najah National University.

AVITTATHUR, B. & JAYARAM, J. 2015. Green supply chains: a perspective from an emerging economy. *International Journal of Production and Economics*, 164:234-244.

AWASTHI, A., CHAUHAN, S., GOYAL, S., KAUR, J. & SIDHU, R. 2017. A dematel based approach for investigating barriers in green supply chain management in Canadian manufacturing firms. *International Journal of Production Research*, 56(2):312-332.

AZEVEDO, S.G., CARVALHO, H. & MACHADO, V.C. 2011. The influence of green practices on supply chain performance: a case study approach. *Transportation Research Part E*, 47:850-871.

BABIN, B.J. & ZIKMUND, W.G. 2013. *Essentials of marketing research*. 5th ed. Ohio: Cengage Learning.

BABIN, B.J., BACK, W.C., HAIR, J.E. & ROLPH, E.A. 2010. *Multivariate data analysis*. New Jersey: Pearson Hall.

BABIN, B.J., CARR, J.C., GRIFFIN, M. & ZIKMUND, W.G. 2010. *Business research methods*. 8th ed. Canada: Cengage Learning.

BADEN, M.S. & MAJOR, C.H. 2013. *Qualitative research: the essential and practice*. London: Routledge.

BAGOZZI, R.P. & YI, Y. 2012. Specification, evaluation, and interpretation of structural equation models. *Journal of the Academy of Marketing Science*, 40(1): 8-34.

BAHRIN, A.S., MUNIR, A., OTHMAN, A.A. & SUNDRAM, V.P.K. 2017. Green supply chain management practices in Malaysia manufacturing industry. *International Journal of Supply Chain Management*, 6(2):89-95.

BAI, C., KUSI-SARPONG, S., SARKIS, J. & WANG, X. 2014. Green supply chain practices evaluation in the mining industry using a join trough sets and fuzzy TOPSIS methodology. *Resources Policy*, 46:86-100.

BAILEY, A., JIA, F., RUEDA, X. & ZULUAGA-CARDONA. 2018. Sustainable supply chain management in developing countries: an analysis of the literature. *Journal of Cleaner Production*, 189:263-278.

BAIRAGI, V. & MUNOT, M.V. 2019. *Research methodology: a practical and scientific approach*. New York: CRC Press.

BAJPAI, R. & BAJPAI, S. 2014. Goodness of measurement: reliability and validity. *International Journal of Medical Science and Public Health*, 3(2):112-115.

BALOYI, N. 2016. Proposed sin tax on sugar sweetened beverages. *Golegal*. [Online]. Available at: <https://www.golegal.co.za/proposed-sin-tax-sugar-sweetened-beverages/>. Accessed: 12/05/2018.

BARBER, M.G., BURT, J.E. & RIGBY, D.L. 2009. *Elementary statistics for geographers*. 3rd ed. New York: Guilford Publications.

BARBOSA, E. & SCUR, G. 2016. Green supply chain management practices: multiple case studies in the Brazilian home appliance industry. *Journal of Cleaner Production*, 141:1293-1302.

BARESEL-BOFINGER, A.C.R. 2016. Implementation of innovative green management methods in the supply chain: the case of the Greek manufacturing sector. D.Tech Dissertation. Sheffield: University of Sheffield.

BARUA, M.K., KATIYAR, R., KUMAR, G., MEENA, P.L. & TIBREWALA, R. 2017. Impact of sustainability and manufacturing practices on supply chain performance: findings from an emerging economy. *International Journal of Production Economics*, 197:303-316.

BARVE, A. & MUDULI, K. 2011. Role of green issues of mining supply chain on sustainable development. *International Journal of Innovation, Management and Technology*, 2(6):484-489.

BEAN, W.L. & COETZEE, N. 2016. A green profitability framework to quantify the impact of green supply chain management in South Africa. *Journal of Transport and Supply Chain Management*, 10(1):1-15.

BEASLEY, L.O., DOPP, A.R., EISENBERG, D., MUNDEY, P. & SILOVSKY, J.F. 2019. Mixed-method approaches to strengthen economic evaluations in implementation research. *Implementation Science*, 14(2):1-9.

BEAVER, B.H., BEAVER, R.J. & MENDENHALL, W. 2012. *Introduction to probability and statistics*. Canada: Cengage Learning.

BEE, P.S., FERNANDO, Y., JABBOUR, C.J.C. & THOMÉ, A.M.T. 2018. Understanding the effects of energy management practices on renewable energy supply chains: implications for energy policy in emerging economies. *Energy Policy*, 118:418-428.

BEGU, L., DIMA, A.M., MAASSEN, M.A. & VASILESCU, M.D. 2018. The relationship between the knowledge economy and global competitiveness in the European union. *Sustainability*, 10:1-15.

BENITEZ-CORREA, C., GONZALEZ-TORRES, P., OCHOA-CUEVA, C. & VARGAS-SARITAMA, A. 2019. A comparison between deductive and inductive approaches for teaching efl grammar to high school students. *International Journal of Instruction*, 12(1):225-236.

BERNARD, H.R. 2011. *Research methods in anthropology: qualitative and quantitative approaches*. 5th ed. United States: Altamira Press.

BERNDT, A. & PETZER, D. 2011. *Marketing research.* Cape Town: Pearson Education.

BEUKES, J., PRINSLOO, J.J. & PELSER, T.G. 2013. Service expectations from high- and low-volume customers in the alcoholic beverage industry. *Acta Commercii*,13(1):1-8.

BEVERAGE ASSOCIATION OF SOUTH AFRICA. 2016. Response to taxation of sugar sweetened beverages policy paper. [Online]. Available at: <http://www.bevsa.co.za/wp-content/uploads/2016/08/ 22082016-BEVSA-SSB-Tax-Comments-FINAL.pdf>. Accessed: 11/03/18.

BEVERAGE INDUSTRY ENVIRONMENTAL ROUNDTABLE. 2010. Beverage industry sector guidance for greenhouse gas emission reporting. [Online]. Available at: <https://www.fcrn.org.uk/sites/default/files/Beverage_Industry_Sector_Guidance_for_GHG_Emissions_Reporting_v2.0.pdf>. Accessed: 15/02/2018.

BEVERAGE INDUSTRY ENVIRONMENTAL ROUNDTABLE. 2011. A practical perspective on water accounting in the beverage sector. [Online]. Available at: <http://waterfootprint.org/media/downloads/BIER2011WaterAccountingSectorPerspective.pdf>. Accessed: 05/01/18.

BEYENE, Z.T. 2016. Green supply chain management practices in Ethiopian tannery industry: an empirical study. *International Research Journal of Engineering and Technology*, 3(4):287-298.

BHADAURIA, V.S., GREEN, K.W., MEACHAM, J. & ZELBST, P.J. 2012. Green supply chain management practices: impact on performance. *Supply Chain Management: An International Journal*, 17(3):290-305.

BHARDWAJ, A., CHANDNA, P. & SHARMA, V.K. 2016. Green supply chain management related performance indicators in agro industry: a review. *Journal of Cleaner Production*, 141-119.

BHATTACHARJEE, K. 2015. Green supply chain management – challenges and opportunities. *Asia Journal of Technology and Management Research*, 5(1):14-19.

BHATTI, M.A., CHANDRAN, V.G.R. & SUNDRAM, V.P.K. 2016. Supply chain practices and performance: the indirect effects of supply chain integration. *Benchmarking: An International Journal*, 23(6):1445-1471.

BHENGU, M.R. 2011. Beverages packaging and consumer buying behaviour: the case of university of kwazulu-natal students. M.Tech Dissertation. Durban: University of Kwazulu-Natal.

BLAXTER, L., HUGHES, C. & MALCOLM, T. 2010. *How to research*. 4th ed. New York: Open University Press.

BOH, W.F., LUO, C., XU, Y. & ZHENG, H. 2017. Leveraging industry standards to improve the environmental sustainability of a supply chain. *Electronic Commerce Research*, 27:90-105.

BOLARINWA, O.A. 2015. Principles and methods of validity and reliability testing of questionnaires used in social and health science researches. *Nigerian Postgraduate Medical Journal*, 22(4):195-201.

BONCZ, I. 2015. *Introduction to research methodology*. Hungary: Wilson Publications.

BONITUO, P.I. 2014. Assessing the benefits and challenges of corporate social responsibility in the Kumasi metropolis: a case of the beverage industry. M.Tech Dissertation. Kumasi: Kwame Nkrumah University of Science and Technology.

BOODOO, S. 2018. Economic slowdown drives beverage innovation among bottom-end retailers. *Bizcommunity*, 18 January. [Online]. Available at: <http://www.bizcommunity.com/Article/196/162/172400.html>. Accessed: 05/05/2018.

BOON-ITT, S., LAOSIRIHONGTHONG, T., SAMARANAYAKE, P., THAMSATITDEJ, P. & WANNAKARN, M. 2017. Eco-design practices towards sustainable supply chain management: interpretive structural modelling (ism) approach. *International Journal of Sustainable Engineering*, 10(6):326-337.

BOON-ITT, S., WONG, C.W.Y. & WONG, C.Y. 2018. How does sustainable development of supply chains make firms lean, green and profitable? a resource orchestration perspective. *Business Strategy and the Environment*, 27:375-388.

BOSHOFF, S.C. 2012. Knowledge utilisation in the South African wine industry. D.Tech Dissertation. Stellenbosch: Stellenbosch University.

BRITO, J. & DUDLEY, S.E. 2012. *Regulation: a primer*. 2nd ed. United States of America: The Mercatus Center.

BROUTHERS, L.E. RAGLAND, C. & WIDMIER, S. 2014. Institutional theory and international market selection for direct selling. *Marketing Intelligence and Planning*, 33(4):538-555.

BROWN, D. & OPIE, C. 2019. *Getting started in your educational research: design, data production and analysis*. London: Sage.

BROWN, T.A. & MOORE, M.T. 2013. *Running head: confirmatory factor analysis*. Boston: Boston University.

BRUNDIN, E. & WIGREN-KRISTOFERSON, C. 2013. Where the two logics of institutional theory and entrepreneurship merge: are family businesses caught in the past or stuck in the future? *South African Journal of Economic and Management Sciences*, 16(4):452-467.

BRYMAN, A. 2012. *Social research methods*. 4th ed. New York: Oxford University Press.

BUI, T.D., LIM, M.K., TAN, K.H. & TSENG, M-L. 2017. Knowledge management in sustainable supply chain management: improving performance through an interpretive structural modelling approach. *Journal of Cleaner Production*, 162:806-816.

BURKI, U. & DAHLSTROM, R. 2017. Mediating effect of green innovations on interfirm cooperation. *Australasian Marketing Journal*, 25(2):149-156.

BURKI, U., DAHLSTROM, R. & ERSOY, P. 2018. Achieving triple bottom line performance in manufacturer-customer supply chains: evidence from an emerging economy. *Journal of Cleaner Production*, 197:1307-1316.

BVUMA, K. 2013. The implementation of green supply chain management: minimising environmental risk in the South African manganese and phosphate mining industry. M.Tech Dissertation. Vanderbijlpark: Vaal University of Technology.

ÇANKAYA, S.Y. & SEZEN, B. 2018. Effects of green supply chain management practices on sustainability performance. *Journal of Manufacturing Technology Management*, 1-25.

CARVALHO, A.L.D., ESPOSTO, K.F., IGNACIO, L.R. & OMETTO, A.R. 2016. Synergy between the multiple supply chain and green supply chain management (GSCM) approaches: an initial analysis aimed at fostering supply chain sustainability. *European Journal of Sustainable Development*, 5(3):119-132.

CATALDO, F., KIELMANN, K. & SEELEY, J. 2012. *Introduction to qualitative research methodology: a training manual*. United Kingdom: Department for International Development.

CATON, K. 2013. Between you and me: making messes with constructivism and critical theory. *Tourism Culture and Communication*, 13(2):127-137.

CHAI, S. & KIM, M. 2017. Implementing environmental practices for accomplishing sustainable green supply chain management. *Sustainability*, 1-17.

CHAMPION, D., DAINTY, A.J.D., DANIELS, K.J. & GLOVER, J.L. 2014. An institutional theory perspective on sustainable practices across the dairy supply chain. *International Journal of Production Economics*, 152:102-111.

CHANG, B-Y., KENZHEKHANULY, Y. & PARK, B. 2013. A study on determinants of green supply chain management practice. *International Journal of Control and Automation*, 6(3):199-208.

CHANG, C.H. & CHEN, Y.S. 2013. Green organizational identity and green innovations. *Management Decision*, 51(5):1056-1070.

CHANG, M.L.D., SUKI, N.M. & TAM, Y.L.A. 2014. Student satisfaction with the service quality of cafeteria: A structural approach. *International Journal of Business, Economics and Law*, 4(1): 105-111.

CHATTOPADHYAYA, S., KUMAR, S. & SHARMA, V. 2012. A case study from Indian electrical and electronics industry. *International Journal of Soft Computing and Engineering*, 1(6):275-281.

CHAWLA, D. & SODHI, N. 2011. *Research methodology: concepts and cases*. New Delhi: Vikas Publishing House.

CHEGE, E.N. 2012. Green supply chain management practices and supply chain performance of private hospitals in Nairobi, Kenya. M.Tech Dissertation. Nairobi: University of Nairobi.

CHEN, A.J., BOUDREAU, M-C., KARAHANNA, E. & WATSON, R.T. 2011. An institutional perspective on the adoption of green IS & IT. *Australasian Journal of Information Systems*, 17(1): 5-27.

CHEN, S-P., LEE, Y-C., TSAI, C-T. & WANG, Y-F. 2013. Developing green management standards for restaurants: an application of green supply chain management. *International Journal of Hospitality Management*, 34: 263-273.

CHEN, X., XIAO, X., ZENG, H. & ZHOU, Z. 2016. Institutional pressures, sustainable supply chain management, and circular economy capability: empirical evidence from Chinese eco-industrial park firms. *Journal of Cleaner Production*, 155:54-65.

CHEN, Y. & LIN, L-S. 2010. Structural equation-based latent growth curve modeling of watershed attribute-regulated stream sensitivity to reduced acidic deposition. *Ecological Modelling*, 221: 2086-2094.

CHEN, Y-C., LIM, M.K., TSENG, M-L., WONG, W-P. & ZHAN, Y. 2016. A framework for evaluating the performance of sustainable service supply chain management under uncertainty. *International Journal of Production Economics*, 195:359-372.

CHENG, Y., JIA, J., JU, Y. & WANG, Y. 2019. Investigating the impact factors of the logistics service supply chain for sustainable performance: focused on integrators. *Sustainability*, 11(2):1-16.

CHIEN, M-K. 2014. Influences of green supply chain management practices on organizational sustainable performance. *International Journal of Environmental Monitoring and Protection*, 1(1):12-23.

CHINOMONA, R. 2011. Non mediated channel powers and relationship quality: a case of smes in ZIMBABWE channels of distribution. Ph.D Dissertation. Taiwan: National Central University.

CHIRUME, J. 2017. Coke on strike – workers at beverage company enter second week of strike. *GroundUp*, 20 October. [Online]. Available at: <https://www.groundup.org.za/article/coke-strike/>. Accessed: 22/05/2018.

CHITRAMANI, P. & MEERA, B.L.L. 2014. Environmental sustainability through green supply chain management practices among Indian manufacturing firms with special reference to tamilnadu. *International Journal of Scientific and Research Publication*, 4(3):1-8.

CHOI, D. & HWANG, T. 2015. The impact of green supply chain management practices on firm performance: the role of collaborative capability. *Operations Management Research*, 8:69-83.

CHOLA, L., HOFMAN, K.J., LABADARIOS, D., MANYEMA, M., TUGENDHAFT, A. & VEERMAN, L.J. 2015.Cost of inaction on sugar-sweetened beverage consumption: implications for obesity in South Africa. *Public Health Nutrition*, 19(13):2296-2304.

CHOOMRIT, N., KIATCHAROENPOL, T., SIRISAWAT, P. & WANGPHANICH, P. 2016. A study of green procurement practices: a case study of the computer parts industry in Thailand. Proceedings of the 2016 International Conference on Industrial Engineering and Operations Management, 8-10 March 2016, Malaysia, 382-388.

CHRISTENSEN, L. & JOHNSON, B. 2014. *Educational research: quantitative, qualitative, and mixed approaches*. 5th ed. New Delhi: Sage.

CHU, S.H., LEE, M., PARK, S. & YANG, H. 2017. The impact of institutional pressures on green supply chain management and firm performance: top management roles and social capital. *Sustainability*, 9:1-21.

COETZEE, N. 2016. Quantifying the impact of green supply chain management: a South African case study. M.Tech Dissertation. Pretoria: University of Pretoria.

COLICCHIA, C. & STROZZI, F. 2015. Information processing and management using citation network and keyword analysis to perform a systematic literature review on green supply chain management. *Journal of Scientometric Research*, 4:195-205.

COLLINS, H. 2010. *Creative research: the theory and practice of research for the creative industries*. Canada: Applied Visual Arts Publishing.

COULIBALY, A., YAZDANI, M., ZARATE, P. & ZAVADSKAS, E.K. 2017. A group decision making support system in logistics and supply chain management. *Expert Systems with Applications*, 88:376-392.

COUPER, M.P. & GROVES, R.M. 2011. *Survey methodology*. 2nd ed. Canada: Wiley.

COVES, A.M., LUSA, A. & TABORGA, C.P. 2018. A proposal for a green supply chain strategy. *Journal of Industrial Engineering and Management*, 11(3):445-465.

CRAVEN, R.G., DICKE, T., GOU, J., MARSH, H.W. & PARKER, P.D. 2019. Confirmatory factor analysis (cfa) exploratory structural equation modeling (esem) & set-esem: optimal balance between goodness of fit and parsimony. *Multivariate Behavioral Research*, 1-41.

CRESWELL, J.W. 2014. *Research design: qualitative, quantitative, and mixed methods approaches*. 4th ed. London: Sage.

CROSS, J.A. & DISSANAYAKE, C.K. 2018. Systematic mechanism for identifying the relative impact of supply chain performance areas on the overall supply chain performance using scor model and sem. *International Journal of Production Economics*, 201:102-115.

CUFF, R.E. 2011. Exploring the validity of two organizational energy measures in the South African context. M.Tech Dissertation. Pretoria: University of Pretoria.

DA SILVA, I.N., DA SILVA, I.R., DE OLIVEIRA, U.R., ESPINDOLA, L.S. & ROCHA, H.M. 2018. A systematic literature review on green supply chain management: research implications and future perspectives. *Journal of Cleaner Production*, 187:537-561.

DAINTY, A.R.J., SUNINDIJO, R.Y. & ZOU, P.X.W. 2014. A mixed methods research design for bridging the gap between research and practice in construction safety. *Safety Science*, 70:316-326.

DANIEL, B.K. 2018. Reimaging research methodology as data science. *Big Data and Cognitive Computing*, 2(4):1-13.

DANIEL, E. 2016. The usefulness of qualitative and quantitative approaches and methods in researching problem-solving ability in science education curriculum. *Journal of Education and Practice*, 7(15):91-100.

DANSO, A.K. 2007. The effect of technological changes on unemployment in the beverage sector of the South African economy. M.Tech Dissertation. Potchefstroom: North-West University.

DAS, D. 2017. Development and validation of a scale for measuring sustainable supply chain management practices and performance. *Journal of Cleaner Production*, 164:1344-1362.

DAS, D. 2018. The impact of sustainable supply chain management practices on firm performance: lessons from Indian organisation. *Journal of Cleaner Production*, 203:179-196.

DAVID, R.J., SINE, W.D. & TOLBERT, P.S. 2011. Studying choice and change: the intersection of institutional theory and entrepreneurship research. *The Intersection of Institutional Theory and Entrepreneurship Research Organization Science*, 22(5):1332-1344.

DE GIOVANNI, P. & ESPOSITO VINZI, V. 2012. Covariance versus component-based estimations of performance in green supply chain management. *International Journal of Production Economics*, 135(2):907-916.

DE PABLOS, P.O., IMBER, J.B., LYTRAS, M.D., MAURER, H., ROULSTONE, A. & ZIDERMAN, A. 2010. *Knowledge management, information systems, e-learning, and sustainability research*. Berlin: Springer.

DE SOUSA JABBOUR, A.B.L., JABBOUR, C.J.C., LATAN, H. & VAZQUEZ-BRUST, D.V. 2017. Green supply chain practices and environmental performance in Brazil: survey, case studies, and implications for b2b. *Industrial Marketing Management*, 66:13-28.

DENNICK, R. & TAVAKOL, M. 2011. Making sense of Cronbach's alpha. *International Journal of Medical Education*, 2:53-55.

DENSCOMBE, M. 2010. *The good research guide for small-scale social research projects*. 4th ed. United Kingdom: Open University Press.

DEPOY, E. & GITLIN, L.N. 2013. *Introduction to research: understanding and applying multiple strategies*. 4th ed. United State of America: Elsevier.

DIABAT, A. & GOVINDAN, K. 2011. An analysis of the drivers affecting the implementation of green supply chain management. *Resources, Conservation and Recycling*, 55(6):659-667.

DISTELL. 2016. Sustainability report. [Online]. Available at: <https://www.distell.co.za/Knowledge/pkdownloaddocument.aspx?docid=1159>. Accessed: 21/09/2017.

DONGHYUN, C., JIN, S.R., SANG, M.L. & YONGHWI, N. 2013. Pressures affecting green supply chain performance. *Management Decision*, 51(8):1753-1768.

DONNELLY, L. 2016. Tax on soft drinks could benefit obese South Africa. *Mail & Guardian*, 05 February. [Online]. Available at: <https://mg.co.za/article/2016-02-04-tax-on-soft-drinks-could-benefit-obese-sa>. Accessed: 05/05/2018.

DRAGHICI, A., IVASCU, L., MOCAN, M., RUS, S. & TURI, A. 2015. Modeling the green supply chain in the context of sustainable development. *Procedia Economics and Finance*, 26:705-708.

DRAGOMIR, V.D. 2018. How do we measure corporate environmental performance? a critical review. *Journal of Cleaner Production*, 196:1124-1157.

DU PREEZ, R., TERBLANCHE-SMIT, M. & VAN DER SPUY, T. 2014. Measuring the impact of branded alcohol advertising and price on brand versus segment consumption. *International Business and Economics Research Journal*, 13(6):1515-1524.

DUBEY, R. & GUNASEKARAN, A. 2016. *Strategic management of sustainable manufacturing operations*. United States of America: IGI Global.

DUBEY, R., FOROPON, C., GUNASEKARAN, A., GUPTA, S., HAZEN, B., ROUBAUD, D. & SHIBIN, K.T. 2017. Examining sustainable supply chain management of smes using resource based view and institutional theory. *Annals of Operations Research*, 1-26.

DUBEY, R., GUNASEKARAN, A. & PAPADOPOULOS, T. 2017. Green supply chain management: theoretical framework and further research directions. *Benchmarking: An International Journal*, 24(1):184-218.

DUBEY, R., GUNASEKARAN, A. & SHIBIN, K.T. 2017. Explaining sustainable supply chain performance using a total interpretive structural modelling approach. *Sustainable Production and Consumption*, 12:104-118.

DUFFIELD, C., ROCHE, M. & WHITE, E. 2011. Factors in the practice environment of nurses working in in-patient mental health: a partial least squares path modeling approach. *International Journal of Nursing Studies*, 48:1475-1486.

DUFFY, A., RENTIZELAS, A. & TUNI, A. 2018. Environmental performance measurement for green supply chains: a systematic analysis and review of quantitative methods. *International Journal of Physical Distribution and Logistics Management*, 48(8):1-31.

DUNN, S.C., SEAKER, R.F. & WALLER, M.A. 1994. Latent variables in business logistics research: Scale development and validation. *Journal of Business Logistics*, 15(2):145-172.

DURBAN CHAMBER OF COMMERCE AND INDUSTRY. 2016. [Online]. Available at: <http://www.durbanchamber.co.za/Content/Docs/Final%20%20%20Comment%20on%20Taxation%20on%20Sugar%20Sweetened%20Beverages.pdf>. Accessed: 21/01/18.

DURHAM, L. 2013. The South African solution to supply chain. *Supermakert & Retailer*, 20 April. [Online]. Available at: <https://www.supermarket.co.za/SR_Downloads/S&R%20April%202013%20Supply%20chain.pd>. Accessed: 18/03/2018.

ECONEX AND QUANTEC RESEARCH. 2010. Working for South Africa: the contribution of SAB to the South African economy. [Online]. Available at: <https://www.sab.co.za/wp-content/uploads/2016/03/Working-for-South-Africa-3.5-MB-.pdf>. Accessed: 18/07/2017.

ECONEX. 2014. The External cost of alcohol consumption in South Africa: ban on alcohol advertising versus other Appropriate Intervention Policies. [Online]. Available at:<https://econex.co.za/wp-content/uploads/2015/03/econex_researchnote_33.pdf>. Accessed: 20/09/2017.

ECONOMETRIX. 2013. Economic impact of an advertising ban on alcoholic beverages for industry association for responsible alcohol use. [Online]. Available at: <https://www.bizcommunity.com/f/1306/Econometrix_final_report.pdf>. Accessed: 20/09/2017.

ELAHMADY, B., ELSAYED, K.K. & HAMDY, O.M.M. 2018. Impact of sustainable supply chain management practices on Egyptian companies' performance. *European Journal of Sustainable Development*, 7(4):119-130.

ELTAYEB, T.K., RAMAYAH, T. & ZAILANI, S. 2010. Green supply chain initiatives among certified companies in Malaysia and environmental sustainability: investigating the outcomes. *Resource, Conservation and Recycling*, 55:495-506.

ENGERT, M. 2013. Taking an environmental perspective on supply chain management – a study on the German automobile industry. M.Tech Dissertation. Berlin: Erasmus University.

ENYINNA, O. 2017. Conceptual frameworks in green supply chain management (gscm) implementation towards environmental sustainability in African nations. *International Journal of Advances in Engineering Research*, 14(1):15-29.

EPOH, L.R. & MAFINI, C. 2018. Green supply chain management in small and medium enterprises: further empirical thoughts from South Africa. *Journal of Transport and Supply Chain Management*, 10:1-12.

ESFAHBODI, A., WATSON, G., ZHANG, T. & ZHANG, Y. 2016. Governance pressures and performance outcomes of sustainable supply chain management: an empirical analysis of UK manufacturing industry. *Journal of Cleaner Production*, 155:66-78.

ESINAH, O.N. 2014. Green supply chain management practices and supply chain performance in mobile phone firms in Kenya. M.Tech Dissertation. Nairobi: University of Nairobi.

ESMAEILI, A., GOVINDAN, K., ROSTAMZADEH, R. & SABAGHI, M. 2014. Application of fuzzy VIKOR for evaluation of green supply chain management practices. *Ecological Indicators*, 49:188-203.

FAKOYA, M.B. 2014. Contingency approach to sustainable water cost management in a South African brewery. *Journal of Human Ecology*, 48(2):249-255.

FANG, C. & ZHANG, J. 2018. Performance of green supply chain management: a systematic review and meta analysis. *Journal of Cleaner Production*, 183:1064-1081.

FAUL, A.N., LAWSON, T. & VERBIST, A.N. 2019. *Research and statistics for social workers*. New York: Routledge.

FAUZI, F.B.A., ISLAM, S., KARIA, N. & SOLIMAN, M.SM. 2017. A review on green supply chain aspects and practices. *Management and Marketing, Challenges for the Knowledge Society*, 12(1):12-36.

FENG, M., WANG, X., WONG, C.Y., XIAO, Z., XU, M. & YU, W. 2017. Green supply chain management and financial performance: the mediating roles of operational and environmental performance. *Business Strategy Environment*, 27(7):1-14.

FERNANDO, Y., RAHIM, S.A. & SAAD, R. 2016. Sustainable green supply chain management and impact on organisations. *Journal of Emerging Trends in Economics and Management Sciences*, 7(3):147-155.

FLANDERS. 2015. Food and beverages in South Africa. [Online]. Available at: <https://www.flandersinvestmentandtrade.com/export/sites/trade/files/market_studies/81515043 0131409/815150430131409_2.pdf>. Accessed: 20/09/2017.

FOLGORE, C. 2018. Food and beverage industry is confronted by increasing risks. *Insurancegateway*, 16 May. [Online]. Available at: <https://www.insurancegateway.co.za/ ShorttermProfessionals/PressRoom/ViewPress/Irn=18180&URL=Food+and+beverage+industry +is+confronted+by+increasing+risks#.WxZTfEV96Uk>. Accessed: 17/05/2018.

FOO, P-Y., LEE, V-H., OOI, K-B. & TAN, G.W-H. 2018. A gateway to realising sustainability performance via green supply chain management practices: a pls-ann approach. *Expert Systems with Applications*, 107:1-14.

FOUKA, G. & MANTZOROU, M. 2011. What are the major ethical issues in conducting research? Is there a conflict between the research ethics and the nature of nursing? *Health Science Journal*, 5(1):3-14.

FRAERING, M. & MINOR, M.S. 2006. Sense of community: An exploratory study of US consumers of financial services. *International Journal of Bank Marketing*, 24(5):284-306.

FRASER, J. 2013. A gap analysis of employee/training needs in supply chain management. D.Tech Dissertation. Pretoria: University of Pretoria.

GÁBRIEL, M. 2016. Green supply chain management – motivation, methods and expectations – in Hungarian automotive oems. *Journal of Economic Literature*, 12(1):37-45.

GAGALYUK, T., HANF, J. & HINGLEY, M. 2013. Firm and whole chain success: network management in the Ukrainian food industry. *Journal on Chain and Network Science*, 13(1):47-70.

GAI, Y., HE, Y., WAN, H. & WU, X. 2012. Quantitatively analyze composition principle of ma huang tang by structural equation modelling. *Journal of Ethnopharmacology*, 143:851-858.

GANDHI, S., KUMAR, D., KUMAR, P. & MANGLA, S.K. 2015. Evaluating factors in implementation of successful green supply chain management using dematel: a case study. *International Strategic Management Review*, 3:96-109.

GARG, D., HALEEM, A. & LUTHRA, S. 2014. Green supply chain management: implementation and performance - a literature review and some issues. *Journal of Advances in Management Research*, 1(1):20-46.

GARNER, M., KAWULICH, B. & WAGNER, C. 2012. *Doing social research: a global context.* New York: McGraw Hill.

GAUR, A.S., MUKHERJEE, D. & SRINIVASAN, M. 2011. Buyer–supplier partnership quality and supply chain performance: moderating role of risks, and environmental uncertainty. *European Management Journal*, 29:260-271.

GHATARI, A.R. & SHEKARI, H. 2013. Promoting corporate image: a reflection green supply chain management approach. *International Journal of Management and Business Research*, 34:311-324.

GHIARA, V. 2019. Disambiguating the role of paradigms in mixed methods research. *Journal of Mixed Methods Research*, 13(1):1-5.

GHOSH, S.K. 2017. Green supply chain management in production sectors and its impact on firm reputation. *Journal of New Theory*, 18:53-63.

GIANNOCCARO, I. 2018. Centralized vs. decentralized supply chains: the importance of decision maker's cognitive ability and resistance to change. *Industrial Marketing Management*, 73:59-69.

GIMENEZ THOMSEN, C. & LARGE R.O. 2011. Drivers of green supply management performance: evidence from Germany. *Journal of Purchasing and Supply Management*, 17(3):176-184.

GIMENEZ, C. & SIERRA, V. 2013. Sustainable supply chains: governance mechanisms to greening suppliers. *Journal of Business Ethics*, 116(1):189-203.

GODFREY, L. & OELOFSE, S. 2017. Historical review of waste management and recycling in South Africa. *Resources*, 6(57):1-11.

GOH, P.C., JEE, K.S., NG, P.K. & YEOW, J.A. 2014. Reinforcing the need for green practices through a green knowledge society. *Journal of Applied Sciences*, 14:510-517.

GOH, Y-N., HARON, H. & RAMAKRISHMAN, P. 2015. Factors influencing green purchasing adoption for small and medium enterprises (smes) in Malaysia. *International Journal of Business and Society*, 16(1):39-56.

GOKTAN, A.B. 2014. Impact of green management on ceo compensation: interplay of the agency theory and institutional theory perspectives. *Journal of Business Economics and Management*, 15(1):96-110.

GOVENDER, K.K. & KAUPA, S.P. 2014. Exploring premium beer brand consumption behaviour in South Africa. *African Journal of Hospitality, Tourism and Leisure*, 4(2):1-16.

GOVINDAN, K., KADZINSKI, M. & SIVAKUMAR, R. 2016. Application of a novel PROMETHEE-based method for construction of a group compromise ranking to prioritization of green suppliers in food supply chain. *Omega*, 71:129-145.

GOVINDAN, K., KHODAVERDI, R. & VAFADARNIKJOO, A. 2015. Intuitionstic fuzzy based dematel method for developing green practices and performances in a green supply chain. *Expert Systems with Applications*, 42:7207-7220.

GRAFSTRÖM, A. 2010. Entropy of unequal probability sampling designs. *Statistical Methodology*, 7:84-97.

GREEN JR, K.W., INMAN, R.A. & WHITTEN, D. 2011. The impact of timely information on organisational performance in a supply chain. *Production Planning and Control*, 18(4): 274-282.

GU, X., HU, S., LI, Z., XI, Y. & ZHANG, X. 2019. Path analysis of causal factors influencing marine traffic accident via structural equation numerical modeling. *Journal of Marine Science and Engineering*, 7:1-20.

GUPTA, A., KESHRI, A., MISHRA, P., PANDEY, C.M., SAHU, C. & SINGH, U. 2019. Descriptive statistics and normality tests for statistical data. *Annals of Cardiac Anaesthesia*, 22:67-72.

GUPTA, A.D., KANT, R. & MALVIYA, R.K. 2017. Evaluation and selection of sustainable strategy for green supply chain management implementation. *Business Strategy and the Environment*, 27:475-502.

HAIR, J.F., HULT, G.T.M., RINGLE, C. & SARSTEDT, M. 2016. *A primer on partial least squares structural equation modeling (pls-sem)*. New York: Sage.

HAIR, J.F., REAMS, R., RINGLE, C.M. & SARSTEDT, M. 2014. Partial least squares structural equation modeling (pls-sem): a useful tool for family business researchers. *Journal of Family Business Strategy*, 5:105-115.

HAJIKHANI, M., IDRIS, K.B. & WAHAT, N.W.B.A. 2012. Considering on green supply chain management drivers, as a strategic organizational development approach, Malaysian perspective. *Australian Journal of Basic and Applied Sciences*, 6(8):146-165.

HÅKANSSON, A. 2013. Portal of research methods and methodologies for research projects and degree projects. The 2013 international conference on frontiers in education: computer science and computer engineering, 22-25 July 2013, Nevada, 1-7.

HAROON, H., MAHMOOD, Q. & WASEEM, A. 2013. Treatment and reuse of wastewater from beverage industry. *Journal of the Chemical Society of Pakistan*, 35(1):1-10.

HELD, M.B.E. 2019. Decolonizing research paradigms in the context of settler colonialism: an unsettling, mutual, and collaborative effort. *International Journal of Qualitative Methods*, 18:1-16.

HIGGINS, P.G. & YARAHMADI, M. 2012. Motivations towards environmental innovation: a conceptual framework for multiparty cooperation. *European Journal of Innovation Management*, 5(4):400-420.

HOFMAN, K., MABOSHE, M., STACEY, N., TUGENDHAFT, A. & VAN-WALBEEK, C. 2017. Energy drink consumption and marketing in South Africa. *Preventive Medicine*, 105:32-36.

HOLGADO-TELLO, F.P. & MORATA-RAMIREZ, M.A. 2013. Construct validity of Likert scales through confirmatory factor analysis: a simulation study comparing different methods of estimation based on Pearson and polychoric correlations. *International Journal of Social Science Studies,* 1(1):54-61.

HOLMES, T. 2016. Bottling merger worries smaller beverage firms. *Mail & Guardian*, 29 January. [Online]. Available at: <https://mg.co.za/article/2016-01-28-bottling-merger-worries-smaller-beverage-firms>. Accessed: 10/10/2017.

HOLTZMAN, S. 2014. *Confirmatory factor analysis and structural equation modeling of non-cognitive: assessments using proc calis*. Princeton: Educational.

HONGKONG AND SHANGHAI BANKING CORPORATION. 2012. Beverages. [Online]. Available at: <https://www.hsbcnet.com/nutshell/attachments/pdf/emea-consumer-staples-beverages.pdf>. Accessed: 28/01/18.

HU, A.L. & HSU, C-W. 2010. Critical factors for implementing green supply chain management practice: an empirical study of electrical and electronics industries in Taiwan. *Management Research Review,* 33(6):586-608.

HUA, N. & NUSAIR, K. 2010. Comparative assessment of structural equation modeling and multiple regression research methodologies: e-commerce context. *Tourism Management,* 31:314-324.

HUANG, J-W. & LI, Y-H. 2017. The moderating role of relational bonding in green supply chain practices and performance. *Journal of Purchasing and Supply Management,* 1:1-10.

HUANG, T., LIU, Y., ZHANG, N. & ZHAO, R. 2016. An optimization model for green supply chain management by using a big data analytic approach. *Journal of Cleaner Production*, 142:1085-1097.

HUNTER, C. 2017. The development of wine tourism in South Africa. M.Tech Dissertation. Stellenbosch: Stellenbosch University.

HUO, B., YU, U. & ZHANG, M. 2017. The impact of supply chain quality integration on green supply chain management and environmental performance. *Total Quality Management*, 27:1-16.

HWANG, J. & KANG, M.J. 2017. Interactions among inter-organizational measures for green supply chain management. *Procedia Manufacturing*, 8:691-698.

IBARRA, M., NERAMBALLI, A., RYDELL, M., SEQUEIRA, M. & VESTIN, A. 2017. A comprehensive literature review of green supply chain management. Proceedings of the 2nd World Congress on Civil, structural, and environmental Engineering, 2-4 April 2017, Spain, 1-8.

IRALDO, F. & TESTA, F. 2010. Shadows and lights of green supply chain management: determinants and effects of these practices based on a multi-national study. *Journal of Cleaner Production*, 18:953-9662.

ISLAM, M.D., KARIA, N., LEE, C-H. & TSENG, M-L. 2018. Assessing green supply chain practices in Bangladesh using fuzzy importance and performance approach. *Resources, Conservation and Recycling*, 131:134-145.

ISMAIL, N.A. & JENATABADI, H.S. 2014. Application of structural equation modelling for estimating airline performance. *Journal of Air Transport Management*, 40:25-33.

JABBOUR, C.J.C., NEJATI, M. & RABIEI, S. 2017. Envisioning the invisible: understanding the synergy between green human resource management and green supply chain management in manufacturing firms in Iran in light of the moderating effect of employees' resistance to change. *Journal of Cleaner Production*, 168:163-172.

JAMALI, M-B. & RASTI-BARZOKI, M. 2017. A game theoretic approach for green and non-green product pricing in chain-to-chain competitive sustainable and regular dual-channel supply chains. *Journal of Cleaner Production*, 170:1029-1043.

JANVIER-JAMES, A.M. 2012. A new introduction to supply chains and supply chain management: definitions and theories perspective. *International Journal Research,* 5(1):194-207.

JAVAID, M. & SHOEB, M. 2015. Benefits of implementation of green supply chain management in manufacturing industries. *International Journal of Advanced Technology in Engineering and Science*, 3(6):128-132.

JEMUTAI, K.G. 2014. Green supply chain management practices and performance of firms in automotive industry in Nairobi, Kenya. M.Tech Dissertation. Nairobi: University if Nairobi.

JENKS, S. 2017. Reverse supply chain: can it create a means for sustainable initiatives? *Responsible Business*, 28 January 2017. [Online]. Available at:

<https://responsiblebusiness.co/reverse-supply-chain-can-it-create-a-means-for-sustainable-initiatives-3111123b29c6>. Accessed: 18/07/2018.

JERE, A., MASON, R.B. & MRASI, A.P. 2018. Critical skills and knowledge to succeed in the township liquor retail industry. *Journal of Business and Retail Management Research*, 12(3):26-35.

JONGPAIBOON, M., LAOSIRIHONGTHONG, T., SAMARANAYAKE, P. & THAMSATITDEJ, P. 2015. Green supply chain management, triple bottom line, and organizational theory – prioritization with fuzzy ahp method. Proceedings of the 2015 International Conference on Industrial Engineering and Engineering Management, 6-9 December 2015, Thailand, 1588-1592.

JONKER, J. & PENNINK, B. 2010. *The essence of research methodology: a concise guide for master and phd students in management science*. Heidelberg: Springer.

KALIYADAN, F. & KULKARNI, V. 2019.Types of variables, descriptive statistics, and sample size. *Indian Dermatology Online Journal*, 10:82-86.

KAMAL, S.S.L.B.A. 2019. Research paradigm and the philosophical foundations of a qualitative study. *International Journal of Social Sciences*, 4(3):1386-1394.

KAMOLKITTIWON, K. & PHRUKSAPHANRAT, B. 2015. The influence of green supply chain management on business performance of electronic industry in Thailand. Proceedings of 42nd The International Institute of Engineers and Researchers International Conference, 25th October 2015, Hong Kong, 22-27.

KAMOLKITTIWONG, A. & PHRUKSAPHANRAT, B. 2015. An analysis of drivers affecting green supply chain management implementation in electronics industry Thailand. *Journal of Economics, Business and Management*, 3(9):864-869.

KARIMI, A. & RAHIM, K.A. 2015. Classification of external stakeholders pressures in green supply chain management. *Procedia Environmental Sciences*, 30:27-32.

KAUPPI, K. 2013. Extending the use of institutional theory in operations and supply chain management research: review and research suggestions. *International Journal of Operations and Production*, 33(10):1318-1345.

KAZANCOGLU, I., KAZANCOGLU, Y. & SAGNACK, M. 2018. A new holistic conceptual framework for green supply chain management performance assessment based on circular economy. *Journal of Cleaner Production*, 195:1282-1299.

KERSTEN, W. & SAEED, M.A. 2019. Drivers of sustainable supply chain management: identification and classification. *Sustainability*, 11:1-23.

KHAN, S.A.R. & QIANLI, D. 2017. Impact of green supply chain management practices on firms' performance: an empirical study from the perspective of Pakistan. *Environmental Science and Pollution Research*, 24:1-16.

KIARIE, D.M. & MOGENI, L.M. 2016. Effect of green logistics practices on performance of supply chains in multinational organizations in Kenya. *Industrial Engineering Letters*, 6(4):40-50.

KIM, K.K., KIM, M.S. & LEE, H. 2014. Interorganisational information systems visibility and supply chain performance. *International Journal of Information Management*, 34:285-295.

KINYANJUI, E.W. 2014. Green supply chain management practices and performance of hotels in Nairobi. M.Tech Dissertation. Nairobi: University of Nairobi.

KIRKMAN, A. 2010. The role of wine tourism in the marketing of wineries in the Stellenbosch wine route of South Africa. M.tech dissertation. Pretoria: University of South Africa.

KIVUNJA, C. & KUYINI, A.B. 2017. Understanding and applying research paradigms in educational contexts. *International Journal of Higher Education*, 6(5):26-41.

KOZAREVIĆ, S. & PUŠKA, A. 2018. Use of fuzzy logic for measuring practices and performances of supply chain. *Operations Research Perspectives*, 5:150-160.

KULKAMI, P.B., PATIL, S.B. & RAVI, K. 2017. An investigation on green supply chain management and its scope in India construction industries. *International Journal of Research and Scientific Innovation*, 4(9):50-53.

KUMAR, R. 2011. *Research methodology: a step-by-step guide for beginners*. 3rd ed. London: Sage.

KUMAR, R. 2019. *Research methodology: a step-by-step guide for beginners*. 5th ed. California: Sage.

KUMAR, R.C. 2008. *Research methodology*. New Delhi: APH Publishing Corporation.

KUMMER, S., MADITATI, D.R., MUNIM, Z.H. & SCHRAMM, H-J. 2018. A review of green supply chain management: from bibliometric analysis to a conceptual framework and future research directions. *Resources, Conservation and Recycling*, 139:150-162.

KUOSA, T. 2011. Evolution of futures studies. *Futures*, 43:327-336.

KWON, O.K. & POURHEJAZY, P. 2016. A practical review of green supply chain management: disciplines and best practices. *Journal of International Logistics and Trade*, 14(2):156-164.

KYALO, K.C. 2015. Green supply chain management practices and performance of alcoholic beverage manufacturers in Kenya. M.Tech Dissertation. Nairobi: University of Nairobi.

LAARI, S., OJALA, L. & TÖYLI, J. 2017. The effect of a competitive strategy and green supply chain management on the financial and environmental performance of logistics service providers. *Business Strategy and the Environment*, 27(7):1-12.

LABUSCHAGNE, J.P., VAN DEN BERG, H. & VAN DEN BERG, U. 2013. The effects of greening the supplier and innovation on environmental performance and competitive advantage: original research. *Journal of Transport and Supply Chain Management*, 7(1):1-7.

LAI, K-H., SARKIS, J. & ZHU, Q. 2010. An organizational theoretic review of green supply chain management literature. *International Journal of Production Economics*, 130:1-15.

LAI, K-H., SARKIS, J. & ZHU, Q. 2013. Institutional-based antecedents and performance outcomes of internal and external green supply chain management practices. *Journal of Purchasing and Supply Management*, 19:106-117.

LAOSIRIHONGTHONG, T. & SOMSUK, N. 2016. Prioritization of applicable drivers for green supply chain management implementation toward sustainability in Thailand. *International Journal of Sustainable Development and World Ecology*, 24(2):175-191.

LEAVY, P. 2017. *Research resign: quantitative, qualitative, mixed methods, arts-based, and community-based participatory research approaches*. New York: The Guilford Press.

LEE, V. & LO, A. 2014. From theory to practice: teaching management using films through deductive and inductive processes. *The International Journal of Management Education*, 12:44-54.

LEEDY, P.D. & ORMROD, J.E. 2010. *Practical research, planning and design*. 9th ed. New Jersey: Prentice Hall.

LEEDY, P.D. & ORMROD, J.E. 2013. *Practical research, planning and design*. 10th ed. United States of America: Pearson.

LEONCZUK, D. 2016. Categories of supply chain performance indicators: an overview of approaches. *Business, Management and Education*, 14(1):103-115.

LEWIS, P., SAUNDERS, M. & THORNHILL, A. 2009. *Research methods for business students*. 4th ed. London: Prentice Hall.

LEWIS, P., SAUNDERS, M. & THORNHILL, A. 2012. *Research methods for business students*. 6th ed. Italy: Pearson.

LEWIS, P., SAUNDERS, M. & THORNHILL, A. 2016. *Research methods for business students*. England: Pearson.

LI, Y., SHEU, C., YANG, Q. & YE, F. 2018. Linking green market orientation and performance: antecedents and processes. *Journal of Cleaner Production*, 192:924-931.

LINS, S., SUNYAEV, A. & TEIGELER, H. 2018. Drivers vs. inhibitors – what clinches continuous service certification adoption by cloud service providers? Proceedings of the 51st Hawaii International Conference on System Sciences, 2-6 January 2018, USA, 5676-5685.

LYNCH, D.F., NYAGA, G.N. & WHIPPLE, J.M. 2010. A buyer perspective on collaborative versus transactional relationships. *Industrial Marketing Management*, 39(3):507-518.

MALHOTRA, N.K. 2010. *Marketing research: an applied orientation*. New Jersey: Prentice Hall.

MANOHAR, H.L. & KUMAR, G.R. 2015. Impact of green supply chain management attributes on supply chain performance: measurement instrument validity and reliability verification. Proceedings of the 2015 International Conference on Operations Excellence and Service Engineering, 10-11 September 2015, United States, 289-299.

MAPFAIRA, H., MONAGENG, R. & MUTINGI, M. 2014. Developing performance management systems for the green supply chain. *Journal of Remanufacturing*, 4(6):1-20.

MATWERE, R.B., MUMA, B.O., NYAMBEGA, E. & NYAOGA, R.B. 2014. Green supply chain management and environmental performance among tea processing firms in Kericho country- Kenya. *International Journal of Economics, Finance and Management Sciences*, 2(5):270-276.

MAZUMDER, S., RHAMAN, C.M.A. & SHAH, M.G.H. 2013. A study on implementation of green supply chain management in rmg sector of Bangladesh. *International Journal of Scientific and Engineering Research*, 4(6):2679-2685.

MBAABU, D.K. 2016. A concept paper of green supply chain management practices in Kenya. *Department of Business Administration Africa Management Review Journal*, 6(3):74-84.

MBHELE, T.P. & PILLAY, K. 2015. The challenges of green logistics in the Durban road freight industry. *Environmental Economics*, 6(1):64-73.

MBOHWA, C.T. & MUTINGI, M. 2012. A taxonomic framework for formulating strategies in green supply chain management. Proceedings of the 2012 International Conference on Industrial Engineering and Operations Management, 3-6 July 2012, Turkey, 326-335.

MCALOONE, T.C., PIGOSSO, D.C. & ROZENFELD, H. 2013. Ecodesign maturity model: a management framework to support eco-design implementation into manufacturing companies. *Journal of Cleaner Production*, 59:160-173.

MEDINA, M.N.D. & TAYLOR, P.C. 2013. Educational research paradigms: From positivism to multi paradigmatic. *The Journal of Meaning-Centered Education*, 1(2):1-13.

MEI, C.S. 2013. Empirical study on the relationships between green supply chain management practices and organizational performance. M.Tech Dissertation. Perak: Universiti Tunku Abdul Rahman.

MELCK, H. 2017. Strategy, vision and business transformation in the South Africa wine industry. M.Com Dissertation. Midrand: Cape Wine Academy.

MELNIKOVAS, A. 2018. Towards an explicit research methodology: adapting research onion model for futures studies. *Journal of Futures Studies*, 23(2):29-44.

MGIBA, S. 2015. Job satisfaction and the intention to quit by employees in a steel manufacturing company in Gauteng. M.Tech Dissertation. Vanderbijlpark: Vaal University of Technology.

MHELEMBE, K. & POOE, R.I.D. 2014. Exploring the challenges associated with the greening of supply chains in the South African manganese and phosphate mining industry. *Journal of Transport and Supply Chain* Management, 8(1):1-9.

MNGADI, S. 2017. SA alcohol industry can stimulate – or slow down – investment. *BusinessLive*, 16 February. [Online]. Available at: <https://www.businesslive.co.za/bd/opinion/2017-02-16-sa-alcohol-industry-can-stimulate--or-slow-down--investment/>. Accessed: 06/05/2018.

MOHAJAN, H.K. 2018. Qualitative research methodology in social sciences and related subjects. *Journal of Economic Development, Environment and People*, 7(1):1-28.

MOHAPI, D.S. 2016. The effect of mergers and acquisitions on investment returns – cases of Massmart and SABMiller. M.Com Dissertation. Braamfontein: University of the Witwatersrand.

MORALI, O. & SEARCY, C. 2013. A review of sustainable supply chain management practices in Canada. *Journal of Business Ethics*, 117(3):635-658.

MORATA-RAMIREZ, M.A. & HOLGADO-TELLO, F.P. 2013. Construct validity of Likert scales through confirmatory factor analysis: a simulation study comparing different methods of estimation based on Pearson and polychoric correlations. *International Journal of Social Science Studies*, 1(1):54-61.

MRASI, A.P. 2016. Critical success factors in liquor retailing in selected townships of Cape Town, South Africa. M.Tech Dissertation. Bellville: Cape Peninsula University of Technology.

MUGABE, A.V. 2013. Green management practices and supply chain performance of pharmaceutical companies in Nairobi, Kenya. M.Tech Dissertation. Nairobi: University of Nairobi.

MULLER, P. 2018. Skills shortage a concern for industry. *Engineering news*, 20 April, [Online]. Available at: <http://www.engineeringnews.co.za/article/skills-shortage-a-concern-for-industry-2018-04-20/rep_ id:4136>. Accessed: 16/06/2018.

MWIRIGI, P.M. 2016. Drivers of adoption of green supply chain strategy by manufacturing firms in Kanye. D.Tech Dissertation. Juja: Jomo Kenyatta University of Agriculture and Technology.

MWIRIGI, P.M., MWITA, P. & NAMUSONGE, G. 2016. Influence of perceived business benefits on adoption of green supply chain strategy by manufacturing firms in Kenya. *International Journal of Innovative Research and Development*, 5(4):356-366.

NADARAJAH, G. & SABRI, N.A. 2016. Green supply chain: challenges and practical issues. *International Journal of Supply Chain Management*, 5(4):38-42.

NAJEEB, A. 2014. Institutional theory and human resource management. [Online]. Available at: <http://eurekaconnection.files.wordpress.com/2014/02/p-25-30-institutional-theory-theoriebook_finaljan2014-v3.pdf>. Accessed: 31/07/2018.

NATIONAL TREASURY. 2016. Taxation of sugar sweetened beverages. [Online]. Available at:<https://www.treasury.gov.za/public%20comments/Sugar%20sweetened%20beverages/POLICY%20PAPER%20AND%20PROPOSALS%20ON%20THE%20TAXATION%20OF%20SUGAR%20SWEETENED%20BEVERAGES8%20JULY%202016.pdf.>. Accessed: 25/09/2017.

NDERITU, M. & NGUGI, K. 2014. Effects of green procurement practices on an organization performance in manufacturing industry: case study of East African breweries limited. *European Journal of Business Management*, 2(1):341-352.

NDURO, K., OPOKU-FOFIE, I. & PEPRAH, J.A. 2016. Factors influencing green supply chain in the mining sector on Ghana. *European Journal of Logistics, Purchasing and Supply Chain Management*, 4(1):32-50.

NEUMAN, W.L. 2014. *Social research methods: qualitative and quantitative approaches*. 7th ed. United Kingdom: Pearson.

NEWBY, P. 2013. *Research methods for education*. New York: Routledge.

NGCINGWANA, T. 2012. Implications of management control systems for green supply chain management in South Africa: a case study of a food retailer. M.Tech Dissertation. Rondebosch: UCT.

NGUYEN, G.N.T. & SARKER, T. 2018. Sustainable coffee supply chain management: a case study in Buon Me Thuot city, Daklak, Vietnam. *International Journal of Corporate Social Responsibility*, 3(1):1-17.

NIEUWENHUIS, J. 2016. *Introducing qualitative research*. 2nd ed. Pretoria: Van Schaik.

NIYOMYAT, N., RAMINGWONG, S., SOPADANG, A. & TIPPAYAWONG, K.Y. 2016. Factors affecting green supply chain operational performance of the Thai auto parts industry. *Journal of Sustainability*, 8:1-9.

NYAWUYANGA, T.M. 2015. Corporate social responsibility as a tool to accelerate the achievement of development goals in Zimbabwe. M.Tech Dissertation. Bellville: University of the Western Cape.

O'NEIL, S. 2016. Two decades of qualitative research in psychology, industrial and organizational psychology and human resource management within South Africa: a critical review. *South African Journal of Industrial Psychology*, 42(1):1-16.

OCHIRI, G. & ONYINKWA, C. 2016. Effects of green supply chain management practices on competitiveness of firms in the food and beverage sector in Kenya. *European Journal of Business and Management*, 8(14):15-21.

OERTLE, I. 2017. Evaluating the development of emerging South African black owned wine companies. M.Com Dissertation. Cape Town: Institute of Cape Wine Masters.

OGUNLELA, G.O. 2018. Green supply chain management as a competitive tool in the fast-moving consumer goods manufacturing industry. *Journal of Business and Retail Management Research*, 12(4):167-176.

OKELLO, J.O. & WERE, S. 2014. Influence of supply chain management practices on performance of the Nairobi Securities Exchange's listed, food manufacturing companies in Nairobi. *International Journal of Social Sciences and Entrepreneurship*, 1(11):107-128.

PANDEY, M.M. & PANDEY, P. 2015. *Research methodology: tools and techniques*. Romania: Bridge Center.

PANNEERSELVAM, R. 2014. *Research methodology*. 2nd ed. New Delhi: PHI Learning.

PARASAYU, S., SANTOSO, H., SARI, D.P. & SUSANTY, A. 2017. Effect of internal green supply chain practices on environmental performance of smes of wooden furniture industry. Proceedings of the World Congress on Engineering, 5-7 July 2017, United Kingdom, 1-6.

PEARCE, S. & YONG, A.G. 2013. A beginner's guide to factor analysis: focusing on exploratory factor analysis. *Tutorials in Quantitative Methods for Psychology*, 9(2):79-94.

POOE, R.I.D. & MHELEMBE, K. 2014. Exploring the challenges associated with greening of supply chains in the South African manganese and phosphate mining industry. *Journal of Transport and Supply Chain Management*, 8(1):1-9.

PURNOMO, A. 2016. Performance analysis of green supply chain management in pttirtainvestamasubang. Proceeding, 6th international Seminar on Industrial Engineering and Management, 12-14 February 2013, Indonesia, 48-55.

QAZI, F.H. 2016. Effect of green supply chain management practices on sustainability performance of iso14001 smes. M.Tech Dissertation. Johor: University of Tun Hussein Malaysia.

QRUNFLEH, S. & TARAFDAR, M. 2012. Supply chain information systems strategy: impacts on supply chain performance and firm performance. *International Journal Production Economics*, 147:340-350.

QUINLAN, C. 2011. *Business research methods*. London: Cengage Learning.

RAITHATHA, Y. 2017. Understanding the economic impact terrorism has on the destination decision making: Northern Irish tourists. D.Tech Dissertation. Dublin: Dublin Business School.

RANA, Y., SANGHAVI, P., SHENOY, S. & YADAV, R. 2015. A review on green supply chain management in automobile industry. *International Journal of Current Engineering and Technology*, 5(6):3697-3702.

REDDY, A. 2016. Factors affecting green supply chain management (GSCM) initiatives: a case study at ciplamedpro manufacturing. M.Tech Dissertation. Durban: University of Kwazulu-Natal.

REPORT BUYER. 2017. The liquor industry in South Africa 2017. *PR Newswire*, 23 October. [Online]. Available at: https://www.prnewswire.com/news-releases/the-liquor-industry-in-south-africa-2017-300541554.html#>. Accessed: 06/05/2018.

RHA, J.S. 2010. The impact of green supply chain practices on supply chain performance. M.Tech Dissertation. Nebraska: University of Nebraska.

RUZUNGUNDE, V.S. 2014. The relationship between work-family conflict and job stress on organisational commitment: a study of selected hospitals within the health department in the nkonkobe municipality of the Eastern Cape province, South Africa. M.Tech Dissertation. Alice: University of Fort Hare.

SAHU, P.K. 2013. *Research methodology: a guide for researchers in agricultural science, social science and other related fields*. New Delhi: Springer Science & Business Media.

SAM, A.G. & SAM, P.G. 2011. *Research methodology*. New Delhi: Gyan Publishing House.

SARIDOGAN, M. 2012. The impact of green supply chain management on transportation cost reduction in Turkey. *International Review of Management and Marketing*, 2(2):112-121.

SCHWARTZ-SHEA, P. & YANOW, D. 2013. *Interpretive research design: concepts and processes*. New York: Routledge.

SHAH, J. & SWAMI, S. 2012. Channel coordination in green supply chain management. *The Journal of the Operational Research Society*, 64(3):336-351.

SHAHARUDIN, M.R., TAN, C.L., TAN, S.C. & ZAILANI. 2016. The impact of green supply chain management practices on firm competitiveness. *International Journal of Business Innovation and Research*, 11(4):539-558.

SHAHRIARPOUR, M. & TABRIZ, A.A. 2017. The importance of green supply chain management and its role in marketing management. *International Journal of Economics and Financial Issues*, 7(3):265-269.

SHARMA, B. 2016. A focus on reliability in developmental research through Cronbach's alpha among medical, dental and paramedical professionals. *Asian Pacific Journal of Health Sciences*, 3(4):271-278.

SHAU, T.V. 2017. The confirmatory factor analysis (cfa) pf preschool management model in Sarawak. *International Journal of Academic Research in Business and Social Sciences*, 7(6):221-231.

SINGH, T. 2013. Modelling the barriers of green supply chain practices: an Indian perspective. *International Journal of Logistics Systems and Management*, 7(1):81-107.

SINGHAL, P. 2013. Green supply chain and eco-design in electronic industry. *Delhi Business Review*, 14(1):57-78.

SINNANDAVAR, C.M., SOH, K-L. & WONG, W-P. 2018. Dynamics of supply environment and information system: integration, green economy and performance. *Transportation Research*, 62:536-550.

SISODIYA, M.S. 2017. Assessment and design for sustainable green supply chain management. *International Journal of Advances in Scientific Research and Engineering*, 3(5):13-22.

SPEIRS, U.C. 2014. Value chain constraints analyses of selected medicinal and aromatic plants indigenous to South Africa. M.Tech Dissertation. Potchefstroom: UNISA.

STANGOR, C. 2014. *Research methods for the behavioural sciences*. 5th ed. Boston: Sage Learning.

STEYN, L. 2015. South Africa's deficit has a negative effect on employment. *Mail & Guardian*, 18 May. [Online]. Available at: <https://mg.co.za/article/2015-05-18-sas-skills-deficit-has-a-negative-effect-on-employment>. Accessed: 11/06/2018.

SUNDARAKANI, B., VEL, P. & YOUNIS, H. 2015. The impact of implementing green supply chain management practices on corporate performance. *Competitiveness Review*, 26(3):216-245.

TABASSUM, R. 2014. Management of offshore outsourcing: a case study based on transaction cost analysis(tca). M.Tech Dissertation. Molde: Molde University College.

TAYLOR, J., VITHAYATHIL, J. & YIM, D. 2018. Are corporate social responsibility (csr) initiatives such as sustainable development and environmental policies value enhancing or window dressing? *Corporate Social Responsibility and Environmental Management*, 25:972-980.

TCHAIKOVSKY, Z. 2017. The relationship between sustainable supply chain management, stakeholder pressure, and financial performance. D.Tech Dissertation. Walden: Walden University.

TOSHKOV, D. 2016. *Research design in political science*. London: Red Globe Press.

TRACY, S.J. 2013. *Qualitative research methods: collecting evidence, crafting analysis, communicating impact*. United Kingdom: Wiley-Blackwell.

VALUE LINE RESEARCH DEPARTMENT. 2015. Industry overview: beverage. [Online]. Available at: <https://www.valueline.com/Stocks/Industries/Industry_Analysis_Beverage.aspx>. Accessed: 26/10/2017.

VAN WYK, B.E. 2011. The potential of South African plants in the development of new food and beverage products. *South African Journal of Botany*, 77:857-868.

WACHIRA, M.C. 2016. Operations management practices and supply chain performance of alcoholic beverage firms in Kenya. M.Tech Dissertation. Nairobi: University of Nairobi.

WAHYUNI, D. 2012. The research design maze: understanding paradigms, cases, methods and methodologies. *Journal of Applied Management Accounting Research*, 10(1):69-80.

WALLIMAN, N. 2011. *Research methods: the basics*. New York: Routledge.

WALTHER, M. 2014. *Repatriation to France and Germany: a comparative study based on bourdieu's theory of practice*. Germany: Springer.

WANG, Q., WANG, Z., ZHANG, S. & ZHAO, X. 2018. Effects of customer and cost drivers on green supply chain management practices and environmental performance. *Journal of Cleaner Production*, 189:673-682.

WANG, V.C.X. 2014. *Handbook of research on scholarly publishing and research methods*. USA: IGI Global.

WATER FUTURES. 2011. Addressing shared water challenges through collective action. [Online]. Available at: <https://assets.wwf.org.uk/downloads/waterfuturesreportau2011.pdf>. Accessed: 24/09/2017.

WESGRO. 2015. Beverages Africa. [Online]. Available at: <https://www.wesgro.co.za/pdf_repository/2014%20Africa%20Beverages.pdf>. Accessed: 24/12/2017.

WESGRO. 2016. Beverages. [Online]. Available at: <https://www.wesgro.co.za/pdf_repository/2016_06%20Beverages.pdf>. Accessed: 23/12/2017.

WESSELS, M.M. 2015. Carbon and water footprint for a soft drink manufacturer in South Africa. M.Tech Dissertation. Potchefstroom: UNISA.

WILMORE, J. 2013. South African Breweries' workers strike over pay. Just-drinks. [Online]. Available at: <https://www.just-drinks.com/news/south-african-breweries-workers-strike-over-pay_id111633.aspx>. Accessed: 25/05/2018.

WILSON, J. 2010. *Essentials of business research: a guide to doing your research project*. London: Sage.

WORLD WILDLIFE FUND SOUTH AFRICA. 2012. Carbon and water risk for South Africa's top companies, bonds and equity funds: how corporate emissions expose investors to carbon taxes and thirsty assets are vulnerable to climate change impacts. [Online]. Available at: <https://awsassets.wwf.org.za/downloads/carbon_and_water_risk_for_south_africa_s_top_companies__bonds_and_equity_funds_final_rep.pdf>. Accessed: 24/09/2012.

YANG, C-S. 2017. An analysis of institutional pressures, green supply chain management, and green performance in the container shipping context. *Transportation Research*, 61:246-260.

YING, L.J. 2014. Factors influencing the intention to adopt green supply chain initiatives in manufacturing firms based on theory of planned behaviour (tpb). M.Tech Dissertation. Pahang: University of Malaysia.

YOUNIS, H. 2016. The impact of the dimensions of green supply chain management practices on corporate performance. D.Tech Dissertation. Wollongong: University of Wollongong.

ZAHID, S.M. 2016. Green supply chain management practices and determinant factors: a quantitative study on small and medium enterprises using structural equation modeling. D.Tech Dissertation. Fargo: North Dakota State University of Agricultural and Applied Sciences.

ZOHRABI, M. 2013. Mixed method research: instruments, validity, reliability and reporting findings. *Theory and Practice in Language Studies*, 3(2):254-262.

ZSCHIRNT, E. 2019. Research ethics in correspondence testing: an update. *Research Ethics*, 15(2):1-21.

APPENDIX A: QUESTIONNAIRE

Vaal University of Technology

Questionnaire

Thank you for paying attention to this academic questionnaire. The purpose of this study is to investigate the influence of green supply chain management practices and environmental performance on supply chain performance in the beverage industry of South Africa. I am kindly asking for your support in completing the questionnaire. The study is only for academic purposes and the information will be reserved confidential. It will take you about 5-10 minutes to complete the whole questionnaire.

Researcher: Michael Mahlatsi

Contact number: 084 537 8039

Email address: mk.mahlatsi00@gmail.com

SECTION A

GENERAL INFORMATION

The section is asking your background information. Please indicate your answer by ticking (✓) on the appropriate box.

Profile of respondent

A1 Gender

Male	
Female	

A2 Race

Black	
Coloured	
White	
Indian	
Other	

A3 Ethnic group

Zulu		Sotho	
Xhosa		Afrikaner	
Tswana		Other	

A4 Age

21-25 years	
26-30 years	
31-45 years	
46-50 years	
51 & more	

A5 Educational level

Matric		Degree		Masters	
Diploma		Honours degree		Other	

A6 Marital status

Single		Divorced		Widowed	
Married		Separated			

SECTION B

Green purchasing

Below are the statements about green purchasing. You may agree or disagree with each statement by ticking the appropriate number provided where:

Please tick only one number for each statement

1	2	3	4	5
strongly disagree	disagree	moderately agree	agree	strongly agree

GP1	My organisation selects their suppliers based on environmental criteria	Strongly disagree	1	2	3	4	5	Strongly agree
GP2	My organisation use a questionnaire to collect information about its suppliers' environmental aspects, activities, and/or management system	Strongly disagree	1	2	3	4	5	Strongly agree
GP3	My organisation makes sure that its purchased products must contain green attributes such as recycled or reusable items	Strongly disagree	1	2	3	4	5	Strongly agree

GP4	My organisation makes sure that its purchased products must not contain green environmental undesirable items such as lead or other hazardous or toxic materials.	Strongly disagree	1	2	3	4	5	Strongly agree
GP5	My organisation evaluates the environmental aspects of its second-tier suppliers.	Strongly disagree	1	2	3	4	5	Strongly agree

SECTION C

Investment recovery

Below are the statements about investment recovery where you are required to indicate the extent to which you agree or disagree with the statement by ticking the appropriate number where:

Tick only one number for each statement

1	2	3	4	5
strongly disagree	disagree	moderately agree	agree	strongly agree

IR1	We aim to sell the excess inventories or materials	Strongly disagree	1	2	3	4	5	Strongly agree
IR2	We aim to sell the scrap and used materials	Strongly disagree	1	2	3	4	5	Strongly agree
IR3	We aim to sell the excess capital equipment	Strongly disagree	1	2	3	4	5	Strongly agree
IR4	We aim to sell the refurbished products	Strongly disagree	1	2	3	4	5	Strongly agree

SECTION D

Eco-design

Below are statements about eco-design. You may agree or disagree with each statement by ticking the appropriate number provided where:

1	2	3	4	5
strongly disagree	disagree	moderately agree	agree	strongly agree

Please tick only one number for each statement

ED1	Our products are designed to reduce consumption of material or energy	Strongly disagree	1	2	3	4	5	Strongly agree

ED2	Our products are designed for reuse, recycle, recovery of material, component parts	Strongly disagree	1	2	3	4	5	Strongly agree
ED3	Our design processes avoid or reduce the use of hazardous products	Strongly disagree	1	2	3	4	5	Strongly agree
ED4	Our design processes minimise waste	Strongly disagree	1	2	3	4	5	Strongly agree

SECTION E

Internal environment management

Below are statements about internal environment management. You can indicate the extent to which you agree or disagree with the statement by ticking the corresponding number in the 5 point scale below.

1	2	3	4	5
strongly disagree	disagree	moderately agree	agree	strongly agree

Please tick only one number for each statement

IEM1	Our senior managers are committed to green supply chain management implementation	Strongly disagree	1	2	3	4	5	Strongly agree
IEM2	Our mid-level managers support the implementation of green supply chain management	Strongly disagree	1	2	3	4	5	Strongly agree
IEM3	Our company has special training for workers on environmental issues	Strongly disagree	1	2	3	4	5	Strongly agree
IEM4	Our company has a Pollution Prevention Program	Strongly disagree	1	2	3	4	5	Strongly agree

SECTION F

Environmental performance

Below are statements about environmental performance where you are required to indicate the extent to which you agree or disagree with the statement by ticking the appropriate number where:

1	2	3	4	5
strongly disagree	disagree	moderately agree	agree	strongly agree

EP1	Our carbon dioxide emission has been reduced after the introduction of green management.	Strongly disagree	1	2	3	4	5	Strongly agree

EP2	Our waste water has been reduced after the introduction of green management	Strongly disagree	1	2	3	4	5	Strongly agree
EP3	Our solid waste has been reduced after the introduction of green management	Strongly disagree	1	2	3	4	5	Strongly agree
EP4	Our energy consumption has been reduced after the introduction of green management.	Strongly disagree	1	2	3	4	5	Strongly agree

SECTION G

Supply chain performance

Below are the statements about supply chain performance. You may agree or disagree with each statement by ticking the appropriate number provided where:

Please tick only one number for each statement

1	2	3	4	5
strongly disagree	disagree	moderately agree	agree	strongly agree

SCP1	Our supply chain is able to meet special customer specification requirements	Strongly disagree	1	2	3	4	5	Strongly agree
SCP2	Our supply chain is characterised by a high level of integration of information systems in our firm	Strongly disagree	1	2	3	4	5	Strongly agree
SCP3	Our supply chain is able to rapidly introduce large numbers of product improvements/variation	Strongly disagree	1	2	3	4	5	Strongly agree
SCP4	Our supply chain is able to handle rapid introduction of new products	Strongly disagree	1	2	3	4	5	Strongly agree
SCP5	Our supply chain has short order-to-delivery cycle time	Strongly disagree	1	2	3	4	5	Strongly agree

THE END

THANK YOU!!

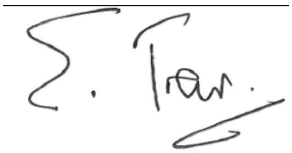
APPENDIX 2
CERTIFICATE OF LANGUAGE EDITING

8 Belle Ombre Road
Tamboerskloof
Cape Town
8001.

28 November 2019.

LANGUAGE EDITING

This is to certify that I language-edited the dissertation "Green supply chain management practices, environmental performance and supply chain performance in the beverage industry of South Africa," by Michael Kgaisi Mahlatsi for the M.Tech. degree in Logistics Management in the Faculty of Management Sciences, Vaal University of Technology.



Elizabeth Trew
Trew.eliz@gmail.com
021 424 6135
073 235 1147